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Sindh Transformational Accelerated Rural Services (STAR) WASH - I

Environmental and Social Management Framework (ESMF)

GEMS

Environmental and Social Management Framework (ESMF)

Sindh Transformational Accelerated Rural Services (STAR) WASH Project

(STAR-WASH-1 P515194)

Government of Sindh

Final Version

Global Environmental Management Services (Pvt.) Ltd

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List of Abbreviations

APs	Affected Parties
BOQ	Bill of Quantities
BCC	Behaviour Change Communication
BP	Bank Procedures
CSOs	Civil society organizations
CCI	Council of Common Interest
CCA	Cultural Command Areas
CHS	Community Health & Safety
CSSP	Civil Society Support Program
DCRs	District Census Reports
DMC	District Municipal Corporation
ESMF	Environmental and Social Management Framework
ESF	Environmental and Social Framework
ESS	Environmental and Social Standards
EC	Environmental Checklists
EIA	Environmental Impact Assessments
ERP	Emergency Response Plan
E&S	Environmental and Social
ESMP	Environmental and Social Management Plan
EHS	Environmental, Health, and Safety
ESA	Environmental and Social Assessment
ESIA	Environmental and Social Impact Assessment
ESCP	Environmental and Social Commitment Plan
FAO	Food and Agriculture Organization
FGDs	Focus Group Discussions
GBV	Gender-Based Violence
GRM	Grievance Redress Mechanism
GoS	Government of Sindh
GIIP	Good International Industry Practice
GEMS	Global Environmental Management Services
IEE	Initial Environmental Examinations
ILO	International Labour Organization
IDPs	Internally Displaced People
IUCN	International Union for Conservation of Nature
IRC	International Rescue Committee
KPIs	Key Performance Indicators
LGD	Local Government Department
LAA	Land Acquisition Act
LMP	Labor Management Procedures
LBOD	Left Bank Outfall Drain
LC	Least Concern
MGD	Million gallons per day
MAF	Million Acre-Feet
MC	Municipal Committees
MSDS	Material Safety Data Sheets
M&E	Monitoring and Evaluation

NGPF	National Gender Policy Framework
NGOs	Non-Governmental Organizations
NWCS	National Water Conservation Strategy
NWP	National Water Policy
NCCP	National Climate Change Policy
NDWP	National Drinking Water Policy
NOC	No Objection Certificate
NDMA	National Disaster Management Act
NCHD	National Commission for Human Development
NRSP	National Rural Support Program
O&M	Operation and Maintenance
ODF	Open Defecation Free
OHWT	Overhead Water Tanks
OIPs	Other-Interested Parties
PIU	Project Implementation Unit
PHED	Public Health Engineering Department
PISC	Project implementation & supervision consultants
PD	Project Director
PCEA	Prohibition of Child Employment Act
PGA	Peak Ground Acceleration
PSHA	Probabilistic Seismic Hazard Assessment
PAFs	Project Affected Families
PCRs	Protected Cultural Resources
PCPS	Precast Concrete Parabolic Segment
PPEs	Personal Protective Equipment
PKR	Pakistani Rupees
RNR	Renewable Natural Resources
RF	Resettlement Framework
UBC	Uniform Building Code
STAR	Sindh Transformational Accelerated Rural Services
SEPA	Sindh Environmental Protection Agency
SEQs	Sindh Environmental Quality Standards
SSESMP	Site-Specific Environmental and Social Management Plan
SSHSP	Site-Specific Health and Safety Plan
SRA	Security Risk Assessment
SEA/SH	Sexual Exploitation and Abuse/Sexual Harassment
SIDA	Sindh Irrigation & Drainage Authority
SEP	Stakeholder Engagement Plan
SDGs	Sustainable Development Goals
SCCP	Sindh Climate Change Policy
SDWP	Sindh Drinking Water Policy
SLP	Sindh Labor Policy
SMRI	Self-Monitoring and Reporting by Industry
SP&DD	Sindh Planning & Development Department
TORs	Terms of References
TMP	Traffic Management Plan
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
TC	Town Committees

US-EPA	United Nations Environmental Protection Agency
VAC	Violence against Children
VU	Vulnerable
WASH	Water, Sanitation and Hygiene
WBG	World Bank Group

Glossary

Term	Definitions
Affected Parties (APs)	The stakeholder category includes local communities and individuals directly impacted by the project's activities
Behavior Change Interventions	Initiatives aimed at modifying behaviors to promote positive health and hygiene practices
Community Health & Safety (CHS)	The protection of local communities from potential health, safety, and security risks and impacts arising from project activities throughout the project lifecycle
Clearing of Right of Way (RoW)	The removal of vegetation and other obstacles from a designated path to allow for construction activities.
Compensation Plan	A program that provides financial or other benefits to individuals or communities who suffer negative impacts from a project.
Code of Conduct	A set of principles outlining expected behavior for workers or members of an organization.
Construction Permit	A formal document issued by a government agency that authorizes the construction of a project.
Drainage Interventions	The construction of drainage systems to collect, convey, and safely dispose of excess surface water.
Disadvantaged or Vulnerable	Disadvantaged or vulnerable refers to those who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits. Such an individual/group is also more likely to be excluded from/unable to participate fully in the mainstream consultation process and, as such, may require specific measures and/or assistance to do so. This will take into account considerations relating to age, including the elderly and minors, in circumstances where they may be separated from their family, the community, or other individuals upon whom they depend.
Emergency Response Plan	Emergency Response Plan refers to a plan of action for the efficient deployment and coordination of services, agencies and personnel to provide the earliest possible response to an emergency. It is often also referred to as a Spill Prevention and Emergency Response Plan to emphasize the need to take preventive measures.
Environmental and Social Management Framework (ESMF)	Refers to an instrument that sets out approaches for managing the risks and impacts to the extent possible for a project that consists of a program and/or series of sub-projects, when the specific risks

	and impacts cannot be determined until the program or sub-project details have been identified.
Environmental and Social Impact Assessment (ESIA)	Refers to an instrument to identify and assess the potential environmental and social impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures.
Environmental and Social Assessment	The process of analysis and planning to ensure the environmental and social impacts and risks of a project are identified, avoided, minimized, reduced or mitigated throughout the project life-cycle
Environmental and Social Standards (ESSs)	The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing**.**
Environment Screening Reports	A report developed to determine the appropriate extent and type of Environmental Assessment required for proposed projects.
Ethnic minorities	Groups within a population sharing a common cultural, linguistic, or ancestral identity distinct from the majority population
Focus Group Discussions (FGDs)	Qualitative research method involving structured discussions to gather insights on specific topics from a diverse group of participants
Grievance Redress Mechanism (GRM)	The plan describes affordable and accessible procedures for third-party settlement of disputes arising from displacement or resettlement; such grievance mechanisms should take into account the availability of judicial recourse and community and traditional dispute settlement mechanisms.
Hygiene	The conditions and practices that help maintain health and prevent spread of disease including handwashing, food hygiene, and menstrual hygiene management.
Improved Drinking Water Source	A source that by the nature of its construction adequately protects the source from outside contamination in particular with fecal matter.
Improved Sanitation Facility	A facility that hygienically separates human waste from human contact.
Key Performance Indicators	Key Performance Indicators (KPIs) are quantifiable metrics used to evaluate the performance or success of an organization, project, or specific activities, providing a clear and measurable way to assess progress toward goals and objectives.
Labor Management Procedures (LMP)	Procedures outlining how the project will ensure fair labor practices, worker rights, and adherence to labor laws.

Land Acquisition	Land Acquisition refers to all methods of obtaining land for project purposes, which may include outright purchase, expropriation of property and acquisition of access rights, such as easements or rights of way. Land acquisition may also include: a) acquisition of unoccupied or unutilized land whether or not the landholder relies upon such land for income or livelihood purposes; b) repossession of public land that is used or occupied by individuals or households; and c) project impacts that result in land being submerged or otherwise rendered unusable or inaccessible. "Land" includes anything growing on or permanently affixed to land, such as crops, buildings and other improvements, and appurtenant water bodies.
Multidimensional Poverty Index (MPI)	An index that measures poverty across three dimensions: deprivation in health, education, and standard of living.
No Objection Certificate (NOC)	A formal document issued by a government agency stating that it has no objection to a particular project or activity.
OHS	Occupational Health & Safety
Other Interested Parties (OIPs)	Those who may have an interest in the project and who could, for example: ● influence the opinions of affected parties either positively or negatively, or ● affect the implementation process or the sustainability of the project's outcomes
Project Implementation Unit (PIU)	The unit responsible for overseeing and coordinating all activities related to the implementation of a project.
Public Health Engineering Department (PHED)	A government department in Pakistan is responsible for providing safe drinking water and sanitation facilities.
Public Disclosure	Sharing project information with stakeholders in a transparent and accessible manner.
Project-affected people (PAPs)	Individuals or communities directly impacted by the project's activities
Residual Impact	Residual impact refers to an impact remaining following application of avoidance, minimization and mitigation measures.
Restoration and Rehabilitation Plan	A plan that outlines measures to restore disturbed areas to their original condition after construction is completed
Safely Managed Drinking Water	Population drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination

Safely Managed Sanitation	Improved sanitation facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite.
Sanitation services	The management of excreta from the facilities used by individuals, through emptying and transport of excreta for treatment and eventual discharge or reuse.
Stakeholder Engagement Plan (SEP)	Stakeholder Engagement Plan (SEP) refers to a formally prepared and approved plan in which the Borrower sets out the process through which they will engage with stakeholders throughout the project life-cycle. It may identify different levels of engagement and consultation as being appropriate for different types of stakeholders.
Sindh Irrigation & Drainage Authority (SIDA)	A government agency that manages the Indus Basin Irrigation System in Sindh province.
Subproject	An individual component of a larger project.
Sindh Environmental Protection Act (2014)	The main environmental law in Sindh, Pakistan. It mandates project proponents to obtain environmental approval from the Sindh Environmental Protection Agency (SEPA).
Sanitation	The hygienic means of separating, treating, and disposing of waste material (human excreta) and wastewater.
Stakeholder Engagement	Stakeholder Engagement refers to a process organized by the Borrower or on behalf of the Borrower, to enable stakeholders to be informed of, and contribute to, project design and implementation. Stakeholder engagement should begin early in project identification and design and continue throughout project implementation.
Stakeholder Mapping	Process of identifying and analyzing stakeholders to understand their interests, influence, and potential impact on the project
Sustainability	The ability to maintain or support a process over time.
Seismic Hazard	The risk of an earthquake occurring in a particular area.
Sexual Abuse and Exploitation (SEA)	A form of violence involving a relationship of power or exploitation, typically between an adult and a child.
Water Supply Interventions	Construction of systems to provide access to clean and safe drinking water.
Water, Sanitation, and Hygiene (WASH)	A collective term refers to initiatives aimed at improving access to clean water, sanitation facilities, and hygiene practices.
Waterborne Diseases	Illnesses caused by pathogenic microorganisms that are transmitted via contaminated water, posing health risks to human populations

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Executive Summary

Introduction

The Sindh Transformational Accelerated Rural Water Supply, Sanitation and Hygiene Services Project (STAR-WASH-1), initiated by the Government of Sindh (GoS) with World Bank support under a Multiphase Programmatic Approach (MPA), executed by Sindh People's Housing for Flood Affectees (SPHF) a section 42 public sector company under GoS. With an estimated financing envelope of US$2.55 billion and an implementation period from FY2026 to FY2035, the program aims to deliver sustainable, climate-resilient WASH services to approximately 1.3 million people in rural Sindh. The project adopts a shift from conventional infrastructure-based approaches to a systems-based model emphasizing service delivery, institutional strengthening, and behavior change. It prioritizes surface water treatment, sanitation and wastewater management, household-level improvements, and sustainable operation and maintenance mechanisms supported by institutional reforms and monitoring systems.

The chapter further highlights critical sector challenges in rural Sindh, supported by key data, including limited access to safely managed drinking water (24.4%), unreliable water supply (81% receiving ≤6 hours/day), and widespread contamination (65.4% of sources unfit for consumption). Poor sanitation, inadequate wastewater management, and associated public health impacts such as a 50.2% child stunting rate underscore the urgency of intervention. In response, the Environmental and Social Management Framework (ESMF) is introduced as a guiding instrument aligned with World Bank Environmental and Social Standards (ESSs) to manage project risks. It outlines procedures for screening, mitigation, stakeholder engagement, and grievance redress, while defining institutional roles led by the SPHF and its Project Implementation Unit (PIU), ensuring effective and compliant project implementation.

Project Description

The project aims to improve access to safe drinking water, safely managed sanitation, fecal sludge and wastewater management, and hygiene behavior change interventions, with the broader objective of improving public health outcomes and contributing to reductions in child stunting. The project is aligned with national and provincial WASH priorities, the World Bank Country Partnership Framework, and relevant successful rural WASH service delivery models. It will be implemented through a professionalized service delivery model involving SPHF, with a focus on institutional strengthening, service sustainability, climate resilience, and scalability. The project is structured around four integrated components that together aim to strengthen rural water supply, sanitation, and hygiene (WASH) services sustainably and inclusively. Component 1 focuses on sector governance and institutional strengthening, development of service delivery frameworks, policy and regulatory systems, and enhanced coordination among key institutions such as PIU, PHED, and LGD, supported by capacity building and digital monitoring systems.

Component 2 addresses the development of rural water supply infrastructure, including treatment facilities, distribution networks, and household connections, with a strong emphasis

on water quality, energy efficiency, and service reliability. Component 3 supports improved sanitation and fecal sludge management through the construction of sanitation facilities and the development of systems for safe collection, treatment, and disposal or reuse of sludge and wastewater. Component 4 complements these investments by promoting hygiene awareness and behavior change, including targeted community engagement, gender-sensitive interventions, and public health measures to ensure sustained adoption of safe hygiene practices. Together, these components provide a comprehensive approach to improving service delivery, public health outcomes, and environmental sustainability in rural areas. The project includes expansion of water supply schemes, development of sanitation infrastructure, fecal sludge and wastewater management at village level, and behavior change campaigns, alongside institutional strengthening and capacity building of key agencies in 16 rural districts. The selection methodology integrates demographic density, distance to water sources (ranging from 0.14 km to 9.83 km)[1], and vulnerability criteria, ensuring equitable and need-based prioritization in alignment with World Bank Environmental and Social Framework (ESF) requirements.

The detailed technical designs and implementation strategies for water supply and sewerage systems based on feasibility studies conducted during 2023–2024[2]. Proposed solutions include piped water networks supplied through tubewells and overhead reservoirs, public standposts for smaller settlements, and hybrid sewerage systems combining centralized and on-site treatment options such as septic tanks, soakage pits, and Anaerobic Baffled Reactors (ABRs). Environmental and social considerations are integrated through the ESMF, including Voluntary Land Donation (VLD), stakeholder consultations, and digital monitoring systems. The project also incorporates renewable energy solutions, such as solar-powered pumps, to enhance operational sustainability, while ensuring improved public health, environmental protection, and long-term service reliability across targeted rural communities.

Overview of Policy, Legal and Regulatory Framework

The section presents a comprehensive overview of the policy, legal, and regulatory framework applicable to the STAR WASH 1 Project, aligning national and provincial requirements with the World Bank's Environmental and Social Framework. It highlights key policies such as the National Sanitation Policy (2006), National Drinking Water Policy (2009), Sindh Drinking Water Policy (2017), and National Climate Change Policy (2012, updated 2021), alongside critical legislation including the Sindh Environmental Protection Act (2014) and SEQS (2016). These instruments collectively guide water quality management, sanitation services, environmental protection, labor standards, and climate resilience during both construction and operational phases. The framework ensures compliance with regulatory requirements such

[1] Settlements were prioritized using a combination of demographic density, vulnerability, and proximity to water sources, with the primary selection criterion limited to settlements located within 3 km of the water body, while distances in the study area ranged from 0.14 km to 9.83 km. This approach supports equitable and need-based targeting by capturing both high-access settlements near water sources and more remote settlements facing greater service gaps, consistent with the World Bank ESF's risk-based assessment and proportional mitigation approach.
[2] Baseline studies and technical feasibility will be conducted on the updated criterion at a later stage.

as IEE/EIA approvals, environmental monitoring, occupational health and safety, and transparency obligations under the Sindh Transparency and Right to Information Act (2016).

The section further integrates the World Bank Environmental and Social Standards (ESS1–6 ESS 8 and 10), identifying their relevance to project risks such as construction impacts, labor conditions, community health, and land use. A detailed gap analysis between national laws and ESS requirements confirms that where gaps exist, the more stringent ESF standards will prevail, supported through instruments such as the ESMF, LMP, SEP, and GRM. The chapter also incorporates international best practices, including World Bank EHS Guidelines, Gender Strategy (2016–2023), and ILO Conventions ratified by Pakistan, ensuring fair labor practices and social inclusion. Comparative analysis of national (SEQS 2016) and international standards (WHO/IFC/USEPA) indicates that the strictest benchmarks will be applied, reinforcing environmental compliance, public health protection, and sustainable project implementation.

Environmental and Social Baseline

The Environmental and Social Baseline establishes a comprehensive reference framework for assessing potential impacts of the STAR-WASH 1 project, drawing on both primary and secondary data collected through field surveys conducted in November 2023, February 2024, and March–April 2026. The analysis highlights critical development challenges in rural Sindh, particularly in sanitation, water supply, and public health. Open defecation remains prevalent at 15–20%, while child stunting exceeds 45%, reflecting strong links between poor sanitation and health outcomes. Sewerage and drainage infrastructure are largely absent or non-functional, contributing to disease risks such as malaria and dengue, especially among the 32.6% of the population living below the poverty line. Additionally, water security remains a major concern, with only 53% of households having access to piped water, mostly in urban areas, while rural populations rely on contaminated groundwater sources, often exceeding safe limits for arsenic and bacteria.

Baseline findings across the project districts reveal significant socio-economic and infrastructure gaps, including low literacy rates (generally 30–55% in rural areas), high rural population proportions, and limited access to basic services such as electricity (available in only about 60% of villages for 4–12 hours daily). Housing is predominantly unplanned, with widespread semi-pucca and katcha structures, and community willingness to pay for services remains low (around 50%), affecting sustainability. Groundwater is largely brackish or contaminated, particularly in coastal and central districts, making surface water from canal systems such as the Indus basin a more reliable option for future schemes. Sanitation coverage is minimal, with very limited sewerage systems and widespread absence of toilets, reinforcing open defecation practices. Overall, the baseline underscores the urgent need for integrated, community-driven, and sustainable WASH interventions tailored to local environmental constraints and socio-economic conditions. All districts fall within Seismic Zone 2A, indicating low to moderate earthquake risk.

Groundwater quality assessments, based on laboratory testing conducted during feasibility studies (2023–2024) across multiple districts, reveal mixed water quality conditions. While pH levels (6.5–8.5) and most heavy metals (e.g., arsenic, lead, chromium) remain within permissible limits, significant concerns persist regarding microbial contamination and high Total Dissolved Solids (TDS). E. coli and fecal coliform contamination were detected in several locations, notably in Sujawal and Jamshoro (up to 238.6/100 ml), posing public health risks. TDS levels frequently exceeded safe limits (1,000 mg/L), reaching extreme values such as 17,910 mg/L in Sujawal and Jamshoro, indicating high salinity and mineralization. Additional issues include elevated turbidity (up to 150 NTU), fluoride exceedances, and localized taste and odor problems. Overall, the findings highlight the need for improved water treatment, regular monitoring, and targeted interventions to ensure safe drinking water across the project areas.

Stakeholder Engagement and Disclosure

A total of sixteen districts has been identified for project interventions, with intensive consultations conducted in seven sample districts. Stakeholders are systematically categorized into Affected Parties, Other Interested Parties, and Vulnerable Groups, with tailored engagement strategies based on interest influence analysis. The ESMF preparation for the STAR WASH 1 Project involved inclusive stakeholder consultations across selected districts, with targeted engagement of vulnerable groups, including women, persons with disabilities (PWDs), minorities, widows, and orphans. Focus Group Discussions (FGDs), particularly with PWDs, revealed significant barriers such as a lack of accessible WASH infrastructure, safety and dignity concerns, and limited participation in decision-making. Female participants highlighted the heavy burden of water collection, inadequate sanitation facilities, and socio-economic constraints, while minority communities reported exclusion from planning processes and inequitable access to services. These findings underscore the need for an equity-focused project approach, incorporating universal access design, gender-responsive facilities, and participatory mechanisms to ensure inclusive, accessible, and affordable WASH services for all.

Extensive consultations conducted during March–April 2026 across 35 villages and multiple district-level workshops engaged a total of 1,872 participants, including men, women, and individuals from vulnerable groups. Of these, 920 were women, representing approximately 49% of the total participants. A total of 721 disadvantaged and vulnerable individuals were consulted, including 61 persons with disabilities (PWDs), 83 elderly persons, 330 individuals from very poor households, 193 individuals from minority/scheduled caste communities, and 54 women-headed households. In addition, 327 institutional stakeholders were engaged. These consultations highlighted critical WASH challenges, including water scarcity, inadequate sanitation, associated health risks, and increasing climate vulnerability. Despite strong participation, women's decision-making involvement remained limited (only 13% fully engaged), indicating the need for more inclusive approaches. Key findings from male and female consultations, NGOs, and government stakeholders emphasize the importance of resilient infrastructure, community ownership, gender inclusion, and strengthened operation

and maintenance systems. The chapter also details strategies for engaging vulnerable groups, capacity-building plans, and information disclosure mechanisms, ensuring that stakeholder feedback is systematically integrated into project design, ESMPs, and implementation processes for sustainable and equitable WASH service delivery.

Potential Environmental and Social Impacts and Mitigation Measures

The section presents a comprehensive assessment of the potential environmental and social (E&S) impacts of the STAR WASH-I project across its lifecycle planning and design, construction, and operation. At the current conceptual stage, the project is classified as Substantial risk under the World Bank's Environmental and Social Framework, primarily due to predictable and reversible impacts such as construction-related pollution, wastewater and sludge management challenges, labor influx risks (including SEA/SH), and issues related to voluntary land donation (VLD) and equitable service access. The study area is provisionally defined as a 100–200 feet corridor along project alignments, subject to refinement during detailed design. While site-specific impacts cannot yet be fully determined, preliminary screening indicates that most adverse impacts will be localized, short to medium term, and manageable through established mitigation measures aligned with the mitigation hierarchy and relevant Environmental and Social Standards (ESSs).

The chapter further identifies key environmental risks, including soil erosion, groundwater and surface water contamination, air and noise pollution, and ecological disturbances, particularly during construction. Social risks relate to exclusion of vulnerable groups, gender disparities, community conflicts over water use, and minor land requirements without large-scale resettlement. Operational risks include public health concerns from wastewater and sludge handling. Mitigation measures such as adherence to SEQS 2016, compliance with Seismic Building Code of Pakistan (2007), implementation of Contractor's Environmental and Social Management Plans (CESMPs), and inclusive stakeholder engagement are proposed to reduce impacts to low or insignificant residual levels. The section also emphasizes that with proper design, regulatory compliance, and institutional capacity, the project is expected to deliver significant WASH benefits while maintaining environmental sustainability and social inclusiveness.

The Substantial risk profile also reflects operational risks associated with groundwater depletion and water-quality impacts from abstraction; sludge and septage management across collection, transport, treatment, disposal and potential reuse; water-treatment residuals and RO reject brine; treatment chemicals such as chlorine; construction and operational waste; and end-of-life management of solar panels, batteries and associated e-waste. Surface-water abstraction may affect downstream users, aquatic ecosystems and seasonal water availability. Community health and safety risks include excavation, temporary access restrictions, underground utilities, road/traffic safety, restoration of affected infrastructure, and nuisance or exposure risks from wastewater and fecal-sludge facilities. These risks will be managed through risk-based screening, site-specific E&S instruments, climate-resilient design, source protection and diversification, OHS/CHS measures, contractual controls, stakeholder engagement, GRM, monitoring and adaptive management.

Key risks during the construction phase include improper camp siting, wastewater and solid waste mismanagement, emergency incidents, biodiversity disturbance, labor influx, social conflict, gender-based violence (GBV/SEA/SH), child and forced labor, and community accessibility issues. These impacts are generally assessed as moderate and site-specific. Mitigation measures emphasize proper site selection (e.g., camps located at least 500 m from settlements), implementation of waste management systems (including septic tanks and designated disposal sites), enforcement of occupational health and safety plans, emergency response protocols (including rainfall thresholds >5 mm/hr and turbidity control <50 NTU), prohibition of child labor, community engagement through grievance redress mechanisms, and strict adherence to codes of conduct and cultural sensitivity training. Following these measures, residual impacts are expected to be insignificant to low.

During the operation and completion phase, the chapter highlights risks related to water quality degradation, water scarcity, noise pollution, and minor impacts on flora and fauna, alongside long-term climate change implications. Climate variability such as increased flooding (20–50% higher runoff), drought (groundwater decline of 1–3 m/year), and temperature rise (+2–4°C) poses significant challenges to WASH infrastructure, potentially affecting service delivery for approximately 1.3 million beneficiaries. Mitigation strategies include regular water quality monitoring, adoption of water conservation practices, infrastructure resilience measures (e.g., elevating facilities 1–2 m above flood levels), and adaptive operation and maintenance protocols such as post-flood inspections within 48 hours and chlorination controls (1–5 mg/L residual). With these interventions, the project is expected to maintain environmental sustainability and social inclusiveness, ensuring that climate-related and operational risks remain manageable and within acceptable limits for long-term service delivery.

Environmental and Social Management and Monitoring Plan (ESMMP)

The Environmental and Social Management and Monitoring Plan (ESMMP) establishes a detailed and compliance-driven framework to systematically manage environmental and social risks throughout the project lifecycle, covering pre-construction/design, construction, and operation & maintenance (O&M) phases. It aligns with the World Bank ESS, regulatory requirements, and international standards, incorporating measurable performance indicators and thresholds (such as SEQS and WHO guidelines) to ensure objective monitoring. During the design phase, the plan emphasizes climate-resilient infrastructure, sustainable water resource management, biodiversity protection, inclusive planning, and robust safeguards for land use and SEA/SH risk prevention. The construction phase addresses site-specific risks, including air and noise pollution, soil and water contamination, waste management, occupational health and safety, labor influx, and community safety, supported by strict mitigation measures, monitoring protocols, and contractor accountability. In the operation phase, the focus shifts to long-term service sustainability, including water quality compliance, safe sludge and brine disposal, groundwater regulation, infrastructure maintenance, and continued social inclusion and grievance redress effectiveness. The ESMMP further

strengthens implementation through clearly defined institutional roles, regular monitoring and reporting systems, and predefined triggers for corrective actions, enabling adaptive management.

ESMF Implementation

The implementation process integrates E&S considerations throughout the subproject lifecycle, including baseline assessment, screening and risk categorization, stakeholder engagement, preparation and clearance of E&S instruments (such as ESMPs), procurement integration, and on-site mitigation implementation. All subprojects are required to complete E&S assessments and obtain necessary approvals prior to construction, ensuring compliance with both World Bank standards and provincial legal requirements under the Sindh Environmental Protection Act, 2014 and relevant rules of the Sindh Environmental Protection Agency.

The Environmental and Social Management Framework (ESMF) will be implemented through a coordinated institutional and service delivery arrangement involving PIU E&S staff, Regional Offices, Supervision Consultants, Contractors/ DBO Contractors, Implementing Partners, and SPVOs (Community-Based Service Providers). The PIU will provide overall leadership, coordination, and ESMF compliance oversight, while dedicated E&S staff will ensure screening, preparation of site-specific instruments, integration of mitigation measures into design and contracts, monitoring, reporting, stakeholder engagement, grievance redress, gender inclusion, SEA/SH risk management, and compliance with World Bank ESSs and provincial requirements. The service delivery model will extend E&S management beyond construction by linking infrastructure development with operation and maintenance, tariff collection, water quality monitoring, wastewater management, service delivery KPIs, MIS reporting, community feedback, and long-term sustainability. Regional Offices, DBO Contractors, Implementing Partners, and SPVOs will support field-level supervision, O&M capacity building, community-based monitoring, grievance resolution, and inclusive participation of women, vulnerable households, and marginalized groups. This integrated arrangement will help ensure that WASH infrastructure is delivered and operated in a technically sound, environmentally sustainable, socially inclusive, and accountable manner.

Before mobilization and within 30 days of commencement of construction, the Contractor(s), in coordination with the PIU and in line with World Bank EHS Guidelines, EHS guidelines for water and sanitations[3] and the ESMF, shall prepare and submit site-specific management plans (including Community Health and Safety, Occupational Health and Safety, Emergency Response, Restoration, Waste Management, Labour Management plan – LMP and Traffic Management Plans) for approval prior to start of works. These plans will be implemented, updated, and monitored throughout construction to ensure compliance with environmental and social requirements, including WBG ESS and SEQS standards, covering risk management, community and worker safety, emergency preparedness (including flood and disaster SOPs), waste control, site restoration, and traffic safety. A structured monitoring

[3] https://www.ifc.org/content/dam/ifc/doc/2000/2007-water-and-sanitation-ehs-guidelines-en.pdf

framework, reporting system, and capacity-building program will support implementation, with PIU oversight, contractor responsibility for daily compliance, and periodic audits to ensure adherence, while non-compliance will be subject to corrective actions and contractual penalties.

ESMF Budget and Implementation

The ESMF for the project is supported by a tentative budget of PKR 19.32 million, which has been incorporated into the overall project cost and will be refined at the subproject stage to reflect actual implementation needs. The budget covers environmental monitoring across pre-construction and construction phases, including water, air, soil, noise, and emissions testing, along with comprehensive environmental and social management measures such as staffing, training, preparation of site-specific ESMPs, GRM implementation, gender and SEA/SH interventions, and health and safety compliance. It also includes provisions for camp management, waste management, regulatory clearances, stakeholder engagement tools, and digital monitoring systems. Costs are structured on a per-village and per-contract basis, with flexibility to adjust sampling frequency and scope based on project footprints and expert guidance. Payments will be made against actual implementation with verifiable evidence, ensuring accountability and efficient utilization of resources.

Grievance Redress Mechanism

The Grievance Redress Mechanism (GRM) for the STAR WASH 1 Project is built on lessons learned from the SPHF Housing Project, where community consultations confirmed a generally effective and trusted system. Communities reported satisfaction with simple complaint submission processes, timely resolution, and transparent feedback mechanisms, although gaps remain in awareness in remote areas and in the need for improved tracking and localized village-level access. Based on this assessment (conducted during ESMF preparation consultations in selected rural Sindh districts), the STAR WASH 1 GRM is designed to strengthen inclusivity by introducing village-level committees, multiple access channels, improved outreach, and enhanced digital tracking to ensure more responsive and accountable grievance handling.

The STAR WASH 1 GRM establishes a structured, multi-tiered and inclusive grievance management system aligned with World Bank ESS10 requirements. It enables stakeholders, including vulnerable groups, to submit complaints through in-person, hotline, digital platforms, and community focal persons, with strict provisions for confidentiality in sensitive cases such as GBV/SEA-SH. A web-based Grievance Management Information System (GMIS) supports real-time tracking, categorization, and reporting, backed by manual systems for continuity. Grievances are addressed within defined timelines, acknowledged upon receipt, resolved within 21 calendar days and escalated through Union Council, district, and PIU-level Grievance Redress Committees. Continuous monitoring, public disclosure, and integration with the Stakeholder Engagement Plan ensure transparency, accountability, and continuous improvement throughout project implementation.

Resettlement Policy Framework

The Resettlement Policy Framework (RPF) for the STAR-WASH 1 Project has been prepared in accordance with World Bank Environmental and Social Standard 5 (ESS5) to guide the management of any potential land acquisition and resettlement impacts, while prioritizing avoidance and Voluntary Land Donation (VLD) as the primary approach. The framework establishes key principles, including avoidance of involuntary resettlement. It defines strict procedures for voluntary land donation, ensuring informed consent, due diligence, documentation, and disclosure, while excluding coercion or any form of pressure on landowners. Eligibility for compensation is determined through a publicly disclosed cut-off date, and all entitlements are aligned with national laws and ESS5 requirements to ensure equitable treatment of affected persons.

The RPF further outlines detailed implementation arrangements, including eligibility criteria, entitlement matrices, consultation and disclosure processes, and a structured step-by-step resettlement implementation procedure supported by Resettlement Plan (RP)/Abbreviated Resettlement Action Plan (ARAP) preparation and approval mechanisms. A comprehensive budget framework with contingency provisions (10–20%) ensures financial readiness, while internal monitoring by the Project Implementation Unit (PIU) and external monitoring by an Independent Monitoring Agency (IMA) provide continuous oversight and accountability. Grievance redress, reporting, and World Bank disclosure requirements are integrated throughout to ensure transparency and stakeholder participation. Overall, the framework ensures that any resettlement impacts under STAR-WASH 1 are managed in a planned, participatory, and socially responsible manner, in compliance with ESS5 standards.

Executive Summary in Sindhi

1 General

The Government of Sindh (GoS), with financial support from the World Bank, is advancing the Sindh Transformational Accelerated Rural Water Supply, Sanitation and Hygiene Services Project (STAR-WASH-1) to increase access to safely managed water supply, sanitation, and hygiene services in selected rural areas of Sindh Province. The project is being implemented under a Multiphase Programmatic Approach (MPA), executed by SPHF a section 42 public sector company under GoS, which is intended to support long-term sector transformation through phased investments, institutional reforms, and behavior change interventions across Pakistan. The MPA has an estimated financing envelope of approximately US$2.55 billion and is expected to be implemented over FY2026 to FY2035, with STAR-WASH-1 serving as the first phase[4].

Since the initial concept stage, the project has been refined with greater emphasis on sustainability, service delivery models, and environmental and social risk management. Under the updated framework, STAR WASH 1 aims to provide equitable, climate-resilient, and safely managed WASH services to approximately 1.3 million beneficiaries in selected rural districts of Sindh. The program moves beyond conventional infrastructure delivery toward a systems-based approach that integrates service delivery, institutional strengthening, and behavior change interventions[5].

The Government of Pakistan, with support from development partners, is launching the STAR WASH-1 Project under the *Multiphase* Programmatic Approach (MPA) to accelerate and scale up access to safe water, sanitation, and hygiene (WASH) services in rural areas of Pakistan. The project recognizes that traditional, asset-focused approaches have not achieved sustainable outcomes at scale. Instead, STAR WASH-1 adopts a programmatic, system-change model to address deep-rooted sector governance challenges, institutional inefficiencies, and behavioral barriers.

The revised project design prioritizes:

- Surface water-based supply systems with appropriate treatment to address contamination (e.g., arsenic, salinity, bacteriological pollutants),
- Fecal sludge and wastewater management systems, including treatment facilities,
- Household-level sanitation improvements, and
- Sustainable operation and maintenance (O&M) mechanisms through institutional reforms.

Key project activities/ modules include:

- Construction of water supply, sanitation, and drainage schemes,

[4]https://documents1.worldbank.org/curated/en/099050925152530238/pdf/P508034-d595fb33-d0e9-4310-a367-6340de5a6fbb.pdf

[5]https://documents1.worldbank.org/curated/en/099052925111540854/pdf/P508034-f59c7128-d2b0-4daf-99eb-1c9e929247d2.pdf

- Development of fecal sludge treatment infrastructure,
- Improvement of WASH facilities in public institutions,
- Implementation of behavior change communication (BCC) campaigns,
- Strengthening institutional capacity and regulatory systems,
- Establishment of robust monitoring, digital reporting, and grievance redress mechanisms (GRM).

1.1 Project Background

Rural Sindh continues to face significant environmental & Climate related vulnerability in achieving universal access to safely managed water supply and sanitation services, despite some improvements in access to basic infrastructure. According to available data, approximately 93% of households in rural Sindh rely on improved water sources; however, only 37.2% have access to piped water connections within their premises, and merely 24.4% of the population has access to safely managed drinking water services (SDG Indicator 6.1.1). A considerable proportion of households (20.8%) depend on hand pumps for drinking water, reflecting continued reliance on self-supplied sources. Despite the presence of piped infrastructure, water supply services remain unreliable, with nearly 81% of the rural population receiving water for six hours or less per day.

Water quality remains a critical concern across rural areas. It is estimated that 65.4% of water sources and 85.3% of household-level drinking water are unfit for human consumption, primarily due to contamination and poor hygiene practices. In addition, Total Dissolved Solids (TDS) levels exceed acceptable limits in approximately 32% of villages, particularly in saline zones, further exacerbating drinking water safety challenges[6].

Sanitation conditions in rural Sindh are similarly inadequate. The lack of safely managed sanitation services has resulted in the continued prevalence of open defecation, poorly constructed latrines, and open drainage systems, with untreated wastewater often discharged into open areas. Although there has been an increase in access to household toilets over the past fifteen years, primarily due to private household investments in flush-to-septic tank systems, most of these facilities consist of non-engineered single-pit septic tanks or leach pits. The effluent from these systems is often discharged into open drains, ultimately accumulating in stagnant ponds or low-lying areas without undergoing any treatment. This practice poses serious risks to both groundwater and surface water quality[7].

The public health implications of poor WASH conditions are severe. Sindh records the highest child stunting rate in Pakistan, at approximately 50.2% among children under five, which is strongly associated with unsafe water, inadequate sanitation, and poor hygiene practices. Waterborne diseases and environmental enteropathy remain widespread, contributing to long-term health and developmental challenges.

[6]https://lupinepublishers.com/environmental-soil-science-journal/fulltext/water-quality-assessment-in-sindh-pakistan-a-review.ID.000156.php
[7] http://publication.pumhs.edu.pk/index.php/ojs/article/view/232

Institutional and operational challenges further aggravate the situation. The operation and maintenance (O&M) of rural water supply schemes have been largely neglected, with limited financial and technical capacity at the local government level and no formalized community-based management systems in place. Although the government has installed approximately 86% of piped water supply schemes, around 20% remain unmanaged after installation, and nearly 58% of schemes are non-functional, primarily due to inadequate funding and the absence of cost recovery mechanisms such as tariff collection. In some cases, communities have informally managed systems through self-help arrangements and local tariff collection; however, these practices remain inconsistent and unsustainable.

As a consequence, public water supply systems have proven largely ineffective, leading to increased dependence on self-supplied water sources, particularly groundwater, which is often unsafe. The situation is further compounded by increasing groundwater extraction, climate variability, and recent flood events, which have exposed the vulnerability of existing infrastructure and service delivery systems.

The updated project framework reflects a shift toward integrated, sustainable, and service-oriented WASH solutions, including improved water quality management, safely managed sanitation systems, strengthened institutional arrangements, and enhanced community engagement. This underscores the critical need for a robust Environmental and Social Management Framework (ESMF) to systematically address associated risks and ensure inclusive and sustainable project outcomes.

1.2 Purpose of the ESMF

1.2.1 Compliance with World Bank Environmental and Social Standards (ESSs)

The project's environmental and social risk is rated substantial, making several Environmental and Social Standards (ESSs) relevant. An Environmental and Social Management Framework (ESMF) will be developed to guide risk assessment and mitigation through generic E&S codes of practice, screening, and site-specific ESMPs. Relevant instruments, including a Resettlement Planning Framework (RPF), Stakeholder Engagement Plan (SEP), Labor Management Procedures (LMP), Community Health and Safety Plan, and GBV/SEA/SH Action Plan, will be prepared. The ESMF will address pollution prevention, occupational and community health and safety, voluntary land donation, and information disclosure requirements in line with ESS1–ESS6 & ESS8. ESS7 and ESS9 are not relevant as no significant impacts on indigenous peoples are anticipated, and no financial intermediaries are involved.

1.2.2 Role and Function of the ESMF

The ESMF is an instrument that examines the risks and impacts when a project consists of a program and/or series of subprojects, and the risks and impacts cannot be determined until the program or subproject details have been identified. The ESMF sets out the principles,

rules, guidelines, and procedures to assess the environmental and social risks and impacts. It contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts; provisions for estimating and budgeting the costs of such measures; and information on the agency or agencies responsible for addressing project risks and impacts, including on their capacity to manage these risks.

1.2.3 Implementation Responsibility and Project Risk Rating

The ESMF will be implemented through a coordinated institutional and service delivery arrangement involving SPHF - PIU E&S staff, Regional Offices, Supervision Consultants, Contractors/ Design-Build-Operate (DBO) Contractors, Implementing Partners (IPs), and SPVOs (Community-Based Service Providers). The PIU will provide overall leadership, coordination, and ESMF compliance oversight, while dedicated E&S staff will ensure screening, preparation of site-specific instruments, integration of mitigation measures into design and contracts, monitoring, reporting, stakeholder engagement, grievance redress, gender inclusion, SEA/SH risk management, and compliance with World Bank ESSs and provincial requirements. .

1.2.4 Screening, Monitoring, and Grievance Redress Mechanisms.

The framework also outlines mechanisms for environmental and social screening, preparation of site-specific instruments, monitoring and reporting, capacity building, and implementation of a responsive Grievance Redress Mechanism (GRM). The ESMF will be applied throughout the project lifecycle to ensure that environmental and social considerations are effectively integrated into planning, design, construction, and operational phases, thereby supporting sustainable and inclusive project outcomes.

1.2.5 Overall Guidance for Project Implementation Agencies

This framework will guide the Project Implementation Unit (PIU)/ SPHF throughout the planning, design, construction, and operational phases, ensuring that environmental and social considerations are systematically integrated into project implementation.

1.2.6 E&S Instrument Readiness, Status and Timing

E&S Instrument Readiness, Status and Timing: This ESMF is the framework instrument for screening and managing future subprojects whose detailed locations and designs are not yet fully known. The ESMF incorporates the Resettlement Framework (RF), screening procedures, site-specific ESMP requirements, VLD procedures, Community Health and Safety measures, labor/OHS requirements, stakeholder engagement and GRM arrangements, and SEA/SH risk controls. The SEP has been prepared and informed by documented stakeholder consultations. The ESMF contains substantive LMP provisions and requires the LMP to be finalized, disclosed, and implemented in accordance with the ESCP before the relevant project activities. A project-specific SEA/SH Action Plan shall be finalized,

disclosed/communicated as applicable, and operationalized before civil works or other activities that create SEA/SH interfaces. The ESMF itself does not establish the documentary status of the appraisal package or external disclosure records for each standalone instrument; SPHF/PIU shall therefore maintain an instrument register and synchronize status, timing, disclosure, and commitments with the latest ESRS and ESCP.

Instrument	**Status evidenced in ESMF**	**Timing/implementation requirement**
ESMF	Final framework document; screening, mitigation, monitoring and institutional arrangements are incorporated.	Apply throughout project lifecycle; site-specific instruments before relevant works.
Resettlement Framework (RF)	Integrated in the ESMF; VLD, eligibility, entitlements, RPs/ARPs and monitoring procedures are provided.	Apply before land access/acquisition or VLD; site-specific RP/ARP where required.
SEP	Prepared and informed by documented stakeholder consultations; GRM and disclosure arrangements are incorporated.	Implement throughout project lifecycle and update as needed.
LMP	LMP provisions are incorporated/referenced in the ESMF; standalone appraisal-package/disclosure status is not established by this document.	Finalize, disclose and implement in accordance with the ESCP before relevant labor-intensive/civil works.
SEA/SH Action Plan	The ESMF sets out SEA/SH controls and requires a project-specific Action Plan; standalone appraisal-package/disclosure status is not established by this document.	Finalize/adopt and operationalize before civil works or other activities creating material SEA/SH interfaces; review at first ISR and earlier if risk changes.
Site-specific ESMP/ESSR/other plans	Not prepared for unknown future sites; instrument selection is triggered by screening and cumulative assessment.	Prepare, review/clear and disclose/communicate before commencement of the relevant subproject activities.

1.3 Project Proponent

Key project proponents for STAR WASH 1 included the establishment of a dedicated service delivery entity, SPHF, which is being set up by the Government of Sindh as a not-for-profit company registered with the Securities and Exchange Commission of Pakistan (SECP).

The SPHF will act as the primary implementing agency responsible for planning, implementing, and managing WASH services under the project. SPHF will serve as the Project Implementation Unit (PIU), with a dedicated WASH team hired to oversee day-to-day operations.

The PIU has dedicated senior Environmental and Social Development Specialists who ensure compliance with World Bank ESF requirements. Given that the institutional structure is newly being established, capacity-building and technical support will be required during the initial stages. Other supporting departments include: Local Government Department (LGD) and Public Health Engineering Department (PHED).

1.4 Methodology for ESMF Preparation

The Environmental and Social Management Framework (ESMF) has been prepared through a systematic, multi-stage methodology aligned with the World Bank Environmental and Social Framework (ESF) and national regulatory requirements, reflecting the project's substantial risk classification and updates to the Terms of Reference (TORs) for STAR-WASH-1 (P508034). This process addresses revisions in project design, including the identification of 16 priority districts, updated institutional arrangements with SPHF as the implementing agency, and the need for refreshed baselines, risk assessments, and stakeholder consultations. The methodology incorporates desk reviews, baseline updates for new locations, targeted consultations in seven sample districts, and development of key instruments such as the Resettlement Framework (RF) focused on Voluntary Land Donation (VLD).

1.4.1 Desktop Review of Available Data and Literature

Prior to initiating field investigations for the Sindh Transformational Accelerated Rural Water Supply, Sanitation and Hygiene Services Project (STAR-WASH-1), a comprehensive desktop review of existing secondary data and documentation has been conducted to establish the environmental and social baseline across the target rural areas of Sindh province.

The following references form the core of the desktop that has been conducted. All World Bank documents are publicly disclosed; others are accessible via respective agencies.

- World Bank. (2025). Concept Environmental and Social Review Summary (ESRS): Sindh Transformational Accelerated Rural Water Supply, Sanitation and Hygiene Services Project (STAR-WASH-1). Report No. ESRSC04949. Washington, DC: World Bank.
- Sindh Environmental Protection Agency (SEPA). (2024). Groundwater Quality Report: Sindh Province. Karachi: SEPA.

- Pakistan Council of Research in Water Resources (PCRWR). (2023). Arsenic Mapping in Groundwater: Sindh Province. Islamabad: PCRWR.
- Government of Sindh & National Disaster Management Authority (NDMA). (2023). Post-2022 Flood Damage and Needs Assessment: WASH Sector. Hyderabad: GoS.
- Pakistan Bureau of Statistics (PBS). (2023). Household Integrated Economic Survey (HIES) 2023: Sindh Chapter. Islamabad: PBS.
- United Nations Children's Fund (UNICEF) & PBS. (2023). Pakistan Multiple Indicator Cluster Survey (MICS) 6: Sindh Province. Islamabad: UNICEF Pakistan.
- World Bank. (2022). Sindh Water Sector Improvement Project: Water Quality Baseline Assessment. Islamabad: World Bank Pakistan.
- International Water Management Institute (IWMI). (2024). Pakistan Water Availability and Scarcity Assessment 2024. Lahore: IWMI.
- World Bank. (2017–2024). ESMF Documents from Comparable WASH Projects in Pakistan (e.g., KWSPIP, Punjab Rural Water Supply). Washington, DC: World Bank.
- World Bank. (2021). Environmental and Social Framework (ESF): Technical Guidance Notes (ESS1–ESS10). Washington, DC: World Bank.

1.4.2 Baseline Data Collection

Secondary data on environmental (water quality, sanitation), socio-economic conditions, and climate vulnerabilities were compiled and updated for all 16 priority districts (Badin, Naushero Feroz, Sanghar, Khairpur, Dadu, Matiari, Shaheed Benazirabad, Larkana, Shikarpur, Tando Allahyar, Kambar Shahdadkot, Hyderabad, Sujawal, Kashmore, Mirpurkhas, Jamshoro) using SPHF data, government databases, and primary/ secondary sources where gaps exist.

1.4.3 Stakeholder Consultations

Fresh consultations were planned and executed in seven sample districts (Badin, Naushero Feroz, Sanghar, Khairpur, Larkana, Jamshoro, Dadu), including separate sessions for men, women, and vulnerable groups in at least five villages per district based on population density and proximity to water sources.

1.4.4 Preliminary Environmental and Social Risk Assessment

Potential risks were re-evaluated based on new baselines and ESRS findings, covering water quality, sanitation systems, construction impacts, community health and safety, labor conditions, land availability, labor influx, and risks to vulnerable groups.

1.4.5 Assessment of Institutional Capacity

Capacity gaps in ES risk management for SPHF (Section 42 company), PIU, and associated agencies were assessed, informing updated capacity-building plans, staffing, and revised implementation roles/responsibilities.

1.4.6 Development of ESMF Framework and Instruments

The ESMF establishes screening procedures, risk categorization, mitigation hierarchy, guidelines for site-specific ESMPs, VLD procedures (via RF), Community Health and Safety measures, GBV/SEA/SH mitigation, and GRM, with updates to monitoring, reporting, and institutional arrangements. Relevance of Environmental and Social Standards and Role of the ESMF

The project will be implemented in accordance with the World Bank Environmental and Social Framework (ESF) and the applicable Environmental and Social Standards (ESSs). The ESMF will serve as the primary instrument for integrating ESF requirements into project planning, design, implementation, monitoring, and reporting, particularly where subproject locations and site-specific risks are not yet fully known. It will define the procedures for environmental and social screening, risk classification, preparation of site-specific ESMPs, and application of complementary instruments such as the SEP and RPF, as applicable. The framework will also set out institutional responsibilities, consultation and disclosure requirements, grievance redress arrangements, and capacity-building measures to ensure consistent compliance with ESF requirements across all subprojects.

1.4.7 Validation and Finalization

The draft ESMF was validated through stakeholder feedback from consultations, expert reviews including SPHF-PIU experts, and World Bank input, ensuring practicality, ESF compliance, and alignment with updated TORs deliverables.

2 Project Description

2.1 Sindh Transformational Accelerated Rural Services Water Supply, Sanitation and Hygiene (STAR WASH) Project

In response to persistent gaps in access to safely managed water supply, sanitation, and hygiene (WASH) services in rural Sindh, the Government of Sindh, with support from the World Bank and development partners, has initiated the Sindh Transformational Accelerated Rural Services Water Supply, Sanitation and Hygiene Services (STAR-WASH) Project.

Under this Project, a programmatic and phased approach will be adopted to expand climate-resilient and safely managed WASH services, targeting approximately 2.5 million beneficiaries in 16 selected rural districts of Sindh through the first phase.

The project will focus on the provision of safe drinking water, improved sanitation systems, including fecal sludge and wastewater management, and promotion of behavior change for hygienic practices, which are critical for reducing child stunting and improving public health outcomes.

The strategy is aligned with national and provincial WASH policies, the World Bank's Country Partnership Framework (CPF), and builds upon successful models such as the Punjab Rural Sustainable Water Supply and Sanitation Project (PRSWSSP), while promoting institutional strengthening, sustainable service delivery, and climate resilience.

The project adopts an integrated service delivery model through a professionalized entity (SPHF) and will be implemented across prioritized rural districts based on need, vulnerability, and service gaps, ensuring long-term sustainability and scalability of WASH interventions.

2.2 STAR WASH OBJECTIVES

The project aims to increase access to safely managed water supply, sanitation, and hygiene (WASH) services in rural Sindh, ensuring that water is safe for human consumption and services are reliable and sustainable.

The STAR WASH Project Development Objective (PDO) is to increase access to safely managed water supply and sanitation services and provide safe drinking water in selected rural areas of the Sindh Province. The PDO indicators are as follows:

- People provided drinking water that is safe at source (number): Target: 2.5 million
- People provided safely managed water services: Target: 1.3 million (indicative)
- People provided with safely managed sanitation services: 1.9 million (indicative)
- Water supply and wastewater quality surveillance systems operationalized[8]

[8] This is a composite indicator, to be developed during preparation, which will allow for the monitoring of the different steps toward the operationalization of surveillance systems, including passing of the essential regulations for monitoring drinking water quality and effluent discharge, and operationalization of testing labs and campaigns (including equipment and training).

- Professionalized service provider operationalized[9]

2.3 Positive and Negative Screening List for STAR WASH-1

The Positive and Negative Screening List will be used as an initial environmental and social screening tool for all proposed subprojects under STAR WASH-1, as summarized in **Table 1** and also referred to in **Annexure I**. The list will help determine whether a proposed activity is eligible for financing, requires redesign, or needs further assessment through site-specific environmental and social instruments such as ESMPs, SSEMPs, RPs/ARPs, or other relevant plans.

The negative list identifies activities that may cause significant, irreversible, cumulative, or unacceptable environmental and social impacts and therefore shall not be financed under the Project. The positive list identifies preferred activities, design measures, and implementation approaches that promote resource efficiency, climate resilience, community participation, environmental protection, and improved WASH service delivery.

This screening approach will support compliance with the World Bank Environmental and Social Framework, applicable ESS requirements, and relevant national and provincial laws.

Table 1: Positive and Negative Screening List for Subproject Eligibility

Negative Screening List			
Sr. No.	**Thematic Area**	**Negative List / Exclusion Criteria**	**ESMF Application**
1	Environmental Assessment	Contaminated sites and hazardous substance risks	Subprojects shall not be financed if located in areas of known or suspected contamination due to hazardous substances, including sites affected by previous industrial activity, waste disposal, chemical storage, or other contamination sources.
2		Significant cumulative or transboundary impacts	Activities likely to generate significant adverse cumulative, transboundary, irreversible, or long-term environmental and social impacts shall be excluded from project financing.
3	Land-use Pattern	Significant change in existing land-use pattern	Construction activities that may cause significant or incompatible changes in existing land use, settlement pattern, agricultural use, or community access to land and natural resources shall not be supported.

[9] This is a composite indicator, to be developed during preparation, which will allow for the monitoring of the different steps toward the operationalization of a professional service delivery, including (a) definition of a corporate vision, strategy and medium-term investment program, (b) regular meetings of the operator Board of Directors, (c) gradual recovery of O&M costs from users' tariffs, among others.

4	Natural Habitats	Works in protected or ecologically sensitive areas	Subprojects involving works inside protected areas, critical natural habitats, ecologically sensitive areas, wetlands, protected forests, or other conservation areas shall not be eligible for financing.
5		Conversion or degradation of natural habitats	Activities that may result in significant conversion, fragmentation, or degradation of natural habitats shall be excluded, particularly where conservation gains do not clearly outweigh potential environmental losses.
6		Disturbance to wildlife, vegetation, green areas, and flora	Activities causing significant disturbance to wildlife, removal or degradation of vegetation, green areas, flora, or biodiversity-supporting habitats shall not be financed.
7		Impacts on threatened, endangered, or migratory species	Sites where threatened or endangered species, sensitive habitats, or migratory pathways have been reported shall be excluded where project activities may cause disturbance, habitat loss, obstruction, or degradation.
8	Physical Cultural Resources	Loss or damage to cultural heritage	Activities that may cause loss of or damage to archaeological, paleontological, historical, religious, cultural, spiritual, or unique natural resources shall not be financed. Chance Find Procedures shall apply where required.
9	Vulnerable Communities / Ethnic Groups	Adverse impacts on ethnic or socially distinct groups	Subprojects likely to create adverse impacts on ethnic groups, vulnerable communities, socially distinct groups, or communities in mixed ethnic villages shall be excluded where impacts may be significant, unacceptable, or conflict-generating.
10	Forests	Clearance of ecologically sensitive or protected forests	Activities requiring clearance of ecologically sensitive forests, protected forests, or forest areas with biodiversity or livelihood value shall not be eligible for financing.
11	Land Acquisition	Areas under anti-encroachment drive	Subprojects located in areas under anti-encroachment drives shall not be supported where there is risk of forced eviction, social conflict, unresolved tenure issues, displacement, or livelihood loss.
12		Physical displacement or severe livelihood loss	No activity shall be financed if it causes physical displacement, involuntary resettlement, or severe loss of livelihood. Any land access requirement

			shall be screened under the ESMF and applicable resettlement instruments.
Positive Screening List			
Sr. No.	**Thematic Area**	**Positive List / Preferred Measures**	**ESMF Application**
1	Resource Efficiency	Efficient use of natural resources and reuse of materials	The Project shall prioritize efficient use of natural resources and reuse of suitable existing materials, debris, and salvaged construction materials where technically feasible, environmentally safe, and consistent with engineering requirements.
2	Stakeholder Engagement	Stakeholder involvement and community commitment	Subprojects shall promote meaningful stakeholder involvement during planning, construction, and operation, including consultation with local communities, women, vulnerable groups, local authorities, and other relevant stakeholders.
3	Renewable Energy and Sustainable Technology	Use of renewable energy and environmentally friendly techniques	The Project shall encourage the use of renewable energy, particularly solar energy, energy-efficient systems, low-maintenance technologies, and environmentally friendly construction methods.
4	Water Conservation	Integration of water conservation measures	Subproject designs shall incorporate water conservation measures where feasible, including leakage reduction, efficient distribution systems, water-saving fixtures, source protection, and reduction of water wastage.
5	Environmental and Social Design	Environmentally and socially responsive design	Designs shall avoid, minimize, and mitigate adverse impacts on flora, fauna, natural resources, cultural resources, and community health and safety through safe siting, resilient design, pollution prevention, and OHS/CHS measures.
6	Community Health and Safety	Avoidance of community disturbance and nuisance	Activities that minimize disturbance to local communities shall be encouraged, including construction methods that reduce noise, dust, traffic disruption, pressure on scarce resources, and community health and safety risks.
7	ESMP Integration	Integration into ESMPs and contractor obligations	Positive measures identified during screening shall be incorporated into site-specific ESMPs, contractor ESMPs, bidding documents, monitoring checklists, and construction supervision arrangements.

2.4 Project Components

The STAR-WASH-1 Project is structured into four components, each comprising defined sub-components with specific activities aimed at strengthening rural water supply, sanitation, and hygiene services. The components collectively address sector governance, infrastructure development, service delivery, and behavior change to ensure sustainable and inclusive WASH outcomes. **Table 2** below provides a summary of the project components, their respective subcomponents, and the key activities to be undertaken under each, offering a clear overview of the scope and nature of interventions relevant for environmental and social assessment.

Table 2: Project Components, Subcomponents, and Key Activities

Component	Subcomponent	Key Activities
Component 1: Sector Governance and Institutional Strengthening	1.1 Institutional Development and Service Delivery Model	Development of service delivery frameworks; clarification of institutional roles; strengthening coordination among PIU SPHF, PHED, LGD and other stakeholders.
	1.2 Policy, Planning, and Systems Strengthening	Development of policies, regulatory guidelines, and service standards; preparation of investment plans and asset management systems; capacity building and training; development of financial sustainability and O&M models; digital monitoring systems.
Component 2: Rural Water Supply Infrastructure and Services	2.1 Water Supply Infrastructure Development	Construction of water supply schemes; installation of intake structures, treatment plants, pumping stations, and reservoirs; laying of transmission and distribution networks; provision of household connections.
	2.2 Water Quality and Service Reliability	Installation of treatment systems (including arsenic removal where needed); solarization and energy-efficient systems; strengthening water quality monitoring and laboratories; improving service continuity and operational efficiency.
Component 3: Sanitation and Fecal Sludge Management (FSM)	3.1 Sanitation Infrastructure	Construction and upgrading of household and community sanitation facilities; improved latrine designs; sanitation facilities in public institutions where applicable.

	3.2 Fecal Sludge and Wastewater Management	Development of FSM systems including collection and transport; construction of fecal sludge treatment plants (FSTPs); safe treatment, reuse, or disposal of sludge; piloting wastewater management solutions.
Component 4: Hygiene Promotion and Behavioral Change	4.1 Behavior Change and Community Engagement	Design and implementation of behavior change communication campaigns; community mobilization; engagement of women and vulnerable groups; awareness programs on hygiene practices.
	4.2 Hygiene Promotion and Public Health Measures	Promotion of handwashing and safe water handling; menstrual hygiene management (MHM) awareness; safe disposal of child feces; integration of hygiene promotion with WASH services.

2.5 Updated Scope of Assessment

- **New Baselines:** Collection of physical, biological, and socioeconomic data for all sixteen districts.
- **Voluntary Land Donation (VLD):** Development of a Resettlement Framework (RF) specifically to manage small land parcels required for village-level infrastructure.
- **Targeted Consultations:** Fresh engagement in at least 5 villages per sample district, ensuring separate dialogues with men, women, and marginalized groups to prevent social exclusion.
- **Digital Integration:** Implementation of a new digital tool for real-time tracking of stakeholder engagement and grievance redress

2.6 Project Area

The following sixteen districts have been identified (as listed in **Table 3** and depicted in **Figure 1**) for investments under the revised project scope. Seven of these (marked as Sample Districts) will undergo intensive stakeholder workshops and fresh environmental and social baseline data collection.

Table 3: Districts for STAR-WASH-1

Geographical Zone	Sample Districts (High Intensity)	Additional Priority Districts
Coastal	Badin	Sujawal

Center	Naushero Feroz	Shaheed Benazirabad, Matiari
South	Sanghar	Mirpurkhas, Tando Allahyar, Hyderabad
North Left	Khairpur	–
North Right	Larkana	Shikarpur, Kambar Shahdadkot, Kashmore
Arid / Rainfed	Jamshoro – Right Bank	-
Right Bank	Dadu	-

2.7 Project's Implementation Methodology - Performance Based Contract and Public Private Partnership

The project will be implemented via hybrid delivery model that combines both approaches i.e., Performance Based Contracting (PBC) and Public Private Partnership (PPP) ensuring efficiency, accountability and long-term sustainability of WASH service delivery

Under the PBC framework, performance linked contracts will be established at multiple tiers of implementation, that includes the PIU, contractors, service providers, VO and village level structure. Payments and contractions obligation will be directly tied to the achievement of predefined Key Performance Indicators (KPIs), ensuring that implementation quality, service delivery standards, and environmental and social compliance are consistently met. This multi-tiered performance monitoring system will enable real-time oversight, strengthen accountability, and incentivize results-based execution across all levels.

Under the PPP model, the project will engage private sector entities for the design, construction, operation, and maintenance (O&M) of selected WASH infrastructure and services. The PPP approach will leverage private sector efficiency, innovation, and technical expertise, while maintaining public sector oversight and regulatory control. Risk-sharing arrangements will be clearly defined, with operational and performance risks largely transferred to private operators, supported by long-term service agreements focused on sustained service delivery.

A structured tariff mechanism will be introduced for the provision of water supply services. The tariff will be designed to be affordable and socially inclusive, while ensuring cost recovery for routine operation and maintenance (O&M) of the systems. Revenue generated through tariffs will primarily be utilized to finance maintenance activities, including system repairs, energy costs, desludging services, and operational staffing, thereby enhancing the financial sustainability and longevity of WASH infrastructure. Provisions will be incorporated to safeguard access for vulnerable and low-income households through targeted subsidies or cross-subsidization mechanisms, where required.

Performance monitoring under both PBC and PPP modalities will be supported through digital Management Information Systems (MIS), third-party validation (TPV), and community-level

feedback mechanisms. Payments to private operators will be linked to service delivery outcomes, including water quality, supply reliability, and environmental and social compliance.

Both PBC and PPP modalities will incorporate Environmental and Social (E&S) performance requirements as integral contractual obligations, ensuring full compliance with the World Bank Environmental and Social Standards (ESSs).

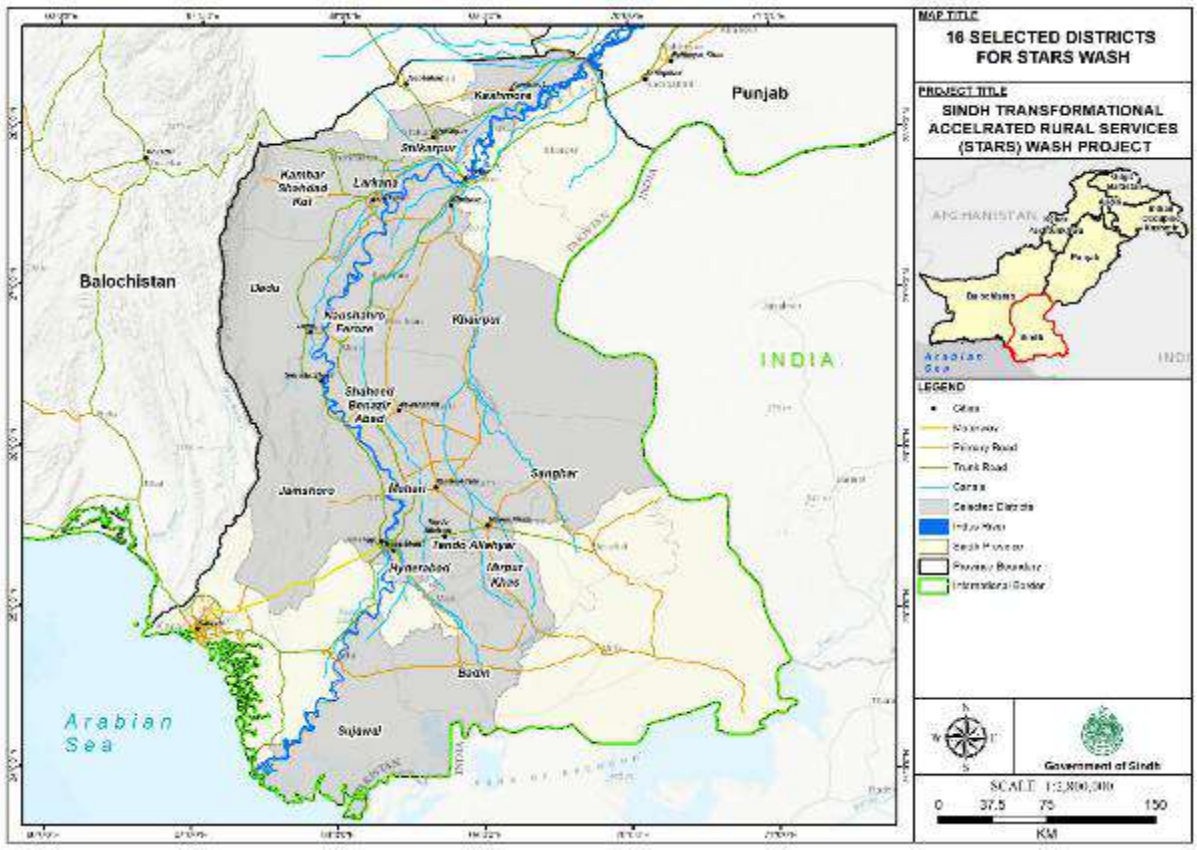


Figure 1: Showing Selected Districts for STAR WASH - I Project

2.8 Methodology for the Selection of Targeted Settlements

2.8.1 Selection Framework and Data Integration

The selection of targeted settlements is driven by a systematic, evidence-based approach that integrates demographic data with geospatial analysis. By evaluating settlements at the Tehsil, Deh, and Union Council levels, the methodology ensures that interventions are localized and context-specific. The process begins with the identification of projected population figures for 2025, allowing the project to anticipate future demand and prioritize areas where the concentration of beneficiaries is highest. This quantitative foundation is further refined by categorizing settlements into high, medium, and low-density clusters, which dictates the scale and type of environmental and social interventions required.

Badin, Dadu, Jamshoro, Khairpur, Larkana, Naushahro Feroze, and Sanghar each contribute five settlements, totaling about 46,936 projected residents. High-density clusters dominate (92%), reflecting emphasis on populous areas like Mazarpur Mallah-Lakhadi (3,035 pop.) while including low-density cases for balanced representation.

1.1.1 Vulnerability and Accessibility Metrics

A critical component of the selection is the "Near Distance" metric, which measures the proximity of a settlement to its primary water source. This indicator serves as a proxy for socio-economic vulnerability; settlements located at a significant distance from water sources, some exceeding 9 kilometers, are prioritized to alleviate the physical and economic burden on the community. By correlating population density with distance to essential resources, the framework identifies "service deserts" where the need for infrastructure is most acute. This ensures that the selection process moves beyond mere convenience, focusing instead on reaching the most underserved populations within the targeted districts.

Settlements were stratified by cluster density (High, Medium, Low) based on projected 2025 populations ranging from 124 to 3,060 persons. Primary criteria targeted the highest population in high-density clusters nearest to water sources (e.g., 0.14 km in Badin), with controls for the lowest population farthest away (up to 9.83 km in Jamshoro) to capture vulnerability gradients. This ensures equitable focus on demographic pressure and access gaps, aligning with World Bank ESF requirements for risk-based targeting.

1.1.2 Geospatial Validation and Compliance

To maintain high standards of technical accuracy and environmental oversight, every candidate settlement is mapped using precise GPS coordinates. These coordinates allow for the integration of site-specific data into the broader Environmental and Social Management Framework (ESMF) screening process. This geospatial validation ensures that selected sites do not encroach on protected ecological zones or culturally sensitive areas. Furthermore, the application of standardized "ESS Settlements Selection Criteria" provides a transparent and replicable logic for decision-making, ensuring that the selection of one village over another is based on objective environmental and social safeguards rather than subjective preference. The criteria summary for the selection of settlements is given in a tabular form in **Table 4.** While the location maps of the selected villages in depicted in **Figures 2 to 8.**

Table 4: Criteria Summary for Selection of Settlements

District	Count	High Density	Medium Density	Low Density	Total Pop (2025)	Aug. Distance (km)
Badin	5	4	1	0	7,613	1.64
Dadu	5	4	1	0	8,962	1.75
Jamshoro	5	4	0	1	3,372	3.22
Khairpur	5	4	1	0	7,307	1.72
Larkana	5	4	1	0	6,652	1.64
Noshehro Feroze	5	4	1	0	7,661	2.19
Sanghar	5	4	0	1	5,369	1.82

35 settlements selected across 7 districts; 92% High Density Clusters; criteria emphasize population size (124–3,060) and water proximity (0.14–9.83 km). Total projected population: ~46,936.

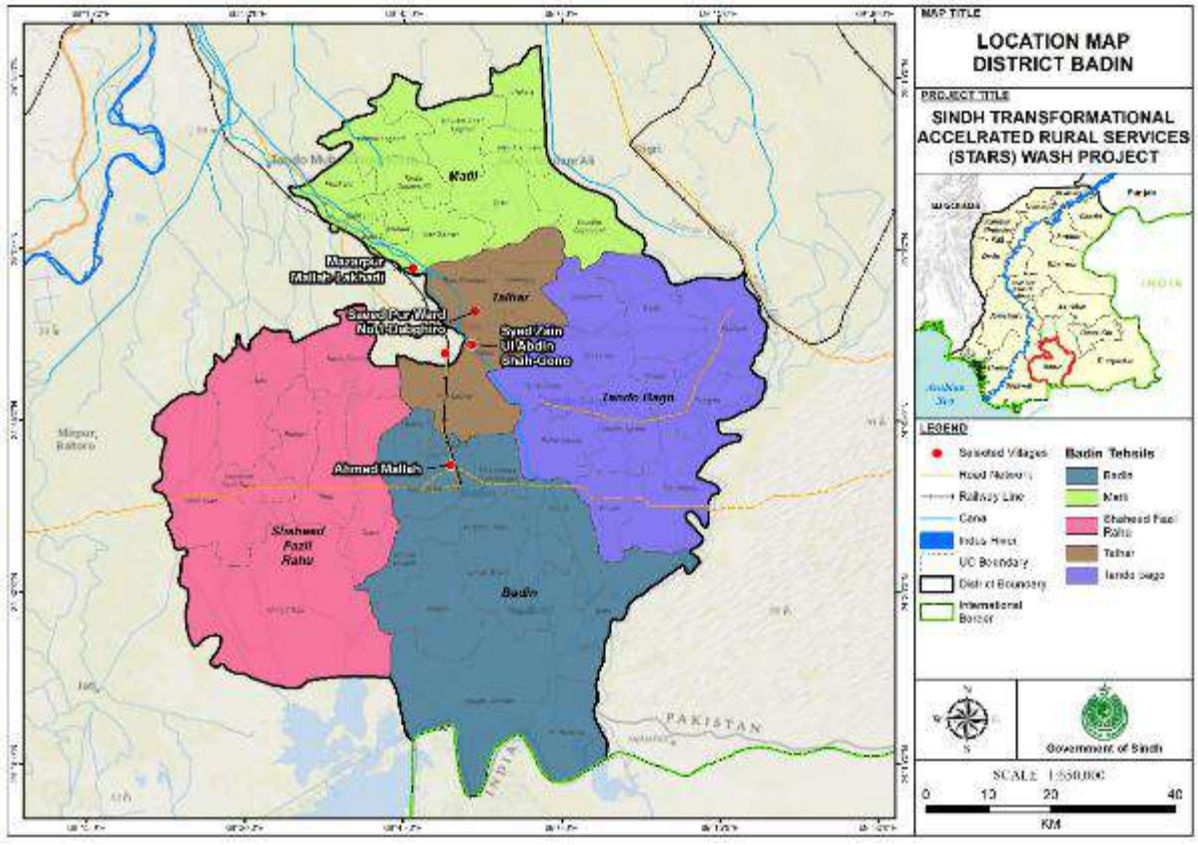


Figure 2: Location Map of Selected Villages in District Badin

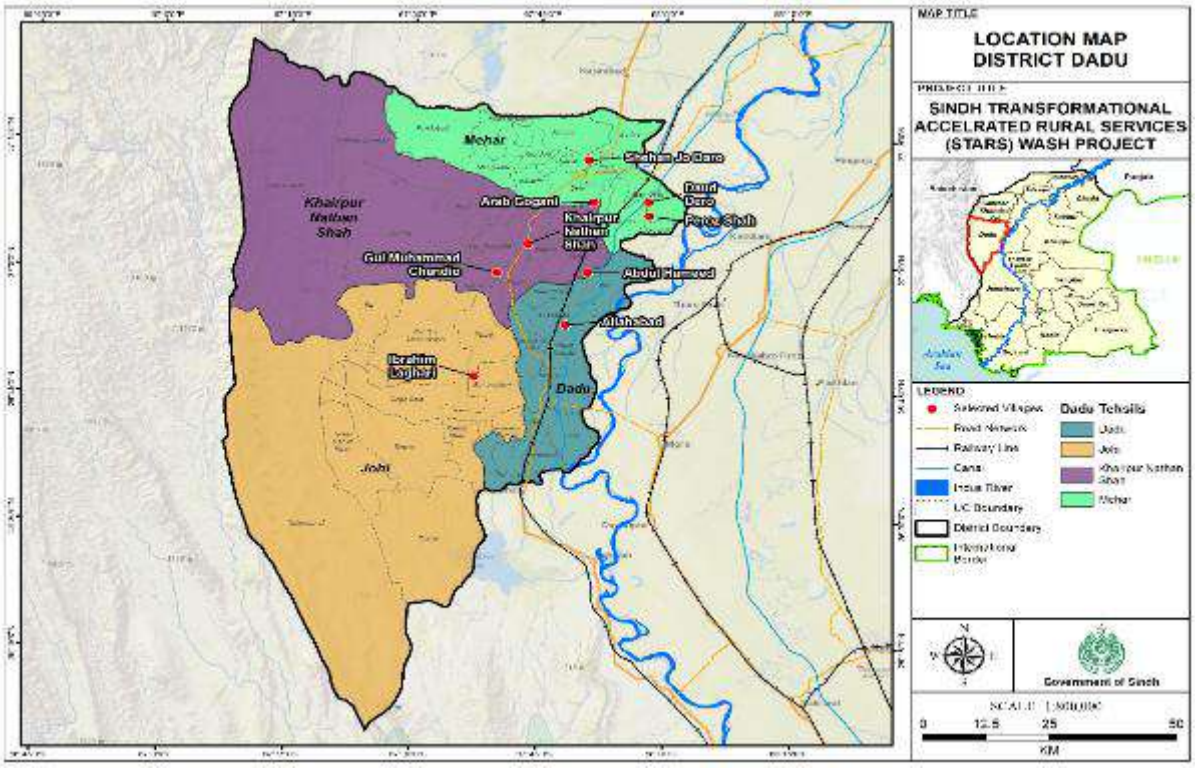


Figure 3: Location Map of Selected Villages in District Dadu

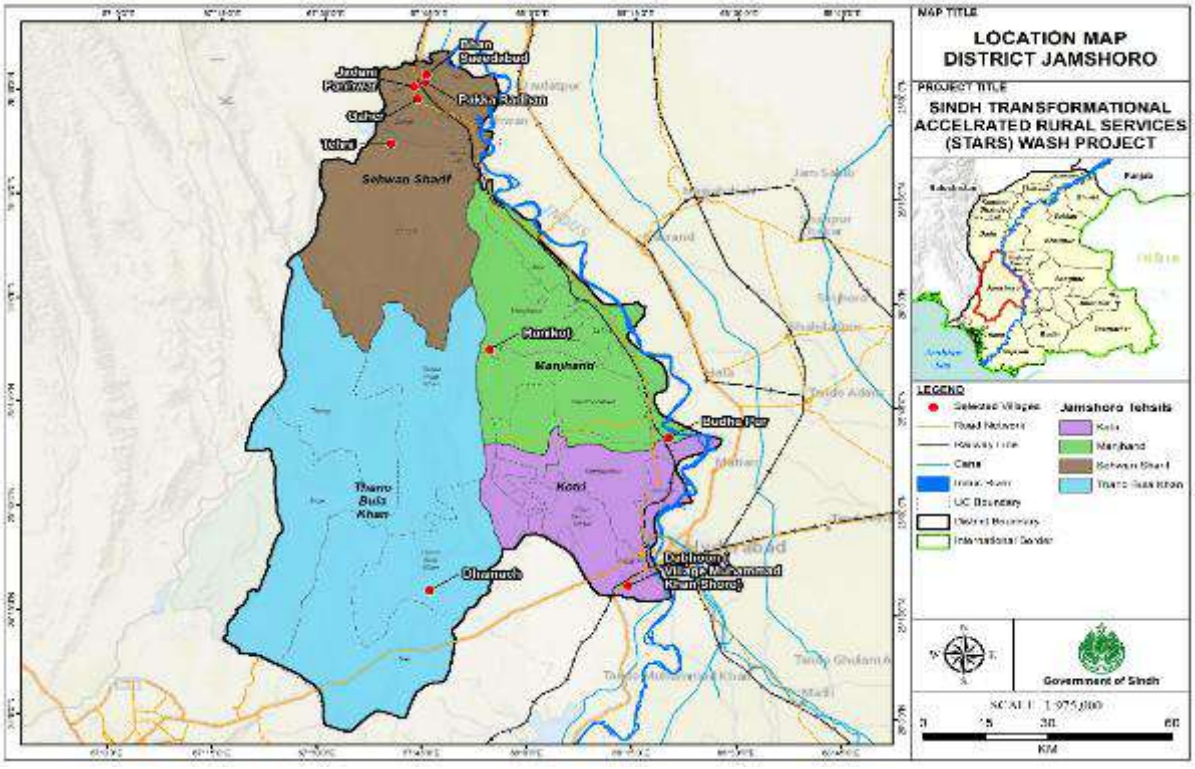


Figure 4: Location Map of Selected Villages in District Jamshoro

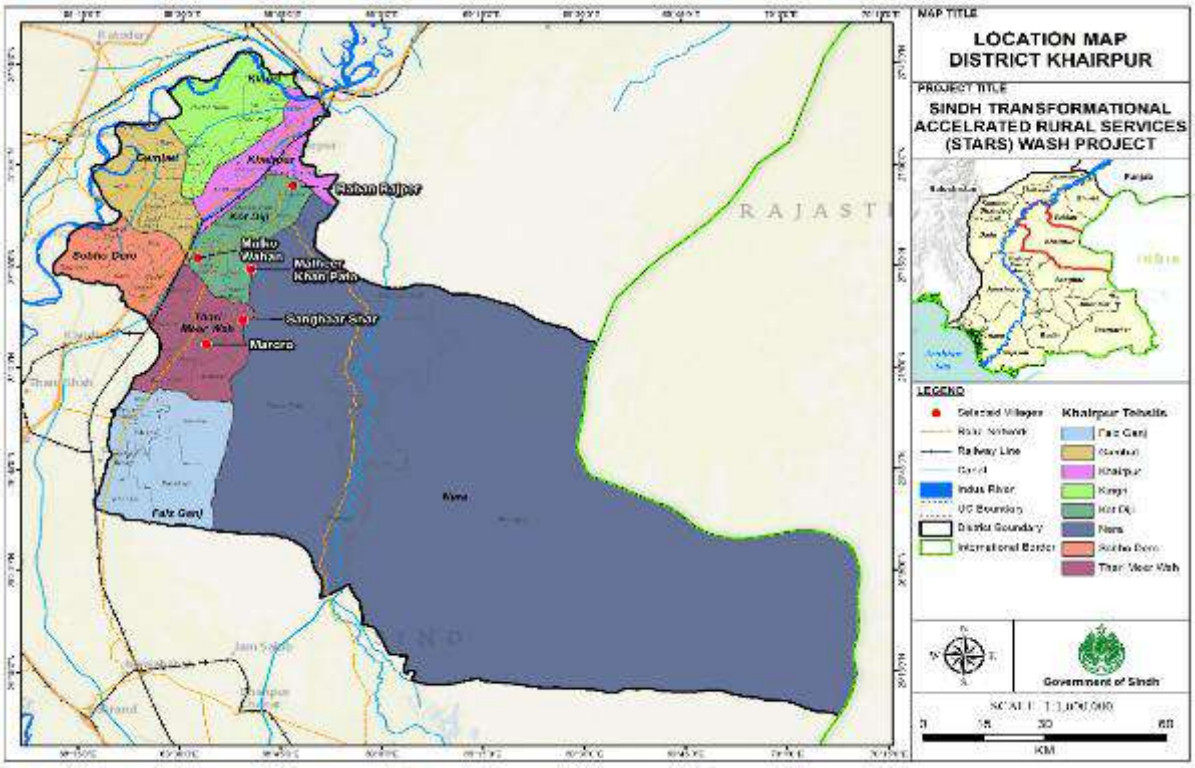


Figure 5: Location Map of Selected Villages in District Khairpur

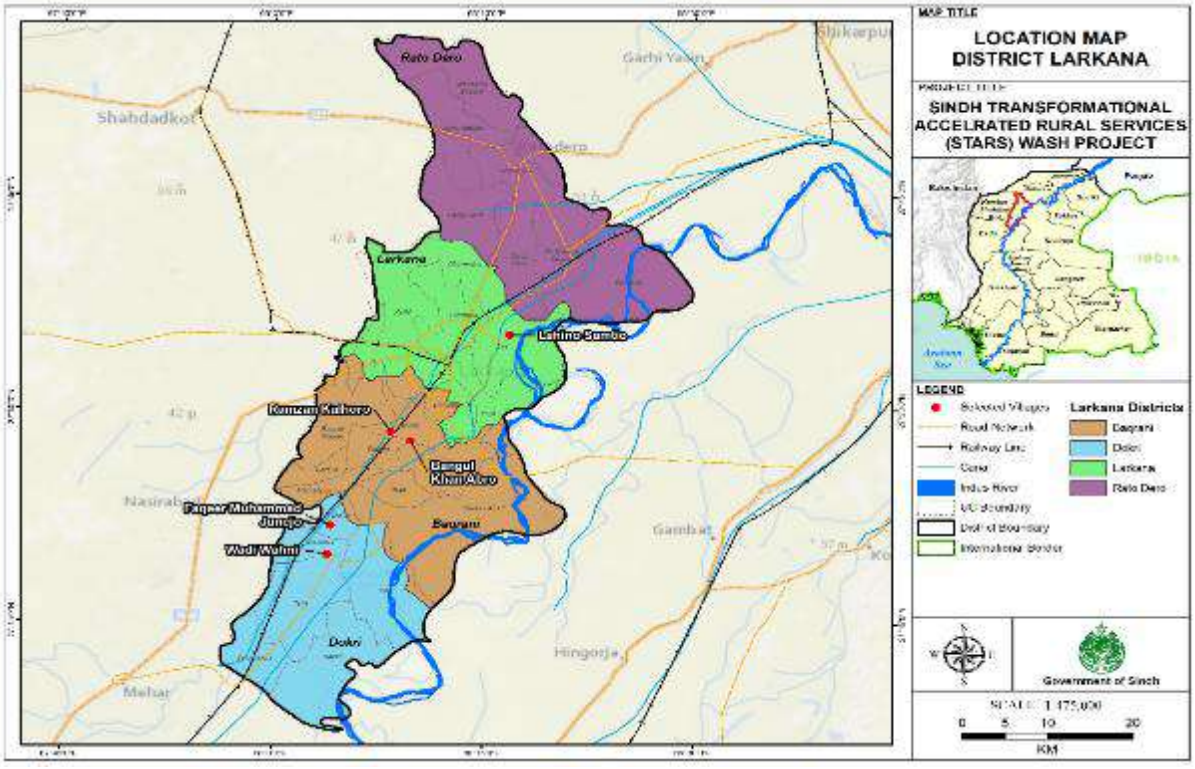


Figure 6: Location Map of Selected Villages in District Larkana

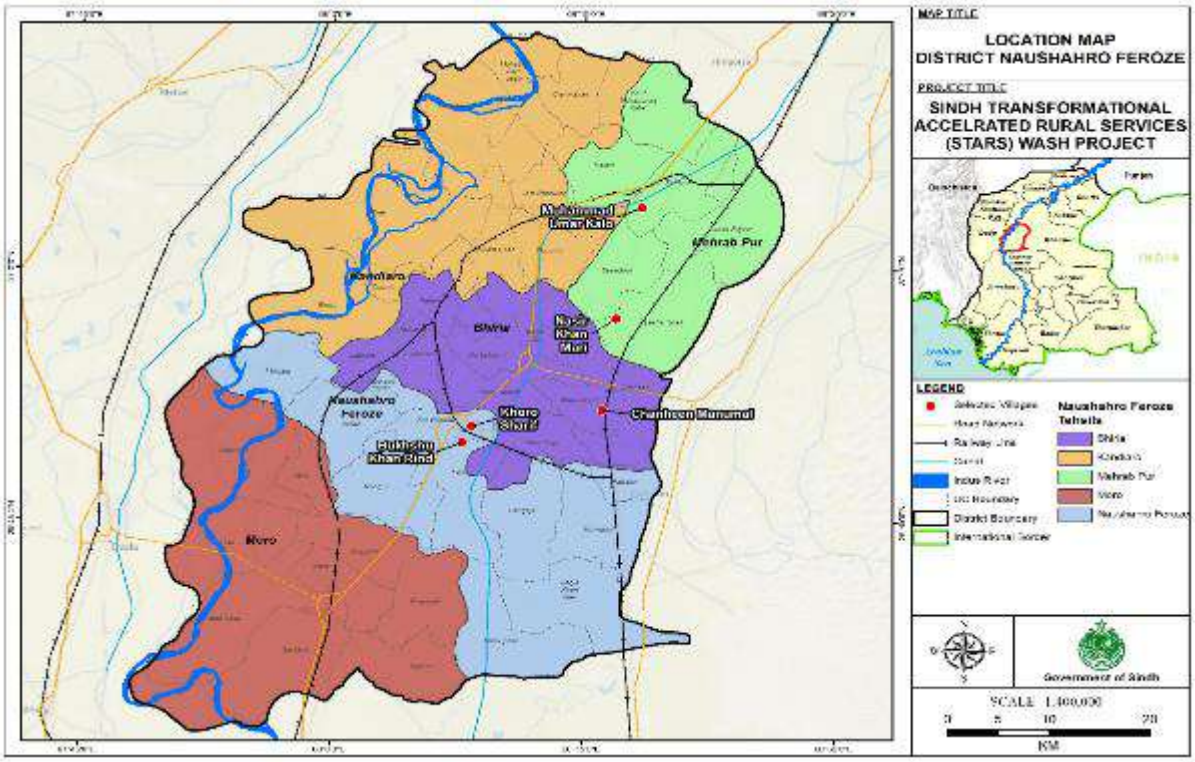


Figure 7: Location Map of Selected Villages in District Naushero Feroze

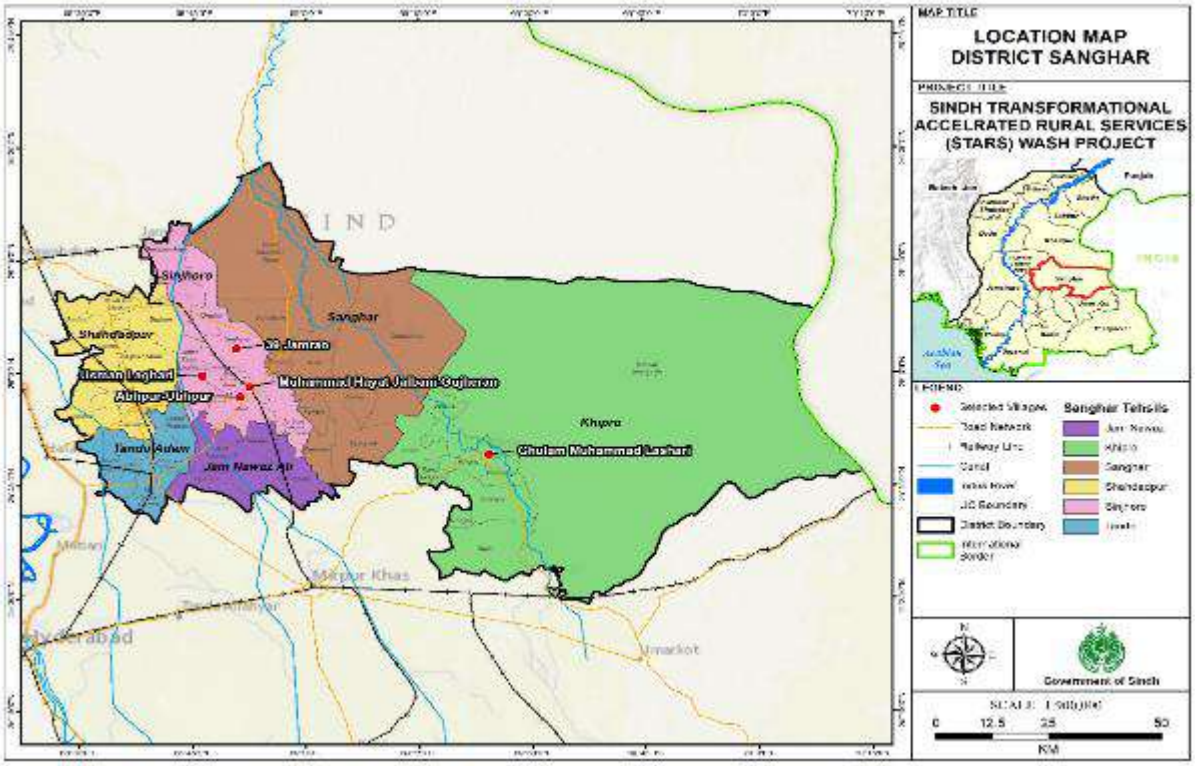


Figure 8: Location Map of Selected Villages in District Sanghar

2.9 Selected Villages in Seven Sampled Districts

The proposed project interventions cover 16 districts as depicted in **Figure 9**. For stakeholder consultations and focus group discussions (FGDs), the project applied the same methodology used under the SPHF WASH component, which classifies Sindh into seven geographical zones: Coastal, Centre, South, North Left, North Right, Arid/Rainfed, and Right Bank.

Based on this zonal approach, a total of 7 districts were selected, with 5 villages identified in each district according to the following criteria:

i. High-Density Cluster

- One village with the highest population is located closest to the project-identified water source
- One village with the highest population is located farthest from the project-identified water source
- One village with the lowest population is located farthest from the project-identified water source
- One village with the lowest population is located closest to the project-identified water source

ii. Low-Density Cluster

- One village with the highest population within the low-density category.

This geographic spread encompasses a diverse range of administrative units, including numerous Tehsils and Union Councils, ensuring that the framework addresses both urban peripheries and remote rural settlements. The list of selected villages in the seven sampled districts has been given in **Table 5**.

Table 5: List of Selected Villages in Seven Sampled Districts

District	Tehsil/ Taluka	Union	Deh	Village
Badin District	Matli	Haji Sawan	Lakhadi	Mazarpur Mallah-Lakhadi
	Badin	-	Karabari	Karabari/Ahmed Mallah
	Taluka Talhar	Pir Ali Bahadur Shah@ Chanri	Gono	Syed Zain Ul Abdin Shah-Gono
	Taluka Talhar	Wasi Adil	Dabghiro	Saeed Pur Ward No 1-Dabghiro
	Taluka Talhar	Haji Muhammad Ashraf Thebo @ Rip	Sandki	Mian Pota-Sandki
Dadu District	Khairpur Nathan Shah	Rahooja	Dangar	Abdul Hameed
	Mehar	Kolachi	Lalo Ghari	Arab Gogani
	Mehar	Sobho Magsi	Peroz Shah	Peroz Shah
	Mehar	Shah Panjo	Kacho Nari	Daud Dero

District	Tehsil/ Taluka	Union	Deh	Village
	Khairpur Nathan Shah	Fatehpur	Qomi Charo	Khairpur Nathan Shah
Jamshoro District	Sehwan	Jhangara	Tehni	Tehni
	Sehwan	-	Gahir	Gahir
	Sehwan	Wahur	Wahur	Jadani Panhwar
	Sehwan	Shaikh	Karyani	Pakka Radhan
	Sehwan	Shaikh	Bhan	Bhan Saeedabad
Khairpur District	Kot diji	Jhando Mashaikh	Mulko Wahan	Malko Wahan
	Mirwah	Hindyari	Hindyari	Maroro
	Mirwah	Talli @ Sabbar Rind	Nazim Shar	Sanghaar Shar
	Kot diji	Goondariro	Goondariro	Raban Rajper
	Kot diji	Bapho	Nebahoo Pata	Malheer Khan Pato
Larkana District	Dokri	Wadi Wahni	Wadi Wahni	Wadi Wahni
	Dokri	Gujhar	Dokri	Faqeer Muhammad Junejo
	Bakrani	Pathan	Bhangi Kalhoro	Ramzan Kalhoro
	Bakrani	Pathan	Shaikh Fojo	Bangul Khan Abro
	Larkana	Agani	Lahno Samtio	Lahino Samtio
Noshahro Feroze District	Naushahro Feroze	Naushahro Feroze MC	Dhori Bachal	Bukhshu Khan Rind
	Naushahro Feroze	Naushahro Feroze MC	Sarhal	Khoro Sharif
	Bhiria	Chaheen	Chaheen Manomal	Chanheen Manumal
	Taluka Meharabpur	Saeedpur	Syed Shuja	Muhammad Umar Kalo
	Taluka Meharabpur	Saeedpur	Deengaro	Nasir Khan Mari
Sanghar District	Khipro	Hathungo	Dhadhro	Ghulam Muhammad Lashari-Dhadhro
	Sinjhoro	-	Bitoor	Bitoor / Usman Laghari
	Sinjhoro	Shah Mardanabad	39 Jamrao	39 Jamrao-39 Jamrao
	Sinjhoro	Abbas Abad	Ubhpur	Abhpur-Ubhpur
	Sinjhoro	Kurkly	Gujheran	Muhammad Hayat Jalbani-Gujheran

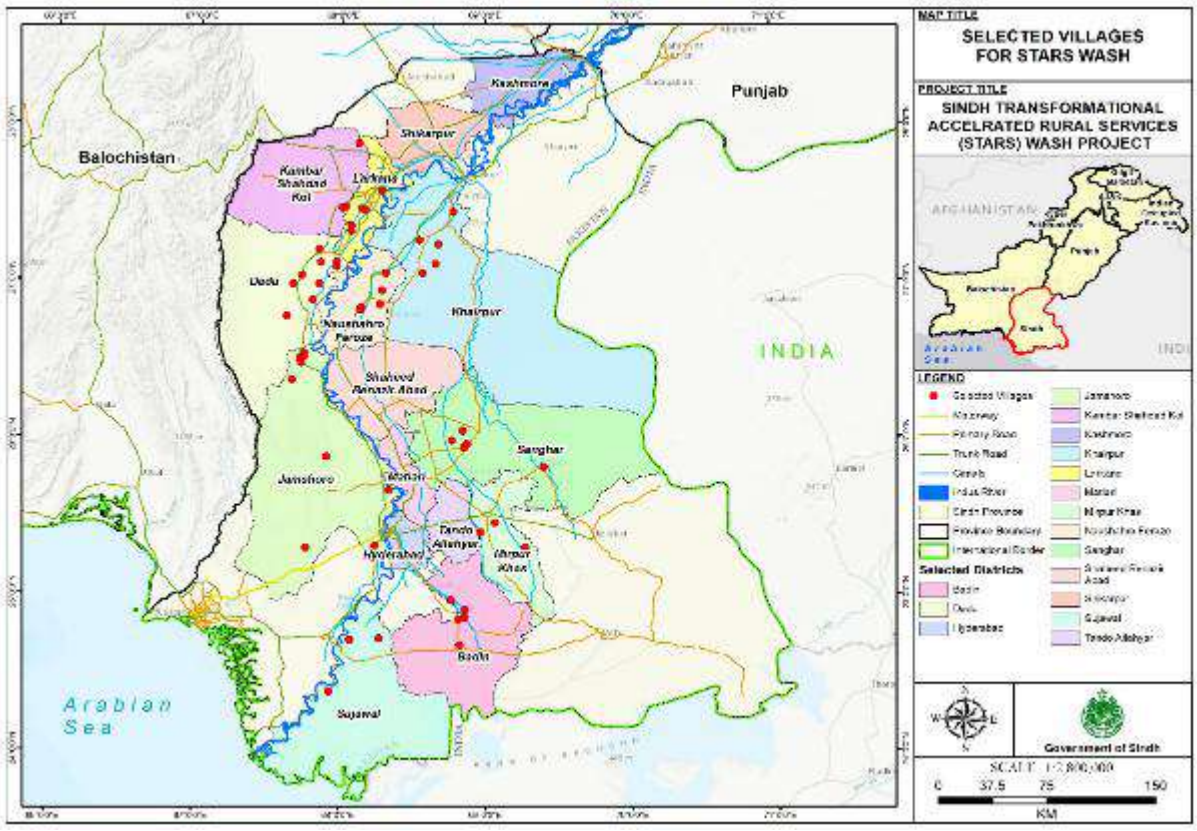


Figure 9: Location Map of Selected Villages

2.10 Summary for ESMF Integration

2.10.1 Strategic Alignment and Social Equity

The settlement selection process is designed to align with the core principles of the Environmental and Social Management Framework (ESMF) by promoting inclusivity and social equity. By targeting districts such as Badin, Dadu, Larkana, and Sanghar, the project addresses regional disparities through a rigorous filtering process that favors high-density clusters and marginalized communities. The selection logic explicitly accounts for the projected 2025 population, ensuring that the infrastructure remains sustainable and relevant throughout its intended lifecycle. This proactive planning minimizes the risk of social exclusion and ensures that project benefits are distributed equitably among the most vulnerable stakeholders.

2.10.2 Environmental Safeguarding and Resource Management

From an environmental perspective, the methodology serves as a preliminary screening tool to assess resource pressure and potential impacts. By documenting the distance to water sources and the density of settlements, the ESMF can better predict the cumulative impact of

sub-projects on local aquifers and land use patterns. The use of precise longitudinal and latitudinal data facilitates a rapid environmental assessment of each site, allowing for the early identification of mitigation measures. This structured approach ensures that all selected villages meet the stringent environmental compliance requirements of the project while maximizing the efficiency of resource allocation across the diverse landscapes of Sindh.

2.11 Feasibility Study

The design consultant also carried out a thorough technical survey and site reconnaissance. In accordance with the revised criteria, the existing studies will be considered as reference material to ensure consistency and comparability with the new/ updated assessments.

During 2023-2024 survey, PHED and local administration officials in the districts[10] were consulted to gather data on existing water supply and sewerage schemes in the selected villages. All existing water supply and sanitation facilities were physically inspected during site visits. Additionally, influential landowners and local residents in all the selected villages were consulted to understand the current sanitation conditions, reasons for infrastructure failure/issues related to sanitation, and available water sources.

For Component 1 activities such as feasibility studies, investment planning, sector strategies, technical assistance and sector reforms, E&S considerations shall be integrated from the outset. Terms of reference and technical studies shall identify relevant E&S risks, alternatives, resource constraints, climate and disaster risks, land implications, stakeholder considerations, and downstream safeguards requirements so that future investment and planning decisions are consistent with the ESF and this ESMF. Where Component 1 outputs may lead to physical investments, the resulting recommendations shall identify the E&S screening and instrument requirements that will apply before those investments proceed

2.11.1 Site Reconnaissance

This initial stage involves meetings with PHED officials in each district to collect preliminary data. Information is also gathered from residents, and route maps of selected villages are created. The current water supply and sanitation conditions are evaluated, along with a house count, to gauge the project's scope. This stage establishes a baseline for more detailed studies.

[10] The design consultant completed the feasibility study for selected villages in nine districts, working separately from the Environmental and Social Management Framework (ESMF) consultant. Out of the previously included districts, five are still part of the project – Start Wash - I (retained districts: Dadu, Kambar Shahdadkot, Sujawal, Mirpurkhas, Jamshoro), while four have been dropped (exclude districts Jacobabad, Umerkot, Tharparkar, Thatta) after reviewing the project scope. In addition, eleven new districts have been added under the STAR WASH I program. Detailed feasibility studies for these new districts (Badin, Naushero Feroz, Sanghar, Khairpur, Matiari, Shaheed Benazirabad, Larkana, Shikarpur & Tando Allahyar) will be carried out later. However, it is expected that the basic design conditions, relevant project factors, and overall parameters will stay mostly the same, with no major differences anticipated.

2.11.2 Topographic Survey

A comprehensive ground control network was established using GNSS coordinates. Streets, roads, and transmission lines were mapped, and detailed layout drawings of proposed water and sanitation networks were produced. These surveys had been finalized prior to the commencement of detailed technical assessments.

2.11.3 Detailed Technical Survey

Stakeholder consultations and site visits were carried out to assess existing water supply and sewerage systems. Data on available water sources consumed by PHED and locals was compiled, and suitable land parcels for overhead reservoirs (OHR), pump stations (PS), and treatment plants for wastewater (WWTP or SWTP) were identified. Failures in existing infrastructure were analyzed, and GIS mapping was performed to integrate findings. This phase had been informed by the reconnaissance and topographic surveys.

2.11.4 Groundwater Studies

This involves conducting electrical resistivity surveys and hydrological studies to understand subsurface conditions and water availability. These studies help identify potential groundwater sources and assess their viability for the project.

2.11.5 Social Survey

This survey evaluates the living standards, health, and hygiene conditions of the population. It assesses the community's willingness to pay for improved services, issues related to land acquisition, and their needs and demands. Social and cultural issues are also considered to ensure the project is socially inclusive and acceptable to the community.

2.11.6 Laboratory Testing

Quality testing of groundwater, surface water, and wastewater has been conducted in this phase. These tests are essential for assessing the suitability of water sources and designing appropriate treatment processes to ensure safe and reliable water supply and sanitation services.

2.12 Proposed Design for Project Components

Based on extensive surveys by the technical teams, including comprehensive groundwater studies, electrical resistivity surveys, and groundwater/surface water testing, various water supply systems, drainage, and wastewater treatment plants have been proposed, taking into account the prevailing conditions of the area.

2.12.1 Design Considerations of the Proposed Water Supply System

A piped network will be proposed for sustainable sources and areas with pacca houses and planned streets. Groundwater will be extracted through tubewells, which will fill overhead tanks, supplying water through a main loop designed using the Draw Method. Water lines will be laid on one side of the street, with connections to houses on both sides.

Public standposts will be proposed for unsustainable sources and minor settlements. Medium Level Reservoirs (MLRs) will be filled through tubewells and serve as public standposts. Taps attached to these MLRs will allow residents to collect drinking water.

The salient features of the proposed water supply network are as follows:

- The water supply network is planned as a grid system covering the entire village.
- A fill-and-draw system will be designed for each village, as described earlier.
- The network has been designed considering the population density of the area.
- Dead ends are avoided as much as possible.
- The network is proposed to follow existing tracks (both katcha and soling), and if no roads are present, it will adapt accordingly.

1.1.2.1 Design Principle of Water Supply System

The existing water supply system in each village has been discussed in detail in Section 3 of Feasibility Study Report Volume – II. Based on the findings from extensive surveys conducted by technical teams, including comprehensive groundwater studies, electrical resistive surveys, and groundwater/surface water testing, various water supply systems are proposed, taking into account the prevailing conditions of the area.

For a sustainable water source, groundwater will be extracted through tubewells, which will fill overhead tanks. Water will then be supplied through these tanks using the Fill and Draw Method. Schematic diagrams of the proposed water supply system can be seen in **Figures 10 -12**.

Water lines will be laid on one side of the street, with house connections extending to homes on the other side. While the alternative of providing two water lines on both sides of the street was considered, it was not chosen for the following reasons:

- The capital cost of laying a water line on one side of the street is less than the cost of laying two lines on either side.
- The operation and maintenance costs of maintaining two lines are higher than maintaining one line on one side of the street.
- Many village streets are unpaved, so pipe crossings for house connections will not typically require dismantling roadwork.

For less sustainable water sources, Medium Level Reservoirs (MLRs) have been proposed. These reservoirs will be filled through tubewells and will act as public standposts.

In smaller settlements, Medium Level Reservoirs (MLRs) will be provided, equipped with taps, allowing residents to collect drinking water from these tanks.

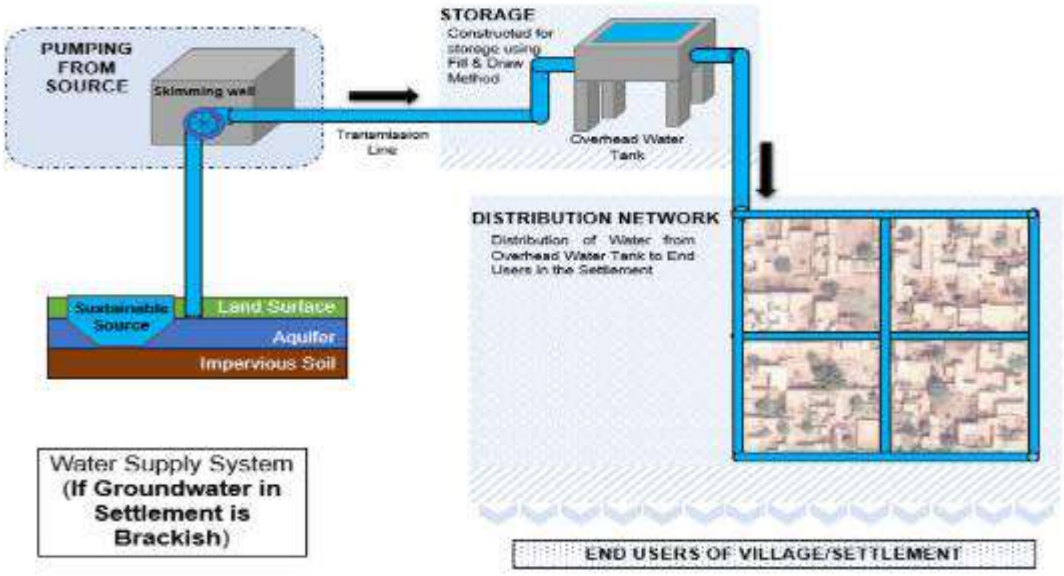


Figure 10: Schematic of Water Supply System for Villages

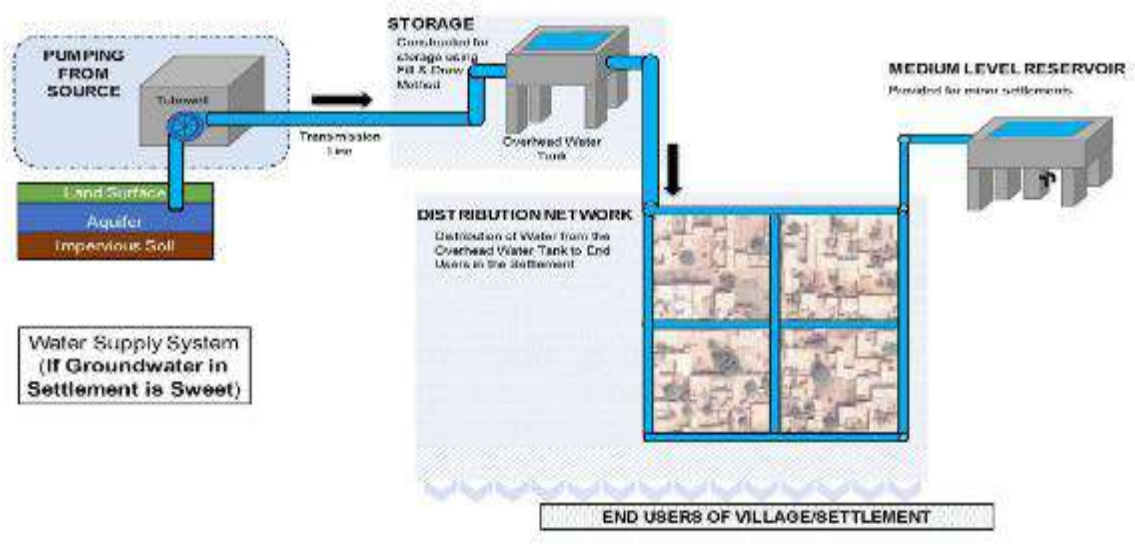


Figure 11: Schematic of Water Supply System for Village and MLR for Minor Settlements

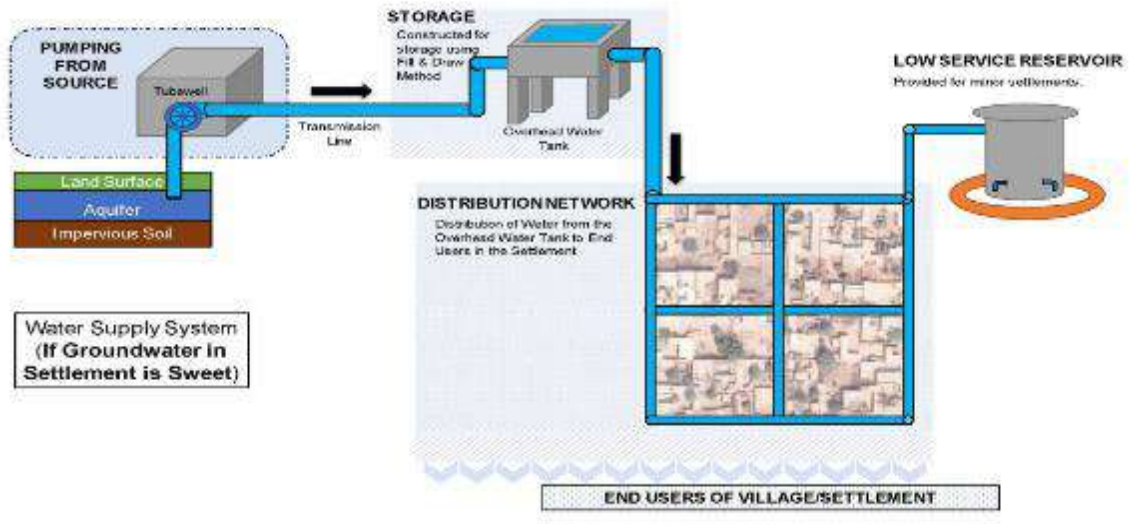


Figure 12: Schematic of Water Supply System for Village and LSR for Minor Settlements

2.12.2 Water Source Study

The Groundwater Source Study, including Electrical Resistivity Survey (ERS) and water quality testing, is detailed in Volume 4 of the Feasibility Study Report in Section 10.

2.12.3 Components of the Water Supply System

The proposed water supply system in all the villages includes the following components:

a) Tubewells/Water Pumps

Based on the groundwater source study report, water (either groundwater or surface water) will be extracted through tubewells. These tubewells will fill the overhead water tanks or medium-level reservoirs, which will then supply water to the village.

b) Water Storage Tanks

As discussed in Section 4 of Volume II (Design Criteria), a fill and draw system has been proposed for the villages. To ensure a reliable water supply, tubewells will fill overhead water tanks or medium-level reservoirs (MLRs), which will then distribute water to the village. The overhead reservoirs (OHRs) and MLRs are designed to hold one-third of the average daily demand, meaning they will be filled three times a day to provide a continuous 24-hour water supply. Four different capacities of OHRs and three capacities of MLRs are proposed for thirty villages.

c) Water Supply Network

The overhead tanks will supply water through a network covering the entire village. A main loop will distribute water to secondary and tertiary networks, using HDPE pipes for the water network.

d) Public Stand-Post

In some villages, public stand-posts have been provided, which will be fed directly by the OHR. By implementing these components, the proposed water supply system aims to ensure a sustainable and reliable water supply for the villages.

2.12.4 Design Considerations of the Proposed Sewerage System

1.1.2.2 Design Principle of Sewerage System

Currently, the project area villages lack a proper sewerage system, with multiple disposal points present in most areas. The main objective of the proposed sewerage system is to collect sewage from the villages and dispose of it after a certain degree of treatment to enhance the overall environmental, sanitation, hygienic, and social conditions of the villages. Different types of sewerage systems are proposed for various villages. The proposed sewerage systems include the following components:

- House connection chambers
- Sewer lines
- Sewage pumping station (including a screening chamber and wet well)
- Sewage treatment plant (comprising an Anaerobic Baffled Reactor (ABR) and Waste Stabilization Ponds (WSP))
- Septic tanks and soakage pits
- Sewage sucker truck (SST)

Based on various technical, financial, and social considerations, as well as prevailing conditions, five types of sewerage systems are proposed for the villages as outlined in the Design Criteria (for details, refer to Volume II: Proposed Water and Sanitation System, Section 4: Design Criteria and Alternative Analysis). The six types of sewerage systems are as follows:

i. Sewer lines with Pumping Station & WWTP
ii. Drains with Pumping Station & WWTP
iii. Sewer Line with Communal Septic Tanks
iv. Septic tanks and Soakage pits
v. Septic tanks and Sewage Sucker Truck (SST)
vi. Septic tanks +and Soakage pits + Sewage Sucker Truck

For larger settlements, sewer lines have been provided. These lines have been laid in the center of the street, with house connection chambers placed between every two houses on both sides of the street to collect sewage into the sewer line. Although the alternative of laying two sewer lines on both sides of the street was considered, it was not chosen for the following reasons:

- The capital cost of laying one sewer line in the center of the street is less than the cost of laying two lines on either side.
- The operation and maintenance costs of maintaining two lines are higher than maintaining one central line.
- Many village streets are unpaved, so pipe crossings for house connections will not typically require dismantling roadwork.

A schematic of the proposed sewerage system is shown in **Figure 13**, and a schematic of a septic tank with a soakage pit connection is shown in **Figure 14.**

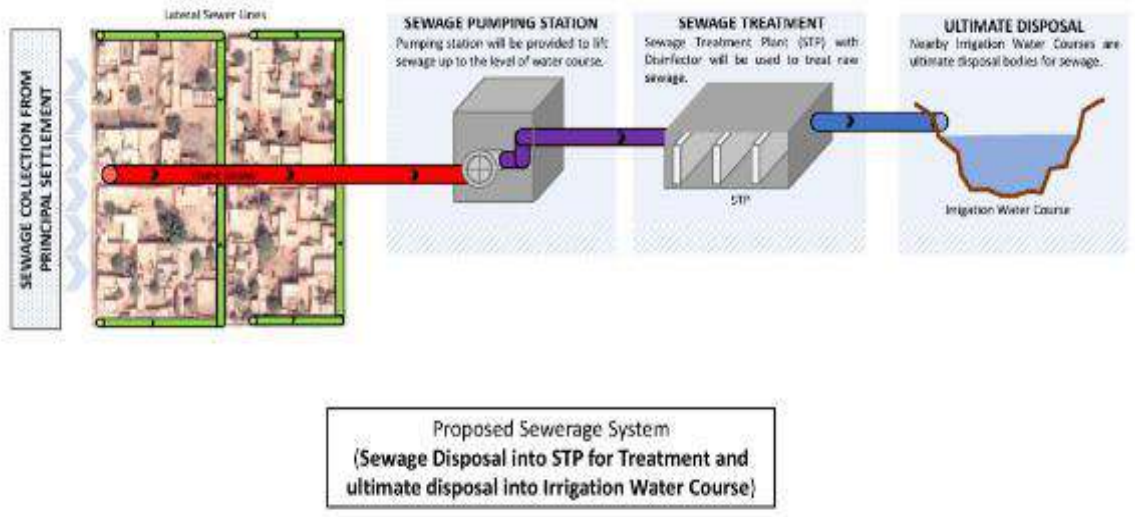


Figure 13: Schematic of Proposed Sewerage System

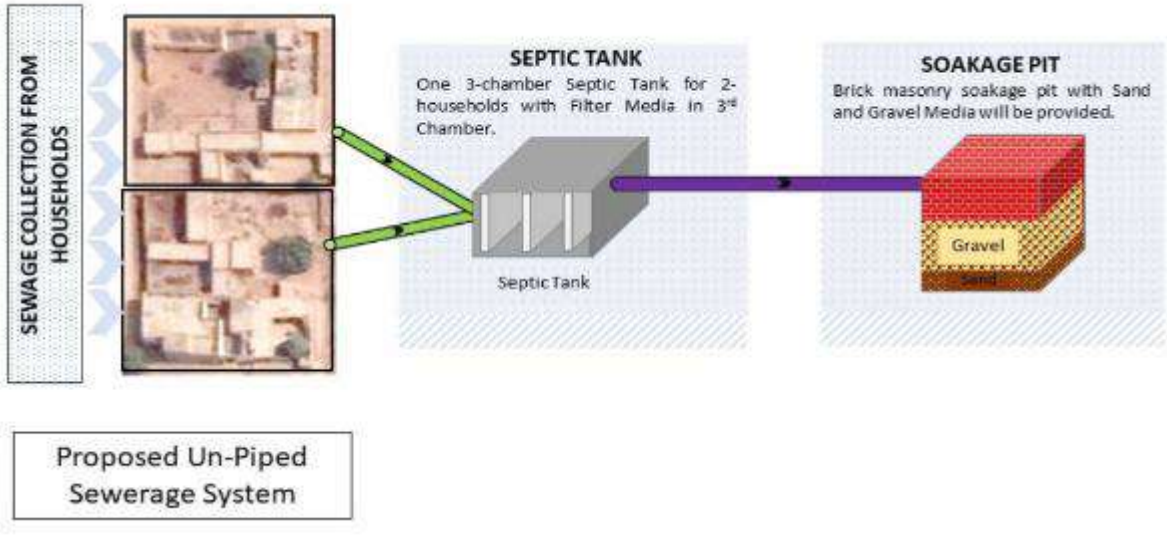


Figure 14: Schematic of Proposed Septic Tank with Soakage Pit

In smaller settlements, where sewer lines or drains are not provided, individual houses will have septic tanks with soakage pits. Toilets in these houses will connect to a three-chamber septic tank, where sewage is treated anaerobically. The last chamber contains filter media to further remove pollutants before the treated effluent is carried to a soakage pit. Here, the effluent percolates into the ground, with soil acting as a filter to remove contaminants and pathogens. The soakage pit includes layers of sand and pea gravel for additional filtration.

In some villages with a shallow groundwater table, soakage pits are not used to avoid contamination. Instead, a sewage sucker tank will collect the treated effluent from the septic tanks and dispose of it in a nearby water body.

In some settlements, many houses lack washroom/toilet facilities, leading to open defecation in fields. This practice contributes to poor sanitation and unclean conditions. For these settlements, separate toilet and bathroom facilities will be provided inside individual houses, with a septic tank and soakage pit. This initiative aligns with UN SDG-06, which aims to improve sanitation, and addresses the World Bank's goals for this project. Additionally, providing these facilities will enhance safety for women, who currently face the risk of going outside at night for defecation. Households will be responsible for cleaning and maintaining the toilets.

1.1.2.3 Land Requirements

Land for the proposed project interventions will be acquired through the Voluntary Land Donation (VLD) process, with donated land ownership transferred to the relevant government department.

1.1.2.4 Design of Proposed Sewage Treatment Plants (STPs)

Sewage Treatment facilities are planned for four villages/ settlements. Each village will have a network of pipes to collect sewage and convey it to a proposed pumping station via gravity flow. From the pumping station, the raw sewage will be transported to the proposed Sewage Treatment Plant (STP).

An Anaerobic Baffled Reactor (ABR) with a Disinfection Tank (DT) is proposed for sewage treatment. The treated effluent will be discharged into nearby water bodies (such as watercourses and canals) and subsequently reused for agricultural irrigation. Additionally, any existing ponds (if available) will be de-sludged and used to store treated effluent during sowing and harvesting seasons when the farmers do not require it. This process is expected to create a pleasant ecosystem of native plants and birds.

The ABR will undergo de-sludging after two years of operation, during which the sludge will be stabilized. The stabilized sludge will then be transported to the waste dumping site at the taluka headquarters.

In the remaining villages, onsite septic tanks (either individual or communal) and soakage pits are proposed for sewage treatment. The details of the STP design for each selected village

are presented in the following section 7: Preliminary Design of Proposed Sewage Collection and Treatment System Volume – II Draft Feasibility Study Report.

2.12.5 Provision of Electricity

A hybrid energy system combining an electricity connection from the local distribution company and a designated solar system is proposed for operating the pumps. The pumps will primarily use solar energy to reduce electricity costs and overall operation and maintenance (O&M) expenses, with electricity serving as a backup during emergencies and periods of low sunlight. The client will ensure the acquisition of the necessary land for the solar system and implement strict security measures to protect against theft and damage.

3 Overview of Policy, Legal and Regulatory Framework

3.1 General

This section outlines the applicable national and provincial policies, strategies, and legislative instruments governing environmental and social management relevant to the STAR WASH Project. It also explains their applicability to project activities in line with World Bank Environmental and Social Standards (ESS).

3.2 National Strategies, Policies, and Legislation

The summary of major relevant strategies, policies, acts, and legislation from social and environmental perspectives is briefly described in **Table 6** below:

Table 6: Social and Environmental Strategies / Policies / Statutory requirements

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
1.	National Sanitation Policy (2006)	Safe sanitation, hygiene promotion, waste disposal	Directly relevant to sanitation infrastructure and hygiene intervention
2.	National Drinking Water Policy, 2009 Sindh Drinking Water Policy 2017	The National Drinking Water Policy provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people. Drinking water is the constitutional responsibility of the provincial governments and the specific provision function has been devolved to specially created agencies in cities and towns and Tehsil Municipal Administrations under the Local Government Ordinance 2001.	This policy is applicable to the proposed subprojects during the construction & operation phase in terms of regular water quality monitoring.
3.	National Climate Change Policy 2012 (updated 2021) (NCCP)	It also proposes the promotion of futuristic building designs with special emphasis on solar panels for energy self-sufficiency, especially in public sector buildings and the development of all types of renewable energy generation technologies. The policy thus provides a comprehensive framework for the development of Action Plans for national efforts on adaptation and mitigation.	The core area that is relevant in the context of the proposed project is the use of renewable energy generation technologies for STAR WASH 1 interventions. It promulgates the enactment of the regulatory framework for efficient water resource management, including groundwater. This policy will accelerate due to the emissions from the construction machinery.

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
Provincial Environmental Policies / Strategies and their Relevance			
4.	Sindh Sanitation Policy 2017	The sanitation policy places primary emphasis on enhancing the accessibility of sanitation services, ensuring the safe disposal of both liquid and solid waste, and advocating for improved health and hygiene practices across the entire province. This encompasses the effective management of solid and liquid waste originating from municipal, hospital, and industrial sources.	This policy is applicable as the proposed Project involves the establishment of facilities for the provision of safely managed sanitation services in Sindh province.
5.	Sindh Resettlement and Rehabilitation (R&R) Policy 2023	The Sindh Resettlement and Rehabilitation (R&R) Policy 2023, aims to address the negative impacts on individuals resulting from past and ongoing development projects. Although approved by the provincial cabinet and officially notified by the Government of Sindh, its on-the-ground implementation has yet to commence. Encompassing various forms of displacement, including those arising from development projects, natural disasters, and government-driven anti-encroachment initiatives, the policy emphasizes the avoidance or reduction of displacement and resettlement through the exploration of alternative options and technical solutions wherever possible.	At present, the specifics of R&R remain unclear, but it is anticipated that R&R may be necessary during the implementation of the proposed projects. Therefore, this policy is expected to be applicable. However, a definitive determination will be made following thorough due diligence conducted on all proposed sites.
6.	Sindh Drinking Water Policy 2017	A framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water. Drinking water is the constitutional responsibility of the provincial governments and the specific provision function has been devolved to specially created agencies in cities, towns and Tehsil Municipal Administrations under the Local Government Ordinance 2001.	This policy is applicable to the proposed subprojects during the construction phase in terms of regular water quality monitoring.
7.	Sindh Labor Policy 2018 (SLP 2018)	The focus of SLP 2018 is on: the elimination of child labor, handling the issue of bonded labor, tackling discrimination in wages & work opportunities, freedom of association & collective bargaining guaranteed, improvements in the labor inspections system, occupational safety & health. In addition, SLP 2018 addresses women's	The provision of this policy will apply to all the labor employed.

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
		labor issues such as opportunities and equal remuneration in line with the ILO conventions, and protection of vulnerable sections such as mine workers, women, children and persons.	
Key Environmental and Social Legislations			
8.	Pakistan Climate Change Act, 2017	This Act aims to meet obligations under international conventions relating to climate change and to provide for the adoption of comprehensive adaptation and mitigation policies, plans, programs, projects and other measures required to address the effects of climate change and for matters connected herewith and ancillary thereto.	This Act will accelerate due to the emissions from the construction machinery, the application of pesticides, etc.
9.	Sindh Environmental Protection Act, 2014	The Act is a comprehensive legislation and provides the legislative framework for the protection, conservation, rehabilitation and improvement of the environment. The notable points of the law are: No proponent of a project shall commence construction or operation unless he has filed an IEE with the Provincial Agency designated by the Provincial EPAs an IEE, and has obtained approval.	The provision of the act is applicable to the proposed project for conducting an IEE/EIA according to section 17 and to obtain environmental approval from the SEPA. Section 18 of the act is applicable in terms of compliance with Sindh Environmental Quality Standards (SEQS). Similarly, sections 11, 12, 13 & 14 of the act prohibit the discharge or emission of hazardous waste and compliance with standards and import of hazardous waste.
10.	Sindh Environmental Protection Agency, (Review of EC, IEE and EIA) Regulations, 2021	These regulations set out: ● Key policy and procedural requirements for filing an EIA; ● The purpose of environmental assessment; ● The requirement that environmental assessment be integrated with feasibility studies; ● The responsibilities of proponents; ● Provides schedules of proposals that the project requires either an EC or IEE or EIA;	These regulations mandate environmental screening of the project, necessitating the completion of an ESIA/ EIA/ ESMP/ IEE/ EC for the proposed project.

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
		• The environmental screening process of the projects under schedule I, II and III; and The procedure for the environmental approval for filing the case with the concerned SEPA for the granting of the NOC.	
11.	Sindh Environmental Quality Standards (SEQS), 2016	SEQS was promulgated in 2016. Specified standards under SEQS are for: • Drinking Water; • Ambient Air; • Noise; • Industrial Gaseous Emissions; • Municipal and Liquid Industrial Effluents; • Motor vehicle exhaust and noise; and • Treatment of Liquid and Bio-Medical Waste.	All projects to be implemented in Sindh must conform to SEQS, 2016 during all the phases, i.e., construction and operation.
12.	The Sindh Transparency and Right to Information Act, 2016	The aim of this Act is to promote transparency and facilitate access to information, thereby ensuring that all citizens have improved access to public information. It seeks to enhance government accountability to citizens and uphold the fundamental right to information in all matters of public significance. Additionally, the Act aims to foster transparency across all government affairs. Transparency and access to information are fundamental tenets of democracy, empowering citizens to hold the government and its institutions accountable and contributing to the enhancement of governance systems.	This act applies to STAR WASH 1 as it is a public sector initiative and is required to maintain transparency for the public.
13.	Sindh Municipal Water Act, 2012	The Sindh Municipal Water Act of 2012 was established with the purpose of acknowledging, overseeing, and governing municipal water affairs in the region of Sindh. Its objective is to establish a unified and thorough regulatory structure for municipal water supply and sanitation services, guaranteeing the entitlement to essential water supply and sanitation, and promoting the conservation of water resources within the province.	The applicability of this act arises from the fact that the proposed project activities involve municipal water supply and sanitation services.

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
14.	The Sindh Local Government Act 2013 and Sindh Local Government (Amendment) Act, 2021	The Sindh Local Government Act 2013, Chapter VI, outlines the responsibilities of municipal corporations/committees, including land use planning, enforcement of building regulations, management of environmental and health risks, combating food adulteration, provision and upkeep of water supply systems and public drinking water sources, and engaging communities in local infrastructure enhancement such as transportation, landscaping, and removal of encroachments. The 2021 amendment aimed to clarify the roles of municipal corporations and committees, while also establishing a structured relationship between elected councils and provincial departments operating within administrative boundaries.	The application of this act to the proposed project stems from its location and the utilization of public sources during both the construction and operational phases. Additionally, the implementation of the project will be overseen by the Local Government Department (LGD), Government of Sindh, in conjunction with the Public Health Engineering Department, Government of Sindh.
15.	Land Acquisition Act, 1894 and Land Acquisition (Sindh Amendment) Act, 2009	The primary law for the acquisition of land for public purposes in Pakistan is the “Land Acquisition Act (LAA), 1894” (hereinafter referred to as the Act). The land acquired under the Act vests in the province and it is only thereafter that the Province may transfer it to someone else. The Sindh Amendment 2009 of LAA 1894 specifically related to Section 16, Section 23, Section 24 and Section 28-A.	The land needed for the proposed water supply or sanitation interventions is expected to be provided voluntarily by notable individuals/ village leaders. However, this will be confirmed following thorough due diligence conducted on all proposed sites.
16.	The Sindh Occupational Safety and Health Act, (2017)	The Act governs regulations concerning the health and safety of workers and workplace environmental health and safety (EHS) requirements in the project area. It includes provisions outlined in the Factories Act, ensuring the overall well-being of the workforce within their work environment. These provisions encompass maintaining cleanliness in the workplace, adequate toilet facilities, proper waste handling, provision of high-quality drinking water, and promoting worker health and hygiene. Additionally, the Act mandates that no factory operation can commence without obtaining a factory registration certificate from the Directorate of Labor. It strictly prohibits the employment of children under the age of 14 in any factory setting. Furthermore, the recent amendment	This law applies to any project scenario where the rights and protections of workers are upheld. It specifically pertains to construction and project workers and will be adhered to throughout both the construction and operational phases.

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
		in 2021 imposes restrictions on the utilization of contractual labor in manufacturing processes and introduces specific provisions for the safe transportation of female workers, as well as regulations governing working hours for seasonal and year-round factories.	
17.	The Protection against Harassment of Women at the Workplace Act, 2010 Amendment Bill 2022	The Protection Against Harassment of Women at the Workplace Act (2010) refers to sexual harassment at the workplace.	This Act will be applicable to the Project if women are employed for the construction of the proposed Project.
18.	Sindh Prohibition of Child Employment Act, 2017	Article 11(3) of the Pakistani Constitution prohibits employing children below 14 years in hazardous jobs, and the Prohibition of Child Employment Act (PCEA) 2017 in Sindh enforces this, allowing adolescents (14-17 years) to work under specific rules but not in hazardous occupations listed in the Act's schedule.	The relevance of this act to the Project will be to prohibit child employment for the construction of the proposed Project.
19.	Sindh Bonded Labor (Abolition) Act 2015	The Act incorporates gender sensitivity, integrating an anti-discrimination clause mandated by the International Labour Organization (ILO). This clause stipulates that no discrimination shall occur based on factors such as sex, religion, political affiliation, sect, color, caste, creed, or ethnic background when addressing matters related to the enforcement of this Act. Additionally, within all proposed laws, the jurisdictional authority has been shifted from the Judicial Magistrate to the Presiding Officer of Labor Courts, who holds the position of a Session Judge.	This act is relevant as the proposed project may employ a diverse workforce comprising individuals with various religions, political affiliations, sects, colors, castes, creeds, and ethnic backgrounds.
20.	The Sindh Minimum Wages Act, 2021 (Amendment 2023)	To provide the regulation of minimum rates of wages and various allowances for different categories of workers employed in certain industrial and commercial undertakings and establishments.	This Act will be applicable to the Project to ensure that the minimum wages and allowances are given to the Project labor (skilled and unskilled employed for the construction of the proposed Project.

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
21.	National Disaster Management Act, 2010	National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to the whole of Pakistan. The Act was passed in the backdrop of the 2010 Floods in Pakistan and strengthened the Disaster Management system.	This act is applicable to the proposed Project due to its location. The proposed Project will require special consideration of flood disasters and risk management strategies as per the Act.
22.	The Sindh Solid Waste Management Board Act, 2014	The Sindh Solid Waste Management Board Act, 2014 for the collection and disposal of all solid waste, to arrange for effective delivery of sanitation services, to provide a pollution-free environment and to deal with other relevant matters.	The proposed project may generate different types of solid and liquid wastes; therefore, this act shall be applicable to the proposed project to deal with relevant matters.
23.	The Sindh Forest (Amendment) Act, 2012	Regulates forest resources. Empower the government to declare any forest area reserved or protected.	Not relevant as there is no reserve or protected forest fall in the project area.
24.	The Sindh Wildlife Protection Ordinance 1972 (Amendment 2001, 2010) Act, 2007, 2020	The law specifies three broad classifications of the protected areas:- a) National Parks - Hunting and breaking of land for mining are prohibited in national parks, as are removing vegetation or polluting water flowing through the park. b) Wildlife Sanctuaries - Wildlife Sanctuaries are areas that are left as undisturbed breeding grounds for wildlife. Cultivation, grazing and residing are prohibited in the demarcated areas. Special permission is required for the entrance of the public. However, in exceptional circumstances, these restrictions are relaxed for scientific purposes or the betterment of the respective area at the discretion of the authority. Game Reserves - Game reserves are designated as areas where hunting or shooting is not allowed except under special permits.	All interventions are anticipated to occur within rural regions of the province. There are no foreseen direct impacts on biodiversity and natural resources, as construction activities will be conducted in areas that have already been transformed or cultivated. All statutory requirements have been adhered to. If due diligence reveals any interventions within protected areas...

Sr. No.	Policy/Strategy/ Legislations	Key Focus	Relevance to STAR WASH Project
25.	The Antiquities Act 1975 & Sindh Cultural Heritage (Preservation) Act - 1994	Preservation and protection of antiquities (any object more than 75 years old). Empower the government to declare any antiquity as protected. The Act 1994 provides rules and regulations to preserve and protect ancient places and objects of agricultural, historical, archaeological, artistic, ethnological, anthropological and national interest in the province of Sindh	The law will apply to the proposed subprojects primarily because of two key provisions: Construction activities within a radius of 61 meters or 200 feet of protected antiquities are prohibited as per the law. The provisions of this act would also be relevant in case of accidental archaeological discoveries during excavation works for the construction of proposed subprojects.

3.3 The World Bank's Environment & Social Standards (ESS) and Applicable Operational Policies

The World Bank (WB) has defined specific Environmental and Social Standards (ESSs), provided in the Environmental and Social Framework (ESF), which are designed to avoid, minimize, reduce, or mitigate the adverse environmental and social risks and impacts of projects.

A summary of the applicable ESSs (refer to **Table 7**) and their relevance to the project is provided in the table below, followed by details and applicability of the relevant standards.

Table 7: World Bank ESF ESSs Relevance and Requirements

World Bank ESSs	Relevance	Relevance of the Standard for the Project
ESS-1 Assessment and Management of Environmental and Social Risks and Impacts	Relevant	Overall, the proposed subprojects would have positive environmental and social impacts by contributing to resource efficiency and health improvement through water supply, sanitation, and hygiene facilities. However, adverse environmental and social impacts are anticipated due to proposed construction activities under STAR WASH 1 (Rehabilitation of non-functional rural water supply & drainage schemes as well as new schemes). Prepare and disclose an ESMF; develop screening tools and ESMPs/ SSEMPs for each subproject (including FSTPs[11]); integrate mitigation hierarchy and climate/disaster risks into design.

[11] FSTP stands for Faecal Sludge Treatment Plant. These are decentralized facilities designed to safely treat fecal sludge collected from on-site sanitation systems like septic tanks, pit latrines, and soak pits. In STARS-WASH-1, FSTPs will serve multiple villages within each tehsil to process septage/sludge, reducing groundwater contamination and health risks from improper disposal

World Bank ESSs	Relevance	Relevance of the Standard for the Project
ESS-2 Labor and Working Conditions	Relevant	This standard applies to all personnel engaged in executing the proposed project, including direct employees, contracted workers, community workers, and those hired by project suppliers. The ESMF will specifically tackle the implications related to ESS2. This involves developing an occupational health and safety plan to ensure measures are in place for communicable disease precautions, fair treatment, non-discrimination, equal opportunities for all workers (including vulnerable individuals, disabled persons), and facilitating freedom of association and collective bargaining, as well as providing accessible channels for addressing workplace concerns.
ESS-3 Resource Efficiency and Pollution Prevention and Management	Relevant	This ESS is relevant to the project. The subprojects supported interventions would increase the water supply and drainage efficiency, as well as Proper drainage systems, which help prevent pollution of water bodies by reducing the runoff of contaminants and wastewater. This protects the local environment, preserves ecosystems, and supports biodiversity. Besides identifying the construction-related adverse risks and impacts such as: noise, air, soil and water pollution; unattended borrow pits; piling of excavated soil and inappropriate collection, disposal of surplus construction material.
ESS-4 Community Health and Safety	Relevant	This ESS is relevant because, during the construction and operation phase, the proposed subprojects may pose limited potential risks related to accidents related to civil works, roadside accidents, the spread of different transmissible and communicable diseases (HIV/AIDS, STDs), conflicts with locals, use of child labor and forced labor, and gender-based violence (GBV), risks related to Sexual Exploitation and Abuse/ Sexual Harassment (SEA/SH etc. These risks will be addressed via the Community Health and Safety Plan included in the Annexes of this ESMF.
ESS-5 Land Acquisition Restrictions on Land Use and Involuntary Resettlement	Relevant	ESS-5 is relevant as the project will require small, site-specific land parcels for water supply and sanitation infrastructure (e.g., storage tanks, pump houses, and sanitation facilities). While impacts are expected to be minor and localized, there is potential for limited land acquisition or temporary/permanent restrictions on land use. The project will prioritize government land and, where necessary, voluntary land donation (VLD), subject to due diligence to ensure it is free of compulsion and does not adversely affect livelihoods, in line with ESMF requirements.
ESS-6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant	This ESS is not relevant as direct impacts on biodiversity and natural resources are not anticipated, as construction activities will be carried out in already transformed/ rural areas, along with climate-smart interventions such as utilizing renewable energy resources (solar panels). As such, the interventions shall not be carried out in any natural habitats and critical habitats. This ESMF ensures that no construction activity will be carried out

World Bank ESSs	Relevance	Relevance of the Standard for the Project
		in or near the vicinity of any natural habitats and critical habitats. This will be ensured through the subproject E&S screening proposed in this ESMF.
ESS-7 Indigenous Peoples/	Not Relevant	This ESS is not relevant as no indigenous people are found across the province of Sindh.
ESS-8 Cultural Heritage	Relevant	Relevant (Low Risk): Project activities are small-scale and confined to rural areas; however, minor excavation works may pose a chance risk of encountering physical cultural resources. A Chance Find Procedure is included in the ESMF to manage any such discoveries in compliance with ESS-8.
ESS-9 Financial Intermediaries	Not relevant	The STAR WASH 1 Project does not involve any activities with financial intermediaries, hence ESS9 is not relevant to this Project.
ESS-10 Stakeholder Engagement and Information Disclosure	Relevant	Requires early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement is to be conducted in a manner proportionate to the nature, scale, risks and impacts of the project, and appropriate to stakeholders' interests. Specifies what is required for information disclosure and to achieve meaningful consultation. Stakeholder Engagement Plan (SEP) and Grievance Redressal Mechanism (GRM) have been developed as a part of this ESMF.

3.4 Other Relevant World Bank Guidelines

3.4.1 Environmental, Health and Safety (EHS) Guidelines for Water and Sanitation

The project will be guided by the World Bank Group Environmental, Health and Safety (EHS) Guidelines for Water and Sanitation[12], which represent Good International Industry Practice (GIIP) for managing environmental, occupational, and community health risks associated with water supply and sanitation systems. These guidelines address key issues such as wastewater management, water resource protection, sludge disposal, occupational safety, and community health risks, and require the adoption of pollution prevention and resource efficiency measures.

3.4.2 Guidance Note on Labor Influx

A Guidance Note for "Managing the Risks of Adverse Impacts on Communities from Temporary Project-Induced Labor Influx" was issued by the World Bank in 2016. This Note provides guidance on identifying, assessing, and managing the risks of adverse social and

[12] https://www.ifc.org/content/dam/ifc/doc/2000/2007-water-and-sanitation-ehs-guidelines-en.pdf

environmental impacts that are associated with the temporary influx of labor resulting from Bank-supported projects. It contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the subproject's area of influence. It does not introduce new requirements but seeks to provide concrete guidance on approaching temporary labor influx within the environmental and social assessment process[13].

3.4.3 World Bank Group Environmental, Health & Safety Guidelines

In addition to ESSs, the World Bank Group has also established its Environmental, Health and Safety (EHS) guidelines for all the interventions that the group finances. These EHS Guidelines are technical reference documents with general and sector-specific examples of Good International Industry Practice (GIIP). General EHS Guidelines: Issues associated with the construction and operation of maintenance facilities are addressed in the General EHS Guidelines, with another key element like Environment and Occupational Health and Safety (OHS) at the workplace, as well as for the community[14].

3.4.4 World Bank Group Gender Strategy (2016-2023)

The 2015 Gender Strategy recognizes that stronger and better-resourced efforts are needed to address gender inequalities in access to jobs as well as control over and ownership of productive assets are key levers of change for women, their communities and economies and fundamental drivers of economic growth and poverty reduction. Gender equality is central to the World Bank Group's own goals of ending extreme poverty and boosting shared prosperity in a sustainable manner.

3.5 Gap Analysis of World Bank Requirements and National Laws

The identified gaps between ESSs, national and provincial laws for E&S management, and how these gaps are addressed in the ESMF are given below in **Table 8.** Where gaps exist between national laws vis-à-vis ESF, the most stringent requirements will prevail and will be followed under the proposed subprojects.

3.6 International Labor Organization (ILO) Conventions – Ratified by Pakistan

Pakistan has ratified 08 fundamental and 26 technical ILO conventions, the following of which are relevant to the proposed subprojects and are summarized in **Table 9.**

[13] (https://thedocs.worldbank.org/en/doc/497851495202591233-0290022017/original/ManagingRisk of Adverse Impact from project to labor influx.pdf)
[14] (https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines)

Table 8: Gap Analysis between ESSs and the National and Provincial Laws

Relevant ESS	Relevant National and Provincial Laws	Identification of Gaps	Gaps Addressed in ESMF
ESS-1: Assessment and Management of Environmental and Social Risks and Impacts	Sindh Environmental Protection Act, 2014 Sindh Environmental Protection Agency, (Review of EC, IEE and EIA) Regulations, 2021	The criteria mentioned in the Acts for classifying environmental and social risk are different from those in the ESF. The Act, and Regulations, 2021 mainly focus on environmental assessment and management through Environmental Impact Assessment (EIA) and Initial Environmental Examination (IEE) & Environmental Checklist (EC), whereas social assessment is cursory. The different methods and tools (ESIA, environmental and social audit, commutative impact assessment, ESMP, ESMF, regional and sectoral ESIA, SESA etc.) for environmental and social impact assessments, referenced in the ESF, are not part of the National and Provincial legislation.	As the proposed STAR WASH 1 Project is being funded by WB, the environmental and social risk classification criteria mentioned in ESF are being followed. Environmental and social assessment will be/is carried out as per ESS-1 for the proposed project. Additional, mitigation measures for environmental and social impacts will be implemented as part of various plans prepared by the Contractor based on the guidelines provided in this ESMF (Occupational Health and Safety Plan (OHS), Emergency Response Plan, Restoration and Rehabilitation Plan, Waste Management Plan, Traffic Management Plan, etc. has been prepared as a part of this ESMF to mitigate the environmental and social risks.
ESS-2: Labor and Working Conditions	Pakistan Labor Policy 2010, Sindh Labor Policy 2018, and Occupational Health and Safety Act 2018, Sindh Occupational Safety and Health Act 2017, Federal Factory Act 1934, Sindh Factories Act 2015, and Sindh	National and Provincial laws address most of the requirements of the ESS-2. There is no specific requirement for employers to establish a workers' grievance mechanism. However, the implementation of these laws and the management of certain issues addressed under ESS-2, such as OHS, GBV/SEA and Violence Against Children (VAC), and protection against	Labor Management Procedures (LMP) will be developed for the project, which will include guidance on setting up a dedicated workers' GRM, which will provide an accessible means to raise workplace concerns and complaints for all types of project workers. Under the STAR WASH 1 Project, the Contractor/s will develop an OHS Plan based on the guidelines provided in this ESMF and the

Relevant ESS	Relevant National and Provincial Laws	Identification of Gaps	Gaps Addressed in ESMF
	Minimum Wages Act, 2021 (Amendment 2023)	discrimination of religious minorities (many formal sector workers belong to religious minority groups), are not done effectively, as detailed coverage of certain requirements is partial.	Labor Management Procedures (LMP) to mitigate construction-related OHS issues for the contractor/community, such as the exposure to project-related traffic, machinery and material movements, handling of hazardous materials (oil/lubricants), excessive noise/dust etc.
ESS-3: Resource Efficiency and Pollution Prevention	Climate Change Policy of Pakistan 2012, National Climate Change Policy 2012 (Updated 2021), Pakistan Climate Change Act 2016, Canal and Drainage Act 1873, National Water Policy 2018, and Sindh Water Management (Amendment) Act 2018.	National laws address most of the requirements of the ESS-3, particularly on pollution prevention.	Resource efficiency requirements will be incorporated in the ESMP / relevant instruments. Keeping in view the proposed subproject interventions under STAR WASH 1, Greenhouse gas (GHGs) emissions are not likely to be significant; therefore, these estimations will not be required. This ESMF will also ensure the use of relevant WBG Environmental, Health and Safety (EHS) Guidelines, 2007.
ESS-4: Community Health and Safety	National Disaster Management Act, 2010 addresses the community health and safety aspects.	The National Disaster Management Act, 2010 addresses most of the requirements of ESS-4. ESS-4 recommends borrowers take measures to avoid or minimize the transmission of communicable diseases due to the influx of temporary or permanent project labor. However, there is no law (national and/or provincial) dealing with the transmission of water-borne, water-based, water-related, and vector-borne diseases, communicable and non-communicable diseases that could result from	Guidelines for Community Health and Safety Plan and Traffic Management Plan (TMP) have been prepared as part of the ESMF to manage and mitigate associated risks and impacts such as exposure to project-related traffic, machinery and material movements, handling of hazardous materials (oil/lubricants), excessive noise/dust, etc. Additional, mitigation measures for community-related impacts will be implemented as part of various plans prepared by the Contractor/s based on the guidelines provided in this ESMF

Relevant ESS	Relevant National and Provincial Laws	Identification of Gaps	Gaps Addressed in ESMF
		project activities. A community health plan has been prepared to cover the requirements of ESS-4.	(guidelines for Occupational Health and Safety Plan (OHS), Emergency Response Plan, Restoration and Rehabilitation Plan, Waste Management Plan, Traffic Management Plan, Integrated Pest Management Plan, Gender Based Violence (GBV) Action Framework etc. has been prepared as a part of this ESMF to mitigate the environmental and social risks.
ESS-5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Land Acquisition Act (LAA), 1894 and the Sindh Resettlement and Rehabilitation Policy 2023 addresses land acquisition and compensation by the Government.	Pakistan does not have any legal preview for the preparation and approval of resettlement-related documents e.g. Resettlement Action Plan (RAP) / Abbreviated Resettlement Action Plan (ARAP) / Resettlement Policy Framework (RPF). The scope of the LAA, 1894 compared to the requirements of ESS-5 only partially considers the resettlement of displaced populations. Coverage of LAA, 894 also does not provide any assistance for the poor and vulnerable PAPs, livelihood losses, or resettlement costs for rehabilitation. Generally, it covers cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as crops, trees, and infrastructure. LAA, 1894, does not require adequate consultation with affected parties; Compensation for land and other assets is based on average values and schedule unit rates that do not ensure the	The relevance of this ESS will be reassessed during the detailed design stage when more information is available and upon the finalization of the project footprints. Although the proposed subprojects may involve private land acquisition, there is a possibility of economic/ livelihood impacts. Subproject-specific social assessments will identify and quantify such impacts. Compensation and/or livelihood restoration, if and as required, will be done by the site-specific resettlement planning document or VLD process (where applicable).

Relevant ESS	Relevant National and Provincial Laws	Identification of Gaps	Gaps Addressed in ESMF
		replacement market value of the property acquired. However, LAA, 1894 requires that a 15 percent compulsory acquisition surcharge supplement the assessed compensation. According to LAA, 1894, only titleholders can get compensation for their lands, while tenants and squatters are considered illegal occupants. There is no convenient GRM except recourse of appeal to formal administrative jurisdiction or the court of law.	
ESS-6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The Sindh Forest (Amendment) Act, 2012, The Sindh Wildlife Protection Ordinance 1972 (Amendment 2001, 2010) Act, 2007, 2020	All aspects of ESS-6 are not covered under provincial laws. Major identified gaps are as follows: The national system of protected areas does not align with the principles established by the International Union for Conservation of Nature (IUCN). The Forest Act does not provide a regulatory basis enabling to meet the social needs of forest-dependent communities while preserving forest ecosystems, preventing forest degradation and depletion of its resources. The provincial legislation does not provide the categorization of habitats (natural, critical and modified).	This ESS is relevant as indirect impacts on biodiversity and natural resources, as construction activities will be carried out in already transformed/ rural areas, along with climate-smart interventions such as utilizing renewable energy resources (solar panels). As such, the interventions shall not be carried out in any natural or critical habitats. This ESMF ensures that no construction activity will be carried out in or near the vicinity of any natural habitats and critical habitats.

Relevant ESS	Relevant National and Provincial Laws	Identification of Gaps	Gaps Addressed in ESMF
		The provincial legislation does not provide a definition of and/or requirement for biodiversity offset[15]. The provincial legislation is silent regarding the Biodiversity Management Plan, which signifies risks and adverse impacts on biodiversity. The ecosystem services are not referred in the provincial legislation. The provincial legislation is silent regarding the internationally recognized areas of high biodiversity value.	
ESS-7 Indigenous Peoples/ Sub-Saharan African Historically Underserved Traditional Local Communities	There is no law for indigenous people in Pakistan.	NA	This ESS is not relevant as no indigenous people are found across the province.
ESS-8 Cultural Heritage	Pakistan Antiquities Act 1975 (Amendment 1992), and Sindh Cultural Heritage (Preservation) Act 1994	All aspects of ESS-8 are not covered under provincial law. Major identified gaps are as follows: The provincial legislation regarding the development of the Cultural Heritage Management Plan is silent.	The construction activities will be limited in space and time. This ESMF has developed a "Chance Find Procedure" to be followed during project implementation in case of any chance to find physical culture resources.

[15] Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimization and restoration measures have been taken.

Relevant ESS	Relevant National and Provincial Laws	Identification of Gaps	Gaps Addressed in ESMF
		There is no provision related to tangible and intangible cultural properties. The provincial legislation is silent about the disclosure of information regarding cultural heritage due to the safety or integrity of the cultural heritage or would endanger sources of sensitive information from public disclosure.	
ESS-10: Stakeholder Engagement and Information Disclosure	Sindh Environmental Protection Act, 2014, The Sindh Transparency and Right to Information Act 2016	Stakeholder engagement in public sector development projects is not done effectively. It is also not carried out throughout the project lifecycle on issues that could potentially affect relevant parties. Also, there is no proper mechanism to record the grievances.	The ESMF follows a structured approach to stakeholder engagement and public outreach that is based upon meaningful consultation and disclosure of appropriate information, considering the specific challenges. The SEP and GRM have been developed as part of this ESMF.

Table 9: Relevant ILO Conventions

Sr. No.	ILO Conventions	Objectives	Relevance to the Project
1.	C029 - Forced Labor Convention, 1930 (No. 29)	This convention states each member undertakes to suppress the use of forced or compulsory labor in all its forms within the shortest possible period. The convention also states that the term forced or compulsory labor shall mean all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.	The proposed project must abide by this convention to suppress the use of forced or compulsory labor in all its forms. Accessible means to raise workplace concerns and complaints will also be ensured for all types of workers through an effective GRM.
2.	C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	For the purpose of this Convention, discrimination includes any distinction, exclusion or preference made on the basis of race, color, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation.	The proposed project will ensure fair treatment, discrimination, and equal opportunity for workers, as well as support freedom of association and collective bargaining. The proposed project must make efforts to close the gender gap and not widen it through its intervention.
3.	C138 - Minimum Age Convention, 1973 (No. 138)	Article 1 of the convention states that each Member which ratifies this Convention shall specify, in a declaration appended to its ratification, a minimum age for admission to employment or work within its territory and on means of transport registered in its territory; subject to Articles 4 to 8 of this Convention, no one under that age shall be admitted to employment or work in any occupation.	The proposed project should avoid, in particular, child labor that is mentally, physically, socially or morally harmful.
4.	C001 - Hours of Work (Industry) Convention, 1919 (No. 1)	The term industrial undertaking under this convention includes (c) construction, reconstruction, maintenance, repair, alteration, or demolition of any building, railway, tramway, harbor, dock, pier, canal, inland waterway, road, tunnel, bridge, viaduct, sewer, drain, well, telegraphic or telephonic installation, electrical undertaking, gas work, waterworks or other work of construction, as well as the preparation for or laying the foundations of any such work or structure; Article 2 of the	The proposed project may create wage labor; if it does, the working conditions should respect this Convention.

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Sr. No.	ILO Conventions	Objectives	Relevance to the Project
		Convention states that the working hours of persons employed in any public or private industrial undertaking or in any branch thereof, other than an undertaking in which only members of the same family are employed, shall not exceed eight in the day and forty-eight in the week. The limit of hours of work prescribed in Article 2 may be exceeded in case of an accident, actual or threatened, or in case of urgent work to be done to machinery or plant, or in case of "force majeure", but only so far as may be necessary to avoid serious interference with the ordinary working of the undertaking.	
5.	C011 - Right of Association (Agriculture) Convention, 1921 (No. 11)	Each Member of the International Labor Organization which ratifies this Convention undertakes to secure to all those engaged in agriculture the same rights of association and combination as to industrial workers and to repeal any statutory or other provisions restricting such rights in the case of those engaged in agriculture.	The proposed project may create wage labor; if it does, the rights of association and combination should respect this Convention. Accessible means to raise workplace concerns and complaints will also be ensured for all types of workers through an effective GRM.

3.7 Comparison of International and Local Environmental Legislations

In order to select the most stringent standards applicable, a mix of local (SEQS, 2016) and international (IFC), USEPA regulations has been selected. **Table 10** presents IFC workplace noise standards that are applicable to construction workers. It should also be noted that IFC EHS guidelines advise that where existing ambient noise levels already exceed thresholds, the proposed subproject should not increase by more than 3 dB (A) over existing ambient noise at the nearest receptor location off-site.

Table 10: IFC Work Environment Noise Limits

Sr. No.	Type of Work, workplace	IFC General EHS Guidelines
1	Heavy Industry (no demand for oral communication)	85 Equivalent level Leq,8h
2	Light industry (decreasing demand for oral communication)	50-65 Equivalent level Leq,8h

A comparison of applicable local and international guidelines for ambient air quality has been provided in **Tables 11 & 12** below. In the case of CO, NO_2 and suspended particulate pollutants, the SEQS standards for ambient air quality are more stringent in comparison to USEPA and WHO/IFC standards. However, for SO_2, PM_{10} and $PM_{2.5}$ WHO/IFC standards are more stringent.

Table 11: Comparison of International and Local Air Quality Standards

Sr. No.	Pollutants	USEPA		WHO/IFC		SEQS	
		Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
1	SO_2	3 hrs 1 hr	0.5 ppm 75 ppb	24 hr 10 min	20 ug/ m^3 500 ug/ m^3	Annual Mean 24 hrs	80 ug/ m^3 120 ug/ m^3
2	CO	8 hrs	9 ppm (11 mg/m^3)	-	-	8 hrs	5 mg/ m^3
		1 hr	35 ppm (43 mg/m^3)			1 hr	10 mg/ m^3
3	NO_2	Annual Mean	100 ug/m^3 (53 ppb)	1 year	40 ug/ m^3	Annual Mean	40 ug/m^3
		1 hr	100 ppb	1 hr	200 ug/m^3	24 hrs	80 ug/m^3
4	O_3	8 hrs	0.07ppm (148 ug/m^3)	8 hrs. daily maximum	100 ug/m^3	1 hr	130 ug/m^3
5	Suspended Particulate	-	-	-	-	Annual Mean	360 ug/ m^3
						24 hrs	500 ug/ m^3
6	PM_{10}	24 hrs	150 ug/ m^3	1 yr	20 ug/m^3	Annual Mean	120 ug/ m^3
				24 hr	50 ug/m^3	24 hrs	150 ug/m^3
7	PM2.5	Annual Mean	15 ug/m^3	1 yr	10 ug/m^3	Annual Average	15 ug/m^3
		24 hrs	35 ug/m^3	24 hr	25 ug/m^3	24 hrs	35 ug/m^3

						1 hr	15 ug/m^3

Table 12: Comparison of Local and International Drinking Water Standards

Sr. No.	Parameters	Units	SEQS	WHO standards
1	Temperature (During Sample Collection)	^{O}C	NS	NS
2	Color	Pt-Co	≤15TCU	≤15TCU
3	pH	pH unit	6.5-8.5	6.5-8.5
4	Turbidity	NTU	<5	<5
5	Total, Hardness	mg/L	<500.00	NS
6	Total Dissolved Solid (TDS)	mg/L	<1000.00	<1000.00
7	Total Suspended Solid (TSS)	mg/L	NS	NS
8	Ammonia	mg/L	NS	NS
9	Fluoride F-	mg/L	≤1.50	1.5
10	Sulfate (SO4-2)	mg/L	NS	NS
11	Chloride(Cl-)	mg/L	<250.00	250
12	Nitrate (NO3)-	mg/L	≤50.00	50
13	Odor	-	Non Objectionable / Acceptable	
14	Taste	-	Non Objectionable / Acceptable	
15	Sodium	mg/L	NS	NS
16	Iodine	ppm	NS	NS
17	Arsenic (As)	mg/L	≤ 0.05	0.01
18	Iron (Fe 3+)	mg/L	NS	NS
19	Zinc (Zn 2+)	mg/L	5	3
20	Conductivity	µS/cm	NS	NS
21	Bicarbonate	mg/L	NS	NS
22	Nitrite	mg/L	≤3	3
23	Magnesium	mg/L	NS	NS
24	Calcium as Ca	mg/L	NS	NS
25	Phosphate	mg/L	NS	NS
26	Potassium	mg/L	NS	NS
27	Boron	mg/L	<0.3	0.3
28	SAR Iodine (I)	mg/L	NS	NS
29	Aluminum	mg/L	≤ 0.2	0.2
30	Antimony	mg/L	≤0.005	0.02
31	Cadmium	mg/L	0.01	0.003

Sr. No.	Parameters	Units	SEQS	WHO standards
32	Mercury	mg/L	≤0.001	0.001
33	Nickel	mg/L	≤0.02	0.02
34	Selenium	mg/L	0.01	0.01
35	Barium	mg/L	0.7	0.7
36	Total Chromium	mg/L	≤0.05	0.05
37	Copper	mg/L	2	2
38	Lead	mg/L	≤0.05	0.01
39	Cyanide (CN)	mg/L	≤0.05	0.07
40	Manganese	mg/L	<0.5	0.5
41	Total Coliforms	cfu/100ml	0/100 ml	0/100 ml
42	Fecal Coli forms (E.Coli)	cfu/ml	0/100 ml	0/100 ml

The SEQS (2016) for ambient air quality, noise, water and wastewater are more stringent in comparison to USEPA and WHO/IFC standards, except for a few parameters of ambient air quality, noise, and water, which have been considered for these proposed subprojects. Based on the above comparison, only stringent values from the national and international standards shall be applicable to the proposed subprojects.

Regarding regulations regarding other environmental parameters, such as acceptable effluent disposal parameters, the local regulations, i.e., SEQS 2016, are more stringent and would be preferred over any other international regulations. In Pakistan, there are no standards for surface water (used for irrigation); therefore, the Food and Agriculture Organization (FAO) standards will be followed.

4 Environmental and Social Baseline

4.1 General

An environmental baseline assessment is undertaken to establish a reference framework against which potential environmental and social impacts of the project can be identified, assessed, and effectively managed. This chapter presents an overview of baseline conditions within the proposed project area at the district level.

The baseline information has been compiled using a combination of available data sources, including secondary literature, relevant reports, and consultations with key stakeholders. This approach enables a contextual understanding of environmental and social conditions across the project districts, while acknowledging that detailed, site-specific data will be developed during the subproject's E&S instruments preparation.

In addition, provincial-level baseline conditions have been synthesized from secondary sources to provide a broader perspective on the environmental and social setting of the STAR-WASH 1 project. These conditions encompass key physical, environmental, and socioeconomic parameters relevant to the project context.

The district & provincial level baseline datasets are provided in **Annexure II**, which serve as a reference point for environmental and social screening, impact assessment, and the development of appropriate mitigation and management measures.

4.1.1 Sanitation and the Challenge of "Open Defecation Free" (ODF) Status

Sanitation remains the weakest pillar of rural development in Sindh, significantly affecting health outcomes and perpetuating multidimensional poverty. The disparity between urban sewerage networks and rural "non-systems", where waste is often unmanaged, contributes to Sindh's high Multi-Dimensional Poverty Index (MPI) scores.

According to UNICEF Pakistan and the WHO/ UNICEF Joint Monitoring Programme (JMP), open defecation persists at alarmingly high levels in rural Sindh, still ranging between 15% and 20% of households[16]. This problem reflects not only the absence of toilets but also the lack of integrated waste management systems that ensure hygienic disposal and treatment.

The consequences are far-reaching. Data from the National Nutrition Survey indicate that child stunting in rural Sindh exceeds 45%. Unsanitary conditions lead to recurrent fecal-oral infections, impairing nutrient absorption and contributing to chronic malnutrition despite adequate food availability, a public health challenge deeply interlinked with sanitation failures.

[16] https://data.worldbank.org/indicator/SH.STA.ODFC.RU.ZS?locations=PK

4.1.2 Sewerage and Drainage: The "Forgotten" Infrastructure

Existing rural wastewater and fecal-sludge management is characterized by limited or non-functional sewerage/drainage infrastructure, open drainage, on-site pits/septic systems, and discharge of untreated or inadequately treated effluent into open areas or water bodies. These conditions can contribute to groundwater and surface-water contamination, odor and nuisance, disease-vector risks, and unsafe exposure of communities and sanitation workers. The project therefore treats the full sanitation service chain containment, emptying/collection, transport, treatment, final disposal and, where demonstrated safe and permitted, reuse—as an E&S management issue.

While efforts to improve rural water supply are ongoing, sewerage and drainage infrastructure remain critically neglected sectors. Without proper wastewater collection and disposal systems, clean water investments lose their health benefits. In many villages, wastewater flows into open streets or stagnant ponds, creating ideal breeding grounds for mosquitoes and other vectors of malaria and dengue. These diseases disproportionately affect poorer households, adding to the 32.6% of Sindh's population already living below the poverty line.

The Sindh Planning & Development Department highlights that most rural drainage projects suffer from a recurring "build-neglect-rebuild" cycle[17], where initial investments fail due to poor maintenance and lack of community ownership. Sustainable operation and maintenance (O&M) mechanisms are seldom integrated into project design, resulting in rapid infrastructure deterioration. Encouraging community-led management and capacity-building at the local level could help break this cycle and foster durable improvements in sanitation and public health.

4.2 Baseline Information relevant for STAR WASH 1 Interventions

Based on the administrative structure of the Sindh Transformational Accelerated Rural Water Supply, Sanitation and Hygiene (STAR-WASH-1) project, the districts are organized into specific project regions or clusters as referred to in **Table 13** as well as depicted in **Figure 15**.

Table 13: Project Regional Grouping

Region/ Cluster	Included Districts
Northern Cluster (Upper Sindh)	Larkana, Kambar Shahdadkot, Shikarpur, Kashmore, Khairpur
Central Cluster	Naushahro Feroze, Shaheed Benazirabad, Sanghar, Dadu

[17]https://sindhsdgs.gov.pk/wp-content/uploads/2020/10/Localization-of-SDGs-6-Clean-Water-and-Sanitation-in-Sindh.pdf

Southern Cluster (Lower Sindh)	Hyderabad, Matiari, Tando Allahyar, Jamshoro, Badin, Sujawal
Eastern/ Desert Cluster	Mirpurkhas

The STAR-WASH-1 project primarily targets rural areas in Sindh. While the project aims for province-wide impact, it focuses on these districts grouped by their service hubs and socioeconomic vulnerability. To gather baseline data, the ten districts were chosen. Preliminary information from secondary sources was gathered through meetings with representatives from each district's SPHF and PHED, among other line departments. Furthermore, primary data was collected from locals through structured meetings and field surveys using pre-made questionnaires. To determine the project's scope, these surveys included a house count and evaluated the state of the sanitation and water supply. This phase creates an essential starting point for more in-depth research.

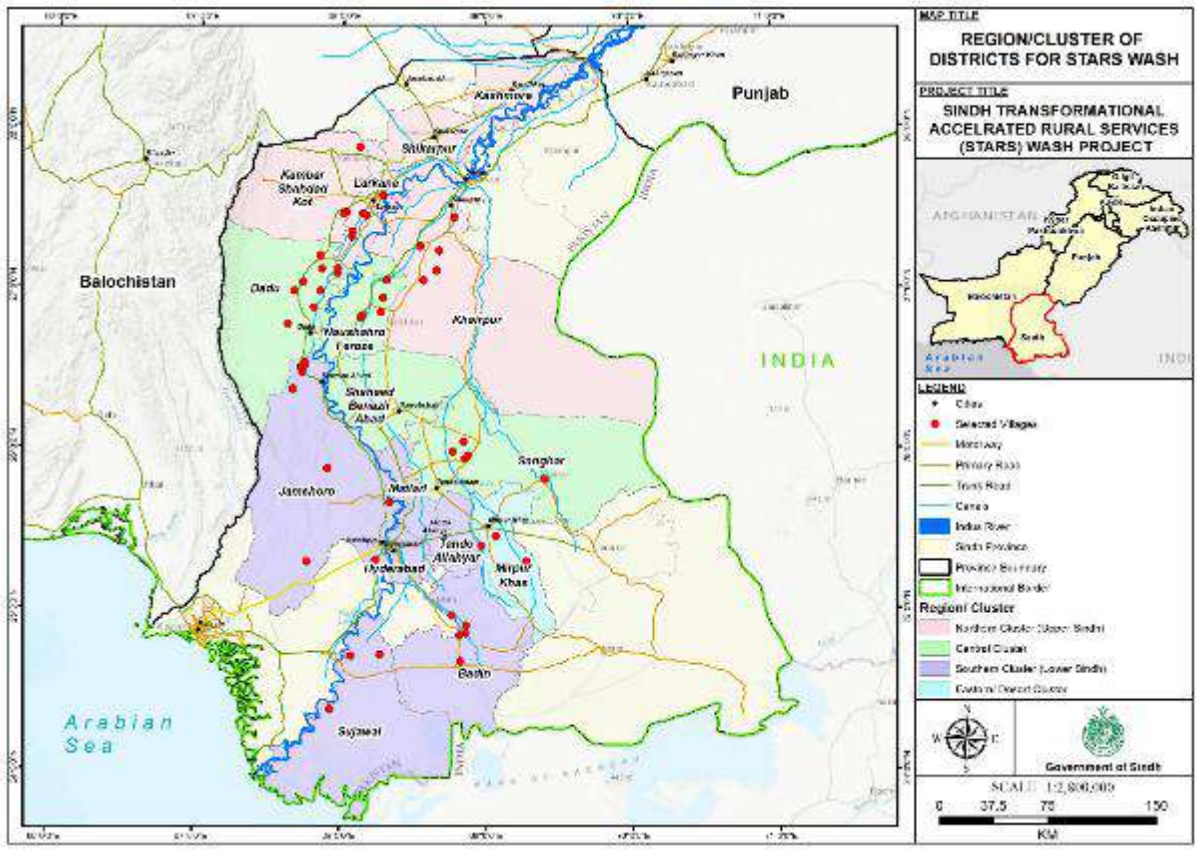


Figure 15: Region/ Cluster for STAR WASH 1 project

The following sections contain data that was gathered from primary sources. The Environmental and Social team conducted field visits in November 2023 and February 2024, followed by additional surveys from March to April 2026 after the revision of the project scope, to collect primary data. Secondary data were obtained from District Census Reports (DCRs), published literature, and relevant government departments

The design consultant also carried out a thorough technical survey and site reconnaissance. During 2023-2024 survey, PHED officials in the districts[18] were consulted to gather data on existing water supply and sewerage schemes in the selected villages. All existing water supply and sanitation facilities were physically inspected during site visits. Additionally, influential landowners and local residents in all the selected villages were consulted to understand the current sanitation conditions, reasons for infrastructure failure/issues related to sanitation, and available water sources

In rural Sindh, water security is a complex issue that goes beyond mere availability; it encompasses accessibility, affordability, and safety. Although approximately 53% of households in Sindh have access to piped water, this statistic disproportionately represents urban centers like Karachi and Hyderabad, leaving rural communities at a severe disadvantage[19].

The Pakistan Bureau of Statistics (PBS), through its Social and Living Standards Measurement (PSLM) surveys, notes that most rural residents depend on hand pumps or motorized bore pumps[20]. Unfortunately, these sources frequently draw from shallow aquifers contaminated with agricultural runoff, nitrates, and heavy metals. The Pakistan Council of Research in Water Resources (PCRWR) has repeatedly found that a considerable portion of groundwater in districts such as Khairpur, Sanghar, and Thatta is unsafe for drinking due to high bacterial counts and arsenic concentrations exceeding WHO thresholds.

4.2.1 Demography

Table 14: Key Demographic Profile for STAR WASH 1- Districts[21]

District	Taluka	Population	Pop. Density (/km²)	Rural Prop. (%)	Male/ Female Ratio	Literacy Rate (%)
Badin	Badin	455,295	238.4	82.1	105.4	38.2
	Golarchi	334,697	182.1	89.4	106.2	34.5
	Matli	443,412	390.6	77.8	104.8	42.1
	Talhar	172,254	321.4	85.3	103.9	36.8

[18] The design consultant completed the feasibility study (The design consultant conducted the feasibility study separately from the ESMF consultant) for selected villages in nine districts, working separately from the Environmental and Social Management Framework (ESMF) consultant. Out of the previously included districts, five are still part of the project – STARS WASH - I (retained districts: Dadu, Kambar Shahdadkot, Sujawal, Mirpurkhas, Jamshoro), while four have been dropped (exclude districts Jacobabad, Umerkot, Tharparkar, Thatta) after reviewing the project scope. In addition, eleven new districts have been added under the STARS WASH I program. Detailed feasibility studies for these new districts (Badin, Naushero Feroz, Sanghar, Khairpur, Matiari, Shaheed Benazirabad, Larkana, Shikarpur & Tando Allahyar) will be carried out later. However, it is expected that the basic design conditions, relevant project factors, and overall parameters will stay mostly the same, with no major differences anticipated.
[19] https://www.pbs.gov.pk/pslm-3/
[20] https://www.pbs.gov.pk/wp-content/uploads/2020/07/PSLM_Report_2024-25-Social-1.pdf
[21] 7th Population & Housing Census 2023, Pakistan Bureau of Statistics (Finalized results)

District	Taluka	Population	Pop. Density (/km²)	Rural Prop. (%)	Male/ Female Ratio	Literacy Rate (%)
	Tando Bago	398,858	215.7	91.2	105.7	31.2
Naushahro Feroze	Bhiria	312,450	410.2	84.1	104.2	48.4
	Kandiaro	325,180	385.5	86.2	105.1	46.7
	Mehrabpur	258,410	450.8	76.5	103.8	51.2
	Moro	382,920	520.4	72.1	104.7	53.5
	Naushahro Feroze	395,680	480.2	79.4	105.3	49.8
Sanghar	Jam Nawaz Ali	162,450	280.4	92.5	106.8	32.4
	Khipro	345,120	120.5	88.7	107.4	28.6
	Sanghar	462,810	310.2	74.3	105.9	45.1
	Shahdadpur	485,340	425.8	70.1	105.2	48.7
	Sinjhoro	320,560	340.4	86.9	106.1	39.5
	Tando Adam	490,230	510.1	62.4	104.5	55.2
Khairpur	Faiz Ganj	240,560	250.2	93.1	107.2	34.8
	Gambat	285,140	410.5	72.4	105.8	52.1
	Khairpur	452,180	480.6	65.8	104.9	58.4
	Kingri	350,230	390.4	82.5	105.4	46.7
	Kot Diji	362,890	310.8	87.2	106.3	41.2
	Mirwah	385,450	325.4	89.4	106.8	39.5
	Nara	185,210	45.6	95.8	108.5	22.4
	Sobho Dero	275,340	370.2	84.1	105.1	44.8
Dadu	Dadu	460,481	435.4	68.4	105.8	54.2
	Johi	294,848	85.2	91.5	107.2	36.8
	Khairpur Nathan Shah	334,258	210.5	87.2	106.4	41.5
	Mehar	460,679	380.4	82.3	105.1	45.7

District	Taluka	Population	Pop. Density (/km²)	Rural Prop. (%)	Male/ Female Ratio	Literacy Rate (%)
Matiari	Hala	262,423	480.2	74.5	104.8	49.5
	Matiari	340,677	390.6	82.1	105.4	46.2
	Saeedabad	166,249	310.4	88.4	106.2	42.1
Shaheed Benazirabad	Daur	512,450	231.8	86.5	105.4	42.1
	Kazi Ahmed	395,210	310.2	82.1	106.2	44.5
	Nawabshah	440,320	720.5	45.2	103.8	62.1
	Sakrand	497,122	380.4	78.4	105.1	48.7
Larkana	Bakrani	229,444	410.2	88.4	106.2	44.8
	Dokri	225,294	390.5	86.2	105.1	47.1
	Larkana	738,672	1150.4	42.1	104.5	64.5
	Ratodero	331,584	420.2	78.4	105.7	51.2
Shikarpur	Garhi Yasin	315,883	310.5	89.1	106.8	38.4
	Khanpur	276,283	290.4	91.2	107.4	34.2
	Lakhi	285,120	330.2	87.5	106.1	41.5
	Shikarpur	354,195	680.8	58.4	104.2	52.1
Tando Allahyar	Chamber	209,208	290.4	92.5	106.5	36.8
	Jhando Mari	231,683	240.2	94.1	107.2	32.1
	Tando Allahyar	395,996	450.6	62.4	104.8	51.5
Kambar Shahdadkot	Kambar Ali Khan	425,120	310.2	78.4	105.1	42.1
	Miro Khan	158,191	280.5	91.2	106.8	38.4
	Nasirabad	151,500	320.4	85.3	105.7	41.2
	Qubo Saeed Khan	98,450	85.6	96.2	108.2	26.5
	Shahdadkot	220,180	410.4	68.4	104.9	49.5
	Sujawal Junejo	125,430	250.2	93.4	107.5	34.1

District	Taluka	Population	Pop. Density (/km²)	Rural Prop. (%)	Male/ Female Ratio	Literacy Rate (%)
	Warah	245,171	305.8	88.1	106.4	39.8
Hyderabad	Hyderabad City	755,290	4500.2	0	103.2	78.5
	Hyderabad Rural	466,701	480.5	85.4	105.8	44.1
	Latifabad	672,435	5200.4	5.2	103.5	75.2
	Qasimabad	304,899	3800.6	8.4	104.1	72.8
Sujawal	Jati	202,299	65.4	92.1	107.8	24.5
	Kharo Chan	10,235	18.2	98.4	110.2	15.8
	Mirpur Bathoro	210,995	180.4	88.5	106.4	31.2
	Shah Bunder	159,887	42.1	96.2	108.5	19.5
	Sujawal	198,581	110.5	82.4	105.1	38.4
Kashmore	Kandhkot	366,484	310.2	78.4	106.1	34.2
	Kashmore	434,975	240.4	82.5	106.8	31.5
	Tangwani	287,710	210.8	91.2	107.4	28.1
Mirpurkhas	Digri	245,180	320.4	88.2	105.4	42.1
	Hussain Bux Mari	185,230	290.5	92.1	106.8	38.4
	Jhuddo	215,440	310.2	89.4	106.2	36.5
	Kot Ghulam Muhammad	310,560	250.4	90.5	106.9	34.8
	Mirpur Khas	520,340	850.2	48.2	104.2	58.7
	Shujaabad	195,410	280.6	91.4	106.5	39.1
	Sindhri	240,890	260.8	93.1	107.1	32.5
Jamshoro	Kotri	437,561	680.4	45.2	104.1	54.2
	Manjhand	140,840	62.5	92.4	106.8	38.1
	Sehwan	269,291	95.4	78.1	105.2	46.5
	Thano Bula Khan	145,450	22.8	95.8	107.5	31.2

The overall condition of the villages presents significant challenges in terms of infrastructure, water supply, and sanitation. The disparity in access to electricity, the prevalence of unplanned housing, and the poor state of existing infrastructure highlight the need for comprehensive and sustainable development efforts. Water quality issues and inadequate sewerage systems further exacerbate the living conditions, necessitating urgent intervention to improve the quality of life for residents.

4.2.2 District-wise Hindu Population Percentages (2023 Census)

Pakistan's 2023 Population and Housing Census reports Sindh's overall Hindu population (including Scheduled Castes) at about 8.8% of the provincial total, up from 8.73% in 2017, with figures concentrated in certain districts. **Table 15** provides percentages for STAR Wash 1 districts, drawing from available 2023 data where specified (primarily matching 2017 patterns due to limited district-level breakdowns in preliminary reports) or consistent sources.

Table 15: District-wise Hindu Population Percentages (2023 Census)

District	Percentage of Hindus
Badin	23.61%
Naushero Feroz	1.64%
Sanghar	21.79%
Khairpur	2.76%
Dadu	0.58%
Larkana	1.45%
Jamshoro	3.87%
Matiari	16.66%
Shaheed Benazirabad	3.86%
Shikarpur	1.4%
Tando Allahyar	34.17%
Kamber Shahdadkot	0.74%
Hyderabad	8.22%
Sujawal	2.91%
Kashmore	3.22%
Mirpurkhas	38.74%

4.2.3 Electricity:

Availability: About 60% of the villages have access to electricity, albeit only for four to twelve hours every day. Electricity is either totally absent from the remaining villages or only available to about 5% of the population, primarily powerful landowners. This uneven allocation draws attention to notable differences in these communities' access to essential services.

4.2.4 Housing and Streets:

Planned vs. Unplanned: Approximately 30% of the villages have planned streets and well-constructed (pucca) houses. However, the majority feature unplanned streets with semi-permanent (semi-pucca) or temporary (katcha) housing.

Shared Courtyards: In nearly all villages, multiple families (typically 4-7) live together in shared courtyards (mela) with a single boundary and often have unplanned or no access roads or streets.

4.2.5 Road Infrastructure:

Road infrastructure in the STAR WASH-1 project districts is mainly based on black-topped, metalled, provincial, secondary, and access roads connecting district headquarters, taluka towns, rural settlements, markets, and service facilities. Available district statistics indicate that the project districts have an estimated 16,317 km of reported road network, based on the latest district-level figures available from Sindh Development Statistics and district profiles. However, road conditions in rural and flood-prone areas vary considerably, and many village access routes may still be narrow, damaged, seasonally inaccessible, or unsuitable for heavy construction traffic.

The project districts have a sizeable road network, but the quality and reliability of access vary between urban/peri-urban centers and remote rural settlements. Districts such as Hyderabad, Jamshoro, Matiari, Shaheed Benazirabad, Larkana, Khairpur, and Mirpurkhas have relatively stronger regional connectivity through national highways, provincial highways, and metalled roads. In contrast, rural areas of Badin, Sujawal, Dadu, Kashmore, Kambar Shahdadkot, Shikarpur, and Sanghar may face access constraints.

4.2.6 Water Supply

Groundwater in the project districts is generally brackish to saline, and rural communities therefore rely heavily on shallow hand pumps, tubewells, or intermittent canal/surface-water supplies[22]. Surface water is widely consumed in rural Sindh without adequate treatment, chlorination, or filtration, which creates a significant public-health risk from bacteriological contamination[23].

In Sindh, 78% of irrigated land is reported to rely on saline groundwater, indicating widespread groundwater salinity conditions across the province[24].

PCRWR reporting for Sindh found that only 25% of water samples were fit for drinking, while the remaining 75% were contaminated with microorganisms and/or arsenic[25].

[22] https://www.thefridaytimes.com/21-Mar-2022/rural-sindh-and-the-struggle-for-clean-drinking-water
[23] https://pcrwr.gov.pk/wp-content/uploads/2024/01/A-Comprehensive-Investigation-and-Spatial-Mapping-in-Canal-Command-Areas-of-Sindh.pdf
[24] https://lupinepublishers.com/environmental-soil-science-journal/fulltext/water-quality-assessment-in-sindh-pakistan-a-review.ID.000156.php
[25] https://lupinepublishers.com/environmental-soil-science-journal/fulltext/water-quality-assessment-in-sindh-pakistan-a-review.ID.000156.php

In one PCRWR assessment covering Sindh urban water supplies, water quality in Mirpur Khas, Tando Allahyar, and Shaheed Benazirabad was reported as unsatisfactory, with 100% of sampled supplies in Mirpur Khas and Shaheed Benazirabad affected in that assessment period[26].

A study from Shaheed Benazirabad found groundwater EC values of 357–3780 µS/cm, TDS of 228–1996 mg/L, total hardness of 115–1275 mg/L, chloride of 35–582 mg/L, and sulphate of 24–697 mg/L, showing that many samples were highly mineralized and often unsuitable for drinking[27].

4.2.7 Indicative Assessment of Source Water Availability

Water-source selection shall be evidence-based and site-specific. Feasibility and design studies shall compare available groundwater and surface-water sources against water quality, contamination vulnerability, seasonal availability and variability, sustainable yield/abstraction limits, environmental-flow and downstream-use considerations, treatment requirements, flood/drought exposure, and source reliability. The project will prioritize source protection and diversification and shall not rely on abstraction levels that could materially compromise existing users, environmental flows, or long-term resource sustainability. Where surface water is used, seasonal water availability and legally allocated/operational requirements shall be considered before finalizing abstraction arrangements.

The indicative assessment presented in the following table provides a district-level overview of groundwater and surface-water resource conditions across Sindh Province to inform strategic planning under the STAR WASH-I Program (refer to **Figure 16**).

The analysis, as elaborated in **Table 16**, highlights significant spatial variation in groundwater quality, with widespread salinity, arsenic contamination, and localized pollution concerns limiting its suitability as a sustainable drinking-water source in many districts, particularly in coastal and canal-command zones. Conversely, surface-water systems associated with the Indus River and its principal canal networks, including Rohri, Nara, Phuleli, Rice, and KB Feeder, represent comparatively more reliable and manageable sources for future water-supply interventions. It is therefore recommended that scheme design and feasibility assessments prioritize canal or river-fed surface supplies as the primary source option, while groundwater utilization should only be considered following site-specific hydrogeological investigations and confirmatory laboratory testing. These indicative findings establish a technical baseline to support future source selection, safeguard measures, and environmental and social due diligence during the planning and implementation of WASH infrastructure investments across Sindh.

[26] https://pcrwr.gov.pk/wp-content/uploads/2023/08/Drinking-Water-Quality-in-Pakistan-Current-Status-and-Challenges.pdf
[27] http://publication.pumhs.edu.pk/index.php/ojs/article/view/427

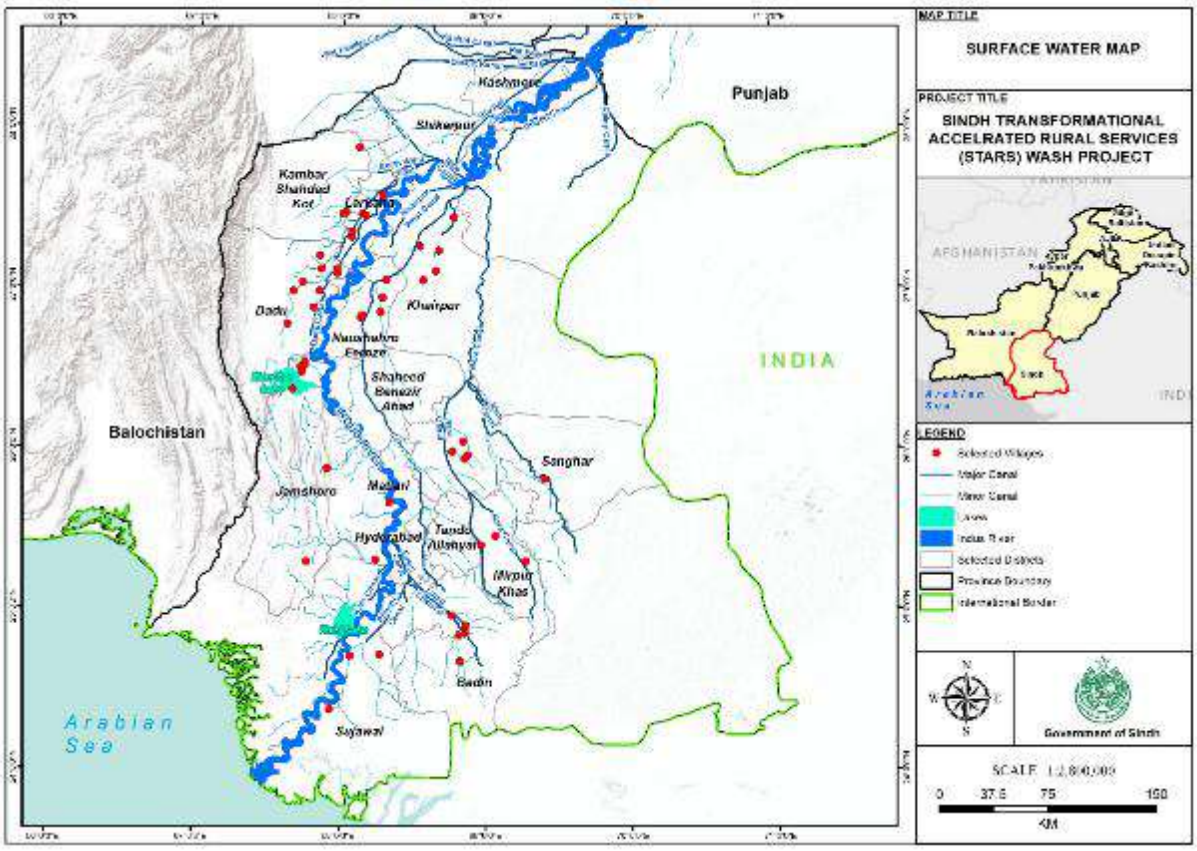


Figure 16: Surface Water Depiction of Sindh

Table 16: Indicative Evaluation of Groundwater and Surface-Water Source Potential

District	Potential groundwater source for drinking-water schemes	Nearby canal / other surface-water source for scheme planning	Indicative planning note
Badin	Poor / generally not recommended as a primary source; groundwater is widely saline and often non-potable due to sea intrusion[28]	Phuleli Canal, Akram Wah / Akram Canal, Guni, Nasir; also, coastal dhands/ wetlands are present but are not preferred potable sources	Prefer treated canal water or other dependable surface source; groundwater only after detailed testing confirms a fresh pocket
Naushehro Feroze	Moderate potential; groundwater is slightly saline but fit for human consumption in parts[29]	Rohri Canal, Naulakha Branch, Siyal Distry, Salehpur Minor, Kandiaro Minor, Sehra Minor, Budak Minor, Nasrat Wah, Jatoi Minor; Indus near western border	Dual option district: investigate both canal-fed schemes and carefully tested fresh groundwater pockets
Sanghar	Caution / variable quality; studies show part of groundwater is	Nara/Rohri canal command setting in central Sindh irrigation system	Prefer canal-based supply where feasible; use groundwater only

[28]https://www.walshmedicalmedia.com/open-access/drinking-water-quality-in-13-different-districts-of-sindh-pakistan-2375-4273-1000235.pdf
[29] https://pcrwr.gov.pk/wp-content/uploads/2021/10/Drinking-Water-Quality-in-Pakistan-2021.pdf

District	Potential groundwater source for drinking-water schemes	Nearby canal / other surface-water source for scheme planning	Indicative planning note
	unsuitable for drinking and toxic elements can exceed limits[30]		after chemical testing, especially for arsenic/ fluoride/ metals
Khairpur	Caution / localized use only; groundwater contamination concerns are documented in Khairpur Mir's and Ranipur area[31]	Nara Canal, Rohri Canal, Khairpur East Canal, Khairpur West Canal	Canal-based schemes are generally more reliable; groundwater may be used only in verified fresh zones
Dadu	Limited / caution; groundwater quality concerns are reported and flood-prone hydrochemistry can affect potability[32]	Dadu Canal, Rice Canal, spill from Indus River	Surface-water supply from canal/Indus-linked source is usually preferable; groundwater needs full testing
Larkana	Caution; central Sindh groundwater in canal-command areas is vulnerable to contamination, so local testing is essential[33]	Rice Canal and canal network in Larkana irrigation zone	Screen canal-water options first, then confirm whether local fresh groundwater is available
Jamshoro	Caution; arsenic in groundwater has been reported in Jamshoro district[34]	Indus River corridor; Kotri barrage-command canal system nearby, including Phuleli/Pinyari/KB Feeder regional network	Surface water is generally the safer planning basis; groundwater only after arsenic-safe test results
Matiari	Caution; arsenic in groundwater has been reported in Matiari district[35]	New Fulleli / regional Kotri barrage canal network	Prefer canal-fed treated supply; groundwater should not be assumed safe without lab testing
Shaheed Benazirabad	Caution; rural drinking-water quality issues are documented in the district[36]	Rohri canal-command network and distributaries in central Sindh	Canal source likely more dependable for public schemes; test groundwater carefully before selection
Shikarpur	Caution to moderate; no district-specific potable groundwater confirmation found here, so treat as unverified[37]	Begari / Rice-canal regional network under upper Sindh irrigation system	Use canal/surface source as planning default unless hydrogeological survey confirms fresh groundwater
Tando Allahyar	Caution; southern/central Sindh groundwater often has salinity and quality constraints[38]	Phuleli / Fulleli-related Kotri barrage canal network in lower Sindh	Canal-based source is generally preferable for larger schemes
Kambar Shahdadkot	Caution; western Sindh districts also rely heavily on canal systems,	Rice Canal / associated upper Sindh canal network; Kirthar catchments in western side	Surface-water or canal-fed schemes should be screened first

[30] https://www.walshmedicalmedia.com/open-access/drinking-water-quality-in-13-different-districts-of-sindh-pakistan-2375-4273-1000235.pdf
[31] https://www.pcrwr.gov.pk/wp-content/uploads/2023/09/National-Threat-of-Arsenic-in-Groundwater-2023.pdf
[32] https://www.pcrwr.gov.pk/wp-content/uploads/2023/09/National-Threat-of-Arsenic-in-Groundwater-2023.pdf
[33] https://pmc.ncbi.nlm.nih.gov/articles/PMC6427645/
[34] https://www.academia.edu/38707270/ASSESSMENT_OF_DRINKING_WATER_QUALITY_DISTRICT_JAMSHORO_SINDH_PAKISTAN_A
[35] https://jmhsr.com/index.php/jmhsr/article/download/702/832/5896
[36] https://pcrwr.gov.pk/wp-content/uploads/2021/10/Drinking-Water-Quality-in-Pakistan-2021.pdf
[37] https://www.walshmedicalmedia.com/open-access/drinking-water-quality-in-13-different-districts-of-sindh-pakistan-2375-4273-1000235.pdf
[38] https://pmc.ncbi.nlm.nih.gov/articles/PMC6427645/

District	Potential groundwater source for drinking-water schemes	Nearby canal / other surface-water source for scheme planning	Indicative planning note
	and groundwater suitability should be treated as site-specific[39]		
Hyderabad	Caution; regional groundwater quality problems are common in Sindh and major urban supply planning typically depends on surface systems[40]	Phuleli (Old Fulleli), Pinyari, New Fulleli, KB Feeder regional system	Surface-water source is usually the more appropriate basis for public water supply
Sujawal	Poor / generally not recommended as primary source; lower/coastal Sindh has deteriorated drinking-water quality and limited fresh groundwater[41]	Indus deltaic channels and lower Sindh canal network; other local surface bodies may be brackish	Prefer treated canal/river source; groundwater likely risky except in confirmed fresh pockets
Kashmore	Unverified to caution; fresh groundwater cannot be assumed without field confirmation[42]	Guddu barrage-command network, including desert/pat feeder and regional canals	Canal source is the safer preliminary assumption for public schemes
Mirpurkhas	Caution; southern Sindh drinking-water quality studies show broad contamination concerns in the region[43]	Nara canal-command / lower Sindh irrigation network	Canal-fed treated source is generally preferable; groundwater needs full chemical and bacteriological testing

Groundwater in coastal and central Sindh districts like Badin and Sujawal is often saline from sea intrusion, while inland areas face arsenic risks in Jamshoro, Matiari, and Khairpur. PCRWR national reports and district studies validate preferring treated canal water from systems like Rohri or Nara for reliability. Always conduct site-specific testing per WHO standards before final scheme design.

4.2.8 Boreholes and NGO Involvement:

NGO Initiatives: In some villages, non-governmental organizations (NGOs) or residents have installed boreholes along watercourses to provide drinking water. However, this water becomes brackish over time, making these initiatives only a temporary solution.

Reliability: These efforts, while helpful, do not offer a long-term solution due to recurring issues of water quality degradation.

[39] https://pcrwr.gov.pk/wp-content/uploads/2021/10/Drinking-Water-Quality-in-Pakistan-2021.pdf

[40] https://www.walshmedicalmedia.com/open-access/drinking-water-quality-in-13-different-districts-of-sindh-pakistan-2375-4273-1000235.pdf

[41] https://pmc.ncbi.nlm.nih.gov/articles/PMC6427645/

[42] https://pcrwr.gov.pk/wp-content/uploads/2021/10/Drinking-Water-Quality-in-Pakistan-2021.pdf

[43] https://asianpubs.org/index.php/ajchem/article/view/36_10_22

4.2.9 RO Plants:

Presence: Reverse Osmosis (RO) plants are present in a few villages but are mostly abandoned or non-functional, reflecting issues with the sustainability and maintenance of advanced water treatment solutions.

4.2.10 Sewerage System

Coverage: Very few villages have an existing sewerage system, and those that do are only partially functional due to negligence and poor operations and maintenance practices. This contributes to unsanitary conditions in these communities.

4.2.11 Sanitation:

Toilets: Toilets are generally unavailable in the katcha houses within the main village areas or their nearby settlements. This results in widespread open defecation, posing serious health risks and environmental concerns.

4.3 Groundwater (Drinking Water Sources) Test Results

Water samples were collected during the Feasibility Studies (2023–2024) from multiple sources, including handpumps, boreholes, dug wells, tubewells, ejector wells, and water supply tubewells, across thirty villages in nine districts. Laboratory analyses covering biological, physical, and chemical parameters are presented in Annexure C of Volume IV of the Feasibility Study. A consolidated summary of these results is provided in **Annexure III.**

The reported laboratory results are based on samples collected from multiple sources across thirty villages in nine districts during the 2023–2024 feasibility studies. Site-specific source-water testing shall be undertaken or updated during subproject preparation before final design and operation, with results recorded in the screening and site-specific E&S instruments.

The project conducted 476 water quality tests in Naushahro Feroze, Khairpur, Badin and Jamshoro. In which 293 were fresh and 84 were brackish ground water sources, Furthermore, 96 canal water sources were also tested.

Following the revision in project scope and prioritization, detailed discussion has been limited to five selected districts, while data from the remaining four districts has been omitted at this stage. For the newly included priority districts (totaling eleven), water quality assessments will be undertaken during the preparation of Environmental and Social (E&S) instruments. The rationale and associated budgetary provisions for this additional monitoring have been incorporated into the ESMF.

In addition, a generalized overview of water quality conditions in Sindh is provided for contextual reference. Detailed information can be accessed through the provided link[44].

[44] https://lupinepublishers.com/environmental-soil-science-journal/fulltext/water-quality-assessment-in-sindh-pakistan-a-review.ID.000156.php

4.4 Health

Country's health system is already battling multiple concurrent health threats including outbreaks of cholera, typhoid, measles, leishmaniasis and HIV. Even before the recent floods, there was a significant disparity in access to health services between rural and urban areas. The current situation will highly likely increase the spread of disease especially if/when response capacities are hindered.

In the floods, around 59 health facilities have been damaged completely and 461 were partially damaged[45]. Access to health facilities, healthcare workers, and essential medicines and medical supplies remain the main health challenges in the flood affected areas. The stagnant water also provided breeding grounds for mosquitoes and subsequent disease spread. From July to early October 2022 over 540,000 malaria cases have been reported in Sindh including diarrheal diseases, dengue fever, measles, and diphtheria[46].Due to disease outbreak there were concerns of high rates of sever acute malnutrition observed in the flood affected areas[47].

The health conditions in rural Sindh are shaped by a combination of environmental, climatic, and infrastructural challenges that significantly impact both community well-being and the effectiveness of Water, Sanitation, and Hygiene (WASH) initiatives. Frequent flooding, contaminated water supplies, and inadequate sanitation systems have led to widespread communicable diseases and malnutrition, particularly affecting vulnerable groups including children, women, the elderly, and individuals with disabilities.

4.4.1 Waterborne and Sanitation-Related Diseases

Waterborne diseases continue to pose a significant public health challenge in rural Sindh. By early 2024, cases of acute watery diarrhoea (AWD) had reached critical levels, with more than 36,000 cases reported weekly, accounting for a substantial share of the 1.8 million cases recorded nationally[48]. The rural population is particularly vulnerable due to dependence on unsafe water sources, inadequate sewage systems, and widespread open defecation. Additionally, outbreaks of typhoid and cholera are frequently observed, especially during and following the monsoon season, when access to clean water is disrupted, and surface water becomes heavily contaminated. Hepatitis A and E, primarily transmitted through the fecal-oral route, also remain common in low-income rural settings.

4.4.2 Vector Borne Diseases

Sindh remains a malaria-endemic region, with a particularly severe spike in March 2024 when over 46,000 cases were reported in a single week, up 83% of the total malaria cases

[45]https://www.acaps.org/sites/acaps/files/products/files/20221130_acaps_rat_briefing_note_on_pakistan_floods.pdf
46https://news.un.org/en/story/2022/11/1130082#:~:text=Multiple%20disease%20threats&text=%E2%80%9CFrom%20July%20to%20early%20October,rates%20of%20severe%20acute%20malnutrition.
47https://news.un.org/en/story/2022/11/1130082#:~:text=Multiple%20disease%20threats&text=%E2%80%9CFrom%20July%20to%20early%20October,rates%20of%20severe%20acute%20malnutrition.
[48] World Bank (2024); Government of Sindh Health Surveillance Data; WHO Weekly Epidemiological Reports

across Pakistan[49]. Contributing factors include stagnant wastewater, inadequate drainage infrastructure, and unprotected water sources, all of which create ideal breeding grounds for mosquitoes. These conditions not only drive high malaria transmission but also increase the risk of other vector-borne diseases such as dengue and emerging infections like chikungunya.

4.4.3 Child Health and Nutritional Impacts

Health challenges linked to inadequate water, sanitation, and hygiene (WASH) are major contributors to the high rates of child under nutrition in rural Sindh. The National Nutrition Survey (2018) reported that 49.9% of children under the age of five were stunted, while 17.7% were wasted, statistics that have seen little improvement in recent years due to ongoing exposure to contaminated water and poor hygiene practices. The situation worsened following the 2022 floods, which led to widespread displacement, loss of livelihoods, and disease outbreaks, leaving an estimated 2.6 million children in southern Sindh affected by severe acute malnutrition[50].

4.4.4 Access to safe drinking water and sanitation

Based on Census 2023, Sindh has approximately 9.86 million households, of which 6.28 million households, representing 63.63%, have access to drinking water within household premises, while 3.59 million households, representing 36.37%, depend on drinking water sources located outside the house. The main sources of drinking water in Sindh include motor pumps/hand pumps at 33.91%, followed by tap water at 31.93%, while dependence on dug wells is limited at 0.97%[51]. District-level variations are significant, with better-served districts such as Larkana reporting high household access, while districts including Mirpurkhas, Badin, Sujawal , Umerkot, Thatta, and Keamari show comparatively lower access levels. These trends indicate the need for STAR WASH-1 to prioritize underserved rural and remote settlements, strengthen water supply infrastructure, ensure source sustainability, and incorporate water quality testing, groundwater screening, and inclusive service delivery measures into subproject planning and implementation.

4.4.5 Waste Management in Project Areas

In Sindh, the largest proportion of the population lives in urban areas as compared to the other provinces of the country. Only 19% of the province has solid waste management facilities. A significant level of disparity is found between urban and rural areas regarding waste management conditions, ranging between 47% in urban areas to only 1% in the rural areas of Sindh. According to the Sindh local government ordinance 2001, SWM is distributed among a number of agencies, and sanitation and solid waste collection and disposal of solid, liquid and industrial and hospital waste to be collected by the Taluka municipal administration. The

[49] Directorate of Malaria Control, Pakistan (2024); Government of Sindh Health Department
[50] National Nutrition Survey (2018); UNICEF Pakistan Emergency Briefs (2023); WHO Flood Emergency Reports
[51] https://www.pbs.gov.pk/wp-content/uploads/2020/07/National-Census-Report-2023.pdf#page=204&zoom=100,92,833

Ordinance directs and empowers the Town municipal administration to collect solid waste and conveyance to transfer the waste to the designated stations, but it does not apply to the Town municipal administration for treatment and disposal of the solid waste, and this responsibility is given to the City District Government Karachi. For the rest of the districts of Sindh, TMA is responsible for the collection and disposal of the waste. This is one of the reasons for good SWM practices in Karachi from the administration's point of view as compared to the other districts of Sindh, because in all other districts, TMAs have to cover all civic issues, including water supply, sanitation, and SWM and have limited resources for all three sectors mentioned earlier.52

The project is being implemented in rural areas of Sindh, where such administrative services of solid waste management and disposal are not being implemented. However, the common practice is that the local population collects solid waste at a designated location, which is later disposed of through pit burning.

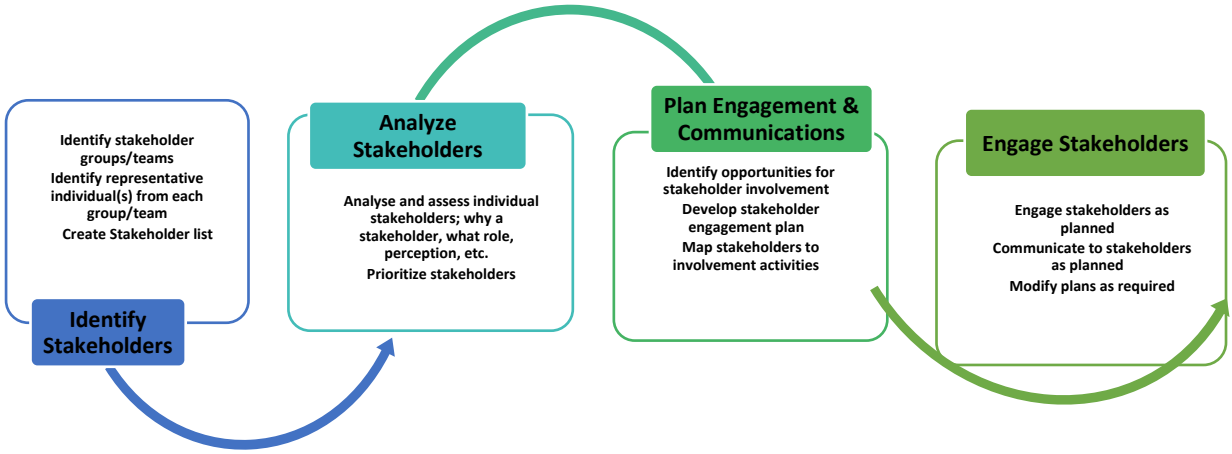
[52] Rahman, Muhammad Abdul, "Revisiting Solid Waste Management (SWM) a case study of Pakistan", International Journal of Scientific Footprints. ISSN 2310-4090

5 Stakeholder Engagement and Disclosure

5.1 Objectives of Stakeholder Engagement

The primary objective of this stakeholder engagement is to establish a structured approach for stakeholder engagement, including timely information disclosure and meaningful consultations during the project's inception, construction, and operational phases. The key objectives of the stakeholders' engagement can be summarized as follows:

- Outline the stakeholder engagement requirements in accordance with Government of Sindh (GoS) regulations and the World Bank's Environmental and Social Standards (ESS).
- Provide guidance on stakeholder engagement approaches, including appropriate timing and methods of consultation throughout the project lifecycle.
- Identify key stakeholders who may be directly affected by, or have the potential to influence, the project.
- Describe measures to ensure inclusive participation by addressing barriers and capturing the perspectives of diverse and vulnerable groups.
- Define effective strategies and communication channels for disseminating project information in line with stakeholder needs.
- Support the Project Implementation Unit (PIU) STAR WASH 1/ SPHF, contractors, and supervision consultants in fostering constructive, respectful, and long-term relationships with stakeholders.
- Establish a structured and accessible grievance redress mechanism (GRM) for addressing stakeholder concerns.
- Clearly define roles and responsibilities for the implementation and management of the SEP.



Early, consistent, and transparent communication with stakeholders is critical for managing expectations, reducing risks, and preventing potential conflicts or project delays. Active

involvement of local communities is essential to the successful implementation of the project, as it fosters effective collaboration between project teams and stakeholders, while also helping to identify, minimize, and mitigate environmental and social risks associated with project activities.

The following sixteen districts have been identified (as listed in **Table 17**) for investments under the revised project scope. Seven of these (marked as Sample Districts) have undergone intensive consultations and stakeholder workshops.

Table 17: Districts for STAR-WASH-1

Geographical Zone	Sample Districts (High Intensity)	Additional Priority Districts
Coastal	Badin	Sujawal
Center	Naushero Feroz	Shaheed Benazirabad, Matiari
South	Sanghar	Mirpurkhas, Tando Allahyar, Hyderabad
North Left	Khairpur	–
North Right	Larkana	Shikarpur, Kambar Shahdadkot, Kashmore
Arid / Rainfed	Jamshoro – Right Bank	-
Right Bank	Dadu	-

5.2 Component-wise Stakeholder Identification:

Stakeholders are identified for each project component, such as water supply, sanitation infrastructure, hygiene promotion, and capacity building, to capture all parties potentially affected or interested in the project.

5.2.1 Stakeholder Categorization:

Identified stakeholders are grouped into:

- **Affected Parties (AP):** In the STAR WASH-1 project, Affected Parties (AP) include rural households across the 16 target districts of Sindh, local farmers and livestock owners, community-based organizations (CBOs), local laborers and contractors, and small business owners, vendors and institutional APs, including PIU SPHF, PHED & LGD. These groups are direct beneficiaries of the project's water supply schemes, sanitation facilities, and drainage infrastructure, with core interests in reliable service delivery, minimizing construction disruptions in their villages, and prioritizing local employment opportunities during implementation.
- **Other Interested Parties (OIP):** Other Interested Parties (OIP) for STAR WASH-1 encompass key government entities such as SEPA, P&DD, and NGOs/CSOs like

HANDS, NRSP, SRSO, SAFCO, RDF, and IRC; academic and research institutions; and local/provincial media. They provide institutional oversight for compliance with World Bank ESS standards, contribute to technical design of WASH facilities, advocate for community needs, and support broad information dissemination through workshops and consultations across districts like Badin, Larkana, and Khairpur;

- **Vulnerable Groups/ Disadvantaged Groups:** Vulnerable/Disadvantaged Groups in STAR WASH-1 consist of women and girls as primary water fetchers, persons with disabilities (PWDs), widows and female-headed households, orphans and child-headed households, ethnic/religious minorities, elderly individuals, and the extreme poor in project villages. Their priorities center on universal design features like ramps/handrails for OHWT/UGWT access, protection from SEA/SH during construction, equitable resource access via metered supplies, and reduced time burdens for water collection to support hygiene and livelihoods in flood-prone rural Sindh.

5.3 Stakeholder Analysis:

Stakeholders are assessed in terms of their level of interest, influence, and potential exposure to positive or negative impacts across different project components. An interest-influence approach is applied to prioritize stakeholders and define tailored engagement approaches for each project component.

5.3.1 Assessment of Barriers and Needs:

Particular attention will be given to the inclusion of vulnerable and disadvantaged groups, including women, internally displaced persons (IDPs), persons with disabilities, youth, the elderly, ethnic and religious minorities, and communities residing in remote or hard-to-reach areas. Engagement approaches will be designed to account for cultural norms and sensitivities to ensure meaningful and safe participation.

Stakeholder identification and analysis will be periodically reviewed and updated throughout the project lifecycle to reflect evolving project design, stakeholder roles, and emerging social risks.

5.4 Community Consultation

These consultations were conducted as part of the preparation of the ESMF and SEP to ensure that stakeholder perspectives were effectively captured and incorporated into the project design. The consultation sessions included Focus Group Discussions (FGDs) with male participants, FGDs with female participants, meetings with village heads and elders, mixed community consultation meetings, and FGDs/individual interviews with vulnerable groups.

In total, 1,872 participants, including men, women, and individuals from vulnerable groups, were consulted. Of these, 920 were female participants, representing approximately 49% of the total. The district-wise details are given in **Table 18.**

Table 18: Details of the Community Consultations

District	Number of Villages	Number of Sessions	Total Participation (M+F=T)
Badin	05	Focused Group Discussion (FGD) Male =05 Nos[53] Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=08	129+108 = 237
Naushero Feroz	05	Focused Group Discussion (FGD) Male =05 Nos Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=06	88+93 = 181
Sanghar	05	Focused Group Discussion (FGD) Male =05 Nos Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=11	154+127 = 281
Khairpur	05	Focused Group Discussion (FGD) Male =05 Nos Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=05	104+96 = 200

[53] The average FGD participation is 25 per session.

District	Number of Villages	Number of Sessions	Total Participation (M+F=T)
Dadu	08[54]	Focused Group Discussion (FGD) Male =05 Nos Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=08	185+215 = 411
Larkana	05	Focused Group Discussion (FGD) Male =05 Nos Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=03	127+142 = 269
Jamshoro	09	Focused Group Discussion (FGD) Male =05 Nos Focused Group Discussion (FGD) Female=05 Nos Meeting with Village Head & Elders = 01 Mixed Community Consultation Meeting = 01 Focused Group Discussion (FGD) / Individual Interviews -Vulnerable Groups=11	154+150 = 350
		Grand Total	**(941+920= 1872)**
		Female to Male Ratio	**49%**

5.4.1 Consultation with AP (Female)

The March 2026 WASH stakeholder consultations across 35 villages (refer to Table 3 of the main SEP document for details) in seven Sindh districts, Jamshoro, Sanghar, Badin, Larkana, Naushahro Feroze, Dadu, and Khairpur, reveal key insights into inclusive participation under ESS10 (effective stakeholder engagement) frameworks. Female attendance was robust, totaling approximately 920 participants with an average of 25 per session (ranging from 5 in Larkana's Ramzan Kalhoro to 55 in Faqeer Muhammad Junejo), and a median of around 23-24, demonstrating successful mobilization efforts particularly in Larkana and Jamshoro, where

[54] The consultation data from the villages in the previous round for District Dadu and Jamshoro has also been incorporated into the updated dataset.

numbers exceeded 30 in several cases. Persons with Disabilities (PWDs) were present in 19 sessions (63%).

However, women's substantive involvement in WASH decision-making remains critically low: only 4 consultations (13%, all in Sanghar's Sinjhoro taluka) reported full "yes" engagement, another 4 (13%, primarily Jamshoro-Sehwan) showed "partial" roles, while 22 (73%) indicated "no," "not directly involved," or equivalent, prevalent in Larkana (all sessions), Badin, Dadu, and Khairpur. This disparity highlights a systemic gender gap beyond numeric representation, where cultural barriers or male-dominated forums likely limit women's voices in hygiene infrastructure, water access, and sanitation planning.

5.4.2 Consultation Points (Female) and Recommendations

Table 19 elaborates on the outcome of the consultation. The consultations reveal consistent barriers like poverty, water scarcity, poor sanitation, low awareness, and mobility issues hindering hygiene and inclusive practices for women and PWDs. Safety risks dominate, with nearly all villages reporting concerns over external worker behavior, child hazards at sites, and sexual harassment potential for women/girls. Flood vulnerabilities affect women, the elderly, PWDs, and poor households due to literacy gaps and inaccessible warnings.

Table 19: Female Consultation Session and Integration Recommendation

Consultation Points Category	Feedback/ Perception/ Concerns from Community	Proposed ESMP Way Forward
Worker Safety & Harassment (ESS2/ ESS4)	External workers raise trust/ safety issues; preference for locals to avoid harassment, restricted mobility for women/girls.	Hire local workers; implement strict codes of conduct, training, supervision; accessible GRM via village committees.
Child Protection at Sites	Risks of injury/ hazards near construction due to a lack of fencing/supervision.	Install fencing, signage, and awareness campaigns; monitor sites to prevent access.
Hygiene Barriers (Women/PWDs)	Poverty, water scarcity, time burdens, and inaccessibility limit behaviour change.	Provide nearby safe water/sanitation; inclusive designs with assistive features; hygiene promotion.
Flood Resilience (ESS10)	Vulnerable groups (women/elderly/PWDs/poor) struggle with warnings, mobility, and access.	Climate-resilient facilities; accessible warnings (audio/visual/local language); drainage strengthening.
GRM Accessibility	Preference for village committee channels for women/PWDs/low-literacy.	Inclusive, multi-channel GRM (village committee, phone); target vulnerable groups.

Project Support Conditions	Strong support if timely, affordable, needs-based; post-handover maintenance needed.	Timely completion; long-term advocacy/maintenance plans; community involvement.

5.4.3 Consultation with AP (Male)

The consultations covered 35 villages across Jamshoro, Sanghar, Badin, Larkana, Noshahro Feroze, Khairpur, and Dadu districts, with dates ranging from 11/03/2026 to 28/03/2026 as shown in Table 5 of main SEP document. The settlements varied widely in size, from small communities such as Syed Zain Ul Abdin Shah-Gono and Ramzan Kalhoro to larger settlements like 39 Jamrao, Sanghaar Shar, and Daud Dero, showing a mix of compact hamlets and major village clusters. Community composition was diverse and commonly included caste/clan groups such as Syed, Mallah, Jutt, Kolhi, Meghwar, Rind, Chandio, Solangi, Rajper, Junejo, and others, indicating mixed social structures across the survey area.

Notable local representatives, elders, and committee heads were recorded in most villages, and male participation ranged from 8 to 64 participants, suggesting varying levels of community engagement across locations.

5.4.4 Consultation Points (Male) & Recommendations

Villages across Jamshoro, Sanghar, Badin, Larkana, and other districts report consistent WASH concerns tied to contaminated water, failing infrastructure, and flood vulnerability. Key issues include unresponsive government grievances, worker safety/privacy risks, and urgent needs for affordable, resilient facilities. Findings of the male consultation session and integration recommendation are enumerated in **Table 20**.

Table 20: Male Consultation Session and Integration of Recommendation

Concern Category	Feedback/ Perception/ Concerns from Community	Proposed ESMP Way Forward
Water Access/ Quality	Groundwater contaminated (Manchar Lake/RBOD), salty, fetched 15+ min by women/girls (Rs 50/30L tankers), distant hand pumps disrupt life.	Install RO plants/pipelines from canals/towns (Bubak), solar-powered schemes; ensure nearby access for women/children.
Sanitation/Drainage	Widespread open defecation (50-100 HHs), non-engineered latrines discharge to low areas/canals; blocked drainage causes stagnant water/ flooding.	Build household latrines, septic upgrades, and new drainage; elevated designs on southern/western village sides for resilience.
Health Risks	Diarrhea, cholera, typhoid, hepatitis, skin/eye issues, child stunting common; rare handwashing, low hygiene awareness.	Hygiene education, safe water treatment, monitoring diseases, integrate WASH in health programs for vulnerable groups.

Safety/ Grievances	Worker misconduct fears (privacy near homes/schools); govt channels are unresponsive, prefer IP/ SPHF GRM; poverty limits payment.	Mandatory worker training/ CODE OF CONDUCT; strengthen accessible GRM via village notables/IP; labor contribution over fees.
Flood Coping	Male-led traditional methods (raised platforms) are uncoordinated, which affects women's household hygiene burden.	Climate-resilient designs (elevated, solar); community training/leadership for women-inclusive flood WASH response.
Infrastructure Needs	Non-functional PHED/LGD schemes (electrical/blockages); no grid power; priorities: water > drainage > sanitation.	Repair/upgrade with solar backups; site on community/govt land via VLD (notables listed); quick implementation.

5.4.5 Cumulative (Male/ Female) Concerns and Recommendations

The project area faces critical WASH challenges that undermine public health, equity, and sustainability. This section outlines key concerns and corresponding ESMF mitigation recommendations to guide ESMP development and implementation. These measures prioritize access, infrastructure resilience, sanitation improvements, social inclusion, and health linkages in alignment with WB ESS, as referred to **Table 21**.

Table 21: AP Demands/ Concerns/ Suggestions and ESMF Recommendations

AP Demands / Key Concerns	ESMF Recommendations (to be detailed in ESMP preparation phase)
Increase the capacity of existing water supply schemes to ensure equitable access to safe and potable water for all households.	Assess technical feasibility of expanding current schemes; prioritize underserved households; ensure equitable distribution and sustainable source development.
Concerns regarding the feasibility, location, and sustainability of proposed overhead water storage tanks.	Conduct detailed engineering design review and site selection during ESMP preparation; ensure structural safety, community accessibility, and long-term O&M viability.
Install community-level water filtration plants to address poor groundwater quality and contamination.	Propose small-scale, locally operated filtration systems; perform water quality assessments; include O&M and capacity-building components in ESMP.
Develop village-level drainage systems with properly designed disposal ponds for effective wastewater management.	Prepare village-level drainage improvement plan; include safe discharge locations, environmental safeguards, and maintenance responsibilities in ESMP.
Install water supply lines tapping better-quality groundwater near canal banks with inclusive distribution networks.	Identify and map potential sources; design environmentally safe abstraction points; ensure inclusive and gender-sensitive distribution layouts under ESMP guidance.

AP Demands / Key Concerns	ESMF Recommendations (to be detailed in ESMP preparation phase)
Drainage systems under PHED management are partially functional; need for regular cleaning and maintenance.	Establish routine maintenance and capacity-building programs for local SPHF/ PHED staff; define frequency and monitoring indicators in ESMP O&M plan.
Need for reliable water supply systems during canal closure periods when groundwater recharge is limited.	Develop multi-source water systems; incorporate storage and seasonal management strategies in ESMP to ensure year-round functionality.
Ensure environmental sustainability and establish clear community-level O&M arrangements.	Integrate environmental screening, impact mitigation, and resilience measures in ESMP; define community O&M roles with SPHF/ PHED oversight.
Heavy burden on women and girls for water fetching, affecting education and well-being.	Include gender-sensitive solutions such as closer water points and household connections; promote women's participation in WASH 1 decision-making during ESMP.
Poverty exacerbates access challenges and increases vulnerability.	Recommend pro-poor subsidies or community-supported schemes; integrate affordability criteria and social equity measures in ESMP planning.
Inadequate water and sanitation are disrupting livelihoods and social well-being.	Establish inclusive WASH 1 management committees; link ESMP interventions with livelihood and health improvement goals.
Poor sewerage and unmanaged wastewater are causing disease spread and unhygienic conditions.	Integrate hygiene awareness programs, and waste management training into ESMP community outreach plans.
Children are facing recurrent illnesses leading to malnutrition and stunting.	Implement health monitoring and hygiene-promotion campaigns; include child health and school sanitation initiatives under ESMP social impact actions.
Continued open defecation due to a lack of sanitation facilities compromises the privacy and safety of women and girls.	Introduce low-cost, gender-sensitive sanitation solutions; include awareness, training, and behavioral change communication in the ESMP implementation plan.

The consultations also provide district-wise details, concerns, attendance sheets, and photo logs, which are compiled in Annexure I of the main SEP. These suggestions underscore the community's commitment to improving water and sanitation infrastructure in their villages for the benefit of all residents.

5.5 Institutional Consultation

Consultative workshops were organized in the headquarters cities of seven[55] project districts across Sindh during March–April 2026 as part of the STAR WASH-1. These consultations were conducted to promote inclusive stakeholder engagement, capture institutional knowledge, and integrate local perspectives into project planning and implementation.

Each workshop brought together a diverse set of participants, including representatives from district-level government departments such as the SPHF, Public Health Engineering Department (PHED), Local Government Department (LGD), Planning and Development Department of Sindh, Social Protection Unit, Social Welfare Department, Revenue Department, and Sindh Environmental Protection Agency (SEPA). In addition, WASH specialists from government and non-governmental organizations, academic experts from local universities and technical institutes, community representatives, local political leaders, and project consultants also participated.

In total, 327 officials and professionals from various line departments, NGOs, and consulting firms were engaged through these workshops. The feedback and recommendations obtained through these consultations have been consolidated in the Report of Consultation with Other Interested Parties, presented as Annexure II of the Stakeholder Engagement Plan (SEP).

These workshops provided effective platforms for information sharing, collaborative dialogue, and joint decision-making, strengthening the STAR WASH-1 Project's approach to sustainable and inclusive WASH service delivery in rural Sindh. (Refer to **Table 22**).

Table 22: OIP Consultations - Workshops at the Seven Districts of STAR WASH-1

District	Date	No. of Participants	Key Stakeholder Groups Represented
Badin	Apr 1, 2026	34	PHED, SEPA, Social Welfare, Health, Education, Wildlife, NRSP, LHDP, HANDS, PPHI, NGOs/ CSOs
Naushero Feroze	Apr 1, 2026	26	Social Welfare, PPHI, SAFCO, SRSO, Local Govt, NGOs
Sanghar	Apr 2, 2026	32	PHED, Irrigation, SEPA, Social Welfare, Forest, Agriculture, Livestock, NRSP, NGOs
Khairpur	Apr 6, 2026	34	PHED, Health, PPHI, HANDS, Social Welfare

[55] The revised E&S consultant scope includes additional consultations in seven districts: Jamshoro, Sanghar, Badin, Larkana, Naushahro Feroze, Dadu, and Khairpur. Five districts—Dadu, Jamshoro, Qambar Shahdadkot, Sujawal, and Mirpurkhas—were retained from the previous list. Consultations were repeated in Dadu and Jamshoro, while data from earlier consultations conducted in Qambar Shahdadkot, Sujawal, and Mirpurkhas has been incorporated and is presented in Annexures II of the main SEP

District	Date	No. of Participants	Key Stakeholder Groups Represented
Dadu (Apr 2026)	Apr 1, 2026	20	Health, Social Welfare, Local NGOs/CSOs, ZDO, TRDP, HANDS
Dadu (Feb 2024)	Feb 27, 2024	57	PHED, Health, Agriculture, Forest, IHHN, RDF, REEDS, HANDS, IRC
Larkana	Mar 13, 2026	21	TMC, Social Welfare, Revenue, Education, PPHI, HANDS, SRSO, SAFCO
Jamshoro (Mar 2026)	Mar 16, 2026	21	SEPA, Forest, RDF, CSSP, Social Welfare, Education, Health, NRSP, USPCAS-W
Jamshoro (Jan 2024)	Jan 19, 24	82	SEPA, Forest, RDF, Wildlife, HESCO, CSSP, Social Welfare, Education, Health, NRSP, USPCAS-W
Total	**8 workshops**	**327 participants**	**28 departments + 15 NGOs/ CSOs**

5.5.1 Discussion Points from OIP Consultation - Workshops

These findings, as elaborated in **Table 23**, support an ESMF that screens subprojects for source sustainability, groundwater quality, wastewater disposal, flood and salinity exposure, land and access issues, social inclusion risks, and institutional capacity constraints before approval. The ESMF should also require site-specific ESMPs that translate these consultation findings into mitigation, monitoring, community engagement, and operational controls during design, construction, and operation.

Table 23: Findings of OIP Consultation Workshop and Integration Recommendation

Key issue/ theme	Summary for ESMF	Recommendations to include while preparing ESMP
Drinking water quality and source safety	Stakeholders reported saline, contaminated, or unreliable water sources in several districts, including concerns over arsenic, fluoride, sewage intrusion, and polluted surface water.	Include source selection criteria, baseline water quality testing, periodic laboratory testing, sanitary setback requirements, source protection measures, and corrective actions for non-compliant results.
Groundwater salinity and hydrogeological variability	Coastal, desert, and arid areas require site-specific design	Require hydrogeological assessment, aquifer suitability verification, alternative source analysis, and

Key issue/ theme	Summary for ESMF	Recommendations to include while preparing ESMP
	because groundwater suitability varies sharply by location.	location-specific design controls before finalizing schemes.
Wastewater treatment and safe disposal	Untreated wastewater discharge and poor drainage were repeatedly identified as environmental and public health risks.	Include wastewater treatment measures, discharge controls, compliance monitoring, sludge handling provisions, and inspection of disposal points.
Mixing of water supply and sewerage lines	Several districts highlighted cross-contamination caused by poor alignment or mixing of drainage and water supply systems.	Include design separation distances, routing review, leak detection procedures, pressure testing, and construction supervision checks.
Non-functional schemes and weak O&M	Past schemes often failed because of weak maintenance, inadequate budgets, a lack of skilled staff, and unclear handover responsibilities.	Include an O&M plan, staffing and training requirements, spare parts provision, maintenance budgeting, handover protocol, and post-construction functionality monitoring.
Community ownership and participation	Communities and local organizations were seen as essential for sustainability and long-term upkeep of infrastructure.	Include a community consultation plan, user committee formation, community monitoring roles, awareness sessions before commissioning, and documented O&M responsibilities.
Inclusion of vulnerable and marginalized groups	Stakeholders emphasized the needs of women, children, persons with disabilities, minorities, and poor or remote households.	Include inclusive design measures, targeted consultations, disability access provisions, equitable beneficiary selection, gender-sensitive facilities, and disaggregated monitoring indicators.
Climate resilience and disaster risks	Flooding, drought, coastal salinity, and wider disaster exposure were highlighted as major risks to WASH infrastructure.	Include flood-resilient siting, climate screening, erosion and inundation protection, emergency preparedness measures, and resilience checks during design review.
Coastal and corrosion-related constraints	In coastal districts, rusting materials, saline conditions, and unreliable groundwater were	Include corrosion-resistant material specifications, salinity risk assessment, hybrid system evaluation, protective

Key issue/ theme	Summary for ESMF	Recommendations to include while preparing ESMP
	highlighted as important design concerns.	coatings, and maintenance provisions for exposed components.
Renewable energy and energy reliability	In off-grid and unreliable power areas, solar-based systems were suggested to improve sustainability.	Include energy needs assessment, solar feasibility review, battery and pump safety provisions, maintenance arrangements, and fallback measures during outages.
Institutional coordination and regulatory compliance	Participants called for stronger coordination with PHED, LGD, SEPA, district authorities, and other agencies, with attention to safeguard compliance.	Include an institutional coordination matrix, permit tracker, SEPA compliance actions, meeting schedule, escalation protocols, and compliance reporting responsibilities.
Land, access, and transparency concerns	Some consultations raised concerns about voluntary land donation, the influence of powerful persons, encroachment, and inequitable access.	Include land due diligence, VLD documentation where applicable, verification of free and informed consent, access protection provisions, and grievance tracking for land-related complaints.
Construction impacts on existing services	Participants noted that project works can damage roads and existing utilities if planning is weak.	Include utility mapping, excavation method statements, traffic and access management, reinstatement obligations, and coordination with utility-owning departments.
Tree cutting and ecological disturbance	Avoidance of tree cutting and compensatory plantation were specifically raised during consultations.	Include tree inventory before works, avoidance-first design review, approval requirements for any cutting, compensatory plantation, and survival monitoring.
Hygiene behavior changes and awareness	Low WASH awareness, poor hand hygiene, and the need for school- and women-focused outreach were recurring themes.	Include a BCC plan, KAP baseline where relevant, school outreach, women-centered awareness sessions, safe water handling messages, and outreach monitoring indicators.
Water quality monitoring transparency	Weak testing systems and lack of routine disclosure of water quality results were highlighted.	Include routine sampling plans, disclosure of test results, trigger thresholds for remedial action,

Key issue/ theme	Summary for ESMF	Recommendations to include while preparing ESMP
		coordination with certified laboratories, and recordkeeping requirements.
Selection of villages and equitable targeting	Participants asked for merit-based village selection and wider coverage of underserved settlements.	Include transparent screening criteria, need-based prioritization, documentation of selection rationale, consultation validation, and monitoring of coverage in remote areas.
Use of local NGOs and community institutions	Local NGOs, LSOs, VOs, and civil society groups were seen as important for outreach and mobilization.	Include criteria for engaging local organizations, scope of support, code of conduct requirements, coordination protocols, and performance monitoring for outreach tasks.

5.5.2 Feedback from NGOs and Civil Society Organizations (WASH Sector)

As part of the stakeholder engagement process, a series of consultative workshops was conducted across selected districts under the proposed STAR WASH 1 Project. Representatives from national and international NGOs, local civil society organizations (CBOs), and development partners actively participated and shared valuable insights based on their experience in implementing WASH interventions in rural Sindh.

- **District Badin**

Key participating organizations included HANDS, Laar Humanitarian and Development Programme, Rural Development Foundation, and Islamic Relief, along with local CBOs.

Participants highlighted that while access to water supply has improved in certain areas, drainage and wastewater management remain critically underdeveloped. It was emphasized that sewerage systems, if not integrated with household-level sanitation facilities and behavior change interventions, may not effectively achieve Open Defecation Free (ODF) status. NGOs stressed the importance of combining infrastructure development with community mobilization and hygiene awareness programs.

- **District Jamshoro & Dadu**

Organizations such as the International Rescue Committee, HANDS (Sehwan/Jamshoro), and initiatives under Sindh Peoples Housing for Flood Affectees shared their field experiences.

Key challenges discussed included:

- Sustainability of water supply schemes due to weak operation and maintenance (O&M) mechanisms
- Limited community ownership of infrastructure
- Technical issues related to source reliability and water quality

Participants recommended strengthening community-based management models, ensuring capacity building of local operators, and aligning STAR WASH 1 interventions with ongoing housing initiatives for better impact.

- **District Khairpur & Naushahro Feroze**

Feedback was received from Dharti Development Foundation, Sindh Rural Support Organization, and SAFCO Support Foundation.

NGOs emphasized:

- The need for equitable access to WASH services, especially for marginalized and remote communities
- Challenges in behavior change, particularly regarding sanitation practices
- Importance of women's participation in water management committees

Lessons learned indicated that community engagement from planning to the implementation stages significantly improves sustainability. NGOs suggested incorporating social mobilization as a core project component, rather than a parallel activity.

- **District Sanghar**

Organizations, including HANDS and CSSP, highlighted issues related to:

- Water scarcity and groundwater quality
- Inadequate drainage infrastructure leading to stagnant wastewater
- Gaps in institutional coordination

They recommended adopting integrated WASH planning, ensuring source sustainability assessments, and promoting low-cost, climate-resilient technologies suitable for local conditions.

- **District Larkana**

Stakeholders, including partners working under Sindh Peoples Housing for Flood Affectees initiatives, shared insights from post-flood rehabilitation efforts.

Key observations included:

- The need to synchronize WASH infrastructure with housing schemes

- Risks of infrastructure damage due to flooding and poor site selection
- Importance of climate-resilient designs

Participants suggested that STAR WASH 1 should adopt a holistic and resilient approach, integrating water supply, sanitation, and drainage with disaster risk reduction measures.

5.5.3 Key Cross-Cutting Themes from NGO Consultations

Across all districts, the following common themes emerged:

- Infrastructure alone is insufficient; behavior change and community engagement are critical
- Strong operation and maintenance systems are essential for sustainability
- Need for inclusive approaches, ensuring participation of women, minorities, and vulnerable groups
- Importance of technical design aligned with local context, including topography and climate risks
- Integration with ongoing development initiatives to avoid duplication and enhance impact.

5.5.4 Engagement Methods & Tools

The stakeholder engagement plan employs a mix of communication and consultation methods tailored to different audiences and project phases. Techniques such as correspondence, meetings, workshops, and public consultations ensure continuous information flow, transparency, and inclusive participation. Regular updates through information platforms, mass media, and direct communication enhance stakeholder trust, while focused discussions and surveys help capture detailed insights and community feedback for informed project decision-making, as depicted in **Table 24.**

Table 24: Stakeholder Engagement Techniques and Their Application

Project Stage	Target Stakeholders	Topic of Consultation / Message	Method Used	Responsibilities	Frequency / Timeline
Planning / Design	Government agencies, NGOs, local administration	Project introduction, objectives, environmental and social baseline, and preliminary impacts.	Correspondence (emails, letters, phone calls), Formal meetings, Public meetings, workshops	ESMF Consultant, Project Implementation Unit (PIU)/ SPHF, E&S Specialists	As required / During planning phase
	Local communities, vulnerable groups	Overview of proposed activities, project benefits, land acquisition, and livelihood impacts.	Public meetings, FGDs, FGDs with vulnerable groups, Leaflets / Brochures	ESMF Consultant, PIU/ SPHF, Social Specialist	As required / During planning phase

Project Stage	Target Stakeholders	Topic of Consultation / Message	Method Used	Responsibilities	Frequency / Timeline
Implementation (Construction)	Affected persons (APs), contractors, community representatives	Construction schedules, anticipated disruptions, safety precautions, and grievance mechanisms.	Direct communication, On-site information sharing, Public meetings	Contractor, PIU/ SPHF, E&S Team	Daily / Weekly / Monthly (as required)
Implementation (Construction)	Media, NGOs, local authorities	Project progress, mitigation measures, and community feedback mechanisms.	Mass media (Radio / TV), Correspondence, Workshops	PIU/ SPHF, Communication Officer	Monthly / Quarterly
Implementation / Operation	General public, community organizations	Environmental monitoring results, project benefits, and sustainability initiatives.	Information disclosure platforms (website, notice boards), FGDs, Surveys	PIU/ SPHF, E&S Specialists	Quarterly / Semi-annual
Operation / Post-construction	Local government institutions, regulatory bodies	Project performance, compliance reporting, and long-term environmental monitoring outcomes.	Formal meetings, Reports, Correspondence	PIU/ SPHF, Environmental Specialist	Quarterly / Annual

5.5.5 AP Engagement Strategy Matrix

Affected parties include local communities, community members and other parties that may be subject to direct beneficiaries or impacts recipients (during construction) from the Project. To ensure targeted and effective stakeholder engagement, project-affected parties have been identified and categorized based on the key components of the STAR WASH 1 Project. This approach enables the project to better understand the nature and extent of impacts on different groups and to design appropriate engagement strategies. The following matrix, as given in **Table 25,** outlines their roles, interests, and engagement mechanisms.

Table 25: Affected Parties Engagement Strategy Matrix

Project Component	Stakeholder Group	Potential Risks	Engagement Mechanisms
Module 1: Water Supply Infrastructure	Rural households/ communes near schemes (7 Districts)	Improved water access; construction disruptions	FGDs, GRM; district-level consultations
	Farmers/ livestock owners/ local population	Water competition; employment benefits	Water committees: job priority for locals
	Residents/businesses (suppliers, entrepreneurs) affected by works	Access issues; business opportunities	Advance notices; livelihood plans
	Households/ communities in poor sanitation areas (project districts)	Health improvements; odor/ excavation risks	Hygiene BCC; women-led groups

Project Component	Stakeholder Group	Potential Risks	Engagement Mechanisms
Module 2: Sanitation and Drainage	Residents/ businesses near STP/ drainage	Flooding/ disease reduction; traffic disruptions	Public meetings; contractor coordination
Module 3: Construction	Communities/ population residing near sites	Noise/ dust/ safety; employment for locals	Site consultations; labor hiring quotas
	Road users/ pedestrians; small businesses/vendors/entrepreneurs	Access limits; income opportunities	Traffic plans; vendor relocation support
	Local laborers, construction companies/contractors, and material suppliers	OHS hazards; contract disputes	PPE training; fair bidding/GRM
Module 4: BCC and Community Engagement	Community-based groups/cooperatives; interest groups representing residents	Behaviour change; inclusion gaps	Village events; CBO grants
	Women/caregivers; school children/youth (district focus)	Empowerment; knowledge gains	Targeted FGDs/ school programs
	Community leaders/ influencers in 7districts	Mobilization roles; misinformation	Leader workshops; feedback loops
Module 5: Institutional Strengthening	Government officials/ district officers (SPHF/ LGD, PHE&RD, municipal admin in 7 districts)	Capacity overload; policy alignment	ToT workshops; joint monitoring
	Local authorities/ service providers; SEPA employees	Compliance/enforcement; O&M sustainability	Digital tools; EPA NOC coordination
	CBOs/ local committees/cooperatives	Oversight roles; funding access	Formation guidelines; performance contracts

5.5.6 OIP Engagement Strategy Matrix

In addition to directly benefiting or affecting communities, other interested parties include government agencies, NGOs, donors, and media organizations with potential influence on project outcomes. These stakeholders require targeted engagement to ensure regulatory compliance, address advocacy concerns, and leverage technical expertise across all project components. The following matrix, as given in **Table 26** outlines their roles, interests, and engagement mechanisms.

Table 26: Stakeholder - OIP Engagement Strategy Matrix

Project Component	Stakeholder Group	Potential Impacts/ Risks	Engagement Mechanisms
All modules (Regulatory Oversight)	Government departments (e.g., Local Government Department, Planning & Development Department, Social Protection Unit, Social Welfare Department, Revenue Department)	Policy alignment delays, land acquisition disputes, and compliance enforcement	Workshops, joint monitoring committees, policy coordination meetings
All Components (Housing Support)	Sindh People Housing for Flood Affectees (SPHF)	Overlap with flood-affected communities; resettlement coordination	Inter-agency consultations; joint site assessments
All Components (Environmental Compliance)	Sindh Environmental Protection Agency (SEPA)	NOC delays; environmental violations fines	EPA NOC coordination; compliance reporting; pre-construction consultations
Components 1-2 (Health & Hygiene)	Health departments and local health facilities	Disease outbreak risks from construction; health benefits from WASH improvements	Public health workshops; disease surveillance coordination
Component 1 (Water Supply)	Agriculture and Livestock Departments	Water competition for irrigation/ livestock; agricultural productivity gains	Sectoral consultations; water allocation committees
All Components (Advocacy & CSO)	Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs)	Advocacy on vulnerable groups; misinformation risks	FGDs; CBO grants; feedback loops
All Components (Funding & Standards)	Development partners and donor agencies (e.g., IFC, ADB, World Bank)	Safeguards compliance; funding conditionalities	Progress reporting; donor coordination meetings
All Components (Research & Monitoring)	Academic and research institutions	Baseline data gaps; impact studies	Research partnerships; joint baseline surveys
All Components (Public Awareness)	Media organizations	Public misinformation; reputational risks	Press briefings; media kits; disclosure events

5.5.7 Disadvantaged / Vulnerable Individuals[56] or Groups (Male & Females)

During community consultations conducted across the selected districts, dedicated efforts were made to engage vulnerable and marginalized groups, including persons with disabilities (PWDs), orphans, widows, women-headed households, and minority communities. Separate and inclusive consultation settings were arranged to ensure that these groups could freely express their concerns, challenges, and priorities regarding WASH services.

A total of 721 disadvantaged and vulnerable individuals were consulted, including 61 PWDs, 83 elderly persons, 330 individuals from very poor households, 193 individuals from minority/scheduled caste communities, and 54 women-headed households. The district-wise distribution and categorization of these participants are presented in **Table 27.**

Table 27: Details of Disadvantaged / Vulnerable Individuals or Groups

District	PWD	Elderly	Very Poor	Minority/ Scheduled Castes	Women-headed Households
Badin	10	12	50	70	10
Naushero Feroz	08	15	43	05	04
Sanghar	13	14	55	83	06
Khairpur	05	08	30	0	07
Dadu	09	11	40	12	10
Larkana	04	06	23	03	04
Jamshoro	12	17	89	20	13
Total	**61**	**83**	**330**	**193**	**54**
PWD: Persons with Disabilities					

5.5.8 Key Issues Raised by Male Vulnerable Groups

Male participants from vulnerable categories, particularly persons with disabilities (PWDs) and orphans, highlighted significant barriers in accessing existing WASH facilities.

- Many reported that existing water supply points and sanitation facilities are not disability-friendly, making access physically challenging or, in some cases, impossible.
- The combination of open defecation practices and physical disability was identified as a major concern, exposing individuals to safety risks, dignity issues, and health hazards.

[56] Note: At this stage, the project components/ modules have been conceptually developed and defined; however, their practical implementation remains in progress and is currently being operationalized in alignment with the approved project design and technical specifications, alongside the finalization and formal approval

- Inadequate infrastructure design, such as lack of ramps, handrails, or proximity, further limits independent access to services.

5.5.9 Key Issues Raised by Female Vulnerable Groups

Female participants, including widows, women-headed households, PWDs, and minority women, shared compounded challenges due to gender roles and socio-economic vulnerability:

- Water fetching responsibilities were reported as physically demanding, particularly for widows and women without male support, who must also manage childcare and household responsibilities.
- Many women indicated that earning a livelihood while fulfilling domestic duties creates significant hardship, especially in conditions of poverty.
- Lack of nearby and reliable water sources increases time burden and physical strain, limiting opportunities for income generation and caregiving.
- Women with disabilities face double marginalization, with restricted mobility and limited access to safe sanitation facilities.

5.5.10 Concerns Raised by Minority Communities

Participants from minority groups expressed concerns regarding limited participation in village-level decision-making processes related to WASH infrastructure.

- They reported instances of exclusion from consultations and planning, leading to inequitable access to services.
- Social dynamics in some areas were noted to influence fair distribution of WASH facilities, potentially marginalizing minority households.

5.5.11 Key Implications for STAR WASH - I Project

The feedback from vulnerable groups highlights the need for a highly inclusive and equity-focused approach in project design and implementation. Key considerations include:

- Incorporation of universal access and disability-inclusive design in all WASH infrastructure
- Targeted measures to reduce the burden on women, particularly in water collection
- Ensuring meaningful participation of vulnerable and minority groups in decision-making processes
- Addressing affordability and poverty-related barriers to access WASH services
- Integrating behavior change interventions to eliminate open defecation, with special attention to vulnerable populations

5.6 Proposed strategy to incorporate the views of vulnerable groups

As shown in **Table 28**, the project will adopt targeted measures to ensure inclusive WASH access for women, persons with disabilities, and minority communities.

Table 28: Proposed Strategy to Incorporate the Views of Vulnerable Groups

Vulnerable Group	Key Issues Identified	Proposed Strategy / Actions	Responsible Entity	Expected Outcome
Persons with Disabilities (PWDs)	Lack of disability-friendly infrastructure; safety and dignity concerns; exclusion from decision-making	Incorporate universal access design (ramps, handrails, wider toilet cubicles); include PWD representatives in consultation and monitoring committees	Design Engineers, Social Safeguard Team, Contractors	Improved accessibility and participation for PWDs in WASH services
Female-headed Households and Widows	Heavy water-fetching burden; limited mobility; poverty-related constraints	Install water points closer to households; provide water storage support systems; promote women's involvement in Community WASH Committees	PMU Social Team, Local Councils, NGOs	Reduced workload and enhanced participation of women in WASH governance
Women and Girls (General)	Lack of privacy and safety in sanitation; dual responsibility of income generation and domestic work	Develop gender-segregated facilities with adequate lighting; conduct hygiene promotion sessions tailored to women's needs	PMU Gender Focal Person, Contractors, NGOs	Safer, more accessible WASH facilities; improved hygiene behaviors
Minority Communities	Exclusion from WASH planning and decision-making; unequal distribution of services	Introduce participatory planning tools ensuring minority representation; monitor equitable service allocation through social audits	PMU, District Implementation Units (DIUs), Local Authorities	Greater social inclusion and fair access to WASH services
Poor and Vulnerable Households	Affordability barriers; limited awareness of hygiene practices	Develop subsidy or installment-based service models; community-led hygiene campaigns emphasizing low-cost solutions	PMU Finance & Social Teams, NGOs	Increased affordability, adoption of hygienic practices
Orphans and Child-Headed Households	Safety risks and dependence on others for WASH access	Coordinate with social welfare institutions to ensure child-friendly facilities and supportive community monitoring	PMU Child Protection Focal Point, NGOs	Enhanced protection and independent access for orphaned and vulnerable children

5.7 Implementation Arrangements and Resources

The project's stakeholder engagement implementation arrangements are as follows:

The Project Implementation Unit (PIU) STAR WASH 1/ SPHF, *as the lead Executive Agency*, will have overall responsibility for planning, coordinating, and implementing stakeholder engagement activities throughout the project lifecycle. The PIU will ensure that all consultations are carried out in a meaningful, inclusive, and culturally appropriate manner in line with the World Bank's Environmental and Social Standard (ESS10).

The Sindh People for Flood Affectee (SPHF) & The Local Government Department (LGD), the government of Sindh, will establish a PIU for the Project with a full-time project director, to oversee the project activities and coordinate all inputs on behalf of the GoS. The key responsibility for implementation of the SEP will lie with the Project Director, who will be supported in this regard by the Senior Environment Specialist and the Senior Social Specialist, as well as their support teams.

Within the PIU, the Environmental and Social (E&S) team, including Social Development Officer and Community Engagement staff, will lead stakeholder engagement activities. Their responsibilities will include organizing consultations, ensuring inclusion of vulnerable groups, maintaining stakeholder records, monitoring engagement effectiveness, and overseeing the Grievance Redress Mechanism (GRM).

At the field level, contractors and supervising consultants will support the implementation of stakeholder engagement activities. They will facilitate site-level consultations, disseminate project-related information, maintain regular communication with local communities, and report stakeholder concerns and grievances to the PIU. Contractors will be required to comply with the SEP and maintain proper documentation of all engagement activities.

Relevant local authorities and community representatives at the Union council/ Village will also be engaged to support outreach efforts, particularly for mobilizing communities and ensuring participation of marginalized and vulnerable groups.

PIU STAR WASH 1 teams will be mobilized to the village level to support in

(i) community mobilization and social analysis for the development of an inclusive and participatory Community Development Plan;
(ii) facilitation and support to the Village Council in the core planning and budgeting, along with technical assistance and support in reporting; and
(iii) engineering support and supervision for small-scale schemes funded at the village level.

Adequate resources will be allocated for effective stakeholder engagement, including budget provisions for consultation activities, communication materials, logistics, community outreach, and operation of the GRM. These resources will ensure that engagement activities are conducted regularly and effectively across all project phases.

To strengthen implementation, capacity-building and training will be provided to PIU staff, contractors, and other stakeholders on stakeholder engagement approaches, inclusion of vulnerable groups, and GRM procedures.

The stakeholder engagement activities will be documented through detailed consultation records, including minutes of meetings, attendance sheets (disaggregated by gender and stakeholder category), photographs, and summaries of key issues raised and actions agreed. In addition, periodic monitoring reports (monthly and quarterly) will capture stakeholder engagement activities, outcomes, and follow-up actions. All documentation will be maintained by the PIU and incorporated into project reports, including SEP and Resettlement Plans (RPs), where applicable.

5.8 Strategy for Information Disclosure

During the preparation stage of the project, an initial outline of information to be disclosed was developed based on consultations with the implementing agency following the World Bank disclosure protocol (refer to **Table 29**). This information includes details to be disclosed to stakeholders such as affected communities, local government departments, NGOs, and experts. However, for the implementation stage, more detailed consultations will be conducted to determine the modes of communication and frequency of future engagements tailored to each type of stakeholder. This will ensure effective communication and engagement throughout the project lifecycle. An updated Stakeholder Engagement Plan (SEP) will be prepared within a month of the project's effectiveness date, incorporating feedback and suggestions gathered during the implementation stage consultations.

Table 29: Strategy for Information Disclosure

Project stage/ Components	Target stakeholders	List of information to be disclosed	Methods and timing
Preparation	PIU STAR WASH 1, LGD and PHED, affected parties, interested groups, public at large, vulnerable groups, Government entities	Appraisal stage SEP, Appraisal stage ESCP.	Websites of PIU STAR WASH 1/ SPHF, LGD and PHED before project effectiveness One-on-one meetings, Consultation meetings
Implementation	PIU STAR WASH 1, LGD and PHED, and other relevant Government ministries and entities	PAD, E&S principles and obligations, Consultation process/ SEP, ESCP, project information	Website of PIU STAR WASH 1, SPHF, LGD and PHED One-on-one meetings Consultation meetings
	Local communities and Vulnerable groups (including minorities, women, people with disabilities)	Regular updates on project activities and specific interventions for vulnerable groups (through PIU STAR WASH 1), SEP and GRM procedures.	Outreach through local community organizations Public notices Press releases in the local media and on the project website

Project stage/ Components	Target stakeholders	List of information to be disclosed	Methods and timing
			Airing of key messages through programs on local FM radio, television and text messages Dissemination of information through social media
	Other ministries and relevant public agencies	Project overview, Progress reports, SEP and GRM procedures.	Consultation meetings Electronic publications Information leaflets and brochures
	NGOs, Academics, Organizations working in the districts	Scope of Project, social mobilization interventions, opportunities for collaboration, ESMP, updated SEP and GRM procedures.	Information Resource portal on the project website Bi-Annual Project Dissemination Workshops Press releases and announcements in the media, notifications of the disclosed materials to local and provincial NGOs
	General public	FAQs, Updated SEP and GRM procedures	Websites of PIU STAR WASH1 / SPHF, LGD and PHED. Print, electronic, broadcast, and social media Brochures, leaflets, posters, nontechnical summary documents and reports Mosque announcements in rural areas Local influential (councilors, community workers, etc.)

5.9 Capacity Building Plan for STAR WASH-1

The capacity building plan has been developed for STAR WASH-1 to strengthen the institutional and field-level capacity of PIU staff, contractors, supervising consultants, Community Liaison Officers, and other community-facing personnel engaged in stakeholder consultation, grievance management, information disclosure, vulnerable group outreach, behaviour change communication, and monitoring of stakeholder engagement activities. The plan is aligned with the SEP, ESS10 requirements, project implementation arrangements, and the budgetary provisions made for social and environmental training, GRM training, and GBV-related capacity building (refer to **Table 30).**

Table 30: Capacity Building Plan for Engagement Teams

Training Topic	Target Audience	Time Frame	Duration of Training	Focal Person / Lead Responsibility	Frequency
Orientation on STAR WASH-1 Project, SEP, ESS10, and stakeholder engagement principles	PIU staff, Social Development Officer, Community Engagement staff, Communication staff, supervising consultants, contractor management staff	At project mobilization and before the start of field engagement activities	1 day	Project Director with Senior Social Specialist and Environmental Specialist, PIU/ SPHF	Once at inception, with a refresher every year
Stakeholder identification, mapping, and consultation planning	PIU E&S team, social mobilizers, CLOs, supervising consultants, contractor focal staff	During the planning stage and before consultations in each district	1 day	Senior Social Specialist / Social Development Officer	Before each district rollout, refresher semi-annually
Community consultation, FGD facilitation, and documentation of engagement records	Community Engagement staff, CLOs, social mobilizers, contractor community interface staff, supervising consultants	Before village-level consultations and prior to construction activities	1 day	Social Development Officer / Community Engagement Lead	Quarterly and before major consultation cycles
Inclusion of vulnerable groups, gender-responsive engagement, and culturally appropriate outreach	PIU E&S team, CLOs, social mobilizers, contractor staff, local facilitation teams	During the planning and implementation stages, especially before community outreach in rural districts	1 day	Senior Social Specialist / Gender or Social Inclusion Focal Person	Quarterly
Communication and information disclosure, including local language outreach and awareness tools	Communication Officer, PIU staff, CLOs, social mobilizers, contractors, NGO/community partners	Prior to launch meetings, disclosure campaigns, and implementation updates	0.5 to 1 day	Communication Focal Person with PIU E&S Team	Quarterly
GRM procedures, grievance uptake, registration, referral, and closure	FGROs, GRM focal persons, CLOs, PIU E&S team, contractors, district grievance staff, GRC members	Before GRM becomes operational and during implementation	1 day	GRM Focal Person / Social Development Officer, PIU	Twice per year, in line with the SEP budget provision for the GM committee training
Sensitive grievance handling, survivor-centered response, GBV/SEA/SH awareness, and code of conduct	PIU staff, contractor staff, supervising consultants, CLOs, community-facing personnel, GRC members	Before contractor mobilization and before field deployment	1 day	Senior Social Specialist with trained GBV focal support / PMU social team	Twice per year and a mandatory induction for new staff

Training Topic	Target Audience	Time Frame	Duration of Training	Focal Person / Lead Responsibility	Frequency
Community health, safety, and construction-phase risk communication	Contractor site staff, CLOs, supervising consultants, PIU E&S team, labor supervisors	Before the start of civil works and during active construction	0.5 to 1 day	Environmental Specialist with contractor EHS representative	Before each work package and refresher quarterly
BCC and hygiene promotion methods for rural communities, schools, and vulnerable households	Community mobilizers, social mobilizers, CLOs, NGO partners, district outreach teams	Prior to the BCC campaign rollout and during implementation	1 day	Communication Officer with Social Development Officer and public health/ resource persons	Quarterly
Monitoring, reporting, KPI tracking, attendance disaggregation, and feedback integration	PIU E&S team, M&E staff, Communication Officer, GRM focal staff, supervising consultants	At start of implementation and before monthly /quarterly reporting cycles	1 day	PIU E&S Team / M&E Focal Person	Quarterly
Institutional coordination, district-level engagement, and reporting protocols	PIU, SPHF, PHED, LGD representatives, supervising consultants, district focal persons	During project startup and before inter-agency field coordination	0.5 day	Project Director / PIU with SPHF coordination support	Semi-annually
O&M awareness, community committee support, and sustainability-focused engagement	Local authorities, service providers, CBOs, village committees, community representatives	During operation preparation and pre-handover stage	1 day	PIU/SPHF, PHED/LGD focal persons, Social Development Officer	At pre-handover and as needed during the operation phase

6 Potential Environmental and Social Impacts and Mitigation Measures

6.1 General

This chapter outlines both the positive and potentially adverse environmental and social effects expected at various stages of the proposed project: planning & design, construction/ implementation, and operation & maintainace. It discusses impacts on physical, ecological, and socio-economic domains, along with suggested mitigation and remedial actions following the mitigation hierarchy. Each impact is qualitatively described, considering its effect on the environment and communities in the study area.

6.1.1 Study Area

The study area covers the region where potential environmental and social impacts of the proposed interventions may occur. This includes the project boundary and adjacent areas where such impacts could be anticipated. The project is primarily linear, encompassing water supply and drainage lines, but also includes non-linear components such as water supply schemes, solar installations, infrastructure development, and water meter placements. Although the exact footprints of the project and its subprojects are not yet finalized, a provisional study area extending approximately 100 to 200 feet on either side of the project boundary is recommended to account for potential indirect impacts. It may vary depending on the actual design and project footprint area. During the detailed design phase, once subproject footprints are defined, the study area will be accurately delineated based on field investigations and the recommendations of E&S Teams.

6.2 Environmental and Social Screening

STAR WASH I has been classified as substantial risk with regards to potential environmental and social (E&S) impacts. The components of STAR WASH I, which may have adverse E&S impacts, are new water supply and drainage schemes.

However, the exact nature, extent, and location of these subprojects are not known at this stage. Potential impacts of a generic nature have nonetheless been screened using the checklist mentioned, the filled screening checklists have been given in **Annexure-IV**.

The Environmental and Social Screening and Scoping Checklist (ESSSC) also functions as an eligibility screen. It shall record, at minimum, activity type, scale, location, environmental and social sensitivity, land and resource-use issues, community and worker health and safety, biodiversity/cultural heritage sensitivity, water-resource risks, and cumulative impacts. Based on screening, a subproject may be (i) eligible with a checklist and mitigation measures, (ii) eligible subject to an Environmental and Social Screening Report (ESSR) and/or site-specific ESMP, or (iii) ineligible and excluded from financing. Activities that would cause significant adverse impacts on critical or natural habitats, protected/ecologically sensitive areas, significant involuntary resettlement or severe livelihood loss, or other activities on the Negative Screening List shall be screened out. New water-supply and drainage schemes will generally require a site-specific CESMP under cluster based ESMPs; institutional WASH improvements are generally lower-to-moderate risk, subject to screening outcomes. Where warranted by risk, site-specific instruments may include an ESIA, ESMP/CESMP, RP/ARP, biodiversity or cultural heritage measures, traffic/access plans, OHS/CHS plans, or other risk-specific instruments.

6.3 General Anticipated Environmental and Social Risks

The precise anticipation of environmental and social (E&S) risks for the project is currently hindered by the pending finalization of design parameters tailored to each site's specific requirements. Design parameters are crucial in determining layout, construction methods, and operational procedures, which directly impact E&S risks. Until these parameters are established, accurately assessing potential risks related to topography, hydrology, Biodiversity/ ecology, and socio-economic conditions remains challenging.

Once finalized, the design parameters will enable a comprehensive evaluation of E&S risks, facilitating the development of effective mitigation measures. The environmental screening shows that the proposed project interventions are not likely to have substantial environmental and social risks that are irreversible, diverse, or unprecedented. Mitigation measures will be developed to reduce all adverse impacts to acceptable levels.

The World Bank classifies projects into four E&S risk categories based on the scale, duration, reversibility, and sensitivity shown in **Table 31**:

The Substantial rating reflects the scale and geographic dispersion of investments, sensitivity and uncertainty of water resources, potential cumulative effects, operational complexity of water abstraction and wastewater/fecal-sludge systems, hazardous chemical handling, community and worker health and safety risks, land-related risks, and uncertainty regarding final subproject locations. Many individual impacts are expected to be site-specific and manageable through appropriate design and site-specific instruments; the overall rating nevertheless remains Substantial until site-specific assessments demonstrate otherwise.

Table 31: World Bank Environmental Risk Classification

Risk Level	Key Characteristics	STAR-WASH-1 Status
High	Wide-ranging, long-term/permanent/irreversible impacts; high magnitude; affects preservation areas, cultural sites, traditional lands; serious health/environmental effects.	Not applicable
Substantial	Large-medium scale impacts; temporary/predictable/reversible; medium magnitude; known mitigation mechanisms available.	Current Classification (Concept Stage)
		Subject to change based on final design/ FSTP siting
Moderate	Limited, short-term, reversible, low-magnitude impacts; easily mitigated; away from sensitive areas.	Potential reclassification if risks are minimized
Low	Minimal/negligible risks; no further assessment needed.	Not applicable

STAR-WASH-1 Substantial Risk Justification: Medium-scale construction pollution, FSTP sludge risks, VLD land use, labor influx (SEA/SH), equitable access issues, all predictable /reversible via ESMF/SEP. Classification may be downgraded with robust mitigation or upgraded if site-specific assessments reveal higher risks. The risks associated with water abstraction and source sustainability, including over abstraction, groundwater depletion, saline intrusion and potential effects on community-dependent natural resources; wastewater and fecal sludge/septage management, including collection, transport, treatment, discharge, reuse and final disposal; and institutional and capacity risks associated with establishing and sustaining the new rural WASH service-delivery model. These include the capacity of SPHF, service providers and relevant institutions to undertake safe operation and maintenance, water-quality monitoring, fecal sludge/septage management, regulatory oversight, contractor/service-provider supervision, grievance redress and E&S monitoring. These risks are expected to be site-specific and manageable through detailed design and screening, water-resource assessment, site-specific ESMPs, CESMP safe sludge management chains, institutional capacity building, and strengthened monitoring and accountability.

The World Bank undertakes environmental screening of each proposed project to define the extent and type of required environmental assessment. Projects are classified into four risk categories based on their type, location, sensitivities, and scale.

6.3.1 Environmental Risks

Despite the project's overall environmental and public health benefits, several risks associated with water supply and sanitation infrastructure require careful management. Increased household water connections are expected to generate higher volumes of wastewater, which, if not adequately managed, may lead to localized waterlogging, contamination of shallow aquifers, and degradation of surface water bodies. Poorly designed or constructed sanitation

systems (e.g., septic tanks, soakage pits, or ABRs) may result in leachate infiltration, posing risks to groundwater quality, particularly in areas with high water tables. Additionally, unsustainable abstraction of groundwater for water supply schemes may contribute to aquifer depletion, saline intrusion (especially in coastal zones), and long-term resource stress. These factors, combined with inadequate hygiene practices, could increase the risk of waterborne disease transmission.

6.3.2 Construction Phase Impacts

Construction-related impacts are expected to be site-specific, temporary, and manageable but may range from minor to moderate in significance. These include generation of construction waste, dust emissions, noise and vibration, disruption to local access, and occupational health and safety risks to workers. Improper disposal of excavated material, construction debris, and wastewater can lead to localized environmental degradation. Risks may be exacerbated in densely populated or flood-prone areas where drainage is already constrained. Furthermore, absence of proper site supervision, weak adherence to ESCOPs, or lack of contractor capacity could intensify these impacts. Effective implementation of mitigation measures, including proper waste management, dust suppression, traffic management, and worker safety protocols, will be critical.

6.3.3 Operational & Maintenance (O&M) Phase Risks

During the O&M phase, key risks relate to infection prevention and control associated with the handling, storage, and disposal of wastewater and fecal sludge. Inadequate operation and maintenance of sanitation systems, including desludging practices and malfunctioning treatment units (e.g., FSTPs or ABRs), may result in environmental contamination and public health hazards. Stagnant wastewater, leaking infrastructure, or poorly managed sludge can create breeding grounds for disease vectors such as mosquitoes and flies. Occupational exposure risks for sanitation workers, particularly in the absence of appropriate PPE and training, are also significant. Ensuring safe sludge management chains, regular maintenance, and adherence to health and safety protocols is essential.

Operational environmental risks also include groundwater depletion and quality impacts from abstraction; surface-water abstraction effects on downstream flows, aquatic ecosystems and competing users during low-flow or peak agricultural periods; sludge/septage risks across collection, transport, treatment, disposal and potential reuse; treatment residuals and RO reject brine; hazardous treatment chemicals such as chlorine; construction and operational hazardous/non-hazardous waste; and end-of-life management of solar panels, batteries and associated e-waste. Treated-effluent risks shall consider receiving-water uses and quality, seasonal flows and assimilative capacity, and cumulative loads from multiple treatment systems. These risks shall be assessed and managed through design controls, site-specific E&S instruments, monitoring and adaptive management.

6.3.4 Social Risks and Land Requirements

Social risks are primarily linked to potential conflicts over water distribution, site selection for infrastructure, and issues related to voluntary land donation (VLD). Although the project does not envisage large-scale land acquisition or physical displacement, small parcels of land may be required for facilities such as water storage tanks or sanitation units. In such cases, risks include inadequate documentation of VLD, elite capture, or coercion, particularly in rural settings. Additionally, legacy issues related to encroachments on public or communal land may complicate site selection and lead to disputes. Transparent processes, proper documentation, and community consultations will be necessary to mitigate these risks.

Community health and safety risks shall also cover excavation and trenching, damage to underground utilities, temporary access restrictions, disruption to mobility, risks to adjacent houses and structures, road/traffic safety associated with movement of materials, equipment, sludge, septage and waste, and nuisance/exposure risks around wastewater and fecal-sludge facilities. Inadequate restoration of roads, streets, drains, crossings and other community infrastructure after construction shall be treated as a project risk and addressed through restoration requirements in site-specific instruments and contracts. Informal occupants and users shall be identified during screening and treated in accordance with the RF and ESS5 requirements; lack of formal title shall not by itself remove applicable rights to compensation or assistance for eligible impacts.

6.3.5 Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) risks

SEA/SH risks in STAR-WASH-1 are assessed as part of the project's substantial social risk profile, and the World Bank notes that GBV, SEA, and SH will be managed through a project-level action plan during implementation.

For STAR-WASH-1, the most relevant SEA/SH risks are likely to come from interaction between workers and communities during construction and service delivery, especially around field visits, site access, and contractor behavior.

Risks can also arise where women or girls must travel to access services, where grievance channels are weak, or where power imbalances discourage reporting.

Because WASH projects often involve household and public access points, poor privacy, unsafe locations, or unmanaged contractor conduct can increase vulnerability even without large worker influx.

Mitigation

The project-level GBV/SEA/SH Action Plan will be prepared and approved during implementation. It will be aligned with the Stakeholder Engagement Plan, Labor Management Procedures, and Community Health and Safety measures through the ESMF, which are the main instruments for reducing SEA/SH-related risk. The project will also use site-specific ESMPs and capacity building of PIU - SPHF is an important part of risk control

The strongest SEA/SH controls would be: code of conduct for workers, survivor-centered grievance handling, confidential reporting channels, contractor supervision, and targeted awareness for women and vulnerable groups. It would also be important to ensure safe consultation spaces for women, referral links to local support services, and monitoring of contractor compliance throughout construction and O&M.

The overall SEA/SH risk is Moderate. Predominantly local hiring is expected to limit labor-influx risk, but if specialized workers are recruited from outside project areas, labor-influx and SEA/SH controls shall be strengthened proportionately. The SEA/SH risk rating and effectiveness of mitigation measures shall be reviewed at the first Implementation Status and Results Report (ISR), and earlier if implementation indicates increased external labor sourcing or higher-than-anticipated SEA/SH interfaces. The SEA/SH Action Plan shall require signed Codes of Conduct, mandatory training, sex-segregated and secure worksite WASH facilities, confidential and survivor-centered grievance channels, referral pathways, and contractor/DBO compliance monitoring.

Mandatory sensitization sessions on SEA/SH prevention for all project staff, contractors, and communities, using local languages like Sindhi. Zero-tolerance clauses in bids, C-ESMPs with SEA/SH sections, worker screening, and supervision during construction

6.3.6 Risks of Social Exclusion

There is a considerable risk that vulnerable and marginalized groups may not equitably benefit from project interventions. These include women-headed households, persons with disabilities, minority communities, landless populations, and those residing in remote or underserved areas. Barriers such as affordability constraints, social norms, lack of awareness, and physical inaccessibility may limit their participation and access to services. Without targeted outreach and inclusive design measures, the project risks reinforcing existing inequalities. Proactive inclusion strategies, gender-sensitive approaches, and accessible infrastructure design will be essential to ensure equitable outcomes.

6.3.7 Sustainability and Governance Risks

The long-term sustainability of WASH infrastructure depends on robust institutional arrangements, adequate financing for operations and maintenance, and strong community ownership. Weak governance structures, unclear roles and responsibilities, and limited technical capacity at the local level may undermine service delivery. Additionally, behavioral factors, such as reluctance to adopt improved sanitation practices or pay for services, can affect sustainability. Water scarcity, seasonal variability, and competing demands for water resources in Sindh further compound these challenges and may lead to allocation conflicts. Strengthening community-based management systems, establishing clear O&M frameworks, and integrating climate resilience considerations will be critical for sustained project outcomes.

The principal/ general impacts associated with the proposed project interventions are presented in **Table 32** below, while all impacts in detail have been discussed in a subsequent section.

Table 32: Potential E & S Risk Linkages to Modules of STAR WASH 1

Project Phase	Key Aspects / Issues	Sector Governance	Access to Water Supply Services	Access to Sanitation	Behavioural Change for Strengthened Hygiene
Design	Technical design and layout planning, hydrology analysis, siting, and land use	Establish transparent design approval processes, adopt water security and groundwater management policies, ensure design compliance with national and IFI safeguards	Optimize network design to maximize service coverage and reliability; ensure adequate raw water protection measures	Integrate wastewater management solutions in design, avoid contamination pathways	Incorporate hygiene promotion messaging in infrastructure design (e.g., hygiene-friendly facility layouts)
Construction	Site clearance, vegetation loss, soil erosion, traffic, noise, dust, waste generation, workers' health and safety, community safety, population influx	Enforce ESMP and occupational health and safety (OHS) plans, ensure contractors follow labor and GRM procedures, strengthen institutional oversight	Ensure temporary water supply during works; protect intake points from construction runoff	Manage sewage and solid waste from camps; prevent open defecation or unsanitary conditions	Conduct community awareness on safety, sanitation, and hygiene around construction sites
Operation & Maintenance (O&M)	Wastewater generation, solid waste from O&M activities, chemical handling (e.g. chlorine), potential contamination, infrastructure safety	Implement standard operating procedures (SOPs) for water quality and safety; ensure institutional capacity for O&M; maintain regulatory monitoring and reporting systems	Monitor and maintain quality of distributed water; control algal growth, chlorination, and corrosiveness of water	Ensure safe disposal/treatment of sludge and effluent; maintain sanitation infrastructure	Promote safe water handling, household hygiene awareness, and behavior reinforcement through community outreach
Cross-Cutting (All Phases)	Biodiversity, resource use (water, energy, materials), social inclusion, gender and vulnerability, community health and safety	Strengthen environmental and social governance across agencies; integrate gender and inclusion strategies;	Prioritize equitable access for vulnerable groups, including poor households, women, and children	Integrate sanitation access for marginalized communities; support	Embed behavioural change communication (BCC) programs—handwashing, water

Project Phase	Key Aspects / Issues	Sector Governance	Access to Water Supply Services	Access to Sanitation	Behavioural Change for Strengthened Hygiene
		transparent grievance redress		inclusive planning	conservation, safe sanitation practices

6.4 Environmental Impacts and Mitigation During Planning and Design Phase

The following is a brief description of the impacts envisaged and the recommended mitigation measures during the planning and design phase.

6.4.1 Technical Design and Layout Planning

Potential Impacts

The aesthetic appeal and ambiance of subproject areas may suffer due to incompatible layout plans and engineering designs of project structures. Inadequate construction, design, siting, and materials for water supply lines and drainage schemes could lead to seepage issues. High wind speeds during storms could damage solar panels and their support structures. Furthermore, poor utilization of available spaces and failure to consider future needs may result in structures with low social acceptability and functionality. Locals may also encounter difficulties accessing their land. Overall, this impact is moderately adverse.

Mitigation Measures

- All factors mentioned above must be thoroughly considered in the technical design of the proposed project, ensuring compliance with both local and international standards.
- During the construction design phase, the highest recorded wind speeds in the sub-project area will be taken into account to ensure the supporting structures are robust enough to withstand potential damage from wind storms.
- Prior to commencing construction of proposed subprojects, the proponent must diligently review and validate all designs, taking into account potential impacts as outlined.
- Only pre-qualified service providers should be engaged for the supply of materials such as pipes, solar systems, etc.;
- Measures should be implemented to facilitate local access to their land throughout the project duration.
- Adherence to relevant legislations, conventions, Environmental and Social Safeguards (ESS 2, 3, 4), and guidelines is essential;

Residual Impact: The impact of technical design and layout planning will be insignificant after taking the above-mentioned mitigations.

6.4.2 Hydrology and Water Resources

Potential Impact

Climate change has heightened the frequency and severity of extreme weather events, altering precipitation patterns. The province displays diverse altitudes, climates, ecosystems, vegetation, and water resource types and abundance. The new construction of water supply and drainage schemes will enhance WASH (Water, Sanitation, and Hygiene) conditions.

This impact is moderately adverse in nature.

Mitigation Measures

- System designs, encompassing aspects like location, dimensions, materials, layout, and slope contours, should incorporate adaptation to climate change and enforce flood and drainage control functions;
- Prior to project design, comprehensive hydrological studies covering both surface water and groundwater should be conducted and ongoing groundwater studies by relevant organizations consulted;
- Sanitation facilities under STAR WASH-1 shall be sited and designed with due consideration of shallow hand pumps, household wells, waterlogging, saline/brackish groundwater, flood-prone conditions, and open drainage practices.
- Septic tanks, soakage pits, leach pits, ABRs, sludge drying beds, and wastewater disposal points shall be located at least 30 meters away from drinking water sources, including hand pumps, dug wells, boreholes, tube wells, and community water points.

- In areas with shallow groundwater, sandy or highly permeable soils, waterlogging, flood risk, or high dependence on shallow hand pumps, the setback distance shall be increased to at least 50 meters, or more where required, based on site conditions.
- Sanitation facilities shall preferably be located down-gradient of drinking water sources, where groundwater flow direction can be reasonably identified.
- Septic tanks, ABRs, collection chambers, manholes, sludge drying beds, and wastewater conveyance structures shall be fully lined and impermeable using reinforced concrete, waterproof plastered masonry, HDPE lining, or other approved leak-proof material.
- All joints, pipe connections, floors, walls, and covers shall be properly sealed to prevent leakage, seepage, infiltration, or exfiltration.
- Unlined pits, informal soakage arrangements, and direct discharge of untreated wastewater into open ground, drains, ponds, or agricultural fields shall not be permitted.
- Soakage pits, leach pits, or infiltration trenches shall not be allowed where the vertical distance between the base of the system and the highest seasonal groundwater table is less than 1.5 meters.
- In high water table, waterlogged, saline, or flood-prone villages, sealed or raised sanitation systems shall be adopted, with controlled effluent conveyance and safe treatment or disposal arrangements.
- Sanitation facilities shall not be located in low-lying depressions, natural drainage paths, flood channels, stagnant water areas, or locations where floodwater may wash out sludge or wastewater.
- Hydrogeological screening shall be carried out before finalizing sanitation schemes, including assessment of groundwater depth, seasonal water table variation, soil permeability, nearby water sources, flood and waterlogging history, drainage conditions, and existing water quality concerns.
- Where screening shows a risk to groundwater or drinking water sources, the design shall be modified through increased setbacks, impermeable lining, raised structures, avoidance of soakage pits, clustered treatment, polishing units, or off-site fecal sludge management.
- The screening findings and required mitigation measures shall be recorded in the subproject screening checklist, site-specific ESMP, and engineering design.
- The PIU Environmental Specialist, with support from design consultants, supervision consultants, PHED, LGD, and local representatives, shall verify compliance with setback, lining, and groundwater protection requirements before construction and during implementation.
- Introduction of water-saving technologies should be tailored to local conditions, considering altitude, climate, ecosystems, vegetation, and water resource types;
- Measures to prevent groundwater depletion should prioritize ensuring surface water availability;
- Stakeholders should be educated about the hydrological cycle, including its interaction with climate change, to increase awareness.

- Relevant legislations, conventions, ESSs (ESS 3) and guidelines must be respected.

Residual Impact: The impact of hydrology and water resources will remain significant even after taking the above-mentioned mitigations.

6.4.3 Flora & Fauna

Potential Impacts

No direct impacts on biodiversity or natural resources are anticipated, as construction activities will be confined to already modified areas within village settlements. All works will be planned and implemented to avoid disturbance to existing flora. For pipeline installation from the water source to the settlement, alignments will be selected to pass through areas with little to no vegetation, and cultivated lands will be avoided to the extent possible. Avoiding intervention in natural or critical habitats like protected areas of the province. None of the interventions under this STAR WASH 1 project at ESMF stage shall be carried out in any protected areas and natural critical habitats.

However, national parks, wildlife sanctuaries, and game reserves are present in some districts. In the context of the project area, it is expected that no endemic or endangered species of flora or fauna are found within 500 meters of the proposed interventions, as most activities are located in rural settlements rather than undisturbed wildlife areas. Furthermore, there are no protected forests near the surveyed villages. (refer to **Figure 17**[57]).

The transportation of construction machinery and the establishment of construction camps, if necessary, may result in habitat loss, particularly affecting bird nests. The movement of construction machinery and the setup of camps could also disrupt the routes of wildlife and other habitats. This impact is anticipated to be moderately adverse in nature.

As the exact subproject locations are not yet known, the ESMF does not rely on a blanket conclusion that sensitive habitats or protected areas are absent. Screening shall verify site sensitivity using available records, field reconnaissance and consultation with relevant authorities where appropriate. Any proposed activity in a protected area, critical/natural habitat, ecologically sensitive area, wetland or other area meeting the Negative Screening List criteria shall be excluded or redesigned in accordance with the ESMF and applicable ESS requirements. Where wastewater discharge may affect aquatic habitats or ecological receptors, biodiversity implications shall be assessed together with the ESS3 receiving-water/cumulative-effluent assessment.

[57] https://wwf.org.pk/foreverindus/ie_protectedareas.php

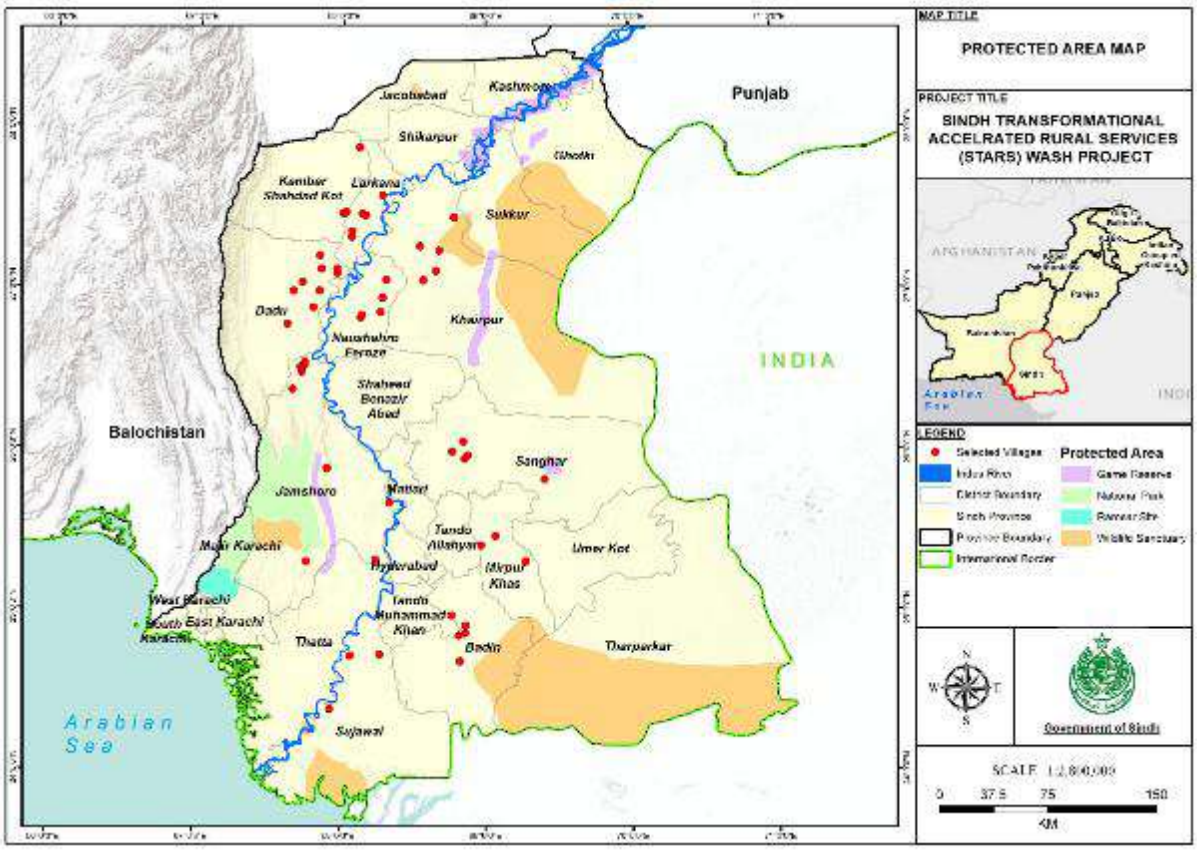


Figure 17: Protected Areas with respect to the Project Area

There are no direct impacts on the biodiversity and natural resources anticipated as construction activities will be carried out in already transformed areas; i.e. rural areas.

However, activities such as setting up construction camps[58] and the movement of construction staff may potentially damage local agricultural land, vegetation, and trees. The installation and movement of construction machinery and camps are expected to encroach upon available agricultural land, affecting vegetation and trees. This impact is considered direct, of medium severity, and site-specific.

Mitigation Measures

- Sites, for the installation of construction camps (if required), should be properly selected to avoid or minimize the cutting of trees, shrubs and herbs;
- The installation of camps and the mobility of construction machinery should be properly planned and well-designed to avoid any loss to local green cover.
- It is recommended to establish construction camps where minimal or no vegetation exists.

[58] Mostly the local labor would be hired due to small works, the establishing regular construction camps by the contractor(s) is unlikely. However, given measures would be taken, if needed

- Tree plantation must be formulated.
- No subproject should be located within an environmentally sensitive area. Moreover, the Contractor will ensure that any surplus construction waste disposal sites are not located in or in close proximity to natural and critical habitats;
- The standard measures must be studied prior to the construction phase to minimize noise due to machinery movements and installations of camps.
- Wildlife movements and routes (if any) must be considered prior to the start of the construction phase;
- The alternate routes and points are recommended to avoid any damage to locally available fauna.
- The waste management plan of the camps must be considered at the planning stage to prevent damage to wild animals and birds.
- Extreme care should be taken to avoid mature trees and especially those providing nesting habitat to avifauna; and
- Relevant legislations, conventions, ESSs (ESS-6) and guidelines must be respected

Residual Impact: The impact on flora will be insignificant after taking the above-mentioned mitigations.

6.4.4 Cumulative Effluent Discharge and Receiving Water Management

Potential Impact

In the absence of a clear mapping of villages and discharge points, multiple STPs in proximity may discharge effluent into the same receiving water body, leading to cumulative pollution loads. This may degrade water quality, exceed assimilative capacity, impact downstream users, harm aquatic ecosystems, and create community health and safety risks.

Mitigation Measures

The E&S instrument will incorporate a catchment-based planning approach to manage cumulative impacts:

- All subprojects, villages, STPs, and proposed discharge locations will be geo-tagged and mapped at the planning stage.
- Identification and characterization of receiving bodies (flows, seasonality, existing uses, baseline quality) and estimation of assimilative capacity.
- For clusters of villages discharging to the same water body, combined effluent loads will be assessed against SEQS/EHS thresholds before approval.
- Staggering of discharge points, flow regulation, or routing to alternative channels where feasible to avoid concentrated loading.
- Ensuring all STPs meet required effluent standards; additional polishing treatment will be required where cumulative loads risk exceedance.
- Prioritize safe reuse (e.g., irrigation) to reduce direct discharge volumes.
- Regular downstream water quality monitoring at shared discharge points; corrective actions triggered if thresholds are exceeded.

- Coordination with local authorities to manage shared water bodies and resolve allocation or discharge conflicts.

Residual Impact: With proper spatial planning and cumulative load management, risks are expected to be low to moderate. However, seasonal low flows and multiple discharges may still create localized stress, requiring continuous monitoring and adaptive management.

6.5 Social Impacts and Mitigation During Planning and Design Phase

6.5.1 Risk of Social Exclusion

Due to the intricate nature of Sindhi society and the prevalent structural inequality in rural areas, there's a significant risk of excluding traditionally marginalized groups from consultation. These include women in general, particularly those from impoverished households, as well as the poor, landless individuals, and minority communities who often face economic hardships in rural Sindhi settings. Despite this, certain infrastructure projects may yield positive externalities beneficial to the broader community. It's crucial to ensure that subprojects generate local employment opportunities whenever feasible and that workers receive fair wages and safe working conditions. Nonetheless, it's imperative to strive for equitable distribution of project benefits across the community.

Mitigation Measures

It is crucial to deliberately involve marginalized communities in project-related consultations whenever feasible. STAR WASH 1 should persist in conducting such consultations, with a heightened focus on ensuring the inclusion of traditionally marginalized groups, including women. These forums serve as platforms for individuals affected by project activities, whether positively or negatively, to voice their experiences to project proponents. Furthermore, communication materials, particularly on social media, should be disseminated to elucidate the project's objectives and activities.

The Stakeholder Engagement Plan (SEP) plays a critical role in mitigating the risk of social exclusion by ensuring that engagement processes are inclusive, accessible, and culturally appropriate. The SEP mandates targeted outreach strategies to engage marginalized and vulnerable groups, including women, the poor, landless households, and minority communities, who are often underrepresented in conventional consultation processes. This includes the use of gender-sensitive approaches, separate focus group discussions for women, engagement through trusted community representatives, and the adaptation of communication methods to local languages and literacy levels.

Furthermore, the SEP emphasizes continuous engagement rather than one-time consultations, ensuring that marginalized voices are heard throughout the project lifecycle, from planning to implementation and monitoring. It also integrates a Grievance Redress Mechanism (GRM) that is accessible to all community members, including those with limited

mobility or social constraints, thereby providing an additional platform to raise concerns and seek redress.

By embedding these inclusive engagement strategies, the SEP supports equitable participation and helps ensure that project benefits, including employment opportunities, are distributed fairly, while minimizing the risk of reinforcing existing social inequalities in rural Sindh.

As women are typically not counted as household heads unless they own a House/land or have a tenancy agreement, they are likely to face more prejudice or discrimination in accessing development resources and project benefits. Special arrangements will be required to reach, include, and involve women in all their diversity as equal partners and beneficiaries in the Project.

6.5.2 Gender Impacts

Gender considerations in STAR WASH 1 projects in Sindh, Pakistan, are crucial across various dimensions. Women and girls often shoulder the responsibility of water and sanitation tasks but encounter barriers to accessing clean facilities, highlighting the necessity for tailored interventions. Additionally, poor water and sanitation disproportionately affect women's health, particularly during menstruation and pregnancy, underscoring the importance of prioritizing facilities that promote menstrual hygiene and maternal health. Moreover, girls' education is hindered by the time spent fetching water, indicating the need for closer clean water sources to enhance attendance and break cycles of poverty and inequality.

Furthermore, empowering women through their active involvement in WASH project planning and implementation is imperative for addressing their specific needs and fostering gender equality. Providing training and leadership opportunities within these initiatives can further empower women, ensuring their voices are heard and their concerns addressed effectively. Moreover, ensuring safety and dignity for women through the provision of gender-sensitive sanitation facilities is essential, as the lack of safe facilities exposes women to various safety risks.

Lastly, recognizing the influence of social norms and cultural practices on WASH project design and implementation is crucial for their effectiveness and sustainability. Engaging with communities to understand and address these norms ensures that interventions are culturally appropriate and resonate with local contexts, thereby enhancing their impact.

Mitigation Measures

a) Planning Phase

- Ensure transparent and participatory site selection with clearly communicated criteria.
- Identify and resolve land-related legacy issues prior to site finalization.
- Implement robust Voluntary Land Donation (VLD) protocols, including:
- Free, prior, and informed consent (FPIC principles where applicable);
- Proper documentation and independent verification;

- Inclusion of women and vulnerable household members in decision-making;
- Prevent elite capture through inclusive stakeholder engagement, with targeted outreach to marginalized groups.
- Ensure active and meaningful participation of women across all project phases, particularly during E&S instrument preparation.
- Conduct separate, culturally appropriate consultations for women where required.
- Promote women's leadership and capacity building in community-based WASH management structures (early identification and training planning).
- Prepare and adopt a project-level GBV/SEA/SH Action Plan.
- Include SEA/SH provisions in bidding documents and Contractor ESMPs (C-ESMPs).
- Establish confidential, survivor-centered GRM channels with multiple safe reporting options.

b) Construction Phase

- Deploy female social outreach teams actively across sub-project areas, to the maximum extent possible.
- Strengthen and operationalize the Grievance Redress Mechanism (GRM) to ensure accessibility, transparency, and timely resolution.
- Continue engagement of women through consultations and feedback mechanisms during construction.
- Enforce Codes of Conduct (CoC) with zero-tolerance clauses for SEA/SH for all workers and contractors.
- Conduct mandatory SEA/SH awareness and sensitization training for workers, contractors, and communities (in local languages such as Sindhi).
- Ensure safe siting and interim arrangements of WASH facilities, minimizing isolation and enhancing visibility during construction.

c) Operation & Maintenance Phase

- Maintain and strengthen GRM for ongoing service delivery issues and community concerns.
- Continue inclusive stakeholder engagement to ensure equitable access and benefit-sharing.
- Promote sustained women's leadership and participation in WASH management committees.
- Continue community awareness campaigns to reduce stigma and encourage reporting.

Ensure GRM remains confidential, survivor-centered, and functional.

6.6 Potential Environmental Impacts and Mitigation during Project Construction / Implementation

The following is a brief description of the impacts envisaged and the recommended mitigation measures during the construction/implementation phase.

6.6.1 Public Utilities

Potential Impact

Due to the proposed subprojects, telephone lines, electric poles, wires, water lines, etc., within the project area of the proposed subprojects' locations may need to be shifted (if any). This impact can be categorized as direct, medium and site-specific.

Excavation planning shall include utility mapping/verification where information is available, safe digging practices, protection of adjacent structures, temporary access and pedestrian arrangements, and timely restoration of roads, streets, drainage, crossings and other affected community infrastructure. Traffic and road-safety controls shall cover movement of construction materials, equipment, sludge, septage and waste through rural communities, including routing, speed control, signage, trained drivers, vehicle condition and community awareness.

Mitigation Measures

- During the design phase, maximum effort will be made to avoid the abovementioned public utilities, and if these are unavoidable, then these will be relocated in a timely manner through the concerned department to avoid any public inconvenience; and
- Relevant legislations, conventions, ESSs and guidelines must be respected.

Residual Impact: The impact of public utilities will be insignificant after taking the above-mentioned mitigations.

6.6.2 Soil Erosion and Contamination

Potential Impact

The proposed interventions for STAR WASH 1 are not expected to involve extensive excavation or activities leading to widespread soil erosion. Minor excavation will occur in water and drainage schemes, with the overall impact aimed at reducing soil erosion, particularly along unimproved drainage ponds.

Clearing vegetation can loosen soil, increasing its susceptibility to erosion by wind and rain. Runoff during the rainy season may carry silt, contributing to soil erosion. Erosion can result in soil mixing with stagnant water, forming a slush that hampers vehicle and machinery movement, construction work, and local movements.

Soil erosion may occur at active construction sites and contractor camps (if necessary), due to uncontrolled runoff from equipment washing yards, excavation, and vegetation clearance. Unauthorized use of borrowed areas can also degrade the landscape. Additionally, soil contamination may arise from solid waste generation and oil or chemical spills.

Mitigation Measures

- The Contractor will be required to instruct and train their workforce in the storage, handling and management of materials and chemicals that can potentially cause soil contamination;

- Material Safety Data Sheets (MSDS) will be strictly followed during handling and storage of chemicals;
- Provision of an impervious platform with an oil and grease trap for the collection of spillages during equipment and vehicle maintenance;
- The soil excavated and silt removed during the water supply and drainage works will be disposed of appropriately, ensuring that it is not dumped in the cultivation fields and does not block the water courses, drains, or local routes and the site shall be restored to its original conditions.
- The scheme design involving the excavation of the water pond should include proper disposal of the surplus soil (e.g., for the embankment for the water pond itself);
- Solid waste generated at the camp sites will be properly treated and safely disposed of only in the demarcated waste disposal sites/areas;
- If any contaminated soils are found, they shall be removed and deposited in a sealed pit in an area agreed/approved with the concerned department;
- Relevant legislation, conventions, ESSs (ESS-3) and guidelines must be respected.

Residual Impact: The impact of soil erosion and contamination will be of low significance after taking the above-mentioned mitigations.

6.6.3 Physical Cultural Resources (PCR)

Potential Impact

During construction, there is a chance of finding archaeological remains. Mismanagement of the archaeological remains may result in the loss of a valuable asset. Further, excavation of earth from borrow areas and clearance of subproject area (where applicable) may result in erosion of soil. Erosion results in a change in the edaphic characteristics of soil. The impact is moderately adverse in nature.

Before excavation, the screening process shall consider available cultural heritage records and, where appropriate, consultation with relevant provincial authorities. The Chance Find Procedure shall apply regardless of whether excavation is expected to be shallow or extensive, and shall be incorporated into bidding documents, DBO/contractor obligations, supervision checklists and community-based implementation arrangements. Work shall stop in the affected area following a chance find until the competent authority provides direction.

Mitigation Measures

- In case of finding archaeological remains during excavation, the Contractor shall immediately report to the Project Implementation and Supervision Consultant (PISC) for onward reporting to the Director General, Culture, Tourism, Antiquities & Archives Department, Sindh, through the Proponent to take further suitable action to preserve those antiques or sensitive remains. Chance finds procedure given in **Annex-V** and The Antiquities Act 1975 & Sindh Cultural Heritage (Preservation) Act – 1994 must be followed**;**

- The Contractor needs to obtain approval for excavation and submit the plan of rehabilitation of the site after excavation if required;
- Time schedule to avoid excavation during rain;
- Cover all exposed soil as soon as soil is exposed; and
- Relevant legislations, conventions, ESSs (ESS 3 & 8) and guidelines must be respected.

Residual Impact: The impact related to the excavation of the earth will be insignificant after taking the above-mentioned mitigations.

6.6.4 Surface and Groundwater Contamination

Potential Impact

The surface water may get contaminated due to surface runoff during construction. Construction activities may result in debris entering the water body, resulting in sedimentation. Storage and transport of construction material may also result in spills of chemicals and contamination of water bodies.

Groundwater may also get contaminated from wastewater generation from the construction camps, and leachate from improper dumping of solid waste. Consumption of water for construction activities may also affect other designated uses of water, especially drinking water, due to the limited availability of drinking water in the area.

The impact is moderately adverse in nature.

Mitigation Measures

As a mandatory step, all the effluents will be disposed of as per the requirements of SEQS, 2016 (if required or as advised by the Environment Specialist). Moreover, to reduce the risk of surface and groundwater contamination, good management practices will be adopted to ensure that fuels, chemicals, raw sewage and wastewater effluent are disposed of in a controlled manner. These measures are described below:

- The proponent will ensure that the construction work is confined within the subproject areas and that water bodies are prevented from pollution during construction;
- The solid waste will be disposed of in designated landfill sites to sustain the water quality for domestic requirements.
- Regular water quality monitoring according to the determined sampling schedule;
- Water required for construction shall be obtained in such a way that the water availability and supply to nearby communities remain unaffected;
- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/ retention pond;
- Wastes will be collected, stored and taken to the approved disposal site;
- The Contractor/s shall ensure compliance with SEQS, 2016 or international standards/guidelines, whichever is more stringent, will be followed (if required or as advised by the Environment Specialist); and
- Relevant legislation, conventions, ESSs (ESS -3) and guidelines must be respected.

Residual Impact: The impact related to surface and groundwater contamination will remain significant even after taking the above-mentioned mitigations.

6.6.5 Ambient Air Quality

Potential Impact

A decline in the ambient air quality within the vicinity of work is expected during the construction phase activities. Due to these activities, the release of exhaust emissions, containing carbon monoxide (CO), sulphur dioxide (SO_2), oxides of nitrogen (NO_X), and

particulate matter (PM), is expected, which can deteriorate the ambient air quality in the subproject sites. The objectionable impacts of settling the suspended dust would be its dry deposition on vegetation and tree covers, motor vehicles, structures, and other exposed surfaces. Exhaust from fossil fuel burning in the construction machinery (excavator, tractor trolley, etc.) will also deteriorate local air quality. Similarly, exhaust from generators (if used) can also have an impact on air quality in the vicinity.

The overall impact on the quality of ambient air during the construction phase may be low, adverse keeping in view the extent of developmental activities for all subproject sites; however, it will be temporary and limited to the project's implementation phase only.

For wastewater and fecal-sludge facilities, community health and safety controls shall also address odor nuisance, disease vectors, hazardous gases such as hydrogen sulfide where relevant, and exposure to untreated wastewater or sludge following malfunction, overflow or inadequate O&M. Facilities shall be safely sited, fenced/controlled, operated and maintained, with monitoring, emergency response, disinfection and community information/behavior-change measures as appropriate.

Mitigation Measures

The impact of the construction phase of the proposed subprojects could be effectively mitigated by the implementation of simple procedures by the Contractor/s, including but not limited to the following:

- All vehicles, machinery, equipment and generators (if required) used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize exhaust emissions;
- Open burning of solid waste from the Contractor's camps (if required) and at the construction site should be strictly banned;
- Preventive measures against dust should be adopted for on-site mixing and unloading operations.
- Construction materials (sand, cement, bricks, gravel, etc.) and spoil materials will be transported through trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) may comply with the SEQS, 2016 and IFC/ WHO guidelines, whichever is stringent (if required or as advised by the Environment Specialist);
- Regular water sprinkling of the site should be carried out to suppress excessive dust emission(s);
- Construction equipment is generally left idle while the operators are on break or waiting for the completion of another task. Emissions from idling equipment tend to be high. Existing idling control technologies, which automatically shut the engine off after a preset time, can reduce emissions without the intervention of the operators.
- Service roads (used for earthmoving equipment and general transport) should be regularly sprayed with water during dry weather;

- All excavation work should be sprinkled with water;
- Diesel generator (if used) should be fitted with an acoustic enclosure and a stack of appropriate height for the proper dispersion of emissions[59];
- Regular monitoring of air quality in accordance with the formulated environmental monitoring plan (given in ESMF); and
- Relevant legislations, conventions, ESSs (ESS-3) and guidelines must be respected.

Residual Impact: The impact on ambient air quality will be insignificant after taking the above-mentioned mitigations.

6.6.6 Noise/ Vibration

Potential Impact

Noise and vibration will occur due to the operation of construction machinery. During construction, sources of noise and vibration include machinery such as excavators, tractor trolleys, water tanks and other equipment, unloading of PVC/ Precast Concrete Parabolic Segment (PCPS), etc., causing some noise and vibration. Noise and vibration are perceived as one of the most undesirable consequences of construction activity. The above machinery is expected to generate severe noise levels in the project area. The cumulative effects from several machines may be significant. However, these increased noise levels will prevail only for a short duration during the construction stage.

The likely impacts due to noise are:

- Psychological effects of the distraction of attention, irritation and short temper in the exposed persons due to persistently higher noise levels;
- Noisy settings and higher background levels can cause temporary threshold shift and the consequent habit of speaking loudly, which may cause damage to vocal cords in the persons exposed.
- Potential impact from vibration during the construction period may consist of damage to structures, and
- Moreover, vibrations from machinery and equipment may produce easy fatigability and generalized aches in the persons operating these machines.

This impact is negative, local, low and short-term.

Mitigation Measures

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels;
- Confining excessively noisy work to normal working hours in the day, as far as possible;
- The Contractor/s working may be limited to daytime to reduce disturbance.
- Vehicles and equipment used shall be fitted, as applicable, with silencers and properly maintained;

[59] Source: IFC General Environmental, Health and Safety Guidelines

- The Contractor/s shall comply with the submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures.
- Personal Protective Equipment (PPEs) shall be provided and worn by the personnel involved in construction activities and trained in their use;
- All complaints will be recorded and responded to in a timely and professional manner.
- The Contractor/s shall ensure compliance with SEQS, 2016 and IFC/ WHO guidelines, whichever is stringent (if required or as advised by the Environment Specialist); and
- Relevant legislation, conventions, ESSs (ESS-3) and guidelines must be respected.

Residual Impact: The impact of noise/vibration will be insignificant after taking the above-mentioned mitigations.

6.6.7 Borrow Areas

Potential Impacts

Construction activities (pipes, foundations, OHRs, drains, etc.) will require significant quantities of borrow materials (soil, sand, aggregate). Preliminary estimates indicate material demand in the range of 500–1,500 m³ per village scheme (depending on scale), which may cumulatively exceed several hundred thousand m³ at the project level[60]. Uncontrolled extraction of this volume may lead to land degradation, loss of productive soil, erosion, dust emissions, traffic impacts, and safety risks.

Borrow areas may result in potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade the hygienic condition of the project area. This impact is medium adverse in nature.

Mitigation Measures

- Soil erosion along the borrow pit shall be regularly checked to prevent/mitigate impacts on adjacent lands;
- For monitoring, each contractor will maintain records of source location, volume extracted/transported (m³), and delivery logs, subject to PIU verification. Use of unapproved sources will be prohibited.
- Where new borrow areas are required, extraction will be limited to defined volumes and areas, with mandatory restoration plans (backfilling, grading, revegetation). Sensitive areas (agricultural land, settlements, water bodies) will be excluded.
- The Contractor/s would prepare a material borrowing and disposal plan (if required);
- Obtain written consent on stamped paper/in a legal manner from the landowner/concerned for material (soil) borrowing;
- Keep photographic records (before, during, after) for borrow and disposal areas;

[60] https://documents1.worldbank.org/curated/en/222201490081035541/pdf/113619-WP-ENGLISH-Construction-Materials-Extraction-PUBLIC.pdf

- The Contractor/s will not leave the borrow pits in such a condition that they are unusable and could be filled with rainwater and cause problems for the community;
- The Contractor/s will ensure that selected borrow areas are clearly demarcated, including the allowable depth of the excavation, before starting any soil removal.
- The barren or unfertile land will be preferred to use as a borrowing area rather than the agricultural land, otherwise, compensation will be made to the landowner(s);
- The Contractor/s has to get approval from the Implementation Consultant's Environment Specialist / The Engineer; and
- Relevant legislation, conventions, ESSs (ESS-3) and guidelines must be respected.

Residual Impact: The impact related to borrowing areas will be insignificant after taking the above-mentioned mitigations.

6.6.8 Trench Safety and Excavation Management

Potential Impact

Excavation for pipelines and structures poses risks of trench collapse, worker burial, falls, and water ingress, particularly in areas with high groundwater tables. Inadequate stabilization and uncontrolled seepage can significantly increase occupational health and safety risks.

Mitigation Measures

- Mandatory trench safety provisions in line with WBG EHS Guidelines and national labor safety requirements will be adhered to in the E&S instrument as per site requirements.
- All excavations exceeding defined depths (e.g., >1.2 m) will require protective systems such as shoring, shielding, or benching, based on soil conditions.
- In high groundwater areas, continuous dewatering (e.g., pumps, well points) will be implemented to maintain dry and stable trench conditions.
- Trenches will be inspected daily and after rainfall by a competent person.
- Safe access/egress (ladders, ramps) will be provided, and spoil will be placed at safe distances from trench edges. Work areas will be barricaded and signposted to prevent accidental entry.
- Workers will be trained in trench safety and provided with appropriate PPE.
- Emergency response procedures, including rescue plans for trench collapse, will be in place.

Residual Impact: With proper stabilization, dewatering, and supervision, trench-related risks are expected to be low, though strict compliance and daily monitoring will be required.

6.6.9 Construction Camps / Camp Sites[61]

Potential Impact

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts, including health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, the behavior of construction workers, and potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is moderately negative in nature.

Mitigation Measures

- The project will seek to avoid sitting camps where their presence might contribute to any conflicts with locals.
- Employment policies that aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values.
- Camps will be designed to be self-contained to reduce demand on infrastructure and services of nearby communities.
- A comprehensive safety and security plan for the camps will be prepared, which will comprise a training manual, the use of safety equipment and emergency preparedness.
- Training will be provided to all staff on camp management rules and overall discipline and cultural awareness.
- Ensure proper waste management practices, including safe handling, storage, collection and disposal of construction/municipal/hazardous wastes (liquid and solid) and the training of employees who handle waste (as advised by the Environment Specialist);
- The site for the construction camp will be selected at least 500 m away from the settlements.
- There should not be any ecologically sensitive areas, e.g., wildlife sanctuaries, game reserves, national parks, forest areas, etc., near the construction camp site;
- Compensatory plantation to be done when construction work nears the end.
- Photographs will be taken before any activity to record the conditions of the campsite and other construction activities that are likely to have adverse impacts.
- The Contractor(s) shall ensure removal & rehabilitation of the site upon completion; and
- Relevant legislations, conventions, ESSs (ESS-2 & 3) and guidelines must be respected.
- Labour Management Procedures (LMP) will be implemented to regulate all aspects of workforce management, including:
    - Fair and transparent recruitment processes, with clear terms and conditions of employment;

[61] Mostly the local labor would be hired due to small works, the establishing regular construction camps by the contractor(s) is unlikely. However, given measures would be taken, if needed

- Enforcement of a Code of Conduct (CoC) addressing worker behavior, including prevention of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH);
- Provision of adequate worker accommodations that meet health, safety, and hygiene standards;
- Establishment of a Worker Grievance Redress Mechanism (GRM) accessible to all workers;
- Prohibition of child labor and forced labor in line with national laws and ESS-2 requirements;
- Regular training on occupational health and safety (OHS), workers' rights, and community interaction protocols;
- Monitoring and supervision mechanisms to ensure contractor compliance with LMP provisions.

Residual Impact: The impact of construction camps/campsites will be minimized but will remain significant even after taking the above-mentioned mitigations into account.

6.6.10 Wastewater Generation at Construction Camps[62]

Potential Impact

Wastewater will be generated at the construction camps by the workers. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources, such as drains, water channels, rivers, etc., apart from soil contamination. This impact can be categorized as medium adverse in nature.

Construction activities may increase disease risks due to disturbance near water bodies, stagnant water in excavations, and temporary disruption of water supply systems. These conditions can lead to contamination of drinking water, proliferation of vectors (mosquitoes, flies), and increased incidence of waterborne and vector-borne diseases in surrounding communities.

Mitigation Measures

To dispose of the liquid waste generated from the construction activities, the following steps will be taken by the Contractor/s:

- Maintain buffer zones; prevent direct discharge of waste, wastewater, or spoil into canals, ponds, or drainage channels; use silt traps where required.
- Plan works in phases to avoid prolonged service disruption; provide temporary alternative water supply (tankers/standposts) where interruptions are unavoidable.
- Ensure proper drainage of construction sites; no standing water in trenches or borrow areas; regular dewatering to prevent mosquito breeding.
- Provide temporary sanitation facilities for workers; prohibit open defecation; ensure proper waste collection and disposal.

[62] *Mostly the local labor would be hired due to small works, the establishing regular construction camps by the contractor(s) is unlikely. However, given measures would be taken, if needed*

- Hygiene Promotion during Works: Conduct targeted awareness for nearby communities on safe water handling, boiling/chlorination during disruptions, and hygiene practices.
- Periodic site inspection, larvicide application where needed, and housekeeping to minimize breeding sites.
- Domestic and chemical effluents from the construction camp will be disposed of by the development of on-site sanitation systems i.e., septic tanks (if required);
- Proper monitoring to check the compliance of SEQS, 2016 will be carried out (if required or as advised by the Environment Specialist);
- Ensure proper and safe waste management practices, including wastewater collection, transportation and its disposal and the training of employees who handle waste (if required or as advised by the Environment Specialist); and
- Relevant legislations, conventions, ESSs (ESS-2 & 3) and guidelines must be respected.
- Monitoring: Regular inspection by PIU and contractors, with immediate corrective actions through ESMP/SSEMP provisions.

Residual Impact: The impact related to wastewater generation at the construction camp will be insignificant after taking the above-mentioned mitigations.

6.6.11 Solid Waste (Construction, Municipal and Hazardous Waste)

Hazardous and non-hazardous wastes shall be managed across construction and operation. Hazardous streams may include treatment chemicals and containers, contaminated sludge, used oils and lubricants, batteries, and laboratory wastes where applicable. Waste shall be segregated, labeled, stored securely, transported and treated/disposed of through approved arrangements, with spill prevention and emergency procedures. Solar panels and batteries shall be managed through planned end-of-life collection, storage, recycling/recovery or disposal arrangements consistent with applicable requirements and the ESMF.

Potential Impact

Different types of waste, including construction, municipal and hazardous wastes, are likely to be generated during the construction phase of the subprojects. The improvement/extension/ new construction drainage and irrigation schemes and solar systems may also generate small quantities of waste, such as plastic tubing, pieces of metal pipes, and pipe fittings, as well as leftover construction material, including excavated soil, cement, sand and bricks, which can potentially cause soil and water contamination.

Insecure and unhygienic disposal of solid wastes, particularly garbage and trash, may cause degradation of soil and land. Insecurely disposed of heaps of waste containing kitchen garbage and food waste can serve as breeding grounds for disease-spreading vectors and rodents. Throwing away solid waste into water channels and the wastewater network can result in the choking of the latter. All these, if left unattended, can become a source of nuisance and environmental pollution in the project area. This impact can be categorized as medium in nature.

Mitigation Measures

- Solid waste generated during construction and camp sites will be safely disposed of in demarcated waste disposal sites and the Contractor/s will provide a proper waste management plan (if required as per advice of the Environment Specialist);
- Training of the workforce in the storage and handling of hazardous materials and chemicals. Construction workers and supervisory staff should be encouraged and educated to practice waste minimization and reuse to reduce the quantity of waste.
- An emergency response plan shall be prepared to address the accidental spillage of fuels and hazardous goods;
- Immediate collection of spilled oils/fuels/lubricants by collection of contaminated soils and skipping oils from surface water by applying appropriate technologies;
- Construction waste such as cement, bricks, gravel and plaster should be crushed and reused in other sites, where possible;
- It will be ensured that no waste or left over construction material is left behind in the cultivation fields; and
- Relevant legislations, conventions, ESSs (ESS-2&3) and guidelines must be respected.

Residual Impact: The impact related to solid waste will be insignificant after taking the above-mentioned mitigations.

6.6.12 Emergency Response

Potential Impact

The construction of the proposed subprojects may encounter emergencies. In addition, disasters such as earthquakes, torrential rain, floods and fires may occur. Lack of an Emergency Response Plan (ERP) or an inefficient response plan may lead to an accident or critical injury. This impact is moderately adverse in nature. The relevant guidelines are given in ESS-2& 4 Community Health and Safety.

Mitigation Measures

The STAR WASH-1 Emergency Response Plan (ERP) Guidelines (**Annexure-IX**, Part A) establish contractor-led protocols to prevent fatalities, protect communities/ environment, and ensure rapid recovery from occupational accidents, spills, fires, and natural disasters like flooding/earthquakes. Part B provides the site-specific SOP for Heavy Rainfall/ Flood Events, mandating PMD monitoring, work cessation (>5 mm/hr rain), dewatering with silt controls (turbidity <50 NTU), vehicle speed limits (20 km/h), and barricading with GRM priority for vulnerable groups. Responsibilities cover Site Supervisors (inspections), HSE Officers (24-hr reporting), and PIU (monthly audits), with 100% worker training, zero LTI targets, and post-rain checklists ensuring WB ESS3 compliance across STAR Wash 1 sites.

Residual Impact: The impact related to natural and man-made disasters will be medium, while risk remains significant even after taking the above-mentioned mitigations.

6.6.13 Flora

Potential Impact

The proposed subprojects may entail the removal of vegetation cover during the clearing of Right of Way (RoW) along the supply lines for improvement, extension, or reconstruction activities. The precise count of trees to be affected will be determined in collaboration with the Forest and Agriculture departments during the detailed design stage, once the project footprints are finalized. However, no tree-cutting is expected for schemes developed outside the RoW.

The emission of noxious gases from the movement of construction machinery could lead to air pollution, adversely impacting the health and vitality of plants in the surrounding environment. Additionally, during construction, there is a risk of damage to vegetation and trees by the contractor's workers, potentially for use as firewood to meet camp requirements, if established. This impact is assessed as moderately adverse.

Mitigation Measures

- Ensure to minimize removal of trees/ saplings, including fruit trees (if any), if possible;
- Cutting of trees and disturbance shall be avoided, as far as possible, so that adverse effects on the process of natural regeneration of species can be minimized;
- No Objection Certificate (NOC) must be obtained from the concerned Forest / Agriculture Department (where required);
- Ensure the compensation of tree cutting to concerned parties, i.e., local community, forest and other relevant departments (where applicable);
- A tree plantation program shall be formulated with the recommendations and technical support of the concerned Agriculture and Forest Department.
- The proponent shall implement the program with the help of the Forest Department;
- The Forest Department and the Agriculture Department shall involve the communities in carrying out the plantation.
- Plan for compensatory planting for five (05) trees against each fallen tree of similar floral function at the available spaces in/around the subproject area;
- Open fires should be banned in the area to avoid the hazards of fire.
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;
- The Contractor and labor shall be strictly directed not to damage any vegetation, such as trees or bushes. They shall use the paths and roads for movement and shall not be allowed to trespass through farmlands or forested areas;
- Contractor/s shall provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel shall not be allowed.
- No schemes should be located inside any or within the vicinity of protected areas; and
- Relevant legislations, conventions, ESSs (ESS-6) and guidelines must be respected.

Residual Impact: The impact-related flora will be low adverse after taking the above-mentioned mitigations.

6.6.14 Fauna

Potential Impact

During the construction phase, the existing population of mammals and reptiles of the subproject areas will be affected due to disturbances arising from construction activities involving excavation, movement of machinery, movement of labor, camping, etc. The existing animals may leave the directly affected areas due to construction activities and human intervention. Some animals, particularly reptiles, may be killed during the earthworks operations. Moreover, the movements of mammals and reptiles will be restricted during the construction phase.

Birds, as well, will tend to move away from the construction areas and find shelter and food elsewhere due to the activities mentioned above for fear of being hunted/trapped.

Noise generated from construction machinery will even scare the wildlife residing in habitats located at some distance from the construction areas. Food and refuse at the Contractor's camps (if established) may attract animals that might in turn be hunted by the workers. A direct impact may be expected on different bird species due to the cutting of trees and some reptile and amphibian species due to the movements of vehicles and other construction activities. This impact is moderately adverse in nature.

Mitigation Measures

- Care shall be taken during construction activities to avoid purposely or accidentally killing animals;
- During construction, care should be taken to avoid mature trees and especially those providing nesting habitat to avifauna;
- The speed of construction vehicles should be limited to certain limits to avoid killing reptiles and other fauna. If any species of special concern are found, the Wildlife Department should be informed to take care of the asset.
- If any wild species and habitats are encountered during construction, they must be dealt with carefully and local Wildlife Department officials should be called.
- Hunting, poaching and harassing of wild animals shall be strictly prohibited, and the Contractor shall be required to instruct and supervise its labor force accordingly and clear orders should be given in this regard;
- The Proponent must take NOC from the relevant department prior to the construction phase (if required);
- Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise-generating activities during the critical periods of breeding.
- Noise-generating activities shall not be carried out during the night by the workforce; clear orders should be given.
- Similarly, wastes of the camps (if established) shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them; and
- The noise produced by the construction activities may be kept to an acceptable level as per SEQS, 2016;

- Relevant legislations, conventions, ESSs (ESS-6) and guidelines must be respected.

Residual Impact: The impact-related fauna will be low adverse after taking the above-mentioned mitigations.

6.7 Potential Social Impacts and Mitigation during Project Construction / Implementation

6.7.1 Occupational Health and Safety

Potential Impact

Occupational Health and Safety (H&S) related impacts may arise during the construction phase due to activities including earthworks, installation of pipes, development of drainage schemes and solar systems, construction of Contractor camps (if required), movement of machinery and manual handling during loading unloading operation, as result of these works there will be a direct impact on the health and safety of all staffs working in subprojects. Eye injury can be caused by stone or metal particles. Another impact will be the hazard of being hit by falling objects, major hand-arm and whole-body vibration hazards, skin and respiratory tract irritation from exposure to cement dust, overexertion and awkward postures, etc.

Other impacts will be falling in the trench, contact with electrical and mechanical equipment, equipment failure, uncontrolled movement, unguarded moving mechanical equipment parts, fatigue, unbalanced load, falling objects, hand injury, slip and trip hazards, wind/storm activity, injury from releasing load too soon, etc. Operating mechanical and electrical equipment will trigger the H&S issues, e.g., struck by moving vehicles or other equipment, slips or trips, struck by flying objects, caught in pinch points, shear points, crush points, falling from machines, etc. Considering these consequences, this impact can be categorized as medium adverse in nature.

The relevant guidelines are in ESS2: Labor and Working Conditions

Mitigation Measures

The following mitigation is given to avoid accidental risks:

- The Contractor/s will be required to strictly follow The Sindh Occupational Safety and Health Act (2017) and World Bank Group EHS Guidelines, 2007. The Contractor will prepare the site-specific occupational health and safety plan in compliance with relevant sections of the WBG General Environmental Health and Safety Guidelines (WBG 2007) and the chosen methodology;
- For sanitation, wastewater and fecal-sludge activities, the DBO operator shall apply task-specific occupational health and safety controls addressing biological, chemical, physical and confined-space hazards. Contracts shall include enforceable labor and OHS requirements, adequate safety budgets, provision and proper use of task-appropriate PPE, worker induction and refresher training, health monitoring and

medical/first-aid arrangements, safe handling and transport procedures, and incident reporting and corrective action requirements. No sanitation or fecal-sludge worker shall undertake hazardous tasks without appropriate training, supervision and PPE.

- Occupational health and safety monitoring programs of the Contractor (s) should verify the effectiveness of prevention and control strategies;
  - Mandatory Toolbox Talks
  - Incident Reporting System
  - Stop-Work Authority
  - Worker Induction and Training
  - Safe Work Procedures
  - PPE and Hygiene Measures
  - Monitoring and Reporting
  - Corrective Action and Enforcement
- All labor management aspects shall be governed by the project's Labor Management Procedures (LMP). The LMP provisions shall be enforced, including:
  - Fair and transparent terms and conditions of employment;
  - Non-discrimination and equal opportunity;
  - Prohibition of child labor and forced labor;
  - Protection of vulnerable workers, including women and migrant labor (if applicable);
  - Maintenance of written contracts and worker records.
- A Labor Grievance Redress Mechanism (Labor GRM), as outlined in the LMP and consistent with ESS2, shall be established and maintained at all worksites. The mechanism shall:
  - Be accessible to all categories of workers (direct, contracted, and primary supply workers);
  - Allow anonymous complaints;
  - Ensure confidentiality and protection against retaliation;
  - Provide timely resolution and documentation of grievances.
- Specific measures shall be implemented to address Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) risks, including:
  - Mandatory Code of Conduct (CoC) for all workers, explicitly prohibiting SEA/SH behaviors;
  - Regular training and awareness sessions on respectful behavior, gender sensitivity, and SEA/SH prevention;
  - Integration of SEA/SH-sensitive procedures within the Labor GRM, including survivor-centered response, confidentiality, and referral pathways to relevant service providers;
  - Coordination with SEP activities to ensure community awareness of acceptable worker conduct and available grievance channels.

  - Establish confidential, survivor-centered SEA/SH reporting channels through the GRM and Labor GRM, with trained focal persons and strict confidentiality.
  - Develop SEA/SH referral pathways for medical, psychosocial, legal, protection, and other support services before civil works commence.
  - Conduct mandatory SEA/SH training for all workers, supervisors, contractors, subcontractors, and field staff before deployment and through refresher sessions.
  - Require all workers to sign a Code of Conduct prohibiting SEA/SH, harassment, intimidation, exploitation, and inappropriate community interaction.
  - Include SEA/SH obligations in contracts, ESMPs, SSEMPs, bidding documents, and contractor performance requirements.
  - Apply penalties for non-compliance, including warning, removal from site, termination, withholding of payments, suspension of works, or contract termination.
  - Integrate SEA/SH awareness into SEP activities, including separate women-focused consultations and disclosure of safe grievance channels.
  - Monitor compliance through signed CoCs, training records, complaint handling records, corrective actions, and confidential incident reporting.
- Providing basic medical training to specified work staff and basic medical service to workers;
- The Contractor/s will ensure the provision of medicines, first aid kits, ambulance, etc. at the camp site;
- OHS requirements shall apply to both construction and operation of water-supply, wastewater and fecal-sludge facilities. Operational hazards include exposure to chlorine and other treatment chemicals, pathogens, confined spaces, sludge handling, wastewater-treatment processes, electrical systems, solar-powered infrastructure, and traffic incidents involving workers, materials, sludge, septage and waste. Task-specific procedures, competency requirements, PPE, health monitoring, emergency response and incident reporting shall be maintained for these activities.
- Complying with the safety precautions for the construction workers as per applicable International Labor Organization (ILO) Conventions;
- Training workers in construction safety procedures and environmental awareness, equipping all construction workers with safety boots, helmets, gloves and protective masks, goggles, shields and monitoring their proper and sustained usage;
- Moreover, proper planning should be done for food storage, setting up of kitchens, production of sewage and wastewater may result in the multiplication of rodents like rats, mice and shrews, etc. and vectors like mosquitoes, bugs and flies, which will have a negative impact.
- Work areas will be cordoned off where necessary.
- Ensure the provision of fire prevention and firefighting equipment;
- Ensure the provision of training related to emergency prevention, preparedness and response arrangements by the Contractor/s; and
- Relevant legislations, conventions, ESSs and guidelines must be respected.

These requirements will be incorporated into the bidding specification and contract documents and will be binding on the Contractor/s, at risk of penalty for noncompliance, as charges to be recovered from Contractor/s for unsafe act or condition.

Guideline for Contractor's Occupational Health and Safety Plan is attached as **Annex-VI** for the preparation of a detailed HSE Management Plan by the Contractor.

Residual Impact: The impact related to occupational health and safety will be minimized but remain significant even after taking the above-mentioned mitigations.

6.7.2 Accessibility Issues

Potential Impact

During the construction activities of the project, local routes can potentially be blocked, adversely affecting the local communities and their livestock.

In addition, construction works on streets, such as installation of drains, pipelines, and pavements, may temporarily restrict or block direct access to houses, shops, and other properties. This can particularly affect vulnerable groups, including the elderly, children, and persons with disabilities, by limiting safe entry and exit.

Closure of existing roads and other pathways (if required) during the construction phase of the subprojects may cause inconvenience to the nearby residents, and visitors and will affect their daily life activities. This impact is short-term, site-specific and medium-adverse.

Mitigation Measures

The Contractor shall prepare and implement a Traffic and Access Management Plan (TAMP) as part of the site-specific ESMP, detailing route diversions, access arrangements, and safety provisions; the guideline for the preparation of TAMP has been annexed as **Annexure VII**.

- Continuous access to residences, shops, and community facilities shall be ensured. Where temporary access restrictions are unavoidable (e.g., during installation of drains, pipelines, and pavements), safe and adequate alternative access (e.g., temporary walkways, planks, or ramps) shall be provided;
- Construction works shall be undertaken in a phased manner to avoid complete blockage of streets and to minimize disruption to local communities and livestock movement;
- Prior information on construction schedules, expected duration of works, and access restrictions shall be communicated to affected communities through appropriate means (e.g., signboards, public notices, and community consultations);
- Adequate and clearly visible signage, barricading, and reflective warning devices shall be installed at all work sites in accordance with good international industry practice (GIIP);
- Safe pedestrian crossings and access routes shall be maintained at all times, with special consideration for vulnerable groups, including women, children, the elderly, and persons with disabilities;

- Uninterrupted access for emergency services (e.g., ambulances, fire services) shall be ensured at all times, in coordination with local authorities;
- Construction materials, machinery, and excavated materials shall be stored in designated areas to avoid obstruction of access routes and public pathways;
- Construction activities shall be scheduled, to the extent practicable, to avoid peak traffic hours, school timings, and local market days;
- Trained personnel (e.g., flagmen/traffic marshals) shall be deployed at critical locations to manage traffic and assist pedestrians;
- A functional and accessible Grievance Redress Mechanism (GRM) shall be maintained to promptly address access-related complaints from affected communities.

Regular monitoring and supervision shall be conducted by the Contractor and PIU to ensure compliance with the above measures and corrective actions taken where required.

Residual Impact: The impact related to accessibility will be minimized, and the issues will be insignificant even after implementing the above-mentioned mitigations.

6.7.3 Cultural / Religious Sites

Potential Impacts

Social issues arise if sites of cultural or religious significance are affected during the construction phase, if any. This impact is categorized as moderate in nature.

Mitigation Measures

Due to the interventions of the proposed project, it is anticipated that no sites of cultural or religious Significance will be impacted. However, if such sites are encountered during construction, the following measures should be adopted:

- Proponent and the SPHF to ensure that the construction staff is educated about the location and importance of the cultural sites that exist in the subproject areas;
- The Contractor/s are to ensure that these sites are not affected by the construction-related activities. These aspects will be included in the training to be conducted for the Contractor's staff.
- Ensure no disturbance to the graveyards during the construction activities; and
- Relevant legislations, conventions, ESSs and guidelines must be respected.

Residual Impact: The impact related to historical, cultural, archaeological, or religious sites will be low after taking the above-mentioned mitigations.

6.7.4 Labor Influx

Potential Impact

This can be particularly acute in smaller communities hosting a male workforce and/or a workforce from other regions, which may result in conflicts between locals and non-locals

concerning employment opportunities, wages and natural resources. Mobile workers can also contribute significantly to gender-based social impacts and risks.

Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural, or ethnic differences or based on competition for local resources. Tensions may also arise between different groups within the labor force and pre-existing conflicts in the local community may be exacerbated. Ethnic and regional conflicts may be aggravated if workers from one group are moving into the territory of the other.

Increased risk of illicit behavior and crime and SEA/SH: The influx of workers and service providers into project areas under STAR WASH 1 may elevate the risk of petty and organized crimes, including theft, physical assaults, substance abuse, prostitution, and human trafficking. In addition, there is a heightened risk of Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH), particularly affecting women, adolescent girls, and other vulnerable groups. These risks may arise from power imbalances, the presence of non-local male workers, and increased economic vulnerabilities within host communities. Potential SEA/SH incidents may include transactional sex, harassment in public spaces or at water and sanitation facilities, and exploitation linked to employment opportunities. Weak institutional capacity, limited presence of trained law enforcement, and sociocultural barriers to reporting may further exacerbate these risks and contribute to underreporting. Consequently, communities may experience both actual increases in insecurity and heightened perceptions of risk, affecting social cohesion and the safe use of project infrastructure..

Increased burden on and competition for public service provision: The presence of construction workers and service providers (and in some cases family members of either or both) can generate additional demand for the provision of public services, such as water, electricity, medical services, transport, education and social services. This is particularly the case when the influx of workers is not accommodated by additional or separate supply systems. If technologies and practices used or introduced by the project are not based on the local culture and capacity, they have a small chance of being understood and embraced by the farmers. Their willingness to maintain the infrastructure, machinery and equipment is likely to be low or unsustainable.

Inadequate waste disposal and illegal waste disposal sites: Large populations of workers generate increased amounts of waste, for which no sufficient local waste management capacities may exist, which would likely lead to improper disposal practices.

In addition, the high-efficiency irrigation techniques increase the demand for labor with better skills and know-how. The impact is moderate in nature.

The relevant guidelines are in ESS4: Community Health and Safety

Mitigation Measures

- Prepare, disclose, and implement Labor Management Procedures (LMP) in line with ESSs, covering employment terms, OHS, prohibition of child/forced labor, and SEA/SH risk mitigation.
- Prioritize hiring of local labor (especially unskilled) to minimize labor influx and associated social risks.
- Establish a Grievance Redress Mechanism (GRM) with a confidential, survivor-centered channel for SEA/SH complaints.
- Adopt and strictly enforce a Code of Conduct (CoC) for all workers, explicitly prohibiting SEA/SH, exploitation, substance abuse, and other misconduct; ensure all workers sign and comply. A sample has been annexed in **Annexure VIII**.
- Conduct mandatory training on SEA/SH prevention, gender sensitivity, cultural norms, and appropriate behavior for all workers and service providers.
- Ensure site security and controlled access to construction areas and camps to reduce crime and unauthorized interactions.
- Schedule construction activities to minimize disturbance to communities, particularly women, and respect local practices and privacy.
- Respect local customs and traditions; strictly prohibit unethical or illegal behavior by workers.
- Manage solid waste, wastewater, and water use responsibly to avoid environmental and community stress.
- Strictly prohibit child and forced labor, with immediate corrective action for violations.
- Engage local authorities and communities, where feasible, to strengthen community safety and response capacity.

Ensure full compliance with applicable laws, ESSs, and project guidelines.

Residual Impact: The impact related to labor influx will be minimized after adopting the mitigation measures, while the risk remains significant.

6.7.5 Child Labor and Forced Labor

Potential Impact

Policy and legislation in Sindh recognize multiple forms of child labor, including bonded labor (which may occur at worksites), involvement of children in project-related activities as paid or unpaid family labor, and engagement in hazardous work such as operating machinery, handling construction equipment, or working in unsafe environments.

Under the Sindh Prohibition of Employment of Children Act, 2017, a child is defined as a person below 14 years of age, and employment of children in any occupation is prohibited. Adolescents (14–18 years) are strictly prohibited from hazardous work.

Child labor is often driven by chronic and transitory poverty, including unemployment of parents, large household sizes, and dependence on daily wage income.

There is also a risk of forced labor, including bonded labor, coercion, withholding of wages, restriction of movement, or employment under unclear or exploitative terms—particularly affecting vulnerable and migrant workers..

Mitigation Measures

- Contractors will strictly prohibit employment of children below 14 years of age in any form of labor and prohibit persons under 18 years from engaging in hazardous work.
- Contractors will be required to verify the age of all workers, particularly for hazardous tasks, through valid identification documents (e.g., CNIC or Form-B).
- All workers will be employed based on clearly defined terms and conditions, preferably in written contracts, including wages, working hours, and nature of work.
- The project will enforce a zero-tolerance policy on forced labor, including bonded labor, debt bondage, coercion, withholding wages, or restriction of movement.
- Contractors will ensure timely payment of wages in full, directly to workers, and maintain transparent payroll records.
- Project staff will conduct regular site inspections and spot checks to identify any instances of child or forced labor.
- A Grievance Redress Mechanism (GRM) will be made accessible to workers and communities to safely report violations, including anonymous complaints.
- Awareness sessions will be conducted for contractors, workers, and communities on labor rights, legal age requirements, and prohibition of forced labor practices.
- Engagement with local communities, NGOs, and labor representatives will be strengthened to monitor and report violations..

Residual Impact: The impact related to child labor and forced labor will be insignificant after taking the above-mentioned mitigations.

6.7.6 Sexual Exploitation and Abuse / Sexual Harassment (SEA/SH) Issues

Potential Impact

The overall assessment suggests that women and girls are at moderate risk of being targeted for GBV, SH and SEA in the project, while also being least able to access support and protection mechanisms. The risk of GBV, SH and SEA is heightened due to the deployment of external personnel, contractors, suppliers, civil works labor, etc., whereas the ability to respond to such complaints within the departments low. Risks related to the exclusion of women, girls and gender minorities, as well as gender-based violence (GBV), sexual harassment (SH) and sexual abuse and exploitation, may arise or be exacerbated by several factors, and their confluence across different parts of Sindh where the project is implemented. Gender minorities, female-headed households, women with disabilities, elderly or widowed women, and those suffering from debilitating diseases and other socially marginalized groups would be more adversely affected or unduly deprived because of their limited resource ownership and control, and lack of social capital or social disadvantage based on gender, age, class, ethnicity, and religion.

SEA/SH and GBV risks under the STAR WASH 1 project may arise through both labor-related interactions and community engagement in service delivery, particularly in rural and underserved areas. Key risk pathways include:

Labor Influx and Workplace-Related Risks

The presence of contracted workers (skilled and unskilled), including potential male-dominated labor influx, may increase risks of sexual harassment (SH) and sexual exploitation and abuse (SEA) affecting:

- Female workers engaged in project activities; and
- Women and girls in nearby communities.

Female laborers working alongside male workers, particularly in the absence of:

- Adequate supervision,
- Gender-segregated sanitation (WASH) facilities, and
- Safe working conditions,
- may face heightened risks of harassment, intimidation, or abuse.

Project staff, contractors, or frontline workers involved in household-level water supply or sanitation services may hold decision-making power over access to services. This creates risks of:

- SEA/SH, including demands for sexual favors in exchange for connections, prioritization, or access to WASH services, particularly affecting:
- Female-headed households, and
- Youth-headed or otherwise vulnerable households.

Changes in water access, land use, or livelihoods (e.g., conversion of grazing land or altered water distribution) may:

- Increase women's workload (e.g., traveling longer distances for fuel/fodder), and
- Heighten exposure to harassment or violence in public or remote areas.
- Pre-existing inequalities (e.g., landlord–tenant dynamics, poverty) may be exacerbated, increasing women's vulnerability to exploitation, though these are contextual risks rather than directly caused by project labor.

Increased earnings among male workers may contribute to transactional sex risks, potentially increasing SEA risks in surrounding communities, particularly where poverty levels are high.

Mitigation Measures

- The Project will adopt a comprehensive, cross-cutting approach to prevent and respond to SEA/SH risks in line with the World Bank SEA/SH Good Practice Note:
- A project-specific Gender and SEA/SH Action Plan will be prepared, adopted, and implemented, including risk mitigation measures, roles and responsibilities, budget, monitoring indicators, and reporting protocols. The Action Plan will be integrated into

the ESMP, LMP, and SEP and applied across all subprojects and it must be prepared (before project effectiveness or before civil works

- Codes of Conduct (CoC) addressing SEA/SH will be developed and enforced for all project workers, including contractors, subcontractors, consultants, and community workers. The CoC will explicitly prohibit SEA, SH, GBV, sexual relations with minors, and any exchange of money, goods, or services for sexual favors.
- The CoC will be mandatory and signed by all workers, included in bidding and contract documents, and linked to enforceable disciplinary measures (including termination).
- The CoC will be translated into local languages and prominently displayed at all worksites, worker camps (if applicable), and community interaction points.
- Mandatory training and awareness programs on SEA/SH and CoC requirements will be conducted for all project workers, with periodic refresher sessions. Specialized training will be provided for supervisors, contractor management, and GRM personnel.
- All SEA/SH complaints will be handled with strict confidentiality and in line with survivor-centered principles.
- Dedicated SEA/SH focal points will be appointed within the Project Implementation Unit (PIU) and contractor teams to oversee implementation, monitoring, and reporting..
- The Contractor/s will be required to provide a nominated person to address the specific risks identified;
- The bidding documents will include specific requirements that minimize the use of expatriate workers and encourage the hiring of local workers, thereby minimizing labor influx.
- If specialized workers are recruited from outside project areas, the applicable labor-influx measures shall be activated proportionately, including worker accommodation and camp controls where relevant, Code of Conduct and SEA/SH requirements, community engagement, worker and community grievance channels, security and behavior protocols, and monitoring of interactions with host communities. Local hiring remains the preferred approach where skills are available.
- The PIU & Contractor/s will be required to establish anti-sexual harassment policies that govern conduct in the workplace;
- The Contractor/s will be required to provide mandatory and repeated training to workers on sexual exploitation and abuse and HIV/AIDS prevention and on the content and obligations derived from the code of conduct;
- Separate, secure, and functional WASH facilities will be provided for female and male workers at all sites.
- Female staff or trained community facilitators will be engaged, where feasible, to support safe interaction with women beneficiaries.
- Project activities must ensure that gaps in access to resources and opportunities, capacities and wealth between the vulnerable groups and the rest of the community are reduced through project implementation; and

Residual Impact: The impact related to gender issues will remain significant even after taking the above-mentioned mitigations.

6.7.7 Stakeholder Engagement

Potential Impacts

Social issues[63] may arise due to improper dissemination of subprojects' progress and benefits. This would generate a moderately significant impact.

Mitigation Measures

- Ensure proper implementation of the Stakeholder Engagement Plan (SEP) throughout the life of the project;
- Implementation responsibilities under the SEP shall be distributed across the project delivery structure. The PIU/SPHF shall provide overall coordination, disclosure oversight, GRM supervision and reporting; Regional Offices shall support district-level outreach and feedback; Implementing Partners shall facilitate community consultations and inclusive engagement; DBO operators/contractors shall disclose work schedules, risks, mitigation measures and worker conduct requirements and maintain site-level feedback channels; and Village Organizations/SPVOs/community operators shall support local information dissemination, participation and grievance uptake. These roles shall be reflected in relevant agreements, contracts, SOPs and monitoring arrangements.
- Ensure information on accessing the project Grievance Redress Mechanism (GRM) is disseminated and grievances are lodged and addressed in a timely manner;

Relevant legislations, conventions, ESSs and guidelines must be respected.

Residual Impact: After these measures, the impact would be of low significance.

6.8 Potential Environmental Impacts and Mitigation on Operation & Maintenance / Completion

The anticipated environmental impacts related to the proposed project have been studied for the operational / completion phase of the project, as discussed hereunder.

6.8.1 Water Quality Degradation

Potential Impact

During operation, there may be a risk of water quality degradation due to pollution from various sources, such as industrial discharge or improper waste disposal.

If Reverse Osmosis (RO) is adopted under STAR-WASH-1, the generation of brine (highly concentrated reject water) may pose significant environmental and social risks. Improper disposal can lead to soil salinization, contamination of surface and groundwater, damage to

[63] In the STARS WASH-1 project, social issues refer to risks affecting community inclusion, trust, and cohesion due to inadequate or unequal dissemination of project information. These include social exclusion of vulnerable groups, community conflicts over perceived inequities, mistrust and misinformation, elite capture of benefits, and increased grievances, ultimately undermining equitable access to WASH services and community support for the project.

agricultural productivity, and risks to aquatic ecosystems. Uncontrolled discharge may also create community concerns and conflicts, particularly in areas already affected by salinity.

RO reject brine and other treatment residuals shall be characterized and managed through approved disposal, containment or reuse arrangements appropriate to the site. Disposal should not cause unacceptable soil salinization, groundwater contamination, agricultural impacts or harm to aquatic ecosystems. Treatment chemicals, including chlorine, shall be procured, stored, handled and transported using appropriate safety controls, compatible containers, Safety Data Sheets, trained personnel, emergency response arrangements and controlled access. During the operation of water supply systems, handling and storage of chlorine (gas or liquid) may pose significant OHS risks, including toxic exposure, chemical burns, respiratory hazards, fire/explosion risks (in case of pressurized gas), and accidental releases affecting workers and nearby communities.

Mitigation Measures

- Regular monitoring of water quality and implementation of appropriate treatment processes to ensure compliance with environmental standards. Establishing effective waste management practices to prevent contamination of water sources.
- The project will assess the feasibility of RO on a case-by-case basis, including identification of safe and sustainable brine disposal options prior to design finalization.
- For safe disposal of brine, drying beds/storage reservoirs will be developed.
- Preferred approaches will include disposal into lined evaporation ponds, discharge into designated drains meeting regulatory standards, or blending/dilution where environmentally acceptable and approved by relevant authorities. All disposal methods will comply with national environmental regulations and World Bank EHS Guidelines. Site selection for RO plants will consider proximity to safe disposal routes and avoid sensitive receptors (agricultural land, freshwater bodies, settlements). Engineering controls such as lined storage, leak-proof conveyance systems, and monitoring of soil and water quality will be implemented. Operational protocols, training of staff, and inclusion of brine management requirements in contractor obligations will be ensured. Community consultations and GRM will address concerns related to disposal practices.
- Store chlorine in ventilated, secure areas with restricted access and clear signage. Allow handling only by trained staff using SOPs and appropriate PPE. Install proper dosing systems, leak detection, and emergency shut-off mechanisms. Maintain emergency response procedures, including first aid and evacuation plans. Conduct routine inspection and maintenance, and keep MSDS and safety records.

With appropriate design and strict adherence to brine management measures, residual impacts are expected to be low to moderate. However, in areas with limited disposal options, some localized environmental risks may persist, requiring continuous monitoring, adaptive management, and regulatory oversight.

6.8.2 Water Scarcity

Potential Impact

Improper management of water resources during operation can exacerbate water scarcity issues, especially in arid regions or areas prone to drought.

Abstraction of canal water for STAR-WASH-1 water supply schemes may create or intensify competition among users, particularly during low-flow periods and peak agricultural seasons (e.g., sowing). This may lead to reduced irrigation availability, perceived inequities in water distribution, and conflicts between upstream–downstream users, farmers, and domestic consumers. The impact is context-specific but can be moderate to significant in water-stressed command areas.

Mitigation Measures

- Implementing water conservation measures such as leak detection and repair programs, promoting water-saving practices among consumers, and investing in water reuse and recycling initiatives.
- The project will undertake seasonal water availability and demand assessments prior to scheme design to ensure sustainable abstraction limits. Close coordination with Irrigation Departments will be maintained to align withdrawals with canal operation schedules and legally allocated shares. Site selection and design will prioritize locations with adequate and reliable flows, and alternative or supplementary sources (e.g., groundwater where suitable, storage reservoirs) will be considered where risks are high. Stakeholder consultations will be conducted to understand local water-sharing dynamics and agree on equitable allocation arrangements. Operational measures will include abstraction controls during low-flow periods, demand management, and transparent communication of water use priorities, with drinking water needs clearly defined. Grievance Redress Mechanisms (GRM) will be activated to address water-related disputes promptly.

With the above measures in place, the risk of social conflict and resource competition is expected to be reduced to low to moderate. However, localized and seasonal tensions may still arise in water-scarce periods, requiring continued monitoring, adaptive management, and stakeholder engagement throughout project implementation.

6.8.3 Fecal Sludge Disposal Risks and Management Measures (ABR Systems)

Potential Impact

FSTP operations expose workers and nearby communities to pathogens, toxic gases (H_2S, methane), odors, and physical hazards during sludge handling, treatment, and drying. Inadequate controls may lead to infections, respiratory illness, accidents, and community nuisance.

Use of unverified or unapproved taluka dumping sites for disposal of ABR sludge may lead to improper handling of fecal sludge, resulting in soil and groundwater contamination, public

health risks, odor nuisance, and non-compliance with regulatory requirements. It may also create community concerns and reputational risks for the project.

Sludge management shall cover the full service chain. Sludge shall be collected/emptied safely, transported in a manner that prevents leakage and exposure, treated to applicable standards, and disposed of or reused only at approved locations/for approved purposes. Where beneficial reuse in agriculture is proposed, the site-specific assessment shall verify pathogen and contaminant controls, applicable restrictions including protection of edible crops where required, and potential effects on soil, groundwater, workers and consumers; reuse shall not proceed where safety criteria are not met.

Mitigation Measures

- If available, licensed and trained operators should carry out desludging using appropriate equipment (vacuum tankers, sealed containers) to prevent spillage and exposure.
- Designated local operators/service providers will be trained in safe sludge removal, including use of PPE, spill prevention, safe handling, covered transport where feasible, and disposal at designated locations. Given the rural context and affordability constraints, locally feasible arrangements will be adopted instead of relying solely on licensed vacuum tanker services.
- Fence FSTPs; maintain buffer distances from settlements; define clean/dirty zones and traffic routes for vacuum trucks.
- Mandatory PPE (gloves, boots, masks/respirators, eye protection, coveralls); vaccination (tetanus, Hep-A/B); handwashing and shower facilities; no eating/smoking in process areas.
- Standard procedures for unloading, screening, drying beds, and sludge removal; prohibition of manual contact with raw sludge; mechanized handling where feasible.
- Ventilation for enclosed units; H_2S/methane monitoring where applicable; confined-space entry permits, standby personnel, and rescue equipment.
- The project will conduct district-wise verification of disposal sites to confirm regulatory approval, technical suitability, and environmental compliance before finalizing sludge disposal arrangements.
- Unapproved or unsuitable sites will be excluded from use. In areas where formal fecal sludge management (FSM) facilities are not available, the project will establish interim safe solutions such as lined sludge drying beds or co-treatment at existing wastewater treatment facilities, in coordination with local authorities and SEPA.
- All sludge transport, handling, and disposal will follow national regulations and World Bank EHS Guidelines, supported by proper documentation, monitoring, and supervision mechanisms.

With site-specific protocols, training, and supervision, OHS and CHS risks at FSTPs are expected to be low, subject to continuous compliance and monitoring.

6.8.4 E-Waste Management (Solar Panels and Batteries)

Potential Impact

Under STAR-WASH-1, the use of solar systems for water supply schemes will generate e-waste at end-of-life, particularly solar panels, inverters, and batteries (including lithium-ion). If not properly managed, this may result in release of hazardous substances, fire and explosion risks (especially from lithium batteries), soil and groundwater contamination, and occupational and community health hazards. Informal disposal or recycling may further exacerbate environmental damage and regulatory non-compliance.

Mitigation Measures

- The project will develop and implement an E-Waste Management Plan aligned with national regulations, SEPA guidelines, and World Bank ESS3 and ESS4.
- Procurement contracts will include mandatory take-back or buy-back provisions, requiring suppliers to collect and safely dispose of end-of-life equipment through licensed recyclers.
- During operation, all defective or end-of-life components will be identified, recorded in an e-waste inventory, and stored in secure, ventilated, and access-controlled locations with appropriate safety measures (including spill containment for batteries).
- E-waste will be segregated (hazardous vs. non-hazardous), and temporary storage periods will be minimized.
- Transportation will be carried out only by authorized handlers using appropriate safety protocols.
- Final disposal will be through SEPA-approved recyclers or facilities, with strict prohibition on open dumping, landfilling, or informal recycling.
- Special handling procedures will be applied for lithium-ion and lead-acid batteries, including fire-safe storage, use of PPE, and emergency response protocols.
- Documentation, tracking, and certification of disposal will be maintained to ensure traceability and compliance.
- Capacity building and awareness programs will be conducted for staff and communities to prevent unsafe handling.

With these measures in place, risks associated with e-waste are expected to be low. However, constraints related to limited formal recycling infrastructure and risks of informal sector diversion may persist, requiring ongoing monitoring, strict enforcement of disposal pathways, and periodic audits.

6.8.5 Groundwater Over-Abstraction Risks Associated with Solar Pumping Systems

Potential Impact

The use of solar-powered pumping systems may increase the risk of groundwater over-abstraction due to negligible marginal operating costs compared to diesel systems. This can

lead to declining groundwater levels, reduced well yields, deterioration of water quality (e.g., salinity ingress), and long-term resource depletion. Secondary impacts include social conflicts among users (domestic vs. agricultural, upstream vs. downstream users) over access and allocation, particularly in already water-stressed areas. Community Health and Safety (CHS) risks may also arise due to reduced water availability for domestic use, increased reliance on unsafe sources, and potential inequities in service delivery.

Mitigation Measures

- The project will incorporate groundwater sustainability considerations into design and operation. This includes hydrogeological assessments to determine safe yield prior to installation, and screening of subprojects in line with ESS3 (resource efficiency).
- Solar pumping systems will be designed with abstraction controls such as flow meters, timed pumping, and where feasible, smart controllers to limit extraction within sustainable thresholds.
- Water resource management will be coordinated with relevant authorities to ensure alignment with regional groundwater management plans. Demand-side measures, including leakage reduction, efficient distribution, and community awareness on water conservation, will be implemented.
- To address social risks, stakeholder consultations will be conducted to understand local water use dynamics, and transparent allocation principles will be established, prioritizing drinking water.
- The GRM will be strengthened to capture and resolve water-related disputes.
- CHS risks will be mitigated through ensuring reliable access to safe drinking water, monitoring water quality, and avoiding over-extraction that could compromise the supply.
- Regular monitoring of groundwater levels and abstraction rates will be carried out, with adaptive management measures triggered if declining trends are observed.
- With these controls, the risk of groundwater depletion and associated social and CHS impacts is expected to reduce to moderate.

However, in areas with pre-existing water stress or weak governance, residual risks may persist, requiring continuous monitoring, enforcement of abstraction limits, and adaptive management throughout the project lifecycle.

6.8.6 Siting and Design Controls for Sanitation Systems in Waterlogged Areas

Potential Impact

In waterlogged or high water table areas, construction of septic tanks and soakage pits may lead to failure of infiltration systems, causing untreated effluent to surface. This can result in contamination of surface water and shallow groundwater, foul odors, vector breeding, and increased public health risks.

Mitigation Measures

The project will adopt a screening-based and design-adapted approach to ensure sanitation systems are appropriate for local hydrogeological conditions:

- Site Screening: All subprojects will include rapid field assessment of groundwater levels and soil conditions. Areas with persistently high water tables or visible waterlogging will be flagged as unsuitable for conventional soakage pits.
- Exclusion Criteria: Septic tanks with soakage pits will not be constructed in areas where the water table is within a safe vertical separation (e.g., less than 1–1.5 meters from pit base) or where soils are already saturated.
- Alternative Technologies: In such areas, the project will deploy feasible alternatives such as raised septic tanks, sealed holding tanks, small-bore sewerage connections (where available), or simplified sewer systems. Where space allows, lined evapotranspiration beds or constructed wetlands may be used.
- Design Modifications: Where partial feasibility exists, systems will be designed with lined chambers, controlled outlets, and overflow arrangements to prevent uncontrolled discharge.
- Drainage Integration: Sanitation systems will be planned alongside local drainage improvements to reduce standing water and improve site conditions.
- Operation & Maintenance: Regular desludging schedules will be established to prevent overflow, with sludge transported to approved treatment/disposal facilities.
- Community Awareness: Users will be informed about system limitations and proper usage to avoid overloading and misuse.

With proper siting, design adaptation, and O&M, the risk of effluent surfacing and associated health impacts is expected to be low. However, localized risks may persist in extreme waterlogging conditions, requiring ongoing monitoring and adaptive solutions.

6.8.7 ABR Effluent and Emissions Management (Including GHG Considerations

Potential Impact

ABR systems generate partially treated effluent and biogas (primarily methane). If unmanaged, effluent may contaminate soil and water, while methane emissions contribute to greenhouse gas (GHG) impacts. Uncontrolled gas release may also cause odor nuisance and localized safety risks. At a program level, cumulative GHG emissions from multiple ABRs during operation may be significant if not assessed and managed.

Mitigation Measures

Mitigation measures for ABR-based sanitation systems and wastewater management will be tailored to the specific environmental, hydrogeological, and climatic conditions of each subproject location through E&S screening, baseline assessment, and site-specific ESMPs.

- In coastal zones, sanitation designs will consider saline intrusion, tidal influence, flood exposure, corrosion risk, and the need to prevent contamination of surface drains, creeks, wetlands, and nearby water bodies.

- In arid and rainfed zones, designs will prioritize water-efficient sanitation options, safe reuse of treated effluent where feasible, and enhanced odor, sludge, and vector control measures, particularly under high-temperature and low-flow conditions.
- In areas with a high water table, ABRs, soakage arrangements, sludge drying beds, and other sanitation units will be designed as sealed, watertight, raised, or lined structures, as appropriate, to prevent seepage and groundwater contamination.
- In dry areas, infiltration-based disposal systems may only be adopted where soil permeability, groundwater depth, and receptor sensitivity confirm that such disposal will not create environmental or public health risks.
- For canal-fed water supply schemes, effluent discharge, reuse, or drainage arrangements will be planned to avoid contamination of canals, distributaries, irrigation channels, and downstream water users.
- For groundwater-based schemes, additional protection measures will be applied around wells, hand pumps, boreholes, and aquifer recharge areas, including safe setback distances, lining/sealing of sanitation structures, and periodic monitoring of nearby drinking water sources.

These differentiated mitigation requirements will be incorporated into subproject designs, bidding documents, site-specific ESMPs/SSEMPs, and operation and maintenance plans..

- All systems will be regularly inspected and maintained, with occupational and community safety measures in place. Monitoring, documentation, and reporting of effluent quality and system performance will be undertaken by the PIU, with corrective actions applied as needed.

Residual risks are expected to be low with proper monitoring and O&M, though continued oversight is required to address any operational lapses.

6.8.8 Structural Integrity and Disaster Risk Considerations for Overhead Reservoirs (OHRs)

Potential Impact

Improper design or siting of Overhead Reservoirs (OHRs) may result in structural failure due to seismic activity, high wind loads, cyclones, or extreme weather events. Such failures can lead to catastrophic collapse, causing loss of life, damage to property, disruption of water supply services, and significant Community Health and Safety (CHS) risks. In coastal and cyclone-prone districts, wind-induced stresses and corrosion may further increase vulnerability.

Mitigation Measures

- All OHRs are designed, reviewed, and constructed in accordance with applicable national building codes and international standards, with explicit consideration of seismic zones and wind load requirements.
- Structural designs will incorporate site-specific hazard assessments, including seismic risk, wind speeds, flooding potential, and soil conditions.

- OHRs in cyclone-prone and high-wind areas will include enhanced structural reinforcement, anchoring systems, and corrosion-resistant materials.
- Construction quality assurance will be enforced through supervision, material testing, and adherence to approved designs.
- Regular inspection and maintenance protocols will be established during operation to identify structural weaknesses, leaks, or stress damage.
- Emergency preparedness measures will include restricted buffer zones around OHRs, community awareness, and integration with local disaster management plans.

With proper design, vetting, and maintenance, the risk of structural failure is expected to be low. However, extreme and unforeseen events may still pose residual risks, necessitating periodic structural audits and adaptive risk management over the project lifecycle.

6.8.9 Noise Pollution

Potential Impact

Operation of water supply and drainage infrastructure, such as pumping stations, may generate noise pollution, impacting nearby communities and wildlife.

Mitigation Measures

- Implementing noise abatement measures such as sound barriers and acoustic insulation;
- Scheduling maintenance activities during off-peak hours to minimize disturbance.

6.8.10 Social Issues During Operation Phase

Potential Impact

During the operational phase of the STAR WASH 1 subprojects, social risks may arise due to inequitable access to water supply and sanitation services, inadequate dissemination of project-related information, affordability constraints, and exclusion of vulnerable and marginalized groups (including women, low-income households, the elderly, and minorities). These issues may result in community dissatisfaction, inequities in service delivery, and potential conflicts over tariffs and resource distribution.

Shared infrastructure such as water standposts and community sanitation facilities may expose women and girls to safety, privacy, and dignity risks, including harassment, GBV, and social exclusion, particularly if facilities are poorly located or designed.

In addition, labor-related concerns such as unfair employment practices in operation and maintenance staff, community health and safety risks, including exposure to unsafe water or infrastructure hazards, and minor ecological disturbances affecting community livelihoods dependent on natural resources may also arise. Weak stakeholder engagement and ineffective grievance mechanisms may further exacerbate these risks.

Project activities may pose CHS risks including exposure to unsafe water during system failure, contamination from poorly managed wastewater/ABR effluent, chlorine leaks, and physical hazards from infrastructure (OHR collapse, open trenches, treatment units). Increased interaction between workers and communities may also create risks of SEA/SH and communicable disease transmission.

Overall, these impacts are moderate, site-specific, and manageable with appropriate mitigation and monitoring arrangements.

Mitigation Measures

- Continue implementation of the Stakeholder Engagement Plan (SEP), ensuring inclusive, culturally appropriate, and gender-sensitive engagement, with a focus on vulnerable and marginalized groups to prevent exclusion and elite capture;
- Provide transparent, timely, and accessible information on service delivery, tariffs, maintenance schedules, and system performance through multiple communication channels;
- Maintain a functional, accessible, and gender-responsive GRM for both community members and workers to address complaints related to service delivery, labor conditions, exclusion, billing, and conflicts, ensuring timely resolution and documentation;
- Ensure fair and non-discriminatory access to water supply and sanitation services, prioritizing underserved and remote communities;
- Adopt transparent and socially inclusive tariff structures, including provisions for low-income households (e.g., subsidies or flexible payment mechanisms where feasible);
- Ensure that operational staff are employed under fair terms and conditions in line with Labor Management Procedures (LMP), including non-discrimination, occupational health and safety (OHS) compliance, and prohibition of child and forced labor;
- Ensure safe operation of water supply systems to prevent contamination and public health risks; implement safety protocols around infrastructure (e.g., pumping stations, storage tanks), and maintain emergency preparedness and response procedures;
- Ensure Community health and safety during operation shall include routine disinfection and water-quality surveillance, safe drainage and wastewater management, prevention of standing water and vector breeding, safe access and maintenance of shared water/sanitation facilities, and clear community responsibilities for proper use and reporting of unsafe conditions. Behavior-change activities shall reinforce safe water handling, hygiene, sanitation, fecal-sludge management and reporting of health/safety concerns. Community-based user arrangements shall support routine oversight, timely maintenance and escalation of service failures, with particular attention to women, children, older persons and persons with disabilities.
- Integrate gender-sensitive measures and SEA/SH risk mitigation into operational procedures, including Codes of Conduct, awareness programs, and safe, confidential GRM channels;

- Design and operation will follow ESS4 and WBG EHS Guidelines, including safe siting, restricted access to hazardous facilities, fencing of treatment units, and emergency response systems.
- Facilities will be located close to households, in visible and frequently used areas, avoiding isolated or poorly lit locations.
- Adequate lighting will be provided; where feasible, community-based oversight mechanisms will be established.
- Separate facilities for men and women; full privacy (doors, internal locks, adequate height); screened bathing/washing areas where applicable.
- Design will consider women, children, elderly, and persons with disabilities.
- Continuous water supply to avoid women traveling long distances or waiting at unsafe hours.
- Establish or strengthen community-based user committees to support participatory monitoring, local conflict resolution, and oversight of service delivery;
- Conduct regular awareness campaigns on water conservation, hygiene, safe water handling, and responsible use of infrastructure to protect public health;
- Ensure that operation of water abstraction and discharge systems does not adversely affect local ecosystems or community-dependent natural resources; implement mitigation measures where minor impacts are identified;
- Regularly monitor social, labor, health, and environmental performance indicators, and update mitigation measures as needed to address emerging risks.
- Accessible grievance mechanisms for reporting safety concerns; integration with SEA/SH risk mitigation (Codes of Conduct, awareness).

6.8.11 Behavior Change Communication (BCC) Risks

Potential Risks

Under STAR-WASH-1, BCC activities (hygiene promotion, safe water use, sanitation practices) may unintentionally exclude marginalized groups such as women, persons with disabilities, minority communities, and the poorest households if outreach channels are not inclusive. Cultural norms in rural Sindh may limit women's participation in public sessions, reducing the effectiveness of hygiene messaging. There is also a risk of misinformation, low uptake of behavior change (e.g., reluctance to use improved sanitation or pay for services), and potential mistrust if messaging is not aligned with local practices. Poorly designed BCC may reinforce existing inequalities or create social friction between target and non-target groups.

Mitigation Measures

- In line with ESS10 (Stakeholder Engagement) and ESS4 (CHS), BCC under STAR-WASH-1 will be designed as an inclusive, community-driven process.
- Outreach will use multiple channels (community meetings, local facilitators, female mobilizers, schools, religious/community leaders) to ensure access for women and vulnerable groups. Separate and safe engagement spaces will be provided for women where required.
- Messaging will be context-specific and culturally appropriate, using local languages and simple formats (visual aids, voice-based tools) to address low literacy.
- Key themes will include safe water handling, sanitation use, hygiene practices, and O&M responsibilities.
- A feedback and adaptive mechanism will be established through the GRM and community committees to capture concerns, misinformation, or resistance and adjust messaging accordingly.
- Participation and uptake will be monitored through periodic assessments, with corrective actions taken where inclusion gaps are identified.

Residual Impact: With inclusive design and continuous feedback, risks of exclusion and ineffective messaging are expected to be low, though sustained engagement will be required to ensure long-term behavior change.

6.8.12 Institutional WASH Risks (Schools and Health Facilities)

Potential Risks

Provision of WASH facilities in schools and health facilities may face risks related to poor design, inadequate O&M, and social exclusion. These include non-functional or poorly maintained toilets, lack of privacy and safety for women and girls (including menstrual hygiene management), increased GBV risks in poorly lit or isolated facilities, and exclusion of persons with disabilities due to inaccessible design. Inadequate water supply or drainage may further reduce the usability and sustainability of facilities.

Mitigation Measures

- Consistent with ESS4 and ESS10, STAR-WASH-1 will ensure gender-sensitive, inclusive, and climate-resilient design of institutional WASH facilities.
- This will include separate toilets for males and females, adequate privacy (doors, locks, lighting), and provision for menstrual hygiene management (water availability, disposal mechanisms). Facilities will be designed to be accessible to persons with disabilities (ramps, handrails, appropriate dimensions).
- Clear operation and maintenance (O&M) arrangements will be established with designated responsible entities (school administration, health facility staff, or local committees), supported by training and budget allocation where feasible. Regular cleaning, water supply reliability, and minor repairs will be ensured.

- Awareness programs will be conducted for users (students, staff, patients) on proper use and hygiene practices.
- Facility locations will be selected to ensure safety (visible, well-lit, accessible areas). Functionality and user satisfaction will be periodically monitored, with issues addressed through the GRM.

Residual Impact: With appropriate design and sustained O&M, risks are expected to be low. However, long-term functionality will depend on institutional capacity and continued resource allocation, requiring periodic monitoring and support.

6.8.13 Potential Environmental Impact of Sewerage Network Type during Operation & Maintenance (O&M) Phase

As outlined in Section 2.7.4.1, a range of sewerage network options has been identified to cater to varying settlement conditions across rural Sindh. During the operation phase, there can be a range of environmental impacts from sewerage and sanitation systems that may be primarily related to the handling, conveyance, and disposal of wastewater. Inadequate system performance, leakages, overflows, or inappropriate technology selection, particularly in sensitive hydrogeological conditions such as high groundwater tables, can result in contamination of soil, surface water, and groundwater resources. These risks are especially critical in the context of Sindh, where baseline water quality is already compromised. Therefore, effective system design, regular monitoring, and adherence to operational protocols are essential to ensure environmental protection and sustainable functioning of sanitation infrastructure.

1. Sewer Lines with Pumping Station

Potential Impact

- Leakage or pipe bursts leading to soil and groundwater contamination: Such failure of pipeline functionality can allow untreated wastewater to infiltrate surrounding soil and aquifers.
- Overflow/backflow during power or mechanical failure: Pumping system disruptions can cause reversal or accumulation of sewage within the network.
- Localized flooding of untreated wastewater in low-lying areas: Poor drainage or system overload can result in wastewater pooling in vulnerable areas.
- Improper sludge handling from pumping stations: Inadequate sludge management can lead to environmental pollution at or near pumping sites.

Mitigation Measures

- Use leak-proof, well-jointed pipelines with routine inspection: Ensures system integrity and early detection of faults to prevent leakage.
- Install standby generators/backup power for pumping stations: Maintains continuous operation and prevents overflow during outages.
- Implement overflow/emergency response mechanisms: Enables quick containment and management of accidental discharges.

- Ensure safe sludge disposal at designated treatment facilities: Prevents environmental contamination from improper sludge dumping.
- Conduct periodic monitoring of system performance: Helps identify operational inefficiencies and environmental risks early.

2. Drains with Pumping Station

Potential Impacts:

- Direct exposure of wastewater causes land and water contamination: Open drains allow untreated wastewater to interact directly with the environment.
- Stagnation due to blockages leading to pollution buildup: Obstructed flow results in accumulation of contaminants and degradation of water quality.
- Solid waste accumulation reducing flow efficiency: Improper disposal of waste into drains hinders hydraulic performance.
- Increased vector breeding due to open wastewater: Stagnant wastewater provides breeding grounds for disease vectors.

Mitigation Measures:

- Provide covered drains where feasible: Reduces direct exposure and limits environmental contamination.
- Ensure routine cleaning and desilting: Maintains flow efficiency and prevents stagnation.
- Install screens/traps to intercept solid waste: Prevents entry of debris that can block the system.
- Conduct community awareness on waste disposal practices: Encourages behavioral change to reduce misuse of drains.
- Maintain pumping systems to prevent stagnation: Ensures continuous movement of wastewater through the system.

3. Sewer Lines with Communal Septic Tanks

Potential Impacts:

- Overflow or seepage from communal tanks contaminating soil/groundwater: Poor containment can lead to leakage of untreated or partially treated effluent.
- Reduced treatment efficiency due to sludge accumulation: Excess sludge reduces the effectiveness of septic treatment processes.
- Risk of untreated effluent discharge: Inadequate system capacity may result in direct release of untreated wastewater.

Mitigation Measures:

- Design watertight septic tanks with adequate capacity: Ensures proper containment and treatment of wastewater.
- Implement scheduled desludging to maintain efficiency: Prevents overloading and maintains treatment performance.

- Ensure proper siting away from water sources: Minimizes risk of contaminating drinking water sources.
- Control effluent discharge pathways: Ensures treated effluent is safely managed and disposed.
- Establish clear O&M responsibilities for communities: Promotes accountability and sustained system performance.

4. Septic Tanks and Soakage Pits

Potential Impacts:

- Groundwater contamination from effluent infiltration: Soakage pits allow partially treated wastewater to percolate into aquifers.
- Nutrient and pathogen migration into aquifers: Contaminants can travel through soil and degrade groundwater quality.
- Environmental risk in high water table or permeable soils: Certain conditions increase the likelihood of rapid contamination.
- Localized soil contamination around pits: Continuous infiltration can degrade soil quality near the system.

Mitigation Measures:

- Maintain safe distance from drinking water sources: Reduces risk of contamination of potable water supplies.
- Use lined, watertight septic tanks: Prevents leakage of untreated wastewater into surrounding soil.
- Design soakage pits based on soil and hydrogeology: Ensures suitability and minimizes environmental risks.
- Restrict use in high-risk areas (coastal/flood-prone zones): Avoids application where contamination risks are highest.
- Conduct regular inspection and desludging: Maintains system functionality and prevents overflow.

5. Septic Tanks and Sewage Sucker Truck (SST)

Potential Impacts:

- Illegal or improper disposal of collected sludge: Lack of regulation may result in dumping into open areas or water bodies.
- Spillage/leakage during sludge transport: Poorly maintained equipment can cause environmental contamination along routes.
- Contamination of land and water bodies from dumping: Uncontrolled disposal directly impacts environmental quality.

Mitigation Measures:

- Use licensed and regulated SST operators only: Ensures adherence to safe and approved desludging practices.
- Ensure sludge disposal at designated treatment facilities: Prevents environmental pollution from improper dumping.
- Monitor desludging operations (tracking/log systems): Enhances accountability and traceability of sludge handling.
- Maintain sealed and well-maintained tanker vehicles: Minimizes risk of leakage during transport.
- Enforce compliance through institutional oversight: Strengthens governance and regulatory control.

6. Septic Tank + Soakage Pit + Sewer Sucker Truck (Hybrid System)

Potential Impacts:

- Combined risk of groundwater contamination and sludge mismanagement: Integration of systems increases overall environmental vulnerability if poorly managed.
- Partial infiltration from soakage pits contaminating aquifers: Effluent seepage contributes to groundwater pollution.
- Environmental pollution if desludging is irregular or absent: Lack of maintenance leads to system failure and contamination.
- Increased cumulative impact in sensitive hydrogeological areas: Combined effects are more severe in vulnerable environments.

Mitigation Measures:

- Restrict soakage pits in high groundwater vulnerability zones: Avoids application in environmentally sensitive areas.
- Ensure watertight septic tanks to minimize leakage: Strengthens primary containment of wastewater.
- Implement scheduled desludging to prevent overflow: Maintains system efficiency and reduces environmental risks.
- Integrate with a regulated FSM system (collection, transport and disposal): Ensures end-to-end safe management of fecal sludge.
- Monitor system performance and community usage practices: Enables timely corrective actions and sustainable operation.

6.8.14 Potential Environmental Impact of Sewerage Network Type during Maintenance Phase

The sewerage network options presented in Section 2.7.4.1 also entail specific environmental considerations during the maintenance phase, which includes activities such as cleaning, desludging, repair, and rehabilitation. These activities can pose environmental risks if not properly managed, particularly in relation to the handling, transport, and disposal of fecal

sludge, as well as potential spillages during maintenance operations. In the absence of regulated practices and adequate disposal facilities, such risks may lead to secondary contamination of land and water resources. Therefore, maintenance of these systems will be carried out using controlled procedures, supported by appropriate equipment, designated disposal mechanisms, and a functional fecal sludge management system, to ensure that environmental impacts are minimized and system performance is sustained.

6.9 Elite Capture

Elite capture in STAR-WASH-1 refers to the undue influence of local power holders, such as landlords, politically connected individuals, or dominant groups, over decisions related to scheme siting, beneficiary selection, employment, tariffs, and grievance handling. Given the project's reliance on community-based institutions like Village Committees (VCs), this risk is material in rural contexts if governance and transparency mechanisms are weak.

6.9.1 Key Impacts

Elite capture can lead to the systematic exclusion of vulnerable groups, including poor households, women, minorities, tenants, and persons with disabilities, from access to water supply and sanitation services. It may distort infrastructure placement, resulting in preferential service delivery to influential households while peripheral or disadvantaged areas remain underserved. Project resources can be misallocated through biased hiring, procurement, and material distribution practices. These dynamics often erode community trust, trigger local conflicts, and reduce participation in operation and maintenance (O&M), ultimately affecting sustainability. The effectiveness of the grievance redress mechanism (GRM) may also be compromised if complaints are suppressed or manipulated. Additionally, exclusion of women from decision-making can reinforce gender disparities and elevate SEA/SH risks in accessing services or employment opportunities.

6.9.2 Mitigation Measures

To address these risks, STAR-WASH-1 integrates inclusive and transparent governance mechanisms across all phases. At the design stage, VWSCs will be constituted with mandatory representation of women and marginalized groups, supported by clear roles, term limits, and conflict-of-interest provisions. Beneficiary selection and scheme prioritization will follow publicly disclosed, criteria-based processes grounded in objective indicators such as poverty, service gaps, and vulnerability. Participatory planning will be ensured through inclusive consultations and community validation of scheme locations.

During construction, transparency will be maintained through public disclosure of employment opportunities, documented hiring procedures, and site-level information boards outlining project details and grievance channels. PIU and supervision consultants will conduct routine monitoring to verify compliance and prevent preferential practices.

In the operation phase, equitable service delivery will be enforced through defined service standards, ensuring coverage across all community segments. Tariff setting and O&M financial management will be conducted transparently, with community oversight and public disclosure of records to prevent financial control by elites.

6.9.3 Monitoring and Adaptive Management

Monitoring will include disaggregated indicators such as the proportion of vulnerable households served, representation in VCs, and grievances related to exclusion. These will be supplemented by social audits, community scorecards, and independent Third Party Validation (TPV). Findings will feed into adaptive management, allowing corrective actions such as re-targeting or restructuring of community institutions where needed.

6.10 Climate Change & STAR WASH 1 Interventions

It is very likely that climate change has an impact on the quality, quantity and availability of water in Sindh. However, climate change is only one of several drivers affecting the water sector. It cannot always be seen as an isolated factor, but in many aspects as an exacerbating factor for other drivers, for instance, when the pollution generated by the discharge of untreated wastewater combines with reduced river flows due to droughts. In practice, impacts are compounded by the vulnerability of water supply schemes, exacerbated by the poor status of the infrastructure in Sindh and of the organizations which operate them.

Recent experience of extreme weather events in the region helps pinpoint the impacts of climate change on water supply and sanitation services. Rains, floods, and droughts were identified as major risks, though water supply and sanitation in Sindh are also vulnerable to other weather and water-related natural hazards, exacerbated by climate change, such as storms, extreme winter temperatures, prolonged summer and flash flooding.

Climate change will likely lead to longer dry periods, which would result in reduced run-offs and therefore reduced dilution of wastewater in rivers and decreased raw water quality for water supply. One of the main aspects in terms of climate change is precipitation. Due to climate change, the precipitation can increase or decrease and/or the intensity of rainfall can change. Key impacts on water supply and sanitation facilities are shown in the following **Table 33.**

Table 33: Climate Impacts and Resilience Measures for STAR WASH 1 Interventions

Climate Scenario	Quantitative Impacts on Water Resources	Quantitative Impacts on WASH Services	Adaptation Measures	O&M Requirements	Residual Risk Rating
Increased Rainfall / Flooding	- Runoff increases by 20-50% in peak events, elevating contaminant loads (e.g., E. coli >1,000 CFU/100mL in floodwaters).	- 30-50% of rural water points fail post-flood; sanitation overflows contaminate 70% of supply systems.	- Elevate pumps/tanks 1-2m above 1-in-20-year flood level.	- Post-flood inspections within 48 hours (check 100% of assets).	Medium (with measures)
	- Flood recurrence: from 1-in-10 to 1-in-5 years in Sindh.		- Install flood vents and backflow preventers on latrines.	- Stockpile 20% spare parts for pumps/valves; chlorinate at 5 mg/L residual.	
Decreased Rainfall / Drought	- Groundwater levels drop 1-3m/year; salinity rises >2,000 µS/cm in 80% of Sindh aquifers.	- Water availability falls <20 L/p/d; hygiene compliance drops 50%.	- Diversify sources (rainwater + protected springs).	- Monthly yield monitoring; rationing protocols at <30 L/p/d.	Low-Medium
	- Surface flows reduce 40-60% in dry season.	- 25% service interruption risk.	- Install low-flow fixtures (5-10 L/flush).	- Quarterly salinity testing; desludge tanks biannually.	
Intense Rainfall Events	- Turbidity spikes to 500-2,000 NTU; erosion transports 10-20x sediments.	- Treatment failure rate 40%; pipe scour damages 15-20% of networks.	- Upsize sedimentation tanks by 50%; reinforce intake screens.	- Daily turbidity checks post-rain; clear screens weekly.	Medium
	- Flash flood peaks 2-5x design flows.		- Use HDPE pipes (PN16 rating).	- Annual CCTV pipe inspections; repair turbidity >50 NTU.	
Heatwaves / Rising Temps (+2-4°C)	- Evapotranspiration rises 10-15%; biological growth doubles.	- Chlorine demand up 25%; sludge volume +15%.	- Shade reservoirs; use UV-stabilized materials.	- Weekly bio-growth monitoring; flush dead-ends biweekly.	Low
	- Demand surges 20-30% in summer.	- Material degradation accelerates 2x.	- Boost chlorination to 1-2 mg/L free residual.	- Heat protocols for desludging crews (rotate shifts).	

Climate change is expected to affect STAR WASH 1 through flood damage, reduced water availability, worsening water quality, and higher treatment and O&M requirements, with particular sensitivity in Sindh where groundwater salinity is widespread and the project aims to serve approximately 1.3 million people.

7 ESMF Implementation

7.1 Overview of the ESMF /implementation

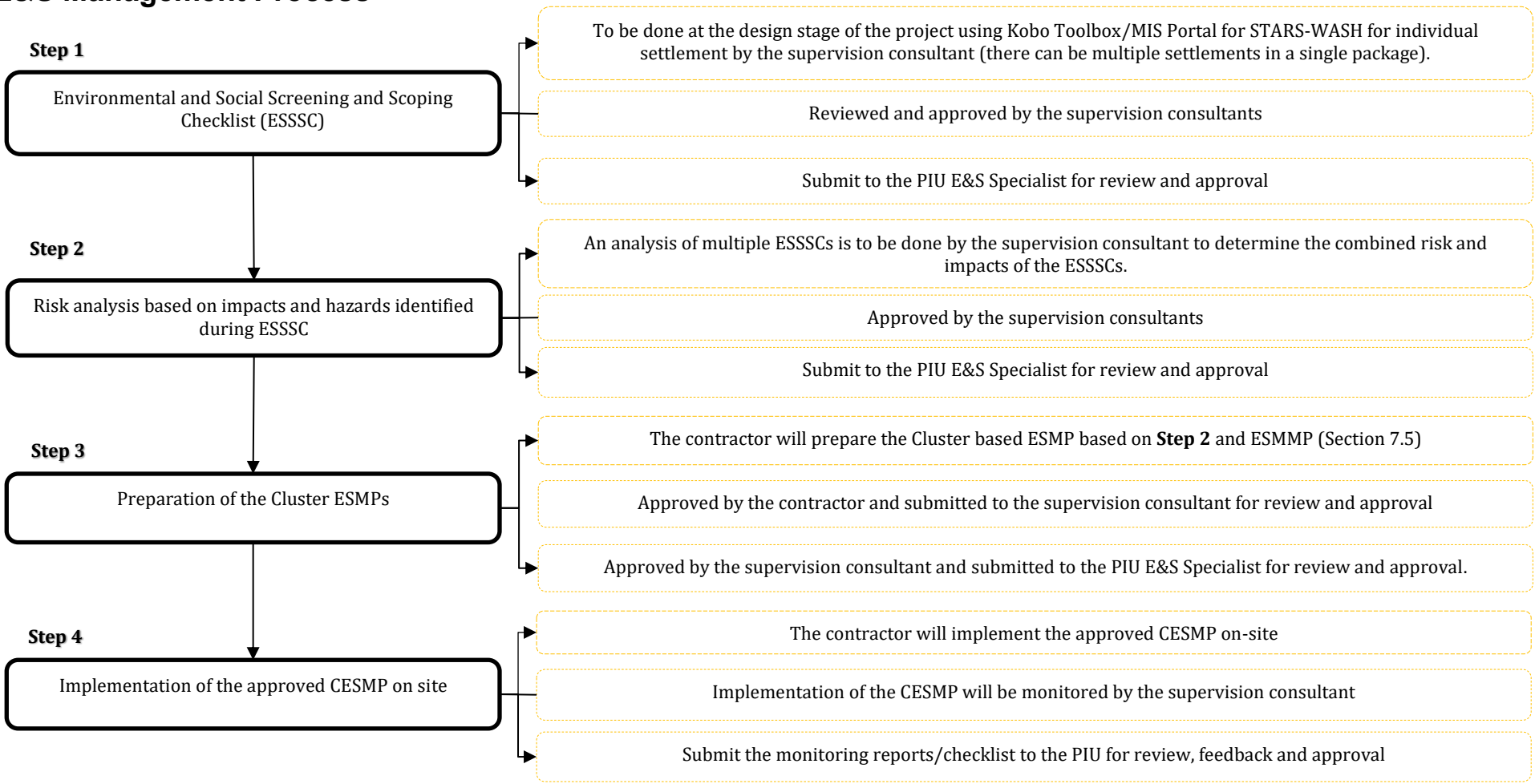
The implementation of the STAR WASH-1 ESMF will require a coordinated institutional arrangement involving the Project Implementation Unit (PIU), Environmental and Social staff, Supervision Consultants, Contractors, Regional Offices, Design-Build-Operate (DBO) Contractors, SPVOs (Community-Based Service Providers), and Implementing Partners (IPs). These institutions will collectively ensure that environmental and social requirements are integrated into planning, design, construction, operation, monitoring, grievance redress, and long-term service delivery arrangements.

The ESMF requirements shall be cascaded through all project delivery mechanisms. Bidding documents and DBO/works contracts shall include applicable E&S conditions, approved site-specific instruments, OHS/CHS requirements, SEA/SH obligations, chance-find procedures, labor requirements, GRM provisions, monitoring/reporting duties, and contractual remedies for non-compliance. Implementing Partners, SPVOs/Village Organizations and community operators shall receive the relevant requirements and responsibilities through agreements, SOPs, training and supervision. Supervision Consultants shall verify implementation through inspections, records, geo-tagged evidence and periodic reporting, while the PIU shall consolidate performance and corrective actions across delivery mechanisms.

The STAR WASH-1 service delivery model is designed to strengthen the link between infrastructure development, community ownership, operational sustainability, and compliance with environmental and social safeguards. Under this model, the PIU will provide overall leadership and ESMF oversight, while regional and field-level actors will support contract supervision, community engagement, operational monitoring, tariff collection, O&M capacity building, MIS reporting, and grievance resolution. This arrangement will help ensure that WASH services are delivered in a technically sound, socially inclusive, environmentally sustainable, and accountable manner.

Given the programmatic nature of the project and the evolving scope of subprojects, the ESMF adopts a framework-based and risk-informed approach, enabling consistent application across diverse interventions and geographic locations.

7.2 E&S Management Process



As part of the STAR WASH project, a structured Environmental and Social (E&S) Management Process has been developed to ensure that all project interventions are planned, designed, implemented, and monitored in compliance with applicable environmental and social requirements. The process establishes a systematic mechanism for identifying environmental and social risks and impacts at the settlement level, assessing cumulative impacts, preparing mitigation and management measures, and ensuring effective implementation and monitoring throughout the project lifecycle.

Step 1: Environmental and Social Screening and Scoping

The process begins with the preparation of an Environmental and Social Screening and Scoping Checklist (ESSSC) at the project design stage. The ESSSC is prepared for each individual settlement through the Kobo Toolbox/Mis Portal for STAR-WASH by the Supervision Consultant. Since a single contract package may include multiple settlements, screening is conducted separately for each settlement to ensure that site-specific environmental and social conditions, sensitivities, risks, and hazards are adequately identified and documented.

The screening process includes identification of potential environmental impacts, occupational and community health and safety risks, waste management concerns, social sensitivities, access constraints, vulnerable groups, land-related issues, and any other project-specific environmental and social aspects relevant to the proposed intervention. Based on the findings of the screening exercise, a preliminary risk analysis is undertaken to assess the nature and significance of anticipated impacts and hazards.

Following preparation, the ESSSC and associated risk analysis are reviewed and approved by the Supervision Consultant and subsequently submitted to the PIU Environmental and Social Specialist for further review and approval to ensure compliance with the project's Environmental and Social Management Framework (ESMF) and applicable World Bank Environmental and Social Standards (ESSs).

Associated facilities shall be identified during screening and feasibility/design review where they are necessary for the functioning of a project-supported system. Examples may include external utility connections, abstraction/intake infrastructure, access roads, transmission/connection facilities, sludge treatment or disposal facilities, and other operationally necessary facilities. Their E&S risks shall be assessed to the extent required by the ESF and incorporated into the relevant site-specific instruments and contractual/implementation arrangements.

Step 2: Cumulative Environmental and Social Risk Assessment

After completion of the individual settlement-level screenings, the Supervision Consultant undertakes a consolidated analysis of multiple ESSSCs to identify combined, cumulative, and area-wide environmental and social risks and impacts associated with the project activities and prepare cluster based ESMPs. This step ensures that broader impacts arising from clustered settlements, interconnected infrastructure, or simultaneous construction activities are appropriately assessed and managed.

The cumulative analysis helps identify shared environmental pressures, community-level impacts, traffic and mobility concerns, cumulative wastewater and waste generation issues, occupational and community safety risks, and potential stress on local resources and services. Once completed, the consolidated assessment is reviewed and approved by the Supervision Consultant and then submitted to the PIU Environmental and Social Specialist for review and approval.

Cumulative-effluent assessment shall be catchment/receiving-water based where multiple treatment systems may discharge to the same receiving body. Geo-tagging of villages, treatment systems and discharge points shall support identification of shared receiving waters; baseline quality, seasonal flow, existing uses and assimilative capacity shall be considered; and combined loads shall be compared with applicable effluent requirements before approval. Biodiversity implications for aquatic habitats and ecological receptors shall be assessed alongside ESS3 pollution and receiving water considerations. The findings shall be incorporated into site-specific ESMPs/ESSRs and engineering designs, with monitoring and corrective action where cumulative loads or receiving-water conditions indicate risk.

Step 3: Preparation of Contractor Environmental and Social Management Plan (CESMP)

Based on the approved findings of the screening and cumulative risk assessment, the Contractor prepares a Contractor Environmental and Social Management Plan (CESMP). The CESMP serves as the primary implementation document that translates identified risks, impacts, and mitigation requirements into practical site-level management measures and procedures.

The CESMP typically includes mitigation and monitoring measures related to occupational health and safety, community health and safety, waste management, traffic management, pollution prevention, emergency preparedness and response, labor management, grievance management, infection prevention and control, and environmental monitoring requirements. The CESMP also defines institutional responsibilities, reporting mechanisms, implementation procedures, and monitoring protocols to ensure effective compliance during project implementation.

The prepared CESMP is first approved internally by the Contractor and then submitted to the Supervision Consultant for technical review and approval. Following this review, the CESMP is forwarded to the PIU Environmental and Social Specialist for final review and approval prior to commencement of construction activities.

Step 4: Implementation and Monitoring of CESMP

Upon approval, the Contractor is responsible for implementing the CESMP at the construction site and ensuring that all environmental and social mitigation measures are effectively integrated into daily project activities. This includes implementation of occupational health and safety measures, provision and use of personal protective equipment (PPE), safe waste disposal practices, traffic and access management, environmental protection measures, and community safety controls.

The implementation of the CESMP is continuously monitored by the Supervision Consultant through regular site inspections, compliance checks, and monitoring activities to ensure adherence to approved environmental and social requirements. Monitoring findings, observations, corrective actions, and compliance status are documented in periodic monitoring reports, which are submitted to the PIU for review, feedback, and approval.

Through this structured process, the project ensures that environmental and social risks are systematically identified, assessed, mitigated, monitored, and managed throughout the design and implementation phases of the project, thereby supporting environmentally sustainable, socially responsible, and safe implementation of the STAR WASH interventions.

Project will ensure that the site specific CESMP (if and when required) under cluster based ESMPs are cleared before the relevant works commence and that its mitigation measures are incorporated into design, bidding/contract documents, implementation and monitoring requirements. Screening records shall be geo-tagged and retained in the project's MIS to provide an auditable link between the subproject location, risk classification, selected instrument, approvals and subsequent monitoring.

Table 34 shows the STAR WASH-1 subproject's environmental screening anticipated classification and guides on the preparation of relevant E&S management instruments/tools. The exact instrument will, however, be decided as per the screening outcome of individual subprojects.

Instrument selection shall be risk-based and documented. Depending on screening and cumulative assessment, the PIU may require a site-specific ESMP/CESMP, Environmental and Social Screening Report/checklist with mitigation measures, ESIA where warranted by the scale or sensitivity of impacts, RP/ARP where ESS5 impacts arise, and additional plans such as OHS, CHS, Traffic and Access Management, Emergency Response, Waste Management, Biodiversity, Cultural Heritage/Chance Finds, or other risk-specific plans. No construction or operation activity shall commence until the required instrument(s) are prepared, reviewed/cleared and disclosed/communicated as required under the ESCP and applicable procedures.

Table 34: STAR WASH 1 Subprojects Environmental Screening and Categorization[64]

[64] The STARS WASH subprojects have been categorized based on the nature and scale of anticipated environmental and social impacts. New water supply and drainage schemes are expected to have moderate impacts requiring CESMPs under cluster based ESMPs, while institutional WASH improvements will entail site-specific, low to moderate impacts addressable through screening checklists and mitigation measures. ESMPs will be prepared package-, lot-, or contract-wise in line with World Bank requirements, whereas SEPA submissions will follow a district-wise approach. Where required, Resettlement Plans (RPs) will be prepared based on due diligence and screening results

Project Modules	Type of Subprojects	Nature of Environmental and Social Impacts	Env. Category	E&S Management Instrument / Tools
Water Supply and Drainage Schemes	Development of new water supply and drainage systems	Likely to have moderate adverse environmental and/or social impacts due to construction activities, impacts on surface and groundwater resources, and localized nuisances such as noise, dust, and waste generation	S	An ESMPs, ESSRs, screening reports, or other relevant tools will be prepared package/ lot/ contract-wise as per World Bank requirements.
Institutional WASH Improvements	Improvement of WASH facilities in schools, health centers, and other public institutions	Likely to have low to moderate adverse environmental and/or social impacts, limited to small-scale construction and minor disturbances to users	M	Environmental and Social Screening Checklist with Mitigation Measures. Package-wise ESMPs, ESSRs, screening reports, or other relevant tools will be prepared under World Bank guidelines, and district-wise instruments will be prepared for SEPA.
Institutional Strengthening	Capacity building of PHED and Local Government Department	Not applicable (NA) – no physical works; activities limited to training, system development, and institutional support	NA	Develop and implement a robust environmental and social monitoring and reporting framework. Resettlement Plans (RPs) will be prepared as required, based on screening and due diligence findings.

7.3 Provincial Regulatory Requirements to Conduct Environmental Assessment

The proposed Project is located in Sindh Province. The Sindh Environmental Protection Act, 2014 is the core environmental law for the proposed Project. Under Section 17 (1) of the Act, it is mandatory for the proponents of the project to execute the Initial Environmental Examination (IEE) and/ or EIA, where warranted, and get approval from EPA, Sindh. Hence, for the proposed Project, the EPA, Sindh is the concerned authority with respect to environmental approvals.

Sindh Environmental Protection Agency (Review of EC, IEE and EIA) Regulations, 2021 provide screening categories of projects for which EC or IEE or EIA needs to be conducted. However, the applicability of these provisions will be determined on a scheme-specific basis, as the project design is not yet finalized and the STAR WASH-1 Project does not currently envisage a combined wastewater treatment plant. Therefore, the requirement for an IEE cannot be applied uniformly to all subprojects at this stage.

Based on the precedent established under the SPHF WASH Project, where environmental clearance/NOC was obtained through submission of an environmental and social screening

checklist, STAR WASH-1 may initially follow the same approach. Scheme-specific screening checklists will be prepared and submitted to SEPA for determination of the applicable environmental assessment requirement. Where SEPA determines that an IEE is required, the Client/Implementing Agency will prepare and submit the relevant IEE for review and approval prior to commencement of civil works..

7.3.1 Integration of E&S Management in Project Life Cycle

The E&S management steps described in the above section (Key Steps for Environmental and Social Management) will be seamlessly integrated within the subproject identification, preparation, appraisal, approval, and implementation cycle. E&S screening (described in the above section, i.e., Subprojects Environmental and Social Screening) will be carried out at the subproject identification stage. The subproject-specific ESMPs, screening reports, or other relevant tools will be prepared, based on this ESMF, during the preparation/appraisal stage and the same will be implemented during the implementation stage.

7.4 Key Institutions Involved in the Implementation of the STAR WASH 1 ESMF

7.4.1 Project Implementation Unit (PIU)

The PIU will be headed by the Project Director, who will monitor and coordinate all project implementation activities. The PIU will serve as the lead implementing entity responsible for overall project coordination, implementation oversight, and compliance monitoring, with support from line departments, field offices, consultants, contractors, and other project partners.

The PIU will ensure that the ESMF is applied throughout the subproject lifecycle, including screening, preparation of site-specific E&S instruments, integration of mitigation measures into design and bidding documents, implementation monitoring, reporting, and corrective action.

Key responsibilities of the PIU will include:

- Provide overall leadership, coordination, and implementation oversight for the STAR WASH-1 Project.
- Ensure implementation of the ESMF and related instruments across all project components and subprojects.
- Coordinate with line departments, regional offices, supervision consultants, contractors, DBO contractors, implementing partners, SPVOs, and relevant local authorities.
- Ensure that E&S screening is completed for each subproject before commencement of works.
- Ensure preparation, review, clearance, and disclosure of required site-specific E&S instruments, including CESMPs, screening reports, and other relevant tools.

- Ensure that mitigation measures are integrated into engineering designs, bidding documents, contracts, and implementation plans.
- Monitor compliance with the World Bank ESSs, national and provincial legal requirements, and ESMF provisions.
- Ensure timely submission of E&S monitoring reports, progress reports, incident reports, and other required documentation to the World Bank.
- Provide strategic guidance for grievance redress, stakeholder engagement, gender inclusion, SEA/SH risk management, and vulnerable group participation.
- Ensure that corrective actions are taken in case of non-compliance, implementation delays, or emerging environmental and social risks.

7.4.2 Environment and Social Staff of PIU

The following dedicated staff will be hired for the implementation of ESMF, TOR for the proposed positions have been added as **Annexure X**:

- Sr. Environment Specialist;
- Sr. Social Development Specialist & Resettlement Specialist; and
- Sr. Behavioral Change Specialist
- Gender Specialist.

Overall responsibilities of the E&S staff of PIU include:

- Supervise, facilitate, and coordinate implementation of the ESMF, including the E&S mitigation and monitoring plan.
- Ensure integration of E&S assessment findings into project planning, engineering design, procurement, and implementation arrangements.
- Ensure that contractors, DBO contractors, supervision consultants, implementing partners, and other field actors comply with the World Bank ESSs, national and provincial regulatory requirements, and ESMF provisions.
- Review and clear E&S screening checklists, Cluster based ESMPs, CESMPs, and other relevant site-specific instruments, as applicable.
- Identify non-compliance issues, recommend corrective actions, and ensure follow-up until closure.
- Prepare bi-annual E&S monitoring and progress reports for submission to the World Bank.
- Coordinate with stakeholders and communities to address concerns related to construction activities, service delivery, access, inclusion, safety, and grievance redress.
- Assist the Project Director in addressing and resolving environmental and social complaints and grievances.
- Prepare environmental, social, OHS, SEA/SH, stakeholder engagement, and community awareness training materials and conduct capacity-building sessions.

- Maintain records of ESMF implementation, screening checklists, ESMPs, third-party monitoring reports, training reports, grievance reports, and compliance evidence.
- Ensure implementation of the Stakeholder Engagement Plan, Labor Management Procedures, SEA/SH Action Plan, Resettlement Framework, ESMPs, screening reports, and other relevant tools.
- Serve as focal points for gender mainstreaming, SEA/SH risk mitigation, vulnerable group inclusion, and gender-sensitive grievance handling.
- Support linkages with NGOs, public-sector entities, and community institutions working on women's empowerment, social inclusion, WASH behavior change, and marginalized groups.

Review the ESMF periodically and recommend updates, if required, based on implementation experience, monitoring results, or changes in project scope.

7.4.3 Regional Office / Program Management Layer

The Regional Office will function as the operational backbone of the service delivery model. It will provide field-level coordination between the PIU, contractors, DBO contractors, implementing partners, SPVOs, local authorities, and beneficiary communities. The Regional Office will support the PIU in ensuring that project implementation is aligned with approved designs, ESMF requirements, service delivery standards, and performance indicators.

Key responsibilities of the Regional Office will include:

- Provide overall field-level coordination between the PIU, DBO contractors, implementing partners, SPVOs, local authorities, and communities.
- Provide top supervision of DBO contractors to ensure compliance with approved designs, specifications, contractual obligations, and performance standards.
- Appoint qualified environmental and social specialists and OHS, environmental and social officers.
- Support on-site contract management through field inspections, milestone verification, compliance checks, and progress reporting.
- Monitor whether infrastructure development and initial service delivery are consistent with approved technical specifications, E&S safeguards, and service delivery KPIs.
- Provide handholding support to SPVOs in financial management, tariff setting, record keeping, basic technical understanding of WASH systems, and O&M practices.
- Facilitate periodic meetings and training sessions for SPVOs, contractors, implementing partners, and other field actors.
- Prepare regular performance monitoring reports identifying gaps in tariff collection, behavioral compliance, water quality, service continuity, grievance resolution, and service delivery KPIs.
- Support implementation and updating of the project MIS by facilitating data collection, verification, and reporting.

- Support impact evaluation, third-party validation, donor reporting, and corrective action planning.

Coordinate with the PIU E&S team to ensure that environmental and social compliance issues identified at field level are reported and addressed in a timely manner.

7.4.4 Supervision Consultant (SC)

The Supervision Consultant will support the PIU in supervising construction activities and ensuring that contractors and DBO contractors comply with the ESMF, approved cluster based ESMPs, CESMPs, design requirements, and applicable E&S obligations

The roles and responsibilities of SC will be:

Oversee contractor and DBO contractor performance to ensure compliance with the ESMF, CESMPs, and E&S mitigation and monitoring requirements.

- Ensure that day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner.
- Appoint dedicated team of qualified environmental and social specialists and OHS, environmental and social officers.
- Maintain strong coordination with the PIU, Regional Office, contractors, DBO contractors, implementing partners, and local stakeholders.
- Supervise and monitor environmental, social, health and safety activities at project sites.
- Verify implementation of mitigation measures related to construction impacts, labor and working conditions, community health and safety, traffic management, access, SEA/SH prevention, and waste management.
- Organize and support environmental, social, OHS, and community safety training programs and workshops.
- Submit periodic E&S compliance and monitoring reports to the E&S team of the PIU. Identify non-compliances, recommend corrective actions, and verify implementation of corrective measures. Suggest additional mitigation measures where required based on site conditions and emerging risks.

7.4.5 Contractor/s and DBO Contractors

Contractors and DBO contractors will be responsible for implementing construction and, where applicable, initial operation and maintenance activities in compliance with approved designs, contract requirements, ESMF provisions, site-specific E&S instruments, and applicable World Bank ESS requirements.

The Contractor(s) and DBO Contractors will appoint or designate qualified Environmental, Social, Health and Safety officers for on-site implementation of ESMF requirements. They will prepare and implement Site-Specific Environmental and Social Management Plans and Site-

Specific Health and Safety Plans for subprojects requiring CESMPs or other relevant tools, as advised by the PIU E&S Specialists.

Key responsibilities of Contractor/s and DBO Contractors will include:

- Implement CAPEX activities in accordance with approved engineering designs, quality standards, ESMF requirements, and E&S safeguards.
- Prepare and implement Cluster based ESMPs, Site Specific CESMPs (if and when required), SSHSPs, traffic management plans, waste management plans, emergency response procedures, and other site-specific plans, as applicable.
- Ensure that construction, commissioning, and initial operation activities comply with applicable environmental, social, health, safety, and public health requirements.
- Appoint qualified E&S/OHS staff at site and management level.
- Implement mitigation measures related to labor and working conditions, prohibition of child and forced labor, community health and safety, stakeholder engagement, grievance redress, SEA/SH risk mitigation, Codes of Conduct, traffic and access management, water quality protection, sanitation and wastewater management, hazardous materials handling, and protection of vulnerable groups.
- Provide mandatory ESHS training to workers, staff, sub-contractors, and site personnel before commencement of works and during implementation.
- Support establishment of practical tariff collection systems during the initial O&M phase, where applicable under the DBO arrangement.
- Deliver services in line with agreed KPIs, including safe potable water quality, adequate supply hours, maintenance of pressure in distribution systems, and compliance with wastewater treatment standards.
- Carry out routine and emergency repair and maintenance during the contract period to ensure service continuity.
- Respond to complaints related to technical faults, service interruptions, water quality, wastewater systems, and infrastructure failures in coordination with SPVOs, Regional Offices, and the PIU.
- Maintain records of E&S compliance, incidents, trainings, grievances, water quality results, O&M activities, and corrective actions.
- Report incidents, non-compliances, accidents, community complaints, and corrective actions to the Supervision Consultant, Regional Office, and PIU in accordance with agreed reporting timelines.
- Ensure that all sub-contractors comply with ESMF, CESMP, labor, OHS, SEA/SH, and community safety requirements.

7.4.6 Sindh People's Village Organizations (SPVO)

The SPVOs will serve as community-based service providers and will play a central role in local ownership, long-term sustainability, grievance resolution, tariff collection, and community-level monitoring of WASH services. They will support both construction oversight

and post-construction service delivery to ensure that the infrastructure remains functional, inclusive, and responsive to community needs.

Key responsibilities of SPVOs will include:

- Monitor quality of works during CAPEX implementation and report construction defects, access issues, or community concerns to the Regional Office, Implementing Partners, Supervision Consultant, and PIU.
- Ensure formalization, registration, and functioning of SPVO governance structures, including transparent decision-making and accountability mechanisms.
- Conduct regular meetings, preferably fortnightly, to review system performance, complaints, O&M needs, tariff collection, and service continuity.
- Support local complaint resolution and escalate unresolved grievances through the project GRM.
- Manage tariff collection, financial records, O&M funds, and procurement processes through agreed committees and transparent procedures.
- Promote sanitation outcomes, including sustained elimination of open defecation and adoption of hygienic practices.
- Support safe solid and liquid waste management practices at community level, including management of wastewater, animal waste, and sanitation-related health risks.
- Regularly update operational, financial, and service delivery information into the MIS system, with support from the Regional Office and Implementing Partners.
- Ensure inclusion of women, vulnerable households, persons with disabilities, minorities, landless households, and other marginalized groups in consultation, grievance redress, and service delivery decisions.
- Support awareness raising on water conservation, safe sanitation, hygiene behavior, tariff payment, and protection of WASH infrastructure.

7.4.7 Implementing Partners

Implementing Partners will provide technical, social, community mobilization, and E&S support to the PIU, Regional Offices, and SPVOs. They will help ensure that infrastructure delivery is aligned with approved designs, ESMF requirements, service delivery objectives, community needs, and sustainability arrangements.

Key responsibilities of Implementing Partners will include:

- Supervise CAPEX activities and ensure that infrastructure development aligns with approved designs, including tubewells, pipelines, treatment systems, wastewater facilities, and other WASH assets.
- Train SPVO members on system operation, preventive maintenance, financial sustainability, tariff collection, record keeping, procurement, and grievance handling.

- Conduct regular village monitoring visits, including weekly visits during the CAPEX phase and monthly visits during the OPEX phase, or as otherwise agreed under the project.
- Appoint qualified environment, social, and OHS staff at the regional level.Ensure compliance with engineering standards, E&S safeguards, public health requirements, and community safety measures.
- Verify records, measurements, field conditions, community feedback, and implementation progress to support transparency and accountability.
- Provide design and procurement support to SPVOs, including technical decision-making, vendor selection, and review of justified procurement needs.
- Validate MIS data to ensure accuracy and reliability of operational, financial, grievance, water quality, and service delivery information.
- Review additional CAPEX or OPEX funding requests and validate whether such requests are technically justified and consistent with project requirements.
- Support stakeholder engagement, behavior change communication, social inclusion, gender mainstreaming, and community-level awareness activities.
- Report implementation gaps, E&S risks, operational issues, and corrective action requirements to the Regional Office and PIU.

7.5 Environmental and Social Mitigation and Monitoring Plan (ESMMP)

ESMMP is considered one of the main elements of ESMF. It will be used as the management tool for the implementation of mitigation measures. The plan includes the following:

- The envisaged impacts as identified in EMSF and their recommended mitigation measures; and
- The person/ organization is directly responsible for adhering to or executing the required mitigation measures.

It is highlighted that although the responsibilities for executing and monitoring the mitigation measures have been delegated to different organizations, PIU STAR WASH will hold the primary responsibility for ensuring the full implementation of ESMF, including ESMP. **Table 35** provides information about all impacts to be raised due to subproject activities during different phases of the project, i.e., Design/ Planning/Pre-construction, Construction / Implementation, and Operation/ Completion. For detailed E&S impacts, please refer to Chapter 6: Potential Environmental and Social Impacts and Mitigation Measures.

Table 35: Environmental and Social Mitigation and Monitoring Plan

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
A. Pre-Construction / Design Phase											
Technical Design & Siting	Inadequate siting and design may expose infrastructure to flooding, climate hazards, and structural instability, leading to long-term service disruption.	Integrate climate-resilient and hazard-informed design criteria, conduct site risk screening (flooding, seismicity), and ensure compliance with national codes and WB standards.	PIU / Design Consultants	Design stage	100% compliance with national building codes + WB ESS; design flood level ≥ 1-in-25-year event (minimum); seismic compliance as per Building Code of Pakistan	Design review, compliance checklist	Once	Approved designs incl. climate parameters	PIU / SPHF	Design Review Report	Design not compliant with codes / WB comments
Hydrology & Water Resources	Unsustainable abstraction may lead to groundwater depletion, salinity intrusion, and increased water stress for local users.	Conduct detailed hydrogeological and water balance assessments, define sustainable abstraction limits, and prioritize conjunctive water use where feasible.	PIU	Scheme areas	Abstraction ≤ 70–80% of safe yield; documented water balance for 100% schemes	Hydrogeological study review	Once	Water balance established	PIU / SPHF	Hydrology Report	No water balance / over-extraction risk

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
Cumulative Effluent Planning	Discharge from multiple schemes may exceed the assimilative capacity of shared water bodies, causing cumulative pollution.	Undertake catchment-level planning, assess cumulative discharge loads, and ensure effluent discharge remains within environmental carrying capacity.	PIU	Cluster schemes	Effluent load ≤ assimilative capacity; BOD ≤ 80 mg/L (municipal discharge baseline, adjustable to SEQS)	Technical modeling review	Once	Discharge mapping completed	PIU	Planning Note	Discharge exceeds capacity
Land & VLD	Improper land donation processes may result in coercion, disputes, or exclusion of vulnerable landowners.	Apply FPIC principles, ensure transparent documentation, third-party verification, and maintain grievance redress mechanisms.	PIU	Communities	100% signed VLD agreements; 0 cases of coercion; 100% FPIC documentation	Document verification, third-party validation	Pre-construction	Signed VLD agreements	PIU / SPHF	VLD Register	Complaints / missing consent
Social Inclusion	Vulnerable groups (women, poor, disabled) may be excluded from project benefits and	Implement SEP with targeted outreach, inclusive consultations, and monitoring of participation	PIU	Communities	≥ 30% women participation; inclusion of vulnerable groups in ≥ 80% consultations	SEP monitoring	Continuous	Participation of vulnerable groups	PIU / SPHF	SEP Report	Low participation rates

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
	decision-making processes.	indicators for vulnerable groups.									
SEA/SH Risk Planning	Absence of preventive systems may increase risk of SEA/SH during project implementation.	Prepare and operationalize SEA/SH Action Plan, establish survivor-centered GRM, and define Codes of Conduct for all workers.	PIU	Project-wide	100% workers sign CoC; SEA/SH Action Plan operational before mobilization	Plan verification, training records	Before works	Plan approved and operational	PIU / SPHF	SEA/SH Plan	Plan not prepared
Biodiversity Screening	Poor site selection may result in disturbance to natural habitats or ecologically sensitive areas.	Screen all subprojects, avoid critical habitats, and incorporate mitigation hierarchy (avoid–minimize–restore–offset).	PIU	All sites	0 subprojects in critical habitats; 100% screening completed	Screening checklist, GIS review	Once	Screening completed	PIU	Screening Report	Subproject in sensitive area
Sanitation Siting	Inappropriate siting in high water table or flood-prone areas may lead to system failure and contamination.	Conduct hydrogeological screening and adopt context-appropriate sanitation technologies (e.g.,	PIU	Scheme sites	100% sites screened for water table; minimum 1.5m clearance from groundwater table (where applicable)	Technical assessment	Once	Site suitability confirmed	PIU	Design Note	High water table ignored

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
		raised or sealed systems).									
B. Construction Phase											
Air Quality	Dust and emissions from excavation, transport, and machinery may degrade local air quality and affect communities.	Regular water sprinkling, covering of materials, vehicle maintenance, and minimizing exposed surfaces.	Contractor	Sites	$PM_{10} \leq 150$ µg/m³ (24h, NEQS); $PM_{2.5} \leq 35$ µg/m³ (WHO interim); 0 visible dust emissions beyond site boundary	Visual inspection + spot monitoring	Weekly	No visible dust	PIU / SC	Inspection Report	Dust complaints / exceedance
Noise & Vibration	Construction noise may disturb nearby communities, schools, and livestock.	Restrict work to daytime hours, maintain equipment, and provide PPE to workers.	Contractor	Settlements	≤ 55 dB(A) day (residential), ≤ 75 dB(A) (industrial) as per NEQS; 0 sustained complaints	Noise meter readings	Weekly	Noise within limits	PIU / SC	Noise Log	Complaints
Soil & Contamination	Excavation and accidental spills may cause soil degradation and localized contamination.	Implement spill prevention and response measures, proper storage of fuels, and controlled	Contractor	Excavation	0 uncontrolled spills; 100% spill response within 24 hrs; no visible contamination	Site inspection, spill logs	Weekly	No contamination	PIU / SC	Site Log	Oil spill / erosion

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
		excavation practices.									
Water Quality	Runoff and improper waste disposal may contaminate nearby water bodies.	Ensure controlled discharge, install temporary sanitation facilities, and prohibit direct disposal into water bodies.	Contractor	Water bodies	pH 6–9; BOD ≤ 80 mg/L; no oil/grease film; compliance with SEQS	Water sampling, lab tests	Monthly	SEQS compliance	PIU	Water Report	Failed tests
Waste Management	Improper disposal of construction waste may lead to land and water pollution.	Segregate waste, reuse where possible, and dispose through approved facilities.	Contractor	Sites	100% waste disposed at approved sites; 0 illegal dumping cases	Waste audits, disposal records	Weekly	No dumping	PIU	Waste Register	Illegal dumping
Borrow Areas	Unauthorized material extraction may degrade land and create safety hazards.	Use approved borrow areas and ensure site restoration after use.	Contractor	Borrow sites	100% use of approved borrow sites; 100% restoration post-use	Site inspection	Monthly	Restoration complete	PIU	Borrow Log	Unauthorized extraction

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
Biodiversity	Vegetation clearing and construction activities may lead to habitat disturbance.	Minimize tree cutting, implement compensatory plantation, and restrict activities in sensitive areas.	Contractor	Sites	Tree replacement ratio ≥ 1:3; ≥ 70% survival rate after 1 year	Plantation monitoring	Monthly	Plantation ratio met	PIU	Plantation Log	Tree cutting
Traffic & Access	Construction activities may block roads, increase accident risks, and restrict community access.	Prepare and implement Traffic Management Plans, provide signage, and maintain alternative access routes.	Contractor	Roads	0 major accidents; ≤ 24 hrs restoration of access if disrupted	Traffic logs, community feedback	Weekly	No major incidents	PIU	Traffic Log	Accidents
OHS	Workers may face risks of injury, accidents, and exposure to hazardous conditions.	Enforce PPE use, safety training, and implementation of site-specific safety plans.	Contractor	Worksites	0 fatalities; LTIFR < 1.0; 100% PPE compliance	Safety audits, logs	Daily	Zero fatalities	PIU	OHS Log	Accidents
Trench Safety	Open trenches may collapse or pose risks to	Provide trench shoring, barriers, and regular inspections.	Contractor	Excavation	100% trenches barricaded; 0 collapse incidents	Safety inspections	Daily	Safe trenches	PIU	Safety Checklist	Collapse risk

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
	workers and public safety.										
Labor Influx	Influx of external workers may create social tension and pressure on local resources.	Prioritize local hiring, enforce worker Codes of Conduct, and manage worker camps responsibly.	Contractor	Communities	≤ 5% grievances unresolved >30 days; 0 major conflicts	GRM records	Monthly	No conflict	PIU	Labor Report	Complaints
SEA/SH	Interaction between workers and communities may increase SEA/SH risks.	Conduct awareness training, enforce CoC, and ensure functional confidential reporting systems.	Contractor / PIU	Sites	100% cases reported within 24 hrs; 100% referred to response services	GRM monitoring (confidential)	Monthly	System functional	PIU	SEA/SH Log	Any allegation
Child/Forced Labor	Risk of underage or forced labor in supply chains or workforce.	Implement strict labor screening, age verification, and contractor compliance checks.	Contractor	Sites	0 child labor cases; 100% workers age-verified	Labor audits	Monthly	No cases	PIU	Labor Checklist	Underage worker
Camps	Worker camps may generate waste, pollution,	Establish camp management plans covering sanitation,	Contractor	Camps	100% camps with sanitation, water, waste systems; 0	Camp inspection	Weekly	Compliance	PIU	Camp Log	Poor sanitation

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
	and social conflicts.	waste, and worker behavior.			major non-compliance						
Wastewater (Camps)	Poor sanitation may lead to stagnant water and disease vectors.	Provide proper drainage and sanitation facilities in camps.	Contractor	Camps	0 stagnant water; 100% functional sanitation	Inspection	Weekly	No stagnation	PIU	Sanitation Log	Vector breeding
Cultural Heritage	Excavation may uncover unknown archaeological or cultural resources.	Implement chance find procedures and halt work upon discovery.	Contractor	Sites	100% compliance with chance find procedure; 0 unreported finds	Incident reporting	As needed	Compliance	PIU	Chance Find Log	Unreported find
C. Operation, Maintenance & Implementation Phase											
Water Quality	Contamination risks from poor operation or external pollution sources.	Regular monitoring, treatment optimization, and compliance with water quality standards.	Operator	Systems	WHO standards: E. coli = 0/100 ml; Turbidity ≤ 5 NTU; Residual chlorine 0.2–0.5 mg/L	Lab testing, operational logs	Monthly	Standards met	PIU	Water Report	Failed tests

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
RO Brine	Improper disposal of brine may cause soil and water salinity issues.	Ensure controlled and environmentally safe brine disposal methods.	Operator	RO sites	Disposal salinity within approved limits; 0 discharge to agricultural land/water bodies	Effluent monitoring	Quarterly	Disposal compliant	PIU	Effluent Report	Improper disposal
Sludge Management	Unsafe handling of sludge may pose health and environmental risks.	Implement safe fecal sludge management chain including transport and disposal.	Operator	FSTPs	100% sludge disposed at approved sites; 0 illegal dumping	FSM audits	Quarterly	Safe disposal	PIU	FSM Report	Unapproved disposal
Groundwater	Excessive abstraction may reduce water availability and affect sustainability.	Monitor groundwater levels and regulate abstraction rates.	Operator	Sources	Decline ≤ 0.5 m/year; abstraction within approved limits	Monitoring wells	Quarterly	Stable levels	PIU	Resource Report	Declining levels
E-Waste	Disposal of electronic components may introduce hazardous waste risks.	Use licensed recyclers and implement take-back systems.	Operator	Facilities	100% disposal via licensed recyclers; documented chain of custody	Audit of records	Annual	Disposal records	PIU	E-waste Log	Informal disposal

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
Infrastructure	Poor maintenance may lead to system failure and service disruption.	Establish preventive maintenance schedules and regular inspections.	Operator	Schemes	≥ 90% system uptime; ≤ 10% downtime	O&M logs	Monthly	Low downtime	PIU	O&M Log	Frequent failure
OHS (O&M)	Workers may be exposed to chemicals and operational hazards.	Enforce SOPs, PPE use, and safety training.	Operator	Facilities	0 fatalities; incident rate < 1 per year	Safety audits	Monthly	No incidents	PIU	OHS Report	Accidents
Community Health	Poor sanitation or water quality may increase disease risks.	Promote hygiene awareness and ensure safe service delivery.	PIU	Communities	≥ 20% reduction in waterborne disease cases (baseline comparison)	Health surveys/data	Quarterly	Reduced cases	PIU	Health Report	Outbreak
Social Inclusion	Marginalized groups may face unequal access to services.	Continue SEP implementation and monitor equitable service delivery.	PIU	Communities	≥ 90% service coverage across all groups; ≤ 10% disparity	Surveys, SEP monitoring	Quarterly	Inclusive access	PIU	SEP Report	Complaints

Parameter / Aspect	Potential Impacts	Mitigation / Management Measures	Implemented by	Monitoring Location	Monitoring Parameters / Performance Indicator (with Thresholds)	Monitoring Mechanism	Frequency	Performance Indicators	Monitored by	Reporting Format	Trigger for Corrective Action
SEA/SH	Residual risks may persist during operation phase.	Maintain GRM, awareness programs, and monitoring systems.	PIU	Project-wide	100% cases resolved per protocol; survivor-centered response applied	GRM review	Quarterly	Functional system	PIU	SEA/SH Report	Any case
GRM	Delays or ineffective grievance handling may reduce trust.	Strengthen GMIS tracking, ensure timely resolution, and feedback loops.	PIU	Project-wide	≥ 90% grievances resolved within 30 days	GMIS tracking	Monthly	Resolution rate >90%	PIU	GMIS Report	Delays
Institutional WASH	Poor O&M in schools/health centers may reduce functionality.	Implement dedicated maintenance and monitoring systems.	Operator	Schools/health	≥ 95% functional facilities	Facility inspection	Quarterly	Functional facilities	PIU	Facility Report	Non-functional units
BCC	Low behavioral adoption may reduce project effectiveness.	Conduct continuous, inclusive behavior change campaigns.	PIU	Communities	≥ 70% adoption of key hygiene practices	Surveys, evaluations	Quarterly	Behavior change indicators	PIU	BCC Report	Low adoption

7.6 Guidelines for the Preparation of Site-Specific Management Plans

Before mobilization, within 30 days of commencement, the Contractor/s will develop CESMP and SSHSP with the support/consent of PIU based on the WB EHS guidelines, which will be relevant to their chosen methodology and meet the requirements of this ESMF. The Contract Agreement will have appropriate clauses to bind the Contractors/s for the above obligations.

7.7 Monitoring Framework

The monitoring framework is also associated with the mitigation plan during the different phases of the subprojects. It ensures that mitigation measures are being effectively implemented. The monitoring of the subprojects is imperative for the implementation of the ESMF. The PIU will continuously carry out monitoring at the field level.

7.7.1 Monitoring Mechanism

Monitoring E&S management is an essential tool for assessing whether the adopted environmental and social management measures meet their stated objectives. Two complementary methodology approaches are being applied to monitor the proposed actions under the ESMF:

- Compliance monitoring, which checks whether the actions proposed by the ESMF have been carried out by visual observation, photographic documentation and the use of checklists prepared for the ESMF; and
- Effect monitoring, which records the consequences of program activities on the biophysical and social environment; as applicable, these effects are repeatedly measured by applying selected indicators.

The plan also defines the monitoring mechanism and identifies a set of verifiable monitoring parameters to ensure that all proposed mitigation measures laid down in the ESMF are completely and effectively implemented.

Monitoring will be carried out to ensure that the mitigation plans are regularly and effectively implemented. It will be performed at three levels i.e., PIU- SPHF, District level by PHED and Contractor/s. At the Contractor's level, the environmental monitoring checklist will be filled on a daily basis, or as per frequency and responsibilities determined and concurred by concerned specialists, by their environmental manager and countersigned by the representative of PIU.

7.8 Capacity Building

To ensure the successful implementation of ESMF and compliance with the E&S mitigation measures, strengthening the capacity of the relevant PIU/ SPHF/ District Office PHED technical staff and Contractors/s is essential. This will be achieved through a series of customized training and awareness sessions.

The objectives of the E&S pieces of training include providing basic knowledge and information on the key environmental and social issues associated with the proposed interventions under the STAR WASH 1 subproject or modules.

Training/capacity-building will cover three key areas and include: (i) E&S Orientation/ Awareness, (ii) ESMF Implementation, and (iii) E&S Management. **Table 36** below provides a capacity-building/training framework for the proposed subprojects.

Table 36: Capacity Building and Training Framework

Sr. No.	Key Areas	Key Aspects to Cover	Potential Participants	Frequency of Training
1	E&S Orientation / Awareness	E&S awareness; Lessons learned from WASH; WB Environmental and Social Standards (ESSs); WBG EHS Guidelines Use of PPEs; Key E&S issues associated with the proposed subprojects; ESMF findings; Checklist /ESMP and its components; and GBV and GRM.	PIU, SPHF, Designated staff at District, Contractor/s.	At the start of the project, and Refresher afterward as and when required.
2	Gender Mainstreaming and GBV, SH and SEA Action Framework	Introduction to and Implementation of Gender Mainstreaming and GBV, SH and SEA	PIU, SPHF Designated staff at District, Contractor/s, PISC staff.	At the start of the project, and Refresher afterward as and when required.
3	ESMF Implementation	ESMF components; Key steps for the implementation of ESMF; Subprojects specific E&S issues and their mitigation measures; Subproject mitigation measures compliance and monitoring requirements and monitoring Checklists used in the field; GRM & GBV; Checklist /ESMP implementation; and Documentation and reporting.	PIU, SPHF Designated staff at District, Contractor/s, SC staff.	At the start of the project, and Refresher afterward as and when required
4	E&S Management	E&S mitigation plans; Community consultation and disclosure of information;	PIU, SPHF Designated staff at District,	On-going/ informal

Sr. No.	Key Areas	Key Aspects to Cover	Potential Participants	Frequency of Training
		Waste disposal; Health and safety issues during construction; Mitigation measures and their implementation; Importance of safe drinking water Personal hygiene; Water conservation; and Prevention and cure of diseases such as malaria and dengue, HIVs and STDs.	Contractor/s, Subproject Beneficiaries	

7.9 Reporting and Documentation

A robust reporting mechanism can enable project progress to be followed up, any prevalent hindrances to program implementation to be identified and rectification measures to be set up if so required. Such a system will allow project staff and WB to track the advancement of the program and reconcile these with the overall objectives and targets of the Project.

Regular and comprehensive reporting will be conducted during the subproject execution. ESMU and respective district-level management shall ensure constant surveillance of the subproject's progress and deliverables through the preparation and submission of these reports. The reporting requirements are provided in **Table 37.**

Table 37: Reporting Requirements

S. No.	Type of Reporting	Frequency	Responsibility	Submitted to
1	Visit Reports and Consultation with Communities, including Women (with date, time, venue and photographs)	Monthly/ Weekly	Contractor/s	SC /PIU
2	E&S Screening Checklists and Screening Reports	As and when required on a basis	Contractor/s	SC /PIU
3	E&S Monitoring Checklists and related compliance report	Monthly/ Weekly Compliance report on a quarterly basis consolidated at the district level	Contractor/s	SC /PIU

S. No.	Type of Reporting	Frequency	Responsibility	Submitted to
4	ESMF Progress Reports	Quarterly, Biannual and Annual	SC[65]	PIU and World Bank
5	Training Reports	Quarterly	Contractor/s, SC	SC /PIU

The system for monitoring compliance with environmental mitigation measures provides periodic inspection, data compilation, and reporting of results. The SC will utilize a checklist to evaluate compliance with mitigation measures. Checklists serve primarily as guides for reviewing performance to determine general compliance with broad indicators, tentatively as follows:

- General conduct of work;
- Labor provisions and occupational / community health and safety;
- Air quality, dust control, noise control and site cleanliness;
- Traffic management;
- Drainage and wastewater;
- Solid waste and spoil handling and disposal;
- Protection of community values; and
- Environmental monitoring and other indicators selected for the work at hand.

The SC will prepare quarterly/biannual reports that reflect the performance of each contract over the period. Reports will be submitted to PIU and the respective environmental department, if required, as per the conditions mentioned in the NOC / environmental approval as part of the periodic project performance reporting requirement.

7.9.1 Data Recording and Maintenance

All forms to be used for recording information during the environmental monitoring will follow a standard format, which will correspond to the database in which all the gathered information will be placed. Check boxes will be used as much as possible to facilitate data entry. The tracking system will be developed for each form.

7.9.2 Database

The database may include the following information:

- Training programs;
- Staff deployment;
- Non-compliances;
- Corrective actions;
- List of environmental data; and
- List of environmental data to be maintained:

[65] Prepare the quarterly reports.

- Soil and land pollution;
- Disposal of waste;
- Water resources;
- Fuel oil and chemical spills;
- Vegetation record;
- Noise and air pollution;
- Socio-economic data; and
- Ecological sensitivities.

7.9.3 Photographic Records

The Contractor/s will maintain photographic records during the implementation of the proposed subprojects. As a minimum, the photographic records will include the site photographs, camp sites and monitoring activities, etc.

7.9.4 Non-Compliance with the ESMF

The implementation of the proposed ESMF involves inputs from various functionaries. The Contractor/s will be primarily responsible for ensuring implementation of the mitigation measures proposed in the ESMF, including CESMP, which will be part of the contract documents. The provision of the environmental mitigation cost will be made in the total cost of subprojects, for which the Contractor/s will be paid on the basis of monthly compliance reports. However, if the Contractor/s fail to comply with the implementation of ESMF, including ESMP, deductions will be made from the payments to the ESMF, including CESMP, claimed under the heads of environmental components.

7.9.5 Review of Recorded Data

All the data and communication recorded and maintained by the Contractor/s will be periodically reviewed and checked by PISC and necessary actions will be recommended for the Contractor/s to improve the recording and documentation. All the complaints in the social complaint register shall be recorded in accordance with the project GRM. Resident complaints will be responded to in a timely manner and action taken will be recorded in accordance with the GRM.

7.10 ESMF Disclosure Requirements

Once finalized, the ESMF with Urdu & Sindhi translation of the Executive Summary will be disclosed on the official websites. The executive summary in Urdu/ Sindhi language will be shared with affected communities and locals. This will ensure the locals are aware of the Project impacts, its mitigation, the responsible staff and the mode of implementation. Hard copies of these documents will also be maintained at all SPHF offices.

7.11 ESMF Implementation Budget

The tentative cost estimate to implement ESMF is estimated as Rs. 19,321,500/-. Details are provided in **Table 38** below**.** This tentative cost will be included in the overall project cost. This cost will be reviewed and firmed up periodically when the project footprints are finalized at the subproject level to ensure realism. Additional costs could be included in the subproject-specific ESMPs that would become part of each bidding/BOQ document. The Contractor(s), however shall be paid against the actual execution with evidential proof of respective ESMF/ ESMP/ relevant instruments activity.

Table 38: Tentative cost estimate to implement ESMF

Sr. No.	Parameter	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
A.	**Environmental Monitoring Cost (Planning and Design / Pre- Construction Phase) (One Village)**					
1	Drinking/ Groundwater Sample	Once	35,000	1	35,000	Since the proposed subprojects' footprints are not finalized at this stage, the number of environmental monitoring samples can be decreased or increased, as per the advice of the Environment Specialist. However, keeping in view the extent of subproject activities, one sample for water, soil, ambient air, and noise level for one village.
2	Surface Water / Wastewater Sample	Once	35,000	1	35,000	
3	Noise Levels & Dust Monitoring	Once	5,000	4	20,000	one sample from the camp area and the other three from nearby sensitive receptors
4	Ambient Air Monitoring	Once	55,000	1	55,000	24 hr monitoring through the total monitoring station as per SEQS
5	Soil Testing (as per the advice of the Environment Specialist)	Once	20,000	1	20,000	
				Sub-Total A	**165,000**	This is one-time cost required prior to start of construction activities.
B	**Environmental Monitoring Cost (Construction / Implementation Phase (One-Years Cost for One Village)**					
6	Drinking/Groundwater Sample	Quarterly	35,000	4	140,000	Since the project footprints are not finalized at this stage, the number of environmental monitoring samples can be increased, as per the advice of the Environment Specialist. However, keeping in view the extent of subproject activities, one sample for water, soil, ambient air and noise level has
7	Surface Water / Wastewater Sample	Quarterly	35,000	4	140,000	
8	Noise Levels & Dust Monitoring	Quarterly	5,000	16	80,000	
9	Ambient Air Monitoring	Quarterly	55,000	4	220,000	
10	Emission Monitoring (Generators &	Quarterly	15,000	10	150,000	

Sr. No.	Parameter	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
	Construction Machinery Stack Noise Monitoring)					been considered for reference from each village, as per SEQS.
11	Soil Testing (as per advice of Environment Specialist)	Bi-annual	20,000	2	40,000	
				Sub-Total (B)	**770,000**	
C	**Environmental and Social Management Cost (Per Package/Per Contract etc.)**					
12	Environmental and social staff - Environment Officer, Social/Community Liaison Officer & HSE 150K for each person	Monthly	450,000	12	5,400,000	This is the tentative yearly cost for one package/ contract/ LOT
13	Training and Capacity Building Cost (venue, travel, refreshments etc.) 5 persons (Project Manager, Env, Social, HSE & Site Manager) estimated per contractor	once per year	50,000	15	750,000	Three events per year. This is the tentative cost for one-year period.
14	Preparation of site-specific ESMPs and other site-specific plans	As required	400,000	1	400,000	Per contract/package as per the contract document
15	GRM running and Implementation Cost	Monthly	75,000	12	900,000	Including all contractual requirements to run GRM
16	Implementation Cost of Gender Mainstreaming and GBV, SH and SEA	Monthly	40,000	12	480,000	Awareness section among the AP/OIP/ APs
17	All HSE-related activities e.g. TBTs, PPEs, decent work, safety signage, emergency preparedness, rain mitigations etc.	Monthly	100,000	12	1,200,000	Cost for PPEs, extinguishers, emergency lights, housekeeping equipment, safety signage and barricades, emergency preparedness kit, first aid kit, etc.
18	Soft and hard landscaping	As required	250,000	lump sum	250,000	This is the tentative cost for tree plantation.
19	Camp Management	Monthly	100,000	12	1,200,000	incl. information boards and telephone/computer, solar or other refrigerators (with generators if needed) for medical supplies, labor camp accommodations & related requirements (sanitation, washrooms, water supply)
20	Solid Waste Management	Monthly	25,000	12	300,000	Collection, segregation, transportation, disposal and management of domestic,

Sr. No.	Parameter	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
						commercial, and construction wastes
21	Cost of obtaining clearances or permits	As required	100,000	lump sum	100,000	per contract/package as per the contract document
22	Travel and accommodation budget for environmental and social staff site visits	Monthly	100,000	12	1,200,000	
23	Digital Integration	Once	700,000	Lump sum	700,000	Implementation of a new digital tool for real-time tracking of stakeholder engagement and grievance redress
24	Kobo Toolbox for Monitoring	Once	250,000	lump sum	250,000	Application of KoboToolbox, setting up user names, configuring ODK Collect, Filling the questionnaire/screening form online
				Sub-Total (C)	**13,130,000**	
D	**Environmental and Social Management Cost (for the whole STAR WASH one time)**					
25	Training and Capacity Building Cost (venue, travel, refreshments etc.) 6 persons (Env, Social & HSE) estimated	once per year	250,000	6	1,500,000	for SPHF, PIU and SC E&S staff, one event per year.
26	Software for data collection / supervision / monitoring / grievance redress	As required	1,000,000	lump sum	1,000,000	per contract/package as per the contract document
27	Other PIU/SC Cost (equipment, vehicles, laptop etc.)	As required	1,000,000	lump sum	1,000,000	for whole project
				Sub-Total (D)	**3,500,000**	
				Grand Total (A+B+C+D)	**17,565,000**	
				Contingency Charges	**1,756,500**	
				Grand Total with Contingencies	**19,321,500**	

7.12 Clauses to be included in BOQs & Bidding Documents regarding ESMF

The following items will be included in the bills of quantities (BOQs) of bidding documents

- The Contractor/s will develop and submit distinct plans (The SSEMP/s), ensuring compliance with this ESMF as well as SEQS. The preparation, revisions, and updates of the plans will be itemized in the Contract documentation.

- Allocation of personal protective equipment (PPE) quantities for all project personnel, including contractors, Project Implementation Unit (PIU) members, and SC, alongside provisions for first-aid boxes, ambulance services, and healthcare facilities staffed with Pakistan Medical Commission-licensed doctors and nurses/ paramedics.
- Deployment of Environmental. Social and Occupational Health and Safety (OHS) staff throughout the construction duration.
- Provision and upkeep of Dust Measurement Meters for on-the-spot measurements (3 units).
- Quarterly 24-hour Ambient Air Quality Monitoring will be conducted at two locations, measuring PM_{10}, $PM_{2.5}$, NO_2, SO_2, and CO levels.
- Continuous 15-minute noise monitoring will be conducted at four sites near settlements during construction activities.

7.12.1 Inclusion of Relevant Components of CESMP in Contract Documents

The CESMP will be included in the bidding/ contract documents and its implementation will be a contractual binding for the Contractor/s. To ensure the implementation of CESMPs by the Contractor/s, the CESMP cost will be part of the BOQ. Compliance with E&S instruments will be carried out by the Contractor/s.

7.12.2 Payment Milestones

Contractor payments will be tied to their environmental, health, and safety performance and evaluated based on the completion of prescribed mitigation measures in ESMF and control measures outlined in the SSEMP. In instances of non-compliance resulting in damage or significant harm to the environment, workers, public or private property, or resources, the Contractor will be obligated to either rectify the damages within a specified timeframe agreed upon with the engineer (SC) or reimburse the expenses.

Repeated non-compliance will result in penalties for the Contractor. The penalty for non-compliance with the ESMF/ CESMP requirements will amount to 3% of the total Civil Works in the Interim Payment Certificate (IPC). This penalty will be enforced after applying all contractual measures and upon issuance of a Non-compliance Report (NCR) by the Engineer.

7.13 Environmental Approvals and Permits Required for Project Implementation

During the Project implementation, environmental along with other clearances and permits, as outlined in **Table 39**, will be necessary. PIU STAR WASH 1, SPHF and the respective Contractor will be responsible for obtaining these approvals from the relevant government departments.

Table 39: Environmental Approvals/ Permits Required during Implementation

Sr. No.	Details of Approval and Permits	Issuing Authority	Requirements	Responsible Agency	Timing
1	**Environmental Approval:** for the overall construction of the Project	SEPA EPA	Submission of the EC/IEE/EIA	PIU STAR WASH 1/ SPHF	Prior to the Construction of the Project
2	**NOC for discharge of effluent**	Taluka /District Administrator/ Assistant Commissioner Office	Submission of a request with the location map for Discharge of Treated Effluent into Canal/ Distributary/Water	Contractor	During the construction phase
3	**Permit for the transport of hazardous material**	Irrigation Department, other relevant department	Construction-related materials include fuels, lubricants, used oils, paints, solvents, cement additives, welding gases, and battery acids. Operational hazards mainly involve water treatment chemicals such as chlorine, sodium hypochlorite, alum, lime, and laboratory reagents. Additional risks arise from treatment sludge, cleaning agents, and fuels used for generators and pumps.	Contractor/ PIU	During the construction & Operation **phase**
4	**Permit for construction**	Local Government / Provincial Highway Department	Laying of sewer and water supply lines.	PIU STAR WASH 1/ SPHF	During the construction phase
5	Demand Notice for Power Supply	WAPDA	Relevant Electricity Supply Company	SPHF	During the construction phase/ operation phase

7.14 Third Party Validation (TPV)

A detailed ToRs for TPV has been incorporated in the annexes of the ESMF as **Annexure XII**. It defines the scope of work, including independent verification of E&S compliance (ESMP/SSEMP implementation), labor and working conditions (ESS2), community health and safety risks (ESS4), stakeholder engagement and GRM functioning (ESS10), and validation

of reported results and outputs at field level. The ToR also specifies methodology (field inspections, beneficiary consultations, document review), sampling strategy, and deliverables.

7.14.1 Selection and Contracting:

The TPV entity will be procured by the Project Implementation Unit (PIU) under SPHF, following World Bank procurement regulations for IPF borrowers. The process will ensure independence, technical competence, and absence of conflict of interest. The World Bank will provide prior review/clearance of the ToR and may review the selection process as per applicable procurement thresholds.

7.14.2 Reporting Frequency and Audience:

TPV will undertake biannual monitoring missions (at a minimum), with provision for additional thematic or spot checks based on risk. Reports will be submitted to the PIU and shared with the World Bank. Key findings will also be summarized in the project's periodic E&S monitoring reports and disclosed, as appropriate, to stakeholders to ensure transparency.

7.15 Integration into Adaptive Management:

A formal feedback loop has been established whereby TPV findings are reviewed by the PIU E&S team and project management. Identified non-compliances or systemic issues will trigger Corrective Action Plans (CAPs) with defined timelines and responsibilities. These actions will be tracked through the project's monitoring system (including GMIS where relevant), and persistent or high-risk issues will be escalated to senior management and the World Bank. TPV insights will also inform updates to mitigation measures, capacity-building plans, and, where necessary, revisions to the ESMF or site-specific instruments.

8 Grievance Redress Mechanism

8.1 Assessment of Existing GRM under SPHF Housing Project

As part of the preparation of the Environmental and Social Management Framework (ESMF) for the STAR WASH Project, an assessment of the existing Grievance Redress Mechanism (GRM) implemented under the Sindh Peoples Housing for Flood Affectees (SPHF) Project was undertaken during community consultations across selected districts in rural Sindh.

Community members were specifically asked about their awareness, accessibility, usage, and satisfaction with the SPHF GRM. The feedback indicates an overall positive perception and effectiveness of the mechanism.

8.1.1 Key findings of SPHF GRM

- The majority of respondents expressed satisfaction with how the SPHF GRM functioned, noting that their complaints and concerns were adequately addressed.
- The complaint submission process was described as simple and user-friendly, with several channels available (in-person, phone, and local focal persons).
- Participants highlighted that grievances were typically resolved within a reasonable timeframe, reinforcing community trust.
- Respondents appreciated regular updates on the progress and outcomes of their complaints, ensuring transparency.
- Women, persons with disabilities, and low-income households generally accessed the mechanism without major barriers.
- Many participants recommended the formation of village-level GRM committees to facilitate easier access, direct communication, and quicker preliminary resolution of grievances at the community level.

8.1.2 Areas for improvement

- Some remote areas showed limited awareness of the GRM's purpose and procedures.
- Participants suggested more active dissemination of GRM information through local leaders, community meetings, and social platforms.
- Several respondents recommended improved tracking tools or acknowledgment receipts to better follow up on lodged complaints.

8.1.3 Implications for STAR WASH GRM Design:

- Building on the strong foundation and community trust developed through the SPHF GRM, the STAR WASH Project should:
- Utilize the established institutional arrangements and experience from SPHF;
- Establish village-level GRM committees for localized and accessible complaint handling;

- Provide multiple inclusive grievance uptake channels;
- Maintain efficient and transparent resolution procedures;
- Conduct targeted awareness campaigns in underserved areas;
- Introduce robust tracking and feedback mechanisms for accountability.

The assessment concludes that the SPHF GRM was well-received and considered effective by communities. While a few gaps remain in outreach and tracking, the system's transparency and accessibility fostered trust. For STAR WASH-1, replicating SPHF's strengths, alongside community-driven enhancements such as village-level committees[66], will significantly improve the efficiency, equity, and responsiveness of its planned GRM.

8.2 STAR WASH 1 GRM

The STAR WASH I Project establishes a Grievance Redress Mechanism (GRM) as a core element of ESMF. The GRM provides a transparent, structured, and culturally appropriate process through which Project-Affected Persons (PAPs), community members (APs), and other stakeholders (OIPs) can raise concerns, seek clarifications, or lodge complaints related to any aspect of project planning, implementation, or operation. It ensures that grievances are addressed promptly, fairly, and effectively, thereby strengthening accountability and trust between the Project and its stakeholders.

8.2.1 Objectives and Purpose

The primary purpose of the GRM is to receive, record, assess, and facilitate the timely resolution of grievances in a manner that is accessible, inclusive, transparent, and responsive. In addition to serving as a formal complaints mechanism, the GRM functions as a feedback and learning tool to support adaptive management and continuous improvement in project execution. Through systematic documentation and analysis of grievances, the mechanism contributes to effective environmental and social risk management and enhances overall project performance.

8.2.2 Accessibility and Inclusiveness

The GRM is designed to ensure inclusivity across social groups and accessibility for all stakeholders, particularly vulnerable and marginalized populations. Multiple entry points and communication channels are established, including in-person submissions, telephone hotlines, dedicated email and web portals, SMS/ WhatsApp messaging, and secure community representatives. Information about the GRM procedures, contact details, and response timelines is disseminated in local languages through community meetings, posters, and social outreach initiatives to ensure awareness among all affected stakeholders.

[66] Their responsibilities include: (i) monitoring day-to-day implementation of mitigation measures at site level (e.g., waste management, safe construction practices, protection of water sources); (ii) supporting identification of local risks such as access restrictions, water contamination, or social conflicts; (iii) facilitating community awareness on hygiene, water safety, and safe use of infrastructure; and (iv) reporting E&S issues to the PIU and contractors through defined channels

8.2.3 Remote Functionality and Continuity

To ensure uninterrupted operations under circumstances such as mobility restrictions, natural disasters, or public health emergencies, the GRM incorporates remote accessibility measures. Designated grievance focal persons are equipped with digital tools and record-keeping systems that allow remote receipt, registration, and resolution tracking of complaints. These measures safeguard the mechanism's continuity and responsiveness during periods when direct field access may be constrained.

The "grievance focal persons" are designated at three levels:

- Community/site level (contractor staff or community facilitators), first point of contact
- District/tehsil level (PHED/LGD or relevant agency staff)- verification and resolution
- PIU level (Social/GRM Specialist), oversight and reporting

To ensure accessibility, both male and female focal persons are appointed, with at least one female focal person at community level to handle sensitive and SEA/SH-related grievances.

8.3 GRM Management Information System (GMIS) – STAR-WASH-1

The STAR-WASH-1 Project will use a Grievance Redress Management Information System (GMIS) as a web-based grievance redress automation system to register, track, and resolve complaints from affected communities. The GMIS will operate in parallel with manual grievance registers to ensure continuity in case of digital or communication breakdowns. Key components of the system include a user-friendly interface, complaint registration and tracking, workflow and escalation automation, analytics and reporting, and integration with existing project information systems. Security and data-protection features will safeguard complainant information and ensure compliance with privacy requirements.

To accommodate illiterate and low-literacy flood-affected populations, the GMIS complaint registration interface will emphasize simplicity and ease of use. This includes a voice-based or voice-assisted interface and a streamlined registration process that collects only essential information (name, contact details, and nature of grievance), supported by basic natural-language-processing logic for categorization. Enable complaint registration through in-person submission (GRCs, local offices), paper forms, suggestion/complaint boxes at community locations, and field staff. Provide toll-free/low-cost helpline and SMS/WhatsApp options for low-bandwidth communication. Conduct awareness campaigns (local language, verbal/visual methods) to inform communities about available channels and procedures.

AP & OIP may submit grievances verbally or in writing through designated GRM channels (e.g., hotline, email, site-level GRM cells, or community focal persons). All implementing staff must record grievances received via any channel into the GMIS web portal. The system will require adequate contact information (phone number, email, and/or mailing address); if the reporter wishes to remain anonymous, they must at least provide locational details to enable follow-up

8.3.1 GMIS Data Structure

The GMIS data structure will consist of a standardized grievance database with 53 core fields, including a unique Grievance Token Number (GTN), date and time of filing, stakeholder category, grievance type, contact details, grievance description, pathway, priority, investigation and review notes, and status. This structure will enable consistent data entry, analysis, and performance monitoring, and will support transparency, accountability, and informed decision-making under the GRM.

8.3.2 Grievance Types under STAR-WASH-1 GRM

The STAR-WASH-1 Grievance Redress Mechanism (GRM) categorizes potential grievances into ten broad areas to ensure systematic registration, tracking, and resolution of complaints. Details regarding the grievance type have been given in **Annexure XIII**. These include issues related to targeting and beneficiary inclusion; project implementation and service quality; environmental and social impacts; community health and safety risks; labor and working conditions; gender, SEA/SH, and social inclusion concerns; financial and contractual matters; stakeholder engagement and information disclosure; governance, transparency, and external interference; as well as any other project-related grievances not otherwise classified. Each category is further defined through specific grievance types to enable clear identification of issues, facilitate timely response, and strengthen accountability and transparency in project implementation in line with applicable Environmental and Social Standards (ESSs)

8.4 Institutional GRM Structure

The GRM operates through a multi-tiered institutional structure to ensure that grievances are resolved at the most appropriate level.

8.4.1 Project-Level Oversight

The overall responsibility for GRM oversight lies with the STAR WASH 1, PIU, which was established to ensure proper functioning, monitoring, and reporting of the mechanism.

8.4.2 Grievance Redress Committees (GRCs)

The key responsibilities of the GRC include:

- Providing strategic oversight and guidance on grievance management
- Reviewing and resolving complex or escalated complaints
- Ensuring compliance with established procedures and timelines
- Strengthening coordination across different levels of implementation

Grievance Redress Committees will be established at multiple levels:

- Project Level GRC/ Central/ PIU Level – overall oversight and policy guidance
- Head Office GRC (Implementing Partner level) – handling escalated grievances.

- District Grievance Redress Department (DGRD) – district-level coordination
- Field Grievance Redress Officer (FGRO) – First point of contact for receiving and resolving complaints

Each GRC will include representatives from project management, technical staff, and community stakeholders, with adequate representation of women.

Table 40: Composition of GRCs at Each Tier

Tier	No. of Members	Chairperson	Members
PIU GRC (Provincial)	3	Project Coordinator (Operations)	Senior Procurement and Contracts Specialist, Social Development Specialist (also Secretary to PIU GRC)
PIU GRC (District)	2	District Project Coordinator	M&E officer (either male or female, to be decided by Chairperson)
UC/ Village GRC (Union Council/ Village)	2	To be nominated by the Chairperson UC /Village	To be nominated by UC/ Village members

The GRM will function as a multi-tier system with designated staff at the PMU, district (or PIU), and UC/ Village levels. At each level, the Project Director will designate a Grievance Redress Committee (GRC), the proposed composition of which has been given in **Table 40**.

The GRM has been designed to ensure that grievances are addressed at the lowest possible level where they are initially lodged. Every effort is made to resolve complaints at the respective Grievance Redress Committee (GRC) where they are first registered. However, if a complaint submitted at the Union Council (UC)/ Village level or PIU level remains unresolved or the complainant is not satisfied with the outcome, a structured escalation mechanism is available.

Complainants who are dissatisfied with the resolution at the UC/ Village GRC may escalate their grievance to the PIU level, or directly to the PIU GRC if deemed necessary. Similarly, grievances that are not satisfactorily resolved at the PIU level can be further escalated to the PIU GRC for review and decision-making.

In cases where the complainant remains unsatisfied even after review at the highest administrative level, i.e., the PIU GRC, the individual retains the right to seek further recourse through the Project Steering Committee or pursue resolution through the appropriate legal channels.

8.4.3 Grievance Uptake Mechanism

Multiple channels have been established (as referred to in **Figure 18**) and are being utilized for receiving grievances to ensure accessibility for all stakeholders, including vulnerable groups. Stakeholders are able to submit complaints through:

- In-person reporting to project or field staff/ or by Community GFP[67]s
- Written applications
- Telephone helplines
- Digital platforms and email communication
- Complaint boxes placed at accessible locations
- All received grievances are systematically recorded in the project's grievance management system and assigned unique identification numbers for tracking purposes.

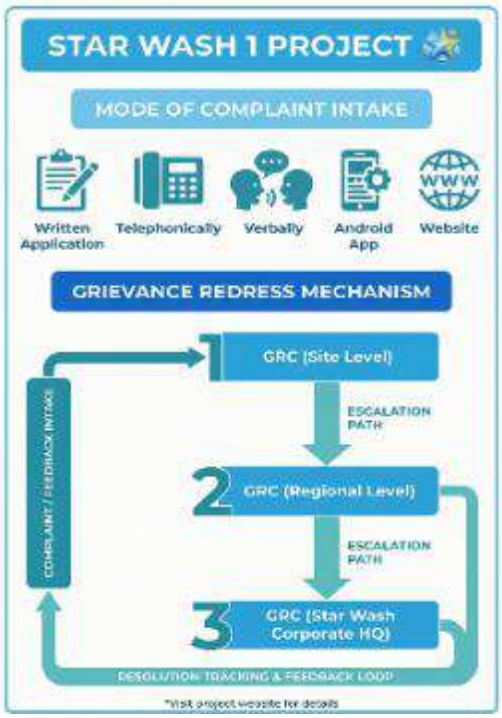


Figure 18: Mode of Complaint Intake

8.4.4 Grievance Prevention Procedure during the project cycle

While grievance redress systems have been established and will be made as robust as possible, the project will also take steps to prevent grievances from arising in the first place. Some of the key measures in this regard are:

1.1.2.5 GRM Focused Consultations:

The Stakeholder Engagement Plan (SEP) outlines a comprehensive framework for consultations and engagement with communities, local leaders, elders, elected representatives, and other relevant stakeholders. Given the complexity of the STAR WASH 1 Project and the involvement of multiple implementing agencies, including the PIU/ SPHF STAR WASH 1, the Local Government Department (LGD), and the Planning Department, interests may vary considerably. In this context, continuous and meaningful consultation is essential to build consensus and ensure inclusive decision-making. Project social mobilizers and community development specialists are actively engaged in the field and maintain regular interaction with communities throughout both the planning and implementation stages, with the aim of proactively identifying and addressing potential concerns and minimizing conflicts.

[67] Role & Responsibility: Each target community will designate at least one trained Grievance Focal Person, with efforts to ensure inclusion of women. GFPs will serve as the first point of contact for grievance uptake in remote and low-literacy settings. Their functions include: (i) registering complaints through verbal, written, or assisted digital means; (ii) maintaining simple grievance logs where GMIS access is limited; (iii) facilitating referrals to the formal GRM system; and (iv) ensuring confidentiality, especially for sensitive cases such as SEA/SH.

1.1.2.6 Information Dissemination:

The SEP also establishes a structured approach for timely and effective information dissemination. Ensuring that communities and stakeholders are well-informed about planned activities, implementation timelines, and measures to mitigate potential impacts significantly reduces the likelihood of misunderstandings and disputes. Continuous sharing of relevant project information contributes to transparency, strengthens stakeholder trust, and supports smoother project implementation.

8.5 Implementation of the GRM

The GRM follows a structured and standardized process, which is consistently implemented across all levels (refer to **Figure 19**):



Figure 19: Steps for the GRM

The PIU STAR WASH 1 has ensured that the Grievance Redress Mechanism (GRM) is accessible to all residents within the project's target districts, including women, elderly individuals, and other vulnerable groups. Culturally appropriate communication approaches have been adopted to raise awareness about the GRM and to facilitate effective grievance handling. The GRM procedures have been translated into local languages, particularly Sindhi, and disseminated across all project locations through various formats such as leaflets, posters, audio-visual materials, and mobile-based text messages, as appropriate.

To enhance outreach, the project has promoted the use of audio-visual tools, including photographs, videos with captions, and edutainment materials, to clearly explain project activities and step-by-step grievance submission procedures. These measures are particularly aimed at supporting individuals with low literacy levels, limited education, or disabilities. In addition, toll-free helplines and automated voice response systems have been established to facilitate access for individuals who are digitally excluded or lack access to smartphones and internet services.

For sensitive complaints, particularly those related to Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/ Sexual Harassment (SEA/SH), female focal persons have been designated at all levels of the GRM and have received specialized training to handle such cases in a confidential and survivor-centered manner. The GRM has been disclosed to stakeholders through both written and verbal communication channels, while specific engagement methods for different stakeholder groups have been outlined in the Stakeholder Engagement Plan (SEP).

8.6 Complaint Process

8.6.1 Step 1: Receive the Complaint/Grievance

Grievances submitted by stakeholders or their representatives are received at three operational levels: Union Council (UC)/ Village, district, and provincial. Complaints may be lodged either verbally (in person or through designated phone lines) or in writing.

All grievances are formally recorded at the point of receipt. At the UC/ Village level, complaints are documented in manual registers where digital systems are not available, and these records are subsequently shared with the PIU GRC on a monthly basis.

At the PIU levels, grievances are directly entered into a centralized digital grievance register for tracking and management. Each complaint is assigned a GTN and acknowledged immediately upon receipt.

8.6.2 Step 2: Initial Review of Grievance

Upon registration, the designated members of the relevant GRC conduct an initial review to assess the nature and underlying causes of the grievance and to identify potential resolution measures. A brief assessment report is prepared in the local language (Sindhi), summarizing the complaint and proposed course of action, and submitted to the Chairperson of the respective GRC.

Grievances related to Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) are handled with strict confidentiality and are immediately referred to the PIU level, where they are managed by a designated and trained GBV specialist.

8.6.3 Step 3: Resolution or Escalation of Grievances

The member(s) and the Chairperson will hold a meeting at least once every two weeks to review all registered grievance cases. If the member(s) and the Chairperson agree on a solution, their decision will be briefly transcribed by a member of the relevant GRC and will be duly signed by the Chairperson as well as all GRC members. This decision will then be communicated both verbally (through phone or a face-to-face meeting) and in writing to the complainant. If the complainant agrees to the proposed solution, he/ she will countersign the written decision or place a thumb impression on it.

For grievances that are resolved, the details of the resolution will be entered into the register/database. The resolved grievance shall also be flagged for follow-up, and the relevant GRC will check in on the complainant's level of satisfaction with the resolution within 14 days. This feedback from the complainant shall also be added to the register/database.

If, however, the complainant is not satisfied with the resolution suggested, he/ she will not countersign the written decision and may choose to escalate the grievance to the next tier GRC or to take it to another forum altogether.

8.6.4 Step 4: Monitoring and Review

It is critical to monitor the effectiveness of the GRM. Appropriate measures for this include monthly reporting on the number of grievances received, resolved and outstanding. This exercise will be undertaken by the Social Officer at the PIU.

The members of the GRC at the PIU and UC/ Village levels will update the Complaint/ Grievance Register weekly to indicate resolved (closed-out) and unresolved cases, those pending with the GRC or with courts. The members will ensure that the status of all complaints/grievances is kept current and will brief their respective Chairpersons weekly on the status of all current complaints/grievances. Monthly, the PIU and UC/ Village GRCs will share a report with the Senior Social Specialist, who, in his/her capacity as Secretary to the GRC, will ensure that the data is entered into a database or dashboard.

An annual sex-disaggregated qualitative review of a sample of complaints processed (ensuring variation such as type of complaint, resolution status, etc.) will also be undertaken to analyze the efficacy of the system. Regular monitoring of the grievance mechanism and its outcomes, particularly of trends and patterns, will be critical to ensuring the identification of systemic problems and adapting practices accordingly.

As part of the annual review/ report, analyzing the trends and time taken for grievance resolution will help to evaluate the efficacy of the comment response and the grievance mechanism. The PMU will also provide an analysis of the grievances at each subproject location using a pre-designed M&E template that will give an insight into the type of complaint(s) received, with the qualitative and quantitative review of the grievance redress mechanism. The PIU will periodically (monthly/ quarterly) upload the actions and results for each grievance, by subproject location, on the Project website under a dedicated GRM tab.

8.6.5 Timeframe

The first response to each grievance registered must be in the form of a written, signed acknowledgment, which must be issued at the time of registration. If the grievance is recorded in a register, which will typically be the case at the UC/ Village level, the acknowledgment can simply take the form of a countersignature on the register by the member GRC, or the chairperson.

The second response to the complainant will take the form of a written decision, as detailed in Step 3 above. This written decision shall be communicated to the complainant within a maximum of 21 calendar days from the date of complaint registration.

If the complainant agrees to the decision and the solution proposed, then the solution shall be affected within 21 days of the complainant's agreement. If, for some reason, the solution is likely to take a longer time to implement, this shall be communicated to the complainant, and he shall be informed of the progress of the solution monthly. All of these milestones, including monthly updates issued to the complainant, will be recorded at the relevant tier, ultimately to be consolidated into the GRM database to be maintained at the PIU.

8.6.6 GRM Flow Chart/ Poster in English & Sindhi

This poster explains (refer to **Figure 20**) the Grievance Redress Mechanism (GRM) process, which ensures that complaints are received, reviewed, resolved, and followed up in a transparent and timely manner. It helps communities understand how grievances are handled and promotes fairness, accountability, and trust in the project.

It raises awareness about the grievance process, informs stakeholders about their rights and the steps for complaint resolution, and supports effective communication between the project and affected communities.



Figure 20: GRM Flow Chart/ Poster in English and Sindhi

9 Resettlement Policy Framework

9.1 Need for Resettlement Policy Framework

The STAR-WASH project addresses "Substantial" environmental and social risks through an updated Environmental and Social Management Framework (ESMF) and Stakeholder Engagement Plan (SEP), leveraging digital monitoring tools and community consultations for equitable access and international compliance. It includes an integrated Resettlement Policy Framework (RPF) within the ESMF, specifically targeting land acquisition and resettlement risks under World Bank ESS5, with Voluntary Land Donation (VLD) procedures for minor village-level parcels (prioritizing government/communal lands), verified by third-party checks to ensure voluntariness, no livelihood impacts, and site-specific RAPs if needed..

9.1.1 Resettlement / Land Acquisition Principles

ESS5 recognizes that project-related land acquisition or restrictions on land use can adversely impact communities and affected persons. Such activities may result in physical displacement (e.g., relocation, loss of residential land, or shelter) or economic displacement (e.g., loss of income sources or livelihoods), or both.

In alignment with ESS5, this RPF follows these core principles:

a) Avoidance: Eliminate involuntary resettlement where feasible; if unavoidable, minimize through project design alternatives.
b) Mitigation: Address unavoidable impacts by:
   i. Providing timely replacement costs compensation for lost assets.
   ii. Assisting displaced persons to improve or restore livelihoods and living standards to pre-displacement levels (or pre-project levels, whichever is higher).
c) Entitlements: Establish transparent, consistent, equitable entitlements for all affected persons (APs) covering physical and economic impacts.
d) Title-neutral: Lack of formal land title does not bar compensation or rehabilitation; resettlement costs fully integrated into project budgets.
e) Timing: Deliver compensation and assistance prior to displacement, ground leveling, demolition, or impacts.
f) Planning: Implement relocation/shelter loss measures via approved resettlement /compensation action plans.
g) Participation: Conduct resettlement consultatively with meaningful engagement of those affected.
h) Livelihood restoration: Restore incomes/livelihoods to pre-resettlement levels, minimum, prioritizing vulnerable groups (elderly, women, children, persons with disabilities, landless).

i) Vulnerable support: Provide vulnerable households (e.g., women-headed, disabled) with enhanced benefit packages beyond standard entitlements.
j) Gender focus: Address gender-specific needs and community vulnerabilities.
k) Disclosure: Implement with full information disclosure, meaningful consultation, and informed participation.
l) GRM: Maintain accessible grievance redress mechanisms throughout.
m) Monitoring: Track resettlement performance against RPF objectives.

9.2 Voluntary Land Donation

The STAR-WASH project prioritizes avoiding private land acquisition by first using government or communal (Shamilat) lands, resorting to voluntary community land donations only when necessary and following ESMF procedures, with all VLD cases requiring prior World Bank no-objection.

9.2.1 Project Land Impacts

Village-level WASH infrastructure, such as handpumps, standposts, septic tanks, and fecal sludge treatment units, requires small plots typically under 500 sqm per site. With 1-2 sites needed across 500+ targeted villages in Sindh, the overall scale remains minimal at less than 25 hectares total.

9.2.2 Land Prioritization Strategy

Land needs follow a clear hierarchy: Priority 1 uses available government or communal lands to eliminate private acquisition risks; Priority 2 employs VLD strictly when Priority 1 is unavailable, ensuring full adherence to World Bank safeguards.

9.2.3 VLD Eligibility and Screening

Donations qualify only for land without structures, tenants, or disputes, limited to under 10% of the donor's total holdings to prevent livelihood impacts, confirmed through public consultations and independent verification. A screening checklist, as attached in **Annexure XIV,** assesses ownership documents, socio-economic effects on donors, vulnerability of affected groups, and direct project benefits, supported by photos and records.

VLD safeguards shall be applied strictly to avoid and minimize displacement. Government or other legally available public/communal land shall be prioritized, and VLD shall be used only exceptionally when the land is not required for the donor’s livelihood and the donor has the genuine right to refuse. The process shall ensure informed consent and verification of all users and rights holders (including tenants, users and customary claimants where applicable), independent verification, transparent documentation, legal clearance, and accessible grievance channels. VLD shall not be used where unresolved disputes, significant livelihood impacts, displacement, or other ESS5 concerns are identified.

9.2.4 VLD Process and Documentation

The process begins with community consultations and site screening, followed by the donor signing a notarized affidavit affirming voluntary donation without coercion or compensation expectations for the specified plot. After independent review and World Bank clearance, the transfer is registered, with one-year post-donation monitoring to confirm no regrets.

9.3 Voluntary Land Donation Protocol

9.3.1 Community Land Donation Procedures

For small-scale community infrastructure (e.g., community rooms, oxidation ponds, wastewater treatment facilities), community land will be acquired through voluntary donation. The executing agency will engage landowners to facilitate donations for STAR-WASH 1 sub-projects, limited to small land parcels.

- Titleholders will face no pressure (direct or indirect) to donate land.
- Donations minimize adverse impacts while maximizing community benefits.

9.3.2 Documentation Requirements

STAR WASH-1 will meticulously document all voluntary donations to prevent disputes:

- Vendor/Landowner Declaration (VLD): Suitable only for community-driven projects where donors gift small parcels for infrastructure directly benefiting their community.
- Record Keeping: Original documents retained at district and provincial executing agency offices; copies maintained at PIU for inspection.
- Full Disclosure: Complete documentation accompanies final project records.

9.3.3 When VLD Is Applicable

Under STAR WASH-1, Voluntary Land Donation (VLD) is applicable only on an exceptional basis, consistent with the practice observed in other World Bank-funded projects in Pakistan. The project will first prioritize the use of government-owned land or communal land (e.g., Shamilat) to meet the small land requirements for village-level water supply and sanitation infrastructure.

VLD shall only be used where land acquisition and displacement have first been avoided or minimized and where the donation is genuinely voluntary. The donor and all identified users/rights holders shall receive understandable information on the proposed use, alternatives, implications and right to refuse, without coercion, threat, intimidation, pressure or undue influence. Independent verification shall confirm informed consent and absence of significant livelihood impacts. Any unavoidable loss of assets or livelihood shall be addressed through the applicable ESS5 entitlement provisions; legal/tenure clearance and qualified

oversight shall be completed before use of the land. The GRM shall remain accessible to donors, users and other affected persons.

VLD may be used only where suitable government or communal land is not available, and in such cases, it must be:

- fully voluntary, with documented consent from the landowner;
- in line with the World Bank's VLD protocol (including consultation, socio-economic screening, and avoidance of significant adverse impacts on the donor household); and
- prior approval by the World Bank E&S team before any land is taken over for construction.

This approach mirrors the VLD arrangements used in other WB-funded projects in Pakistan (for example, urban WASH and local-infrastructure projects), where VLD is allowed only for small parcels, under strict voluntariness checks, and without large-scale land acquisition or involuntary resettlement.

Table 41: VLD Implementation Challenges and Mitigation Measures

Challenge category	Description	Mitigation measures
Social and Exclusion Risks	VLD may reinforce inequity if land-donation decisions favor better-off households while poorer or marginalized groups (ethnic/religious minorities, persons with disabilities) are excluded from siting choices or service access.	Apply participatory siting, ensure representation of vulnerable groups in community committees, and use beneficiary-mapping to confirm equitable service coverage (e.g., shared taps, inclusive toilets) around VLD sites.
Land-status and Encroachment Issues	Widespread squatting and encroachment on government/communal land may push teams toward VLD even where public land exists, but legal or contested status creates delays and risks of using "anti-encroachment-legacy" parcels that must be avoided per E&S requirements.	Conduct early land-status checks with local authorities and land-record sources; avoid any parcel with prior encroachment legacy; prioritize verified government/communal land and use VLD only where these are genuinely unavailable.
Weak Local-Government Capacity	District- and union-level institutions have limited capacity to manage E&S processes, leading to inconsistent VLD application, weak documentation of consent, and gaps in assessing impacts on affected households.	Provide focused E&S and VLD-protocol training to district-level staff and implementing partners; use standardized checklists and digital-enabled consent forms to ensure consistent documentation and third-party verification where needed.
Voluntariness and Pressure Concerns	In resource-constrained, clientelistic settings, true voluntariness is hard to verify; community- or politician-level pressure on small-holder landowners may undermine the "voluntary" character of donations.	Require written, witnessed consent; carry out independent verification (e.g., by social-safeguards consultants or community-based monitors) and allow a cooling-off period; ensure that landowners know they can refuse without loss of services or benefits.
Equity and Siting Bias	Landowners willing to donate may cluster in certain villages or neighborhoods, concentrating infrastructure there and bypassing more remote or disadvantaged settlements, which contradicts the	Apply transparent siting criteria (proximity to poor households, gender-access needs, school locations) and require technical justification for each VLD site in the VLD register; periodically review spatial distribution of VLD schemes against project-level equity targets.

Challenge category	Description	Mitigation measures
	project's equity and access-for-the-poor objectives.	
O&M and Long-Term Sustainability	Past WASH schemes in Sindh suffered from poor operation and maintenance and weak handovers, so communities may fear that VLD will transfer long-term maintenance burdens to them, reducing willingness to donate land unless clear O&M and institutional ownership models are in place.	Ensure clear O&M plans are discussed with communities before VLD; assign ownership to local government or water users' associations with defined roles and resources; include basic O&M budgets and capacity building in the project design.

9.3.4 Land Donation Eligibility Criteria

Land donations must meet strict safeguards to ensure voluntariness and protect vulnerable groups:

- All site alternatives and viability assessed prior to selection.
- Titleholder exclusions (vulnerable households ineligible):
- Titleholder retains > minimum prescribed land holding post-donation.
- Minor impacts only: Donation ≤10% of total holding; no physical relocation required.

Vulnerable Category	Examples
Below the poverty line	Households per provincial rural poverty thresholds (with proof).
Social categories	Women-headed households (women sole earners), minorities, and persons with disabilities are facing land loss, shelter loss, or livelihood impacts.

9.3.5 Land Suitability and Verification

- Land jointly identified by the Revenue Department, landowners, Village Organizations (VO), and project authorities.
- Technical verification confirms suitability for sub-project use without social, health, environmental, safety, or other adverse impacts.
- Land free of squatters, encroachers, encumbrances, or claims.

9.3.6 Documentation and Voluntariness

- Notarized, witnessed statements from each donor verifying voluntary consent.
- Donors informed: equal community access to built infrastructure; no priority claims.

- For any income loss/displacement: community-agreed mitigation measures verified in writing.
- GRM availability throughout the process.
- Full documentation, process, and outcomes included in monitoring reports.

9.3.7 When VLD Is Not Applicable

VLD is not applicable under the following scenarios:

- Where inadequate consultation with the land donor results in lack of understanding about the terms and conditions of the donation.
- In lieu of formal procedures for land acquisition where these do not exist.
- Where donor property owners, landowners, or customary rights holders do not support, or will not directly benefit from, the Project.
- Where conflicts over land exist, including customary collective ownership.
- Conflicting land titling that makes it difficult to establish with certainty who has the right to own, donate, and use a specific parcel of land.
- Where donors did not provide their informed consent and were subject to political or social pressure and coerced into donating.

9.4 Process for Voluntary Donation

This section provides guidance on the process for VLD, namely on how to:

- Determine and document the appropriateness of VLD in the project context.
- Verify the requirements of the donation and the formalization of the donation.
- Carry out due diligence on the owners and users of land donated.
- Ensure appropriate consultation and disclosure.
- Establish informed consent of the person donating the land; and
- Establish grievance redress mechanism.

It is necessary to follow a clear process for the donation, and to prepare and maintain documents that demonstrate such process.

9.4.1 Determine and document that VLD is appropriate in the circumstances of the project.

- The team should record the reasons why it thinks that the donation of land is appropriate for the project. The project team should identify (in as much detail as possible):
- What will the land be used for?
- How much land will the project require on both a permanent and temporary basis?
- How much of the land will be donated?
- The terms of the donation.
- The identities of the parties who intend to donate.
- The beneficiary of the donation; and

- Any details that are relevant to why the donation may be appropriate.

9.4.2 Verify the requirements for transferring, and formalize the transfer of the land

It is important to understand the process that should be followed to transfer the land, and appropriate ways to formalize the transfer so as to achieve certainty for both the transferee of the land and the project. An important consideration will be how transparent the process and the decision-making process actually is, and what can be done to enhance the process.

9.4.3 Conduct due diligence on who owns and uses the land

Given the specific issues surrounding land ownership, it is important that the project team carries out careful due diligence to understand the type of land rights that exist in the project area, and to identify any particular issues relating to land ownership and use. Thereafter, a more specific due diligence must be conducted on each parcel of land proposed for donation to identify:

- The owner or owners of the land.
- The users of the land, or any parties that occupy the land (either physically or through ownership of an asset or conduct of livelihood or business activities on the land).
- Any competing claims of ownership or use.
- Structures and assets on the land.
- Any encumbrance on the land.

9.5 Disclosure and Consultation for VLD

The decision to donate must be made based on a full understanding of the project and the consequences of agreeing to donate the land. Accordingly, the parties that will be affected by the donation (the owners and users of the land) must be provided with accurate and accessible information regarding what the land will be used for, for how long, and the impact the donation will have on them and their families. It is important that prior written notification indicating the location and amount of land that is sought to be provided, and that its intended use for the project is disclosed.

There should be a clear agreement as to which party will pay the costs associated with the donated land. This could include measurement costs, documentation and notarial fees, transfer taxes, and registration fees. It should also include the costs of re-measuring/re-titling the transferee's remaining land and any new documentation relating to it.

9.5.1 Establishing Informed Consent

The project team must be confident that the decision to donate was taken in circumstances of informed consent or power of choice. As discussed earlier, this means being confident that the owner(s) or user(s) of the land understand:

- What is the land going to be used for, by whom, and for how long?
- That they will be deprived of the ownership or right to use the land, and what this really means.
- That they have a right to refuse to donate the land.
- Whether there are alternatives to using this land.
- What they will need to do to donate the land (e.g., execute documents, get spousal consents, pay taxes).
- The effect of the donation on their family, and what they can do if they (or their family or heirs) want the land back.
- The exact demarcation of the land boundary for the project's use.
- Whether there are proposals that would allow other land to be used.
- What they will need to do to donate the land.
- The intergenerational effect of the donation on their family, what they can do if they (or their family or heirs) want the land back.
- The terms and conditions of the land donation must be mutually agreed upon and detailed in a written agreement.

9.5.2 Documentation

Distinction between Donation Agreement and Legal Transfer

Land donation requires two distinct steps:

i. **Agreement to Donate**: Documented evidence of voluntary intent.
ii. **Legal Transfer**: Formal title transfer (where legally required).

Both steps ensure transparency and prevent future disputes, despite the time-consuming nature of legal processes.

9.5.3 Procedure for Privately Owned Land Donations:

i. **Pre-Activity Requirement**: Complete VLD before initiating project activities on donated land.

ii. **Form Completion**: Landowner(s) execute written declaration on stamp paper. (Format provided as **Annexure – XV**).

iii. **Witnessing**: Signed by:

- Village notables
- Community Institutions (CIs)
- Executing Agency (EA) staff

iv. **Notarization**: Document notarized for legal validity.

v. **Community Consultation**: Conducted prior to site finalization.

9.6 Eligibility and Entitlements

The Resettlement Policy Framework (RPF) for the STAR-WASH 1 project will incorporate site selection criteria that fully reflect social safeguards and involuntary resettlement considerations. During the finalization of eligibility criteria, the project will ensure strict compliance with World Bank requirements, particularly with respect to the rights and entitlements of residents within selected project sites.

The RPF is designed on the principle that land acquisition shall be undertaken only as a last resort, with the primary objective of avoiding or minimizing adverse social impacts. This includes preventing or reducing risks associated with land acquisition, as well as any restriction on land use or access to natural resources. In view of the project's scope and implementation approach, Voluntary Land Donation (VLD) will be encouraged and preferred wherever feasible for the execution of subproject activities.

9.7 Cut-off Date

Eligibility for compensation will be strictly determined with reference to the government-announced cut-off date for each project activity involving land acquisition and resettlement (LAR) impacts. The cut-off date will be formally established and publicly notified by the government to prevent in-migration of non-eligible persons and to avoid fraudulent or unsubstantiated claims for compensation, relocation assistance, and livelihood restoration entitlements.

The cut-off date will be disclosed to all APs through a range of participatory and inclusive communication methods, including consultative meetings, focus group discussions, field surveys, and direct community engagement.

9.8 Eligibility and Compensation Entitlement Matrix

This Resettlement Policy Framework (RPF) will be implemented through a compensation and entitlement matrix aligned with national and provincial laws and regulations, as well as the World Bank's Environmental and Social Standard 5 (ESS5). In cases of inconsistency, the provisions most favorable to APs will prevail, as reflected in the Entitlement Matrix (**Annexure XVI**). The matrix is guided by the principle that compensation measures should improve, or at a minimum restore, pre-project living standards while ensuring APs' meaningful participation in project benefits. The matrix may be further refined and adapted in the preparation of site-specific RPs/ARPs.

All reasonable efforts will be made to ensure that compensation is disbursed within agreed timelines. In the event of unforeseen delays, escrow accounts will be established in accordance with ESS5 to securely hold funds until payments can be completed, thereby safeguarding the interests of affected persons.

Resettlement-related impacts have been screened out as the STAR WASH-1 project will not involve any physical or economic displacement. The project will only require land acquisition

on a voluntary basis, which will be managed in accordance with the VLD protocol. To ensure compliance with World Bank ESS5, the project will demonstrate that all donations are minor, involve no household relocation, provide direct benefits to the donor, and are documented through a process of informed consent where the donor retains the right to refuse.

9.9 Budget Estimation Process

Detailed impacts remain unidentified pending technical designs, so AP numbers and costs cannot yet be quantified. Each RP/ARP will detail budgets covering:

- Compensation for affected assets (land, structures, crops).
- Consultation/outreach costs.
- Livelihood restoration and assistance.
- Administration.
- Contingencies (10-15%).

Budgets derive from preliminary valuations and baseline socio-economic studies, refined post-census. Additional estimates cover surveying, planning, consultancy, supervision, entitlements, monitoring, and PIU/AP staff training.

Budget Category	Examples
Compensation	Land, structures, crops; community structures/services restoration.
Relocation	AP transport/settlement; administrative costs.
Income Restoration	Temporary income support; training.
Administration	Staff, training/ capacity building, M&E.
Community Support	Infrastructure (schools, mosques, health posts); awareness programs (health/safety); gender/vulnerable groups aid.

9.9.1 Contingency Arrangement

To ensure the effective and timely implementation of compensation and resettlement activities, every effort will be made to prepare realistic and comprehensive cost estimates during the development of Resettlement Plans (RPs) and Abbreviated Resettlement Plans (ARPs). However, recognizing the inherent uncertainties associated with resettlement planning and the possibility of unforeseen circumstances, a contingency provision equivalent to 10–20 percent of the total estimated budget will be incorporated into the RP/ARP cost estimates to accommodate any unexpected expenditures and ensure smooth implementation.

9.10 Internal Monitoring

Internal monitoring of resettlement activities will be the responsibility of the Environmental and Social (E&S) team within the Project Implementation Unit (PIU), with implementation support from the Implementing Partners (IPs), as referred to **Table 42**. The internal monitoring system will be designed to provide continuous, systematic, and real-time tracking of resettlement planning and implementation processes.

A set of indicative monitoring indicators will be developed and refined based on census and survey data, and will be presented in a dedicated table within the RPs/ARPs. These indicators will guide systematic tracking of performance and outcomes and support effective reporting to the World Bank and other stakeholders.

Table 42: Potential Indicators for Internal Monitoring

Monitoring Aspects	Potential Indicators
Institutional set-up and resource allocation	RP implementation and monitoring of the institutional set-up and budget in place.
	Grievance redress mechanism established and explained to the APs and affected communities.
Delivery of Entitlements	Compensation entitlements disbursed compared with the number and category of losses set out in the entitlement matrix.
	Relocation and rehabilitation costs and income restoration support are provided as per entitlements and schedule.
	Income and livelihood restoration activities are being implemented as set out in the income restoration plan.
Restoration of living standards and income	Affected residential structures reconstructed/ restored at relocation sites.
	Number and percentage of displaced persons covered under livelihood restoration and rehabilitation programs (women, men, and vulnerable groups).
	Number of displaced persons who have restored their income and livelihood patterns (women, men, and vulnerable groups).
	Number of APs (especially vulnerable) provided opportunities in project-related employment.
	Percentage of displaced persons who improved their income and living standards (women, men, and vulnerable groups).
Consultation and Grievances	Consultations were organized as scheduled, including meetings, groups, and community activities.
	Community awareness about the grievance redress mechanism and its use.
	Progress on grievances recorded and resolved, including information dissemination to affected families on the resolution of grievances.
	Information on the implementation of the social preparation phase and special measures for vulnerable groups.

Monitoring Aspects	Potential Indicators
Communications and Participation	Number of meetings held with APs (male and female) to explain RP provisions, grievance redress mechanism, and compensation disbursement mechanism.
	Number of APs (male and female) who participated in meetings.
	Number of meetings and consultations held with vulnerable people.

9.11 External Monitoring

External monitoring of the Resettlement Plans (RPs) and Abbreviated Resettlement Plans (ARPs) will be undertaken to provide an independent and objective assessment of resettlement implementation, as referred to **Table 43**. Based on the findings, Compliance Reports will be submitted to the Project Implementation Unit (PIU) and the World Bank. These reports will also be disclosed on the official websites of the PIU and the World Bank to ensure transparency and accountability. External monitoring may continue beyond the completion of RP/ARP implementation, where necessary, to assess the sustainability of resettlement outcomes.

The Independent Monitoring Agency (IMA), or an equivalent team of qualified experts, will conduct periodic monitoring and submit semi-annual reports, or at a frequency agreed with the World Bank. The external monitoring process will focus on verifying the progress of RP/ARP implementation, assessing compliance with the provisions of this RPF, and evaluating the extent to which resettlement objectives have been achieved.

Table 43: Potential Indicators for External Monitoring

Monitoring Indicator	Basis for Indicator
Basic information on displaced persons' households (Gender disaggregated data essential for all aspects)	Project location, including a description of the project intervention and IR impacts.
	Census data.
	Composition and structure, ages, educational, and skill levels, and gender of household head. Vulnerable households.
	Land and other resource-owning and resource-using patterns.
	Occupations and employment patterns and income sources and levels.
	Participation in neighborhood or community groups and access to cultural sites and events.

Monitoring Indicator	Basis for Indicator
Compensation payment / Restoration of living standards	Was compensation for acquired assets, including structures and other assets, delivered?
	Were compensation payments sufficient to replace lost assets?
	Replacement of affected assets, particularly residential, productive assets and key social and cultural elements?
Restoration of livelihoods (Disaggregate data for displaced persons moving to group resettlement sites, self-relocating displaced persons, and displaced persons with enterprises affected.)	Have affected enterprises received sufficient assistance to reestablish themselves?
	Have vulnerable groups been provided income-earning opportunities?
	Are these opportunities effective and sustainable?
	Do jobs provided restore pre-project income levels and living standards?
Information and satisfaction levels of displaced persons	How much do the displaced persons know about resettlement procedures and entitlements?
	Do the displaced persons know their entitlements and whether these have been met?
	What is the perception of displaced persons about the extent to which their living standards and livelihoods have been restored?
	How much do the displaced persons know about grievance procedures and conflict resolution procedures?
Effectiveness of resettlement planning	Were the displaced persons and their assets correctly enumerated?
	Was the time frame and budget sufficient to meet objectives, and were there institutional constraints?
	Were entitlements based on replacement costs and adequate for rehabilitation and restoration of the APs?
	Were vulnerable groups identified and assisted adequately?
	How did resettlement implementers deal with unforeseen problems?

Based on the findings and recommendations of the independent monitoring reports, any significant issues, gaps, or non-compliance identified during implementation will be addressed through the preparation of a time-bound Corrective Action Plan (CAP). The CAP will be reviewed and approved by the World Bank prior to its implementation and will be disclosed to affected persons and relevant stakeholders to ensure transparency and accountability.

9.12 Reporting and Disclosure Requirements

The Project Implementation Unit (PIU) will be responsible for the preparation and submission of all required resettlement-related documents and reports to the World Bank, including Resettlement Plans (RPs) and Abbreviated Resettlement Plans (ARPs), particularly in cases where project activities are expected to result in significant resettlement impacts.

All such documents and reports pertaining to resettlement planning and implementation will be subject to the World Bank's prior review and clearance, in accordance with the requirements of the Environmental and Social Framework (ESF). Following approval, these documents will be publicly disclosed in line with the Bank's disclosure policy to ensure transparency and accessibility to affected persons and other stakeholders.

In addition, all cases involving Voluntary Land Donation (VLD) and any form of land acquisition will require a formal No Objection from the World Bank prior to commencement of related activities.

Annexure-I:

Negative Positive List for E&S Management Framework

Annexure I: Negative Positive List for E&S Management Framework

NEGATIVE & POSITIVE LIST FOR ENVIRONMENT & SOCIAL MANAGEMENT FRAMEWORK

World Bank Safeguards	Negative List
Environmental Assessment	- Areas of known/suspected contamination due to hazardous substances
	- Activities having "significant adverse cumulative/transboundary impacts"
Land-use pattern	- Construction in areas causing significant change in existing land use pattern.
Natural habitats	- Involves any works in protected areas or in or around sensitive/critical natural habitats
	- Significant conversion or degradation of natural habitat or where the conservation and/or environmental gains do not clearly outweigh any potential losses.
	- Disrupt wildlife and vegetation/Greenland/Flora
	- Selection of sites where threatened and endangered species, migratory pathways have been reported
Physical Cultural Resources	- Loss or damage to cultural property, including sites having archeological (prehistoric), paleontological, historical, religious, cultural and unique natural values, livelihoods including cultural resources.
Indigenous Groups	- Likely to create adverse impacts on ethnic group/villages/and or neighboring villages or unacceptable to ethnic groups living in a village of mixed ethnic composition.
Forests	- Clearance of ecologically sensitive/protected forests
Land Acquisition	- Areas under Anti Encroachment Drive
	- Cause any displacement or severe loss of livelihood

Positive List
- Optimizing use of available natural resources by utilization existing material/debris of the damaged houses. - Stakeholder involvement and commitment during construction.
- Use of renewable energy (solar) and environmentally friendly techniques for construction
- Usage of water conservation techniques as part of design.
- Appropriate design considerations to minimize adverse impacts on environment (flora, fauna, natural resources, cultural resources) and human and community health.
- Construction, rehabilitation and design improvement of existing settlement improvement/protective infrastructure.
- Activities designed specifically to avoid disturbance or nuisance to the local community in terms of high noise, usage of scarce/valuable natural resource.

Annexure-II:

Provincial and District Level General Baseline

Annexure-II: Provincial and District Level General Baseline

General Description of the STARS WASH - Phase 1 Districts

Badin

Badin district is located in the southeastern part of Sindh province and lies approximately between 24°05′ and 25°25′ North latitude and 68°30′ and 69°50′ East longitude. The district is bounded by Thatta and Sujawal to the west, Hyderabad and Tando Muhammad Khan to the north, Tharparkar to the east, and the Arabian Sea to the south.

Administratively, Badin district comprises several talukas, including Badin, Matli, Talhar, and Tando Bago. The district has a predominantly rural population, and the literacy rate is relatively low, estimated at around 30–35%.

Topographically, the district is characterized by flat coastal plains and deltaic regions influenced by the Indus River. Some areas are low-lying and prone to flooding and waterlogging.

The climate is hot and humid due to its proximity to the Arabian Sea. Summers are long and hot, while winters are mild. Rainfall is low but influenced by monsoon patterns.

Hydrologically, the district is irrigated through canals from the Indus River system (Refer to **Figure AII-1**), although water availability can be inconsistent. Coastal areas may experience salinity and intrusion of seawater.

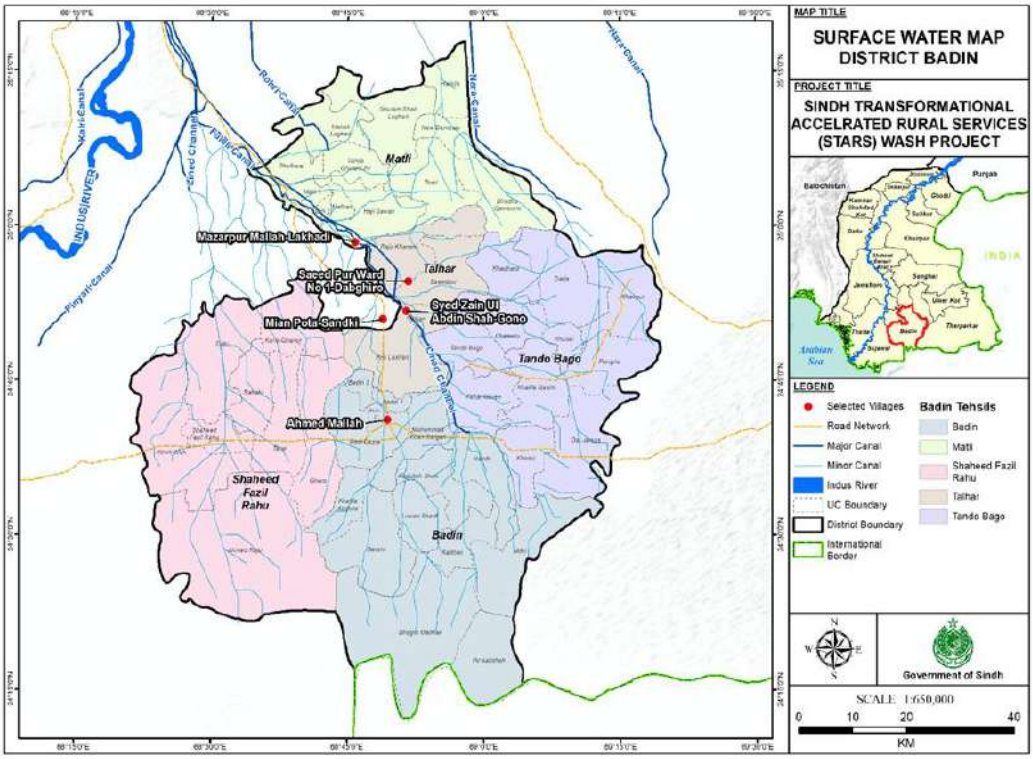


Figure All- 1: Surface Water Map of Badin District

Agriculture and fishing are the main economic activities. Major crops include rice, sugarcane, and sunflower. Livestock rearing is also common.

Infrastructure in rural areas is limited, with many villages lacking access to basic services. Road connectivity varies across the district.

Environmental challenges include salinity, waterlogging, and coastal flooding.

The district falls within a moderate seismic zone. Overall, Badin is a coastal agricultural district facing environmental and developmental challenges.

Naushehro Feroz

The village is located in Naushahro Feroz district of Sindh province, positioned within the fertile agricultural belt of central Sindh. The district lies between Khairpur and Shaheed Benazirabad and is well connected to nearby towns such as Moro, Mehrabpur, and Kandiaro.

Administratively, the village falls under one of the talukas including Moro, Mehrabpur, or Kandiaro. Local governance is managed through the union council system. Basic facilities are available, while higher-level services are accessed in nearby urban areas. The literacy rate is estimated at around 45–50%.

The topography is flat and composed of fertile alluvial plains. The soil is highly productive and suitable for intensive agriculture.

The climate is hot and semi-arid, with long summers and mild winters. Rainfall is limited and irregular. Irrigation is well developed through canals, supporting year-round agriculture. Groundwater is also used in some areas (Refer to **Figure AII-2**).

Agriculture is the dominant occupation, with wheat, sugarcane, and cotton as major crops. Livestock is also common. Vegetation includes cultivated crops and scattered rural trees.

Infrastructure is moderately developed, with better access to roads and services compared to many rural areas.

Overall, the village reflects relatively better agricultural productivity and moderate socio-economic development.

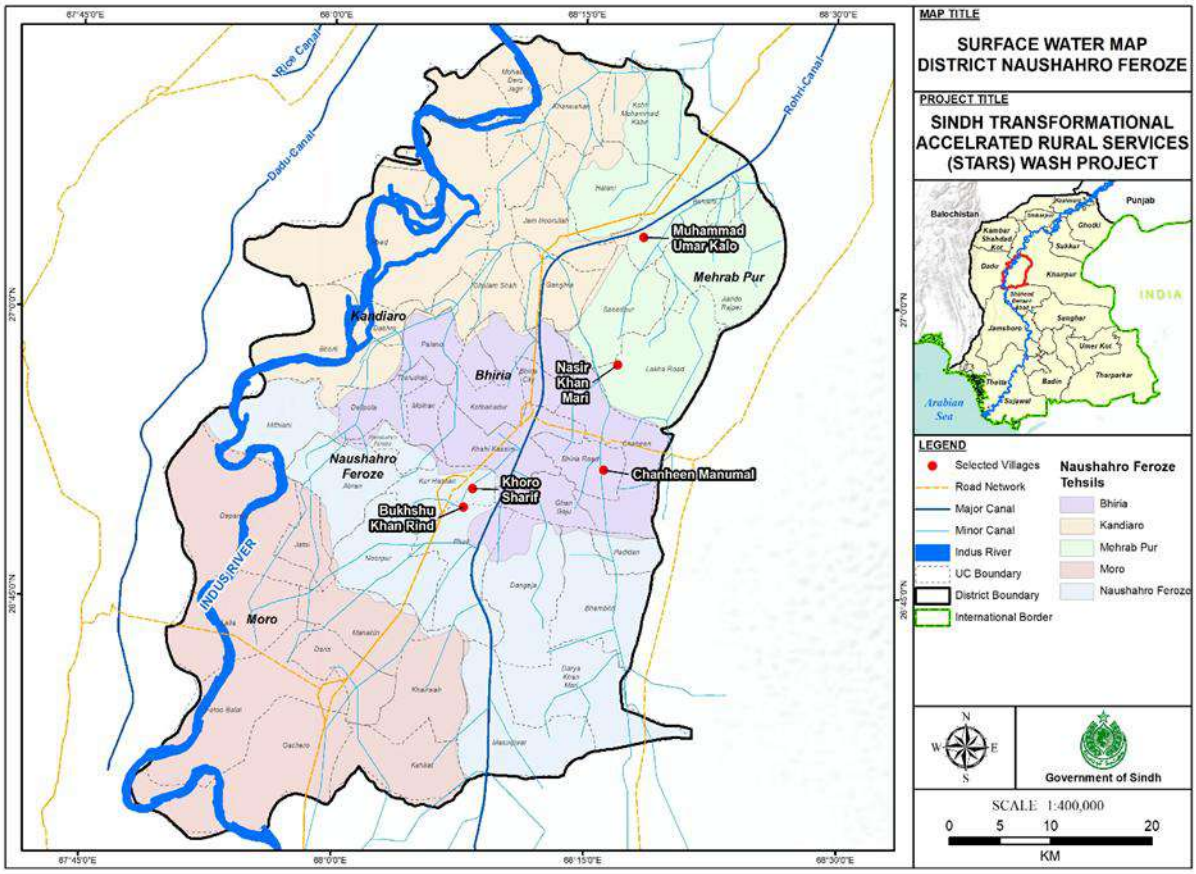


Figure AII- 2: Surface Water Map of Naushero Feroze District

Sanghar

The villages of Sanghar district are located in the southeastern part of Sindh province, extending towards semi-arid and desert-influenced regions. The district shares its boundaries with Tharparkar and Mirpurkhas districts to the east and southeast, while it connects with Shaheed Benazirabad and Hyderabad regions to the west and south.

These villages fall under talukas such as Sinjhoro, Shahdadpur, and Tando Adam. The population is predominantly rural, and agriculture along with livestock rearing forms the backbone of the local economy. Literacy rates in rural areas are estimated to range between 38–42%, with noticeable gender disparities and limited access to higher education facilities.

Topographically, the region presents a combination of fertile alluvial plains and semi-arid lands. Certain eastern parts gradually transition into desert-like terrain influenced by the Thar Desert. Soil conditions vary from fertile loamy soils in irrigated zones to sandy and less productive soils in arid areas.

The climate is hot and dry, characterized by extremely high temperatures during summer and mild winters. Rainfall is low, irregular, and often unreliable, making water scarcity a recurring issue, particularly in remote villages.

Irrigation is supported through canal systems (Refer to **FigureAII-3**); however, access to water is not uniform across the district. Tail-end areas often face shortages, affecting agricultural productivity. Groundwater is available in some locations but may be saline.

Agriculture is the primary economic activity, with major crops including cotton, wheat, and sugarcane. In addition, livestock such as cattle, goats, and sheep play a significant role in sustaining rural livelihoods. Seasonal migration for labor is also observed in some areas.

Infrastructure in the villages is gradually developing but remains uneven. Basic facilities such as primary schools and health units are present in some villages, while others depend on nearby towns like Shahdadpur and Tando Adam for essential services. Road connectivity varies, with some areas linked by paved roads and others by unpaved tracks.

Natural vegetation is sparse and largely dependent on rainfall and irrigation. Environmental challenges include water scarcity, soil degradation, and the impacts of climate variability.

Overall, the villages of Sanghar district represent a transitional zone between fertile agricultural land and arid regions, reflecting a mix of agricultural potential and environmental constraints, along with gradual socio-economic development.

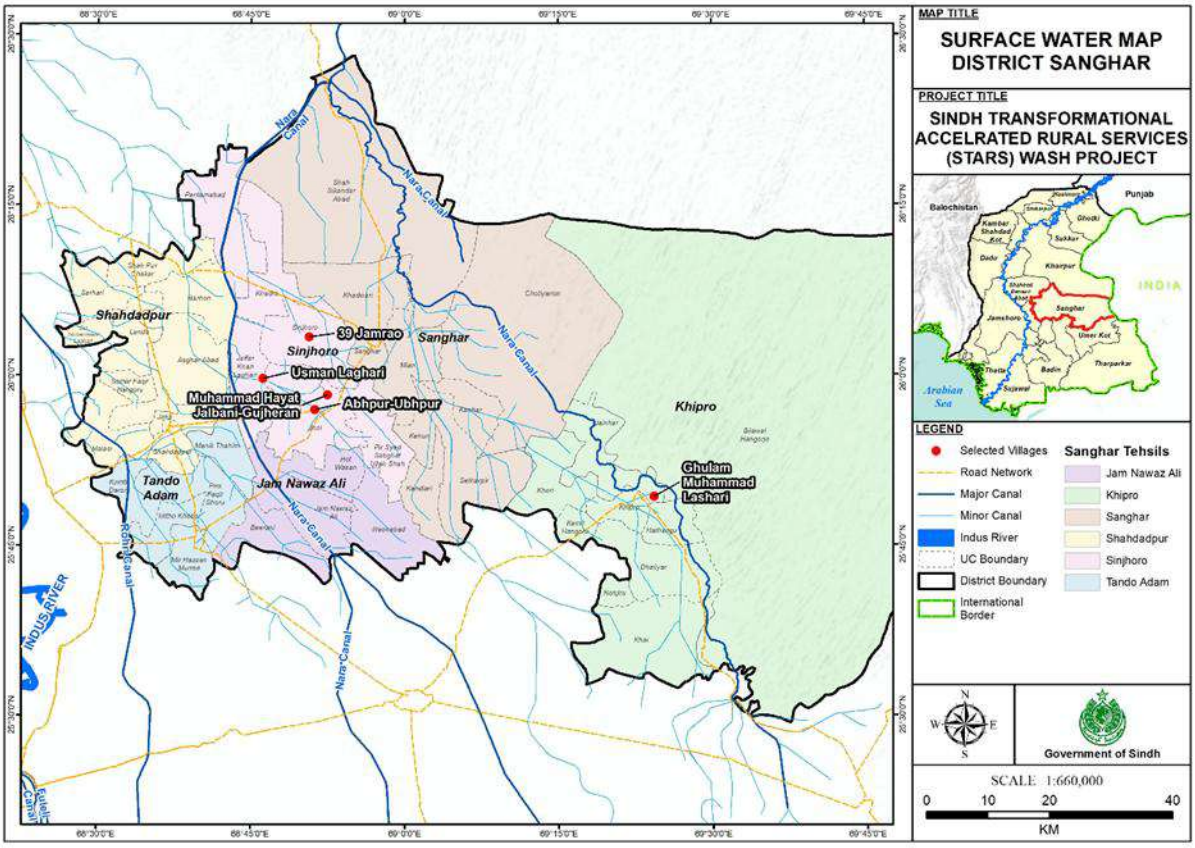


Figure All- 3: Surface Water Map of Shangar District

Khairpur

The village is located in Khairpur district of Sindh province, which lies approximately between 26°00′ to 28°00′ North latitudes and 68°00′ to 69°00′ East longitudes. The village is situated within the alluvial plains of upper Sindh and is connected to nearby towns such as Khairpur city, Kot Diji, and Gambat through local road networks. The surrounding region is bounded by Sukkur district to the north, Larkana to the west, and Naushahro Feroz to the south.

Administratively, the village falls under the jurisdiction of its respective taluka (such as Kot Diji/Gambat/Sobhodero). Local governance is managed through the union council system. Basic public services are limited, and most administrative and municipal facilities are accessed in nearby towns. The literacy rate in the village is estimated to be around 40–45%, with a noticeable gender gap, where male literacy is higher than female literacy.

Topographically, the village is located on flat terrain formed by the alluvial deposits of the Indus River. The soil is generally fertile, consisting of loamy and clayey textures suitable

for agriculture. The land is intensively cultivated, and there are no significant elevation variations across the area.

The climate of the village is hot and semi-arid. Summers are long and extremely hot, particularly from April to June, while winters are mild and short. Temperatures can exceed 40°C during peak summer months, whereas in winter, temperatures may drop to around 8–10°C. Rainfall is low and irregular, and the area largely depends on canal irrigation rather than precipitation (Refer to **Figure All-4**).

There are no natural streams within the village; however, irrigation is supported through canals originating from the Sukkur Barrage system. Watercourses distribute water to agricultural lands. Groundwater is available but often varies in quality, with some areas experiencing salinity issues.

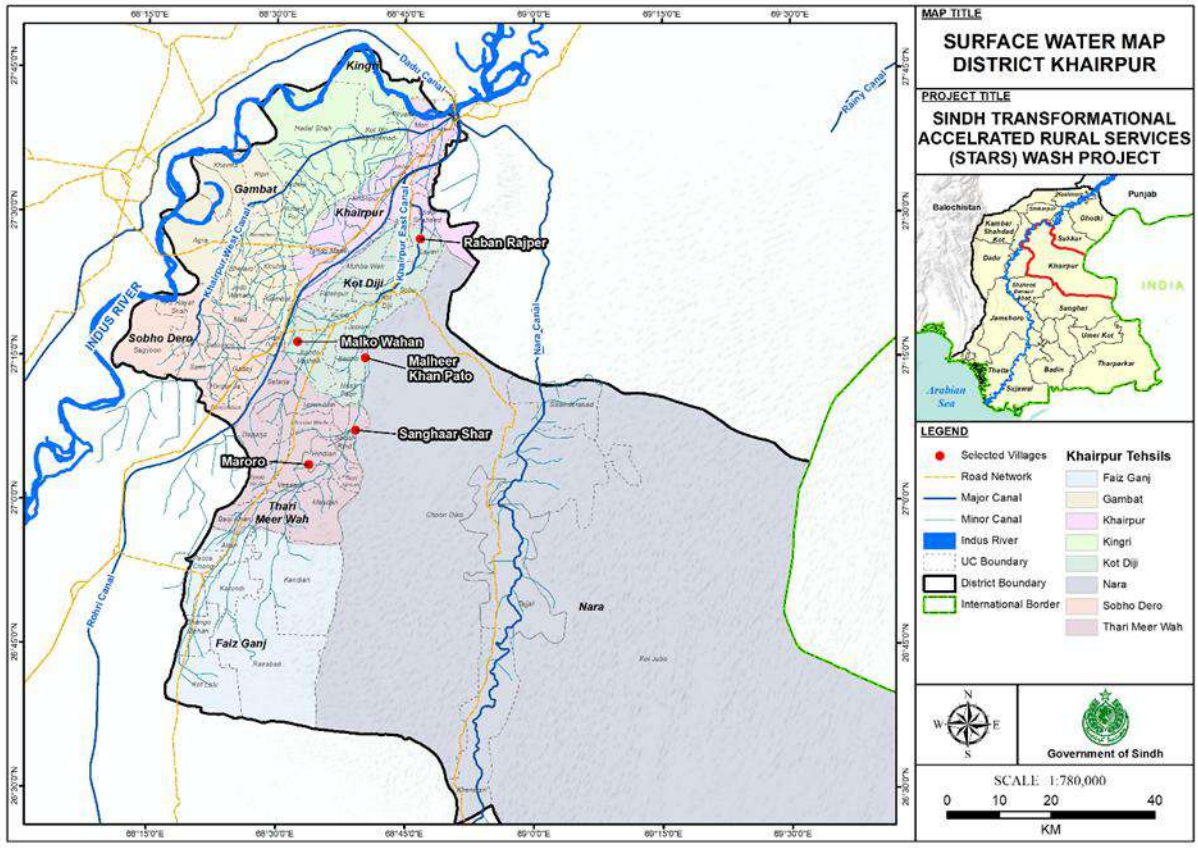


Figure All- 4: Surface Water Map of Khairpur District

Agriculture is the primary economic activity in the village. Major crops include wheat, cotton, sugarcane, and dates, for which Khairpur district is well known. Livestock rearing is also common and contributes to household income. The vegetation mainly consists of cultivated crops along with scattered trees such as neem, babul, and date palms.

The infrastructure in the village is basic. Access roads are mostly unpaved or semi-paved, although main link roads connect the village to nearby towns. Educational facilities are limited to primary or middle-level schools, while healthcare services are minimal, often requiring travel to nearby urban centers.

There are no forests in the village area. Natural vegetation is sparse and largely dependent on irrigation and seasonal rainfall. Environmental challenges include water scarcity in some areas, soil salinity, and the impacts of climate variability.

Overall, the village reflects the typical characteristics of rural settlements in Khairpur district, with an agriculture-based economy, limited infrastructure, and moderate socio-economic development.

Dadu

Dadu district is located between 26° 6' 35" to 27° 26' 20" North latitude and 67° 7' to 68° 2' 17" East longitude. It is situated on the main road leading from Sehwan to Larkana, Sindh. It is bounded on the North by Larkana district, on the East by River Indus (beyond which is Naushero Feroze), on the South by Jamshoro district, and on the West by Khuzdar district of Balochistan

Dadu has a total of 3 Municipal Committees (MC) [68]. MC Dadu, MC Mehar & MC Khairpur Nathan Shah. The total number of Dadu's Town Committees (TC) is 5: TC Phulji Station, TC Johi, TC Sita Road, TC Radhan & TC Thariri Mohabat. According to Pakistan Social & Living Measurement Survey 2014-15; the literacy rate of Dadu district is 66% with 87% urban and 62% of the rural population being literate.

Topographically, Dadu district is divided into 3 distinct areas: The Kohistan area is divided into hilly and Katchho or Kachho areas. Katchho is the area between the Kirthar hills and the Indus. The central part of the district is a plain area made cultivable through irrigation by the Rice and Dadu canals; this is known as the Barrage Zone or Pacco (Refer to **Figure AII-5**).

The River Indus flows along the eastern boundary of the district. There is no other river in the district. Canals and hill torrents known as nais are the main sources of surface water. The most important of these is the Nai Gaji. Other notable Nais are Baran, Sann, and Sol.

Dadu district is home to the riverine forests of Sindh, which are mostly located along the banks of the River Indus. The district also has irrigated plantations and rangelands[69]. The district is irrigated by the Sukkur Barrage system. There are 2 main canals in the district:

[68] Dadu District Census Report 1998; 2017 Census data has not been made public yet.
[69] 1998 District Profile Dadu. (GoPakistan).

Rice Canal and Dadu Canal. The Rice Canal is non-perennial, whereas Dadu is a perennial canal.

Internet and telephone facilities are available in some of the larger villages, towns, and urban areas of the district. Dadu is connected to other parts of Sindh province and Pakistan through Pakistan Railways. The main railway station connecting the district to other major centers of Pakistan is located in Dadu city. Another smaller railway station is located at Johi taluka.

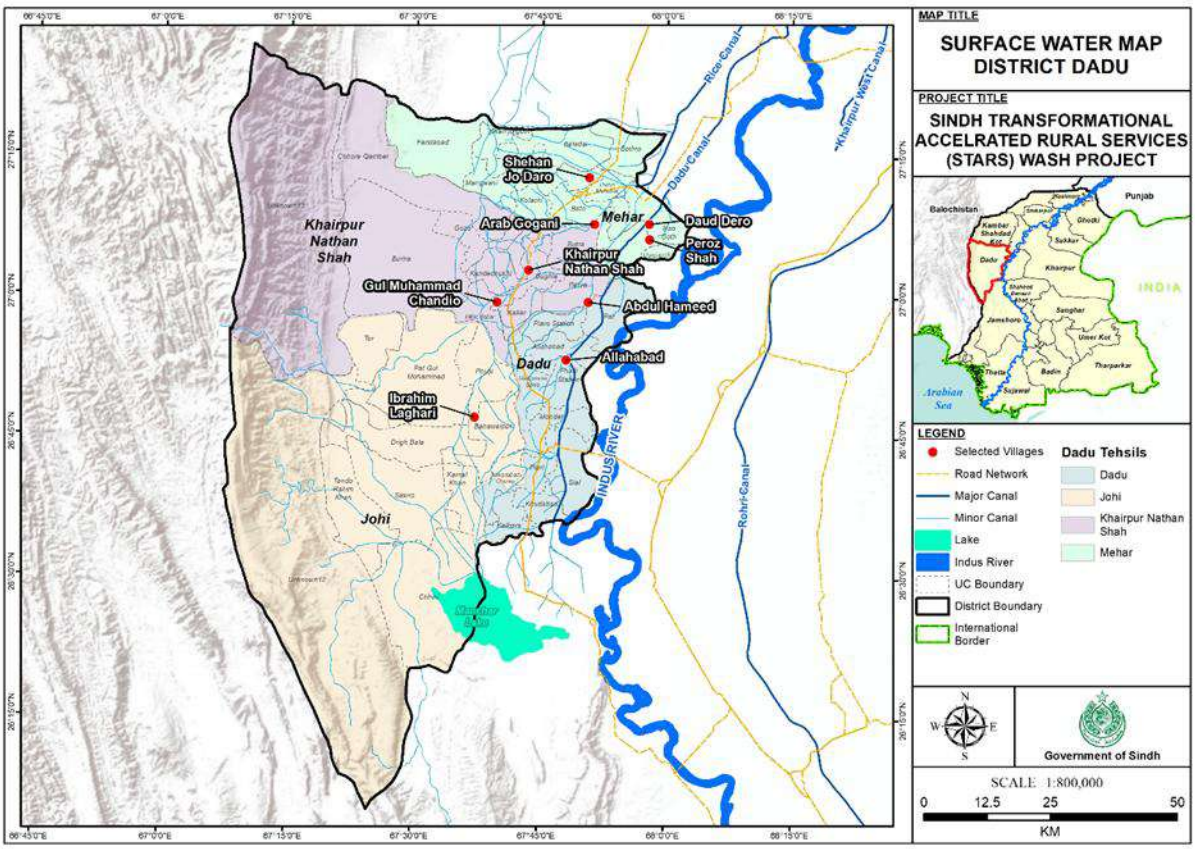


Figure AII- 5: Surface Water Map of District Dadu

Dadu district belongs to the arid region of Pakistan and is highly prone to droughts. The people of Kohistan and Kachho areas are dependent on rainwater, which restores the groundwater. Mahal Kohistan Wildlife Sanctuary and Surjan, Sumbak, Eri, Hothiano Wildlife Sanctuaries are a part of Kirthar National Park located in Dadu district. Protected wildlife includes fox, jackal, jungle cat, chinkara gazelle, urial, monitor lizard, and Indian cobra[70].

[70] Kirthar National Park, Sindh Wildlife Department

Larkana

Larkana district is located in the northwestern part of Sindh province. It lies approximately between 27°20′ to 28°00′ North latitude and 67°30′ to 68°20′ East longitude. The district is bordered by Shikarpur to the north, Kamber Shahdadkot to the west, Dadu to the south, and Khairpur to the east. The elevation of the district is around 50 meters above sea level.

Administratively, Larkana district comprises four talukas: Larkana, Ratodero, Dokri, and Bakrani. Larkana city is the major urban and administrative center. The district has a relatively balanced rural-urban composition compared to neighboring districts. The literacy rate is estimated at around 52–55%.

The topography is largely flat and consists of fertile alluvial plains influenced by the Indus River. The district is well irrigated through canals (Refer to **Figure AII-6**) from the Sukkur Barrage, making it one of the agriculturally productive regions of Sindh.

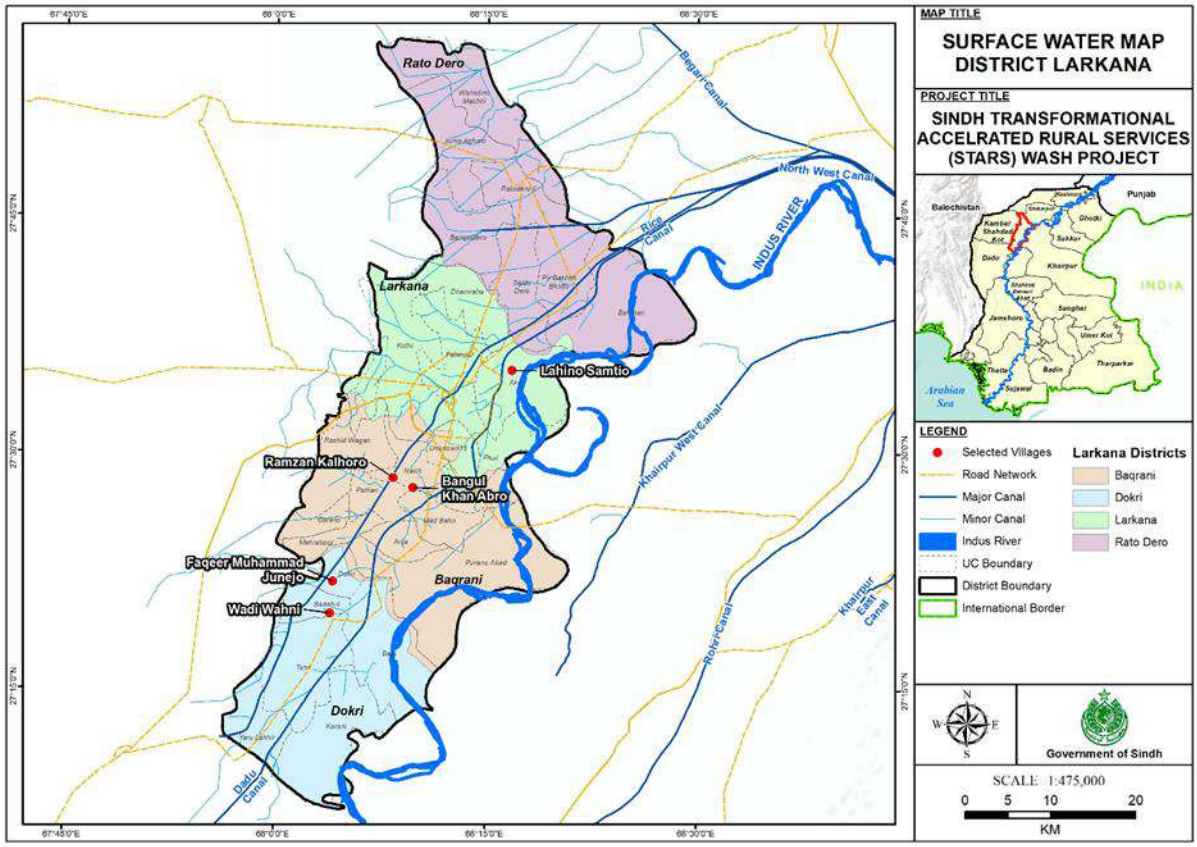


Figure AII- 6: Surface Water Map of District Larkana

Agriculture is the mainstay of the economy, with rice being a major crop, along with wheat and sugarcane. The district is also known for its historical and cultural importance.

Climatically, Larkana experiences hot summers and mild winters. Temperatures can be extreme during summer, while rainfall is moderate but irregular.

The district lies in a moderate seismic zone. Overall, Larkana is a relatively developed district within upper Sindh, with better literacy rates and agricultural productivity.

Jamshoro

District Jamshoro is located between 67° 16' 20" to 68° 27' 37" East longitudes and 24° 58' 14" to 26° 36' 33″ North latitudes, near the Kirthar Range, which forms a part of the border between Sindh and Balochistan. This district shares its boundaries on the North with Dadu district, while on its East, the River Indus separates it from Shaheed Benazirabad, Matiari, and Hyderabad districts. On the South of the district is Thatta district, on the Southwest is Karachi district and on its West, the Khirthar Range completes its boundary.

The district has 2 Municipal Committees: Kotri, Bulhari, It has 6 Town Committees: Jamshoro, Sann, Majhandh, Sehwan Shareef, Bhan Saeedabad & Thano Bula Khan.

Originally, Jamshoro district was part of Dadu district. Topographically, Dadu district (and by extension, Jamshoro district) can be divided into 3 distinct parts: Kohistan or hilly area, Barrage Zone & Lowlands or riverine area.

The Indus is the only river in Jamshoro district, which is interspersed with a number of dhands [natural depressions] and dhoras [small streams]. Manchar, the biggest natural lake in Asia is situated in both Jamshoro and Dadu districts (Refer to **Figure AII-7**).

The district is irrigated by the Kotri Barrage irrigation system. The main canals irrigating the district are the Kalri Baghar Feeder, Danster Canal, and Dadu Canal.

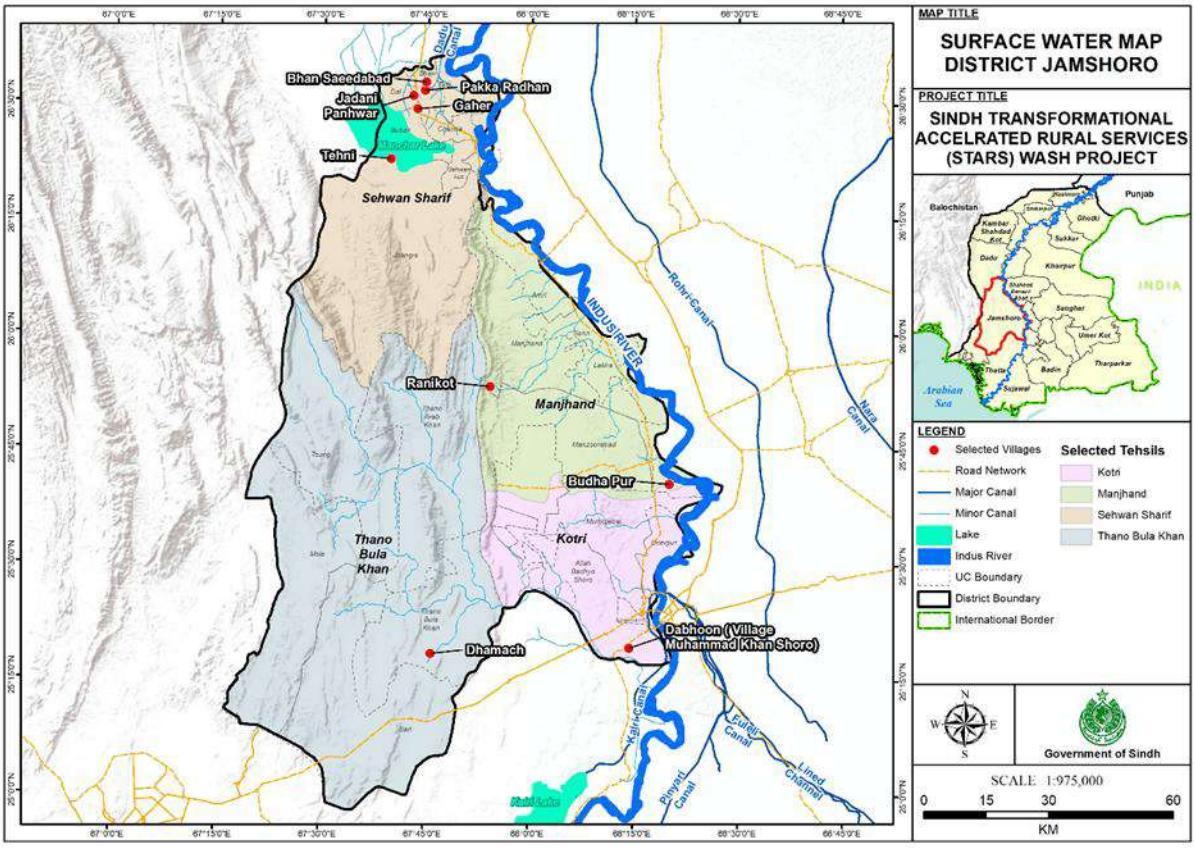


Figure All- 7: Surface Water Map of District Jamshoro

Jamshoro district is a railroad junction and has a number of small, medium-sized, and large railway stations. Kotri Railway Junction is an important railway station from where trains travel in various directions to different parts of the country.

Jamshoro district is home to 2 Thermal Power Houses, namely the Jamshoro Steam Power Plant and Kotri Gas Turbine Power Plant which are both owned and operated by Jamshoro Power Co.

Part of Kirthar National Park (the largest national park in Pakistan) is located in the Jamshoro district. Kirthar is an important habitat for a variety of mammals, birds, and reptiles. Mahal Kohistan Wildlife Sanctuary is situated in the South of Kirthar National Park in Thano Bula Khan tehsil, Jamshoro. Protected wildlife includes common fox, jackal, jungle cat, chinkara gazelle, urial, monitor lizard, and Indian cobra Surjan, Sumbak, Eri and Hothiana Game Reserves located in Thano Ahmad Khan/ Thano Bula Khan; Jamshoro district are also protected areas.

Matriari

Matiari district is located in southern Sindh and lies approximately between 25°30′ to 26°30′ North latitudes and 68°15′ to 68°45′ East longitudes. The district is bounded by Shaheed Benazirabad to the north, Hyderabad to the south, Sanghar to the east, and Jamshoro to the west. The elevation ranges between 20 to 40 meters above sea level.

Administratively, Matiari district comprises three talukas: Matiari, Saeedabad, and Hala. The district is predominantly rural, with agriculture serving as the main source of livelihood. The literacy rate is estimated at around 40–45%, with a noticeable gap between rural and urban areas.

Topographically, the district consists of flat and fertile alluvial plains formed by the Indus River system. The soil is suitable for agriculture and supports a variety of crops.

The climate is hot and semi-arid, characterized by long summers and short, mild winters. Rainfall is low and irregular.

Irrigation is supported through canal systems (Refer to **Figure AII-8**), which play a crucial role in agricultural productivity. Groundwater is also utilized, though its quality may vary.

Agriculture is the backbone of the district economy, with major crops including wheat, sugarcane, and vegetables. The district is also known for traditional handicrafts, particularly in Hala.

Infrastructure is moderately developed, with basic access to roads, schools, and healthcare facilities.

Matiari falls within a moderate seismic zone. Overall, the district is characterized by an agriculture-based economy and moderate socio-economic development.

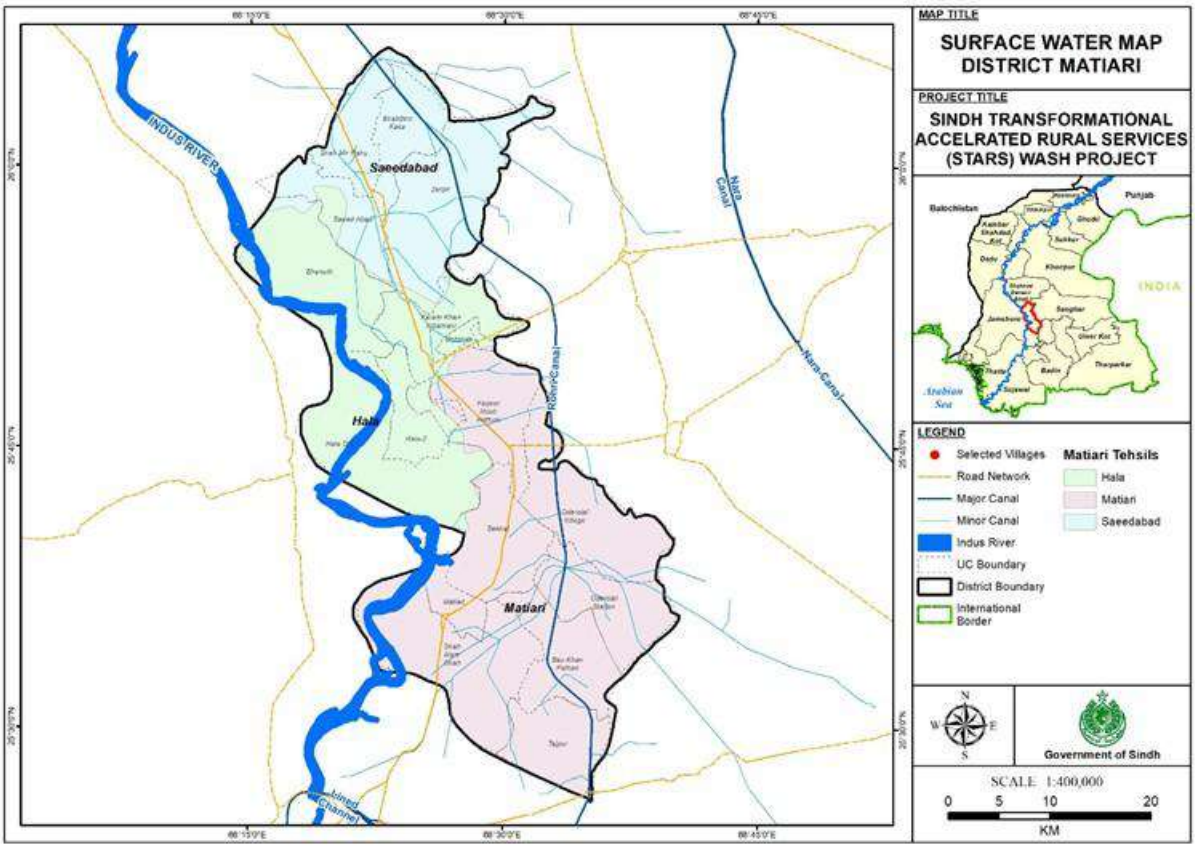


Figure AII- 8: Surface Water Map of District Matiari

Shaheed Benzirabad

The village is located in Shaheed Benazirabad district of Sindh province, which lies approximately between 26°30′ to 27°30′ North latitudes and 68°00′ to 69°00′ East longitudes. The village is situated in the central part of Sindh and is connected to nearby towns such as Nawabshah, Sakrand, and Qazi Ahmed through local road networks. The district is bounded by Naushahro Feroz to the north, Sanghar to the east, and Hyderabad to the south.

Administratively, the village falls under the jurisdiction of its respective taluka (Nawabshah, Sakrand, Daur, or Qazi Ahmed). Governance is managed through the union council system. Basic facilities are available at a limited level, while advanced services are accessed in nearby urban centers. The literacy rate in the village is estimated to be around 40–45%, with a noticeable gender disparity.

Topographically, the village lies on flat alluvial plains formed by the Indus River system. The soil is fertile, consisting mainly of loamy and clayey textures, making it suitable for agriculture.

The climate is hot and semi-arid. Summers are long and extremely hot, while winters are mild. Rainfall is low and irregular, and agriculture depends mainly on canal irrigation.

There are no natural streams in the village (Refer to **Figure AII-9**); however, irrigation is supported through canals originating from the Sukkur Barrage. Groundwater is available but may vary in quality.

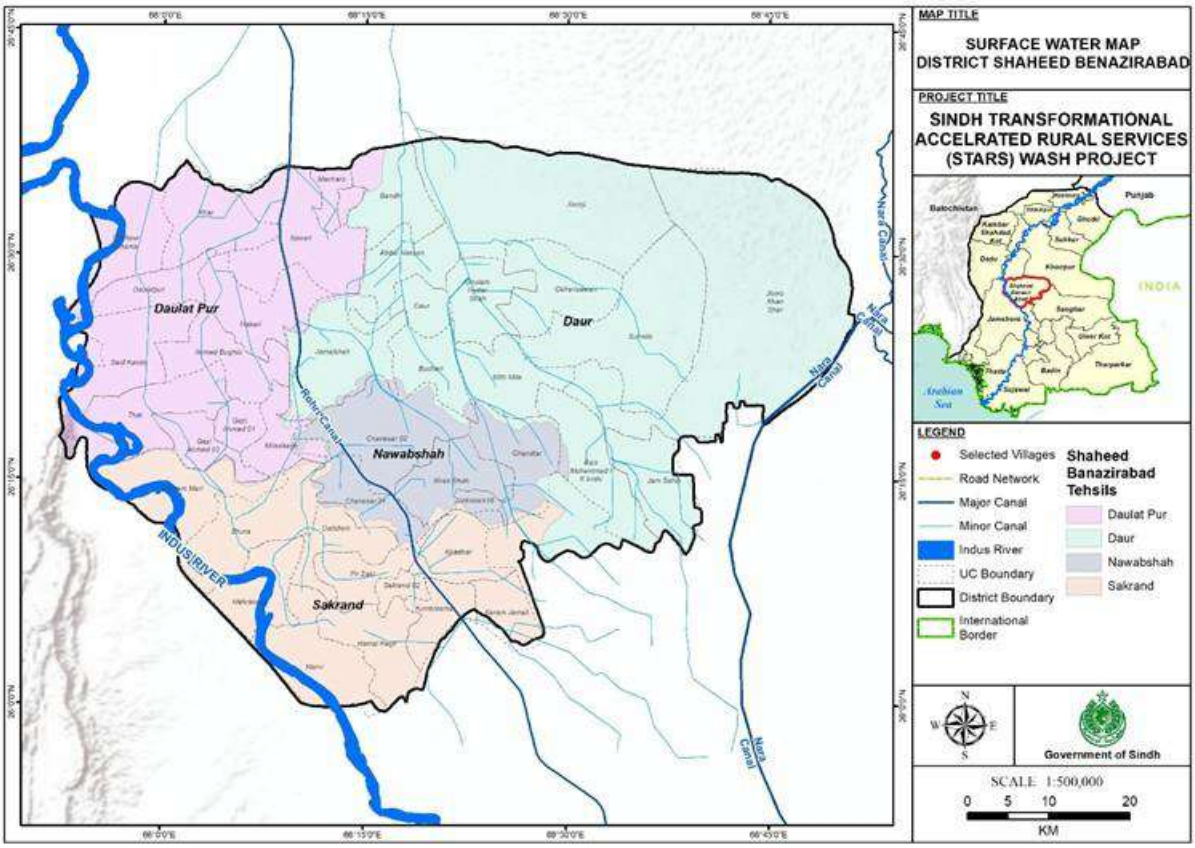


Figure AII- 9: Surface Water Map of District Shaheed Benazirabad

Agriculture is the main economic activity, with major crops including wheat, cotton, and sugarcane. Livestock rearing also contributes to income. Vegetation includes cultivated crops and scattered trees such as neem and babul.

Infrastructure is basic, with limited educational and healthcare facilities. Most services are accessed in nearby towns.

Overall, the village represents a typical rural settlement with moderate agricultural productivity and developing socio-economic conditions.

Shikarpur

Shikarpur district is situated in the northern region of Sindh province. It lies approximately between 27°40′ to 28°20′ North latitude and 68°30′ to 69°10′ East longitude. The district is bounded by Jacobabad and Kashmore to the north, Larkana to the west, Sukkur to the east, and Khairpur to the south. The elevation of the district averages around 50–55 meters above sea level.

Administratively, the district comprises four talukas: Shikarpur, Lakhi, Khanpur, and Garhi Yasin. Shikarpur city is the major urban center and serves as the administrative headquarters. The district has a predominantly rural population, accounting for nearly 70–75% of the total population. The literacy rate is estimated at around 40–42%.

The topography of Shikarpur is predominantly flat, forming part of the Indus alluvial plains. The soil is fertile and suitable for agriculture. The district is irrigated through a network of canals originating from the Sukkur Barrage (Refer to **Figure All-10**).

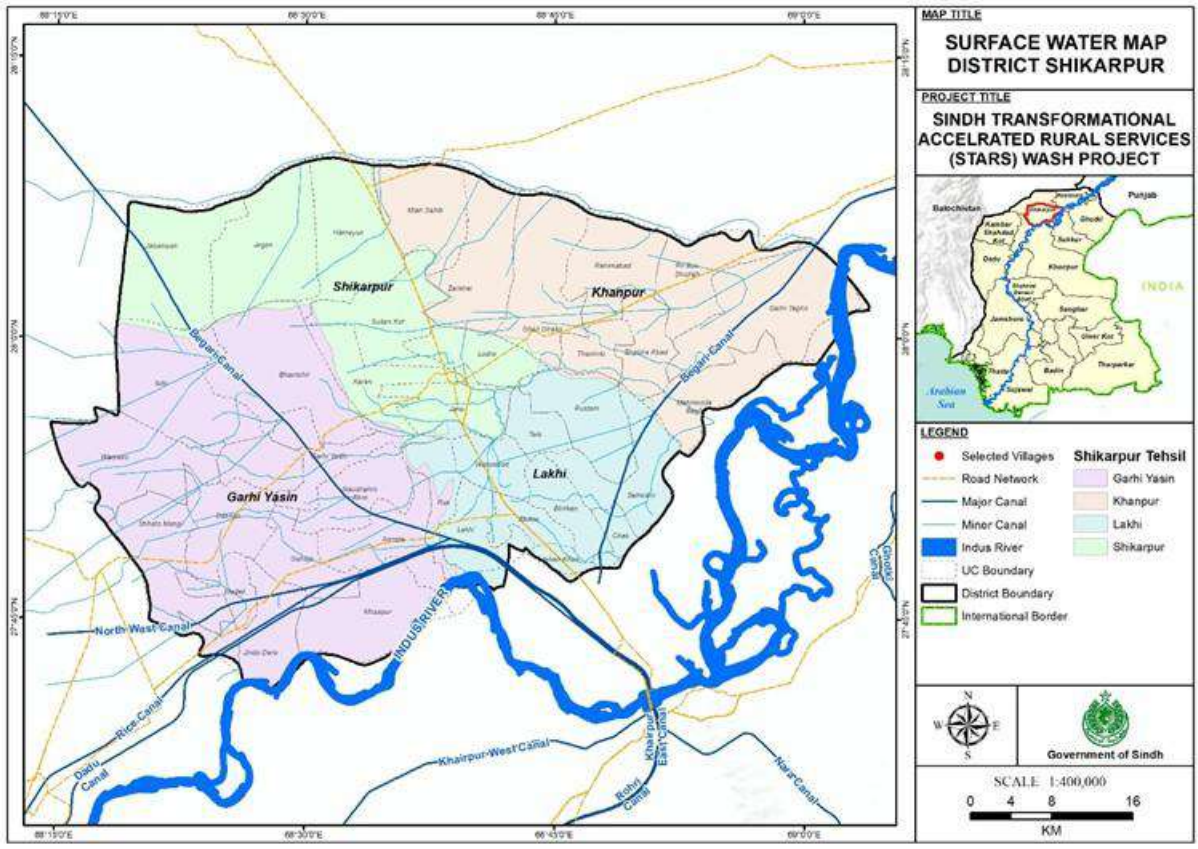


Figure All- 10: Surface Water Map of District Shikarpur

Agriculture plays a central role in the local economy, with major crops including wheat, rice, and dates. The district also has historical significance as a trade center.

Climatically, Shikarpur experiences a hot climate with extreme summers and mild winters. Temperatures can rise significantly during the summer months, while rainfall remains low and erratic, averaging around 100 mm annually.

Seismically, the district falls within a low to moderate risk zone. Overall, Shikarpur is an agriculturally productive district with a strong rural base and moderate literacy levels.

Tando Allaha Yar

Tando Allahyar district is situated in the central part of Sindh Province, lying between 68° 33' to 68° 58' East longitude and 25° 19' to 25° 46' North latitude. It is bordered by Hyderabad district to the West and Northwest, Matiari district to the North, Tando Muhammad Khan district to the South and Southwest, and Mirpurkhas district to the East. The district is centrally located within the fertile Indus Basin plains.

Administratively, the district comprises one municipal committee, Tando Allahyar, and five town committees: Tando Soomro, Chambar, Jhando Mari, Sanjar Chang, and Nasrani. The district is further subdivided into three Talukas: Tando Allahyar, Chambar, and Jhando Mari.

Geographically, the district consists largely of flat and alluvial plains, formed by deposits of the Indus River system. The land is crisscrossed with irrigation canals and distributaries derived from the Jamrao and Nasir Branch canals, off-taking from the Nara Canal of the Sukkur Barrage system. The soils are generally fertile and silty, well-suited for agriculture, which is the backbone of the local economy. Major crops include sugarcane, cotton, wheat, onions, chilies, and banana plantations.

There is no perennial river flowing directly through the district, but it benefits extensively from the canal irrigation network. Several minor natural drains and irrigation watercourses traverse the area (Refer to **Figure AII-11**). The climate of Tando Allahyar is arid to semi-arid, characterized by hot summers and mild winters. The hottest months are May and June, when temperatures range from 46°C to 32°C, while December and January are the coldest months, with temperatures dropping to between 24°C and 10°C. The average annual rainfall is approximately 140 mm, occurring mainly during the monsoon season (July–September).

Vegetation in the district is representative of the Tropical Thorn Forest Zone, with natural flora including acacia species (babul, keekar), tamarix, and capparis. In irrigated tracts, agricultural crops and orchard plantations dominate the landscape, whereas the non-irrigated fringes support only sparse shrub growth and grasses.

The district lies in seismic Zone 2B, indicating a moderate earthquake risk with the likelihood of minor structural damage during seismic events. The absence of major hill systems makes the area less prone to landslides or surface instability.

Tando Allahyar is connected by road and rail networks to Hyderabad, Mirpurkhas, and other surrounding districts through the National Highway system. The Karachi-Mirpurkhas railway line passes through the district, providing an important transportation link.

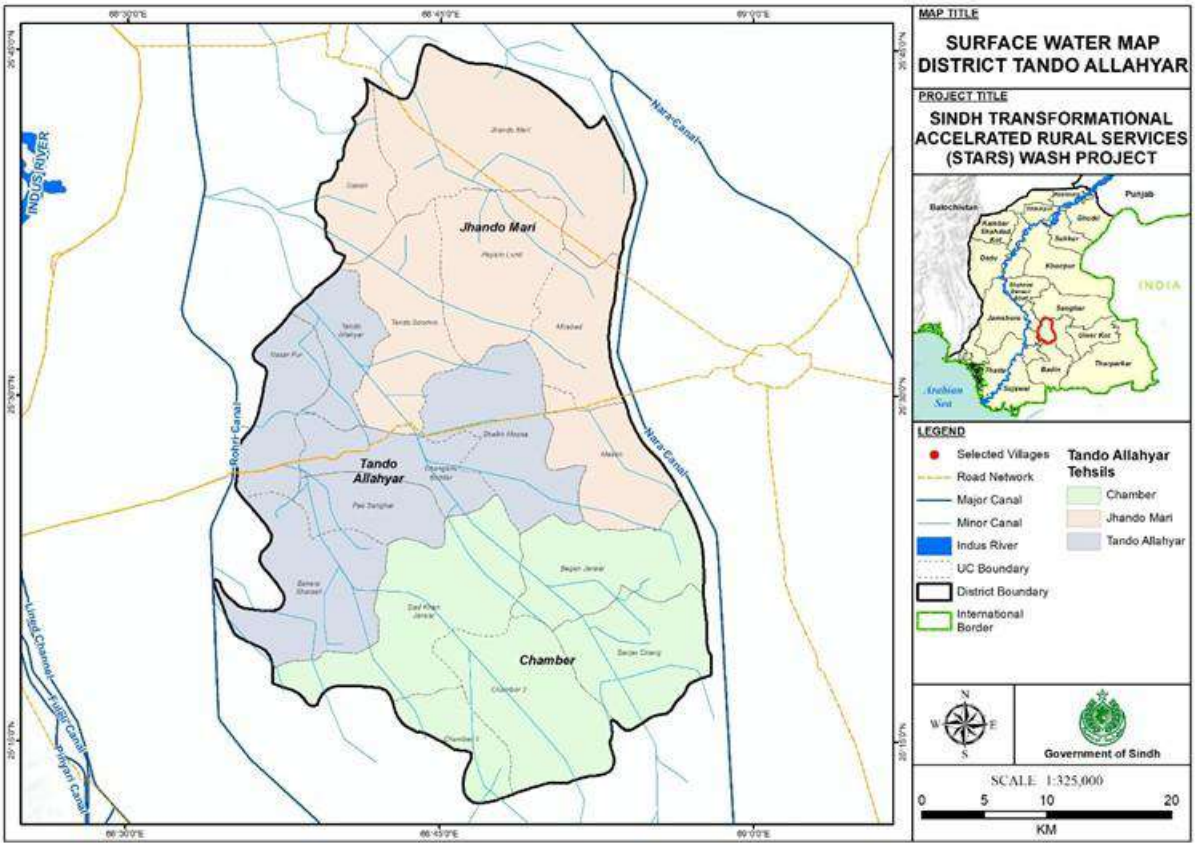


Figure All- 11: Surface Water Map of District Tandi Allahyar

Qambar Shahdadkot

Qamber Shahdadkot district is situated in the Northwest of Sindh Province, spanning from 67° 10’ to 68° 12’ East longitude and 27° 26’ 31” to 27° 58’ 55” North latitude. It shares borders with Nasirabad and Jhal Magsi districts of Balochistan to the Northwest, Shikarpur and Jacobabad districts of Sindh to the Northeast, Larkana district to the East, and district Dadu to the South. To the West lies the imposing Kirthar Mountain Range, beyond which lies the district Khuzdar of Balochistan.

The district has 2 municipal committees: Shahdadkot & Qamber. It has 7 town committees: Miro Khan, Behram, Warah, Gaji Khuhawar, Wagan, Quba Saeed Khan & Naseerabad[71].

The land of the district is like a basin or bowl, surrounded as it is by the Kirthar range. Geographically, the region is divided into three parts: The Kohistan tract (Western tract), the Central Canal Irrigation tract and the Kachho Area.

The only river in the district is the River Indus which flows in the East of the district near its borders with Larkana District. A large number of hill torrents locally known as nais drain. The district is irrigated through canals off-taking from Sukkur Barrage (Refer to **Figure AII-12**). The main irrigation canals of the district are the Kirthar Canal and Saifullah Magsi Canal. The forests of the district belong to Scrub Dry Tropical Thorn Forest Zone. This is the natural vegetation of the Indus Basin. It has the capacity to survive and grow in areas with extremely high temperatures and low precipitation[72].

The district belongs to the semi-arid area of Sindh. Qamber is the fourth hottest region of Sindh after Jacobabad, Shaheed Benazirabad and Larkana. May, June and July are the hottest months, with temperature ranges between 52°C and 33°C. December and January are the coldest months and temperatures range between 21°C and 11°C. Average annual rainfall has been recorded as 102.6 mm during 2002-2007 at the Jacobabad meteorological station, which is the nearest station to Qamber Shahdadkot district. The district falls under zones 2A and 2B of the Pakistan seismic map which means that there will be moderate to low damage by earthquakes.

[71] Profile of Qamber Shahdadkot District by Sheikh Javaid Ali Sindhi for SAROH
[72] Profile of Qamber Shahdadkot District for Saroh, Social Development Organization, Shahdadkot

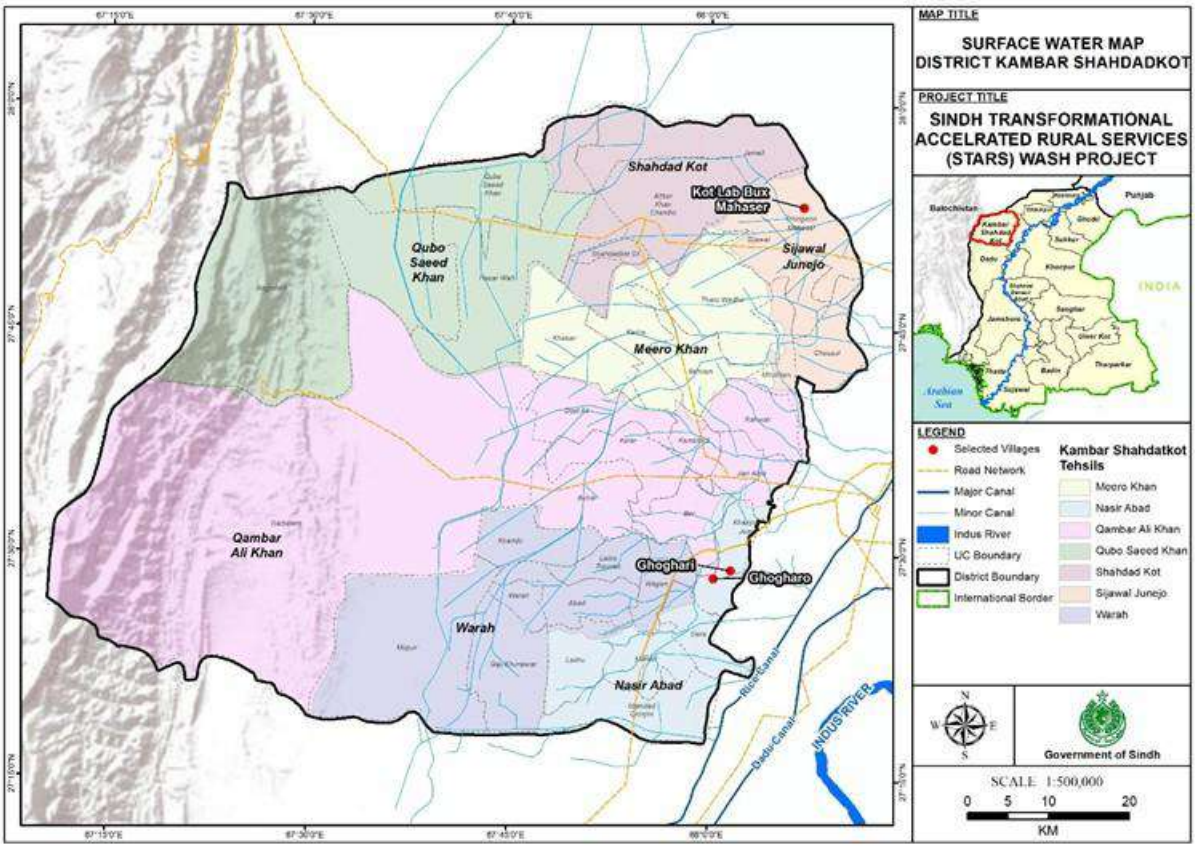


Figure AII- 12: Surface Water Map of District Kamber Shahdadkot

The main Karachi-Peshawar railway line passes through the district. There is no TV station or Radio Station in the district but TV can be viewed through cable TV. Internet is available in all Talukas of the district[73]. Nearly all the major cellular companies operate in the district.

The flora of the district is divided into three parts: irrigated areas, rangelands and the wetlands.

Hyderabad

Hyderabad district is located in the southern part of Sindh province and lies approximately between 25°10′ to 25°45′ North latitudes and 68°10′ to 68°45′ East longitudes. The district is bounded by Matiari to the north, Tando Allahyar and Mirpurkhas to the east, Tando Muhammad Khan and Badin to the south, and Jamshoro district to the west. The district lies at an average elevation of about 13 to 20 meters above sea level.

Administratively, Hyderabad district comprises four talukas: Hyderabad City, Latifabad, Qasimabad, and Hyderabad Rural. Hyderabad is one of the major urban centers of Sindh,

[73] Sindh Development Statistics 2017-18

and the district has a relatively high urban population. The literacy rate is comparatively higher than many other districts of Sindh, estimated at around 60–65%, with better access to education in urban areas.

Topographically, the district is part of the lower Indus plain and consists of flat alluvial land. The soil is fertile and suitable for agriculture, particularly in rural areas.

The climate is hot and semi-arid. Summers are extremely hot, while winters are mild. Rainfall is low and irregular, with occasional monsoon showers.

Hydrologically, the district is irrigated through a network of canals originating from the Indus River (Refer to **Figure AII-13**). Groundwater is also used, although its quality varies in different areas.

Agriculture is practiced mainly in rural parts, with crops such as wheat, vegetables, and fodder. However, the district economy is largely diversified, with significant contributions from trade, industry, and services due to urbanization.

Infrastructure in Hyderabad is well developed compared to other districts, with better road networks, healthcare facilities, and educational institutions.

The district falls within a moderate seismic zone. Overall, Hyderabad is a relatively developed district with a mix of urban and rural characteristics and strong economic activity.

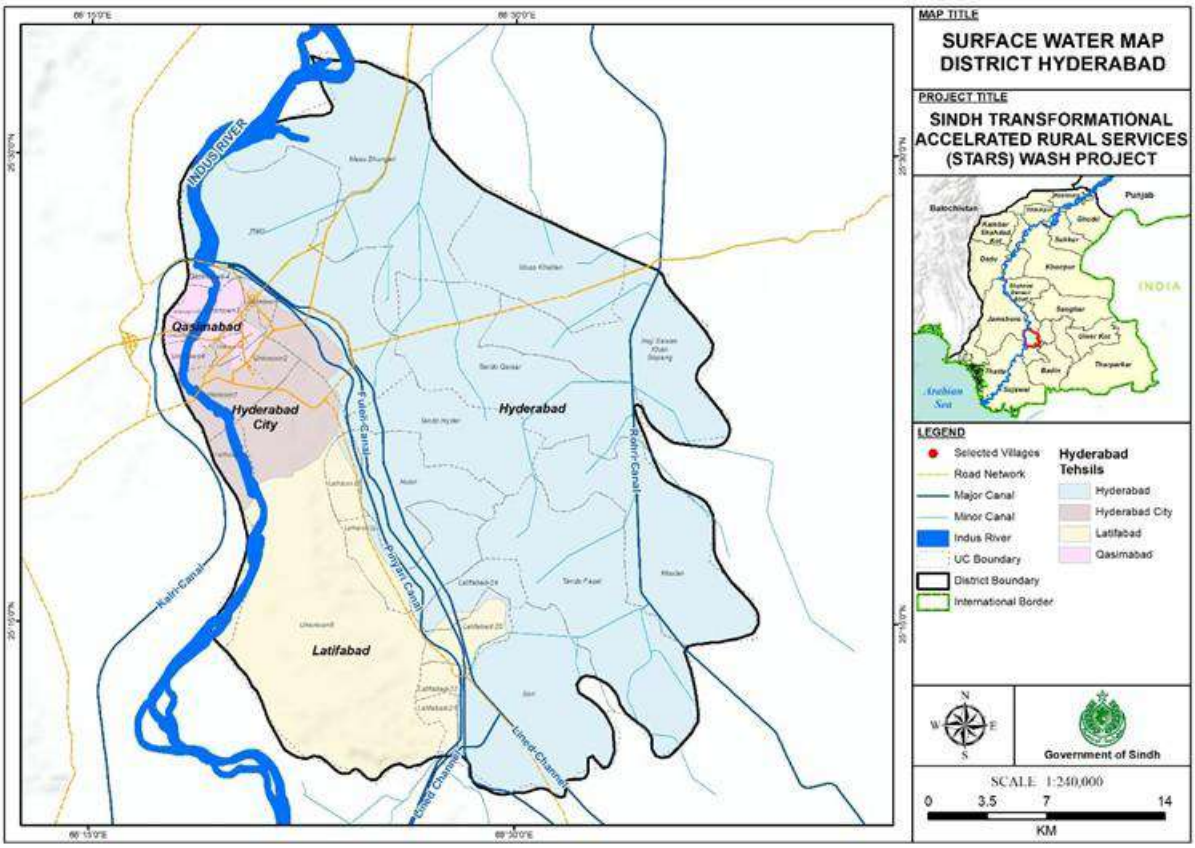


Figure All- 13: Surface Water Map of District Hyderabad

Sujawal

The district is located between 23° 48” 44' to 25° 26” 35' North latitudes and 67° 20” 48' to 68° 44” 52' East longitudes. This district is bounded by Badin and Tando Muhammad Khan districts on the East, Jamshoro district on the North, Hyderabad district on the Northeast, Karachi district on the Northwest and the Arabian Sea and Runn of Kutchh on the South. Sujawal Taluka was upgraded to a district in 2014. Only 2017 population figures are available which have been added to the total population figures of Thatta District but for the rest, this volume continues to treat it as a Taluka of Thatta. The literacy rate in Thatta district is 22.1% with 31.6% males and 11.4% females being literate.

The River Indus divides the district into 2 parts: Sujawal, Mirpur Bothoro, Jati, Shah Bunder, and Kharo Chan talukas on the East, and Thatta, Mirpur Sakro, Keti Bunder, and Ghora Bari talukas on the west of the river (Refer to **Figure All-14**). The northwestern area of the district is a hilly tract called Kohistan.

The district belongs to Zone 2A of the Pakistan Seismic Zone Map which is the minor to moderate damage seismic zone. The soils of the district are extremely saline, especially during the Monsoon period, but salinity declines in the post-Monsoon months. There are

many lakes in the district, of which the most famous are Kalri and Haleji. The Kalri/ Kinjhar Lake is a reservoir for feeding canals in the Thatta district and was formed by joining two lakes: The Kinjhar and Sonehri.

The main source of irrigation in the district is a number of canals, tube wells, lift irrigation, and the spill from the River Indus. There are some barani areas (areas that do not have irrigation facilities) in the district, which depend upon rains for cultivation. The hilly areas of the district are cultivated using Monsoon water and wells, while the canals and channels irrigate the other areas. The district is irrigated through the Kotri Barrage irrigation canals.

The climate of Thatta district is generally moderate. Due to its proximity to the sea, Thatta district experiences moderate temperatures in summer as well as in winter. The sea breeze blows from March to October, making the hot weather comparatively temperate. This also makes the summer humid. May is the hottest month. The mean maximum and minimum temperatures during this month are 40 °C and 25 °C respectively. The winter season starts in November, when a sudden change from the moist sea breeze to dry and cold by the Northeast winds brings a change. January is the coldest month. The mean maximum and minimum temperatures during this month are 26 °C and 9 °C respectively. Rainfall is scanty, and erratic, and mostly occurs during the Monsoon season from July to September. The average annual rainfall is about 200 mm.

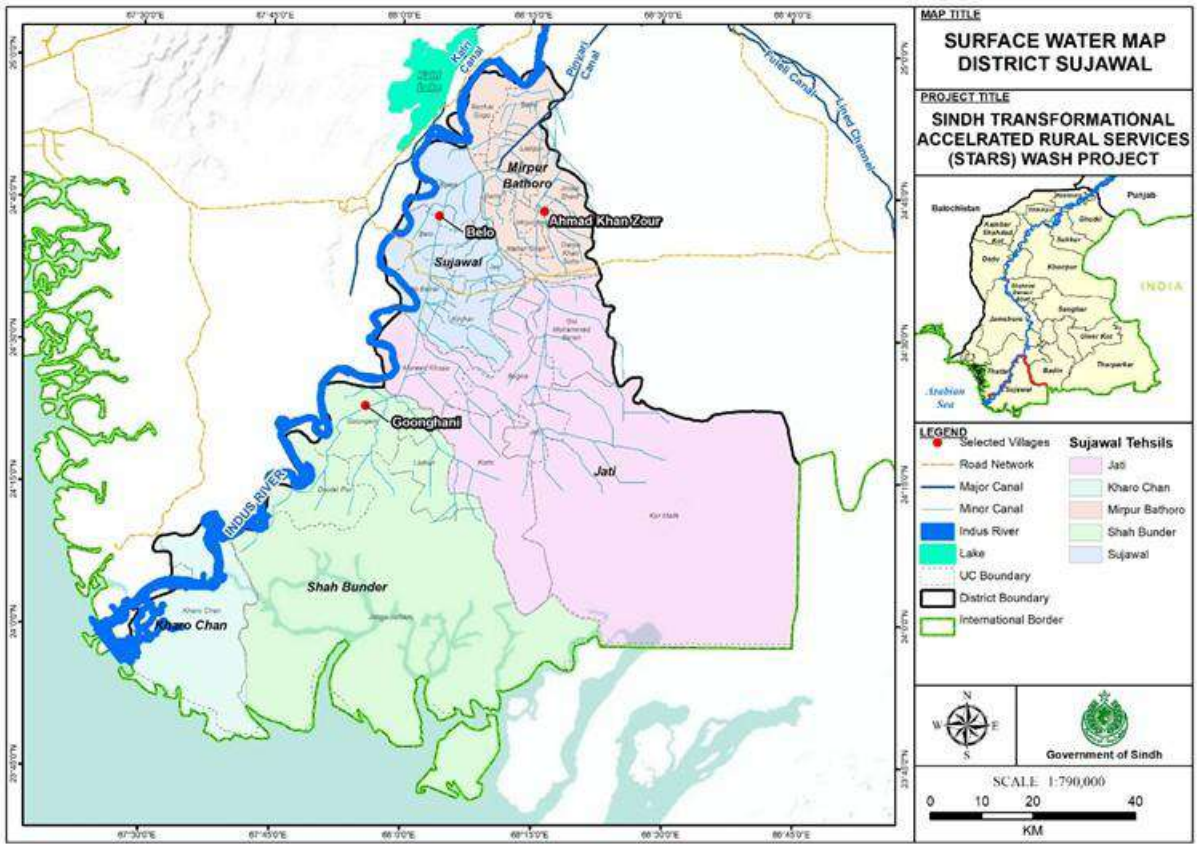


Figure All- 14: Surface Water Map of District Sujawal

The flora of the area is governed by the type of soil and the amount of moisture available. Thatta district has a wide range of soil types due to its diverse land forms which include sandy, deltaic, alluvial, gravel, coastal and mountainous soils, as described already. The main flora of the Riverine Forests[74] is babul (*Acacia nilotica*), bahan or euphrates poplar (*Populus euphratica*), athel pine or farash (*Tamarix aphylla*), lai or salt cedar (*Tamarix dioca*) and kandi (*Prosopis cineraria*).

Thatta district is connected to the rest of the country through the National Highway N-5, which passes through Gharo, Mirpur Sakro Taluka. The main Karachi–Lahore–Peshawar railway line also passes through the northern parts of Thatta district. There is no airport in Thatta district. The closest airport is Jinnah International Airport, Karachi.

Kashmore

Kashmore district is located in the northern part of Sindh province. Geographically, it lies approximately between 27°30′ to 28°30′ North latitude and 68°00′ to 69°00′ East longitude. The district is bordered by Jacobabad district to the west, Shikarpur to the

[74] Study of Riverine Forests, Upstream Sukkur and Downstream Kotri Barrage, Indus for All Program, WWF, Pakistan

south, Ghotki to the southeast, and the provinces of Punjab and Balochistan to the north. The general elevation of the district is around 50–60 meters above sea level.

Administratively, Kashmore district comprises three talukas: Kashmore, Kandhkot, and Tangwani. Kandhkot serves as the main urban and administrative center. The district is predominantly rural, with an estimated rural population exceeding 70%. The overall literacy rate is relatively low, estimated at around 30–32%, with significant disparities between urban and rural areas.

Topographically, the district is part of the Indus River floodplain and is characterized by flat alluvial terrain. The land is fertile but prone to seasonal flooding. The Indus River flows along the district, making it an important source of irrigation and agriculture.

The irrigation system is well developed, supported by canals originating from the Guddu Barrage (Refer to **FigureAll-15**). Agriculture is the backbone of the local economy, with major crops including wheat, rice, and sugarcane. The soil is mainly alluvial, consisting of loamy and clayey textures.

Climatically, Kashmore experiences a hot and semi-arid climate, with extremely high temperatures during the summer months. Rainfall is low and irregular, averaging between 50 to 100 mm annually. Summers are long and intense, while winters are mild.

The district falls within a moderate seismic zone, indicating a low to moderate risk of earthquake damage. Overall, Kashmore district is characterized by its agrarian economy, high rural population, and vulnerability to climatic extremes and flooding.

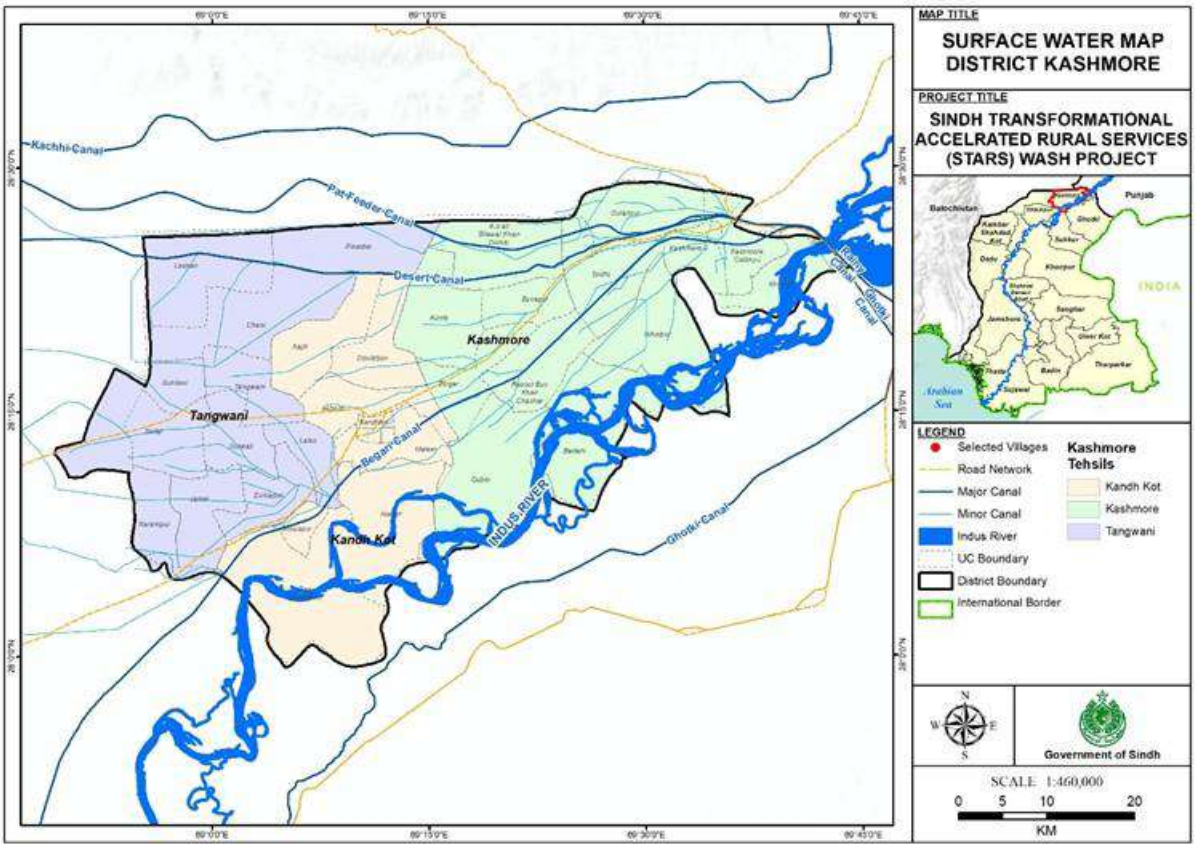


Figure AII- 15: Surface Water Map of District Kashmore

Mirpurkhas

Mirpurkhas district is located between 24° 48' 33" to 25° 48' 7" North latitudes and 68° 59' 3" to 69° 16' 53" East longitudes. It is bounded on the North by Sanghar district, on the Northwest by Tando Allahyar district, on the Southwest by Badin and Tharparkar districts, and on the East by the Umerkot district.

The district has 2 Municipal Committees: Mirpurkhas & Shujaabad. It has 6 Town Committees: Hingomo, Kot Ghulam Muhammad, Digri, Tando Jan Muhammad, Jhuddo & Naukot.

Mirpurkhas district is mostly a plain and irrigated area and is located 70 km from Hyderabad. The soils of Mirpurkhas district consist of loamy and some sandy, young, stratified flood-plain soils of arid and semi-arid zones and consist of alluvial deposits of the Indus; the region is irrigated by canals of the Indus Basin Irrigation System (Refer to **Figure AII-16**). The district has fertile land, making conditions appropriate for farming through irrigation. The district does not have a river but has a natural inundation canal, which is locally called the Nara Dhoro (Eastern Nara Canal). Puran Dhora is a natural seasonal stream in the district flowing in the Mirpurkhas Taluka.

The climate of the district is extreme. The months from April to October are very hot; this heat is relieved by the blowing of the southwestern breeze from the sea. The mean maximum temperatures during these months vary between 37°C to 42°C, while the mean minimum temperatures during this period vary between 18°C to 27°C. The winter months are December, January, and February, when maximum and minimum temperatures are 28°C and 9°C respectively.

Rainfall varies from year to year. Rain mostly occurs during the Monsoon period, between July and September; the mean annual rainfall in Mirpurkhas is about 232 mm.

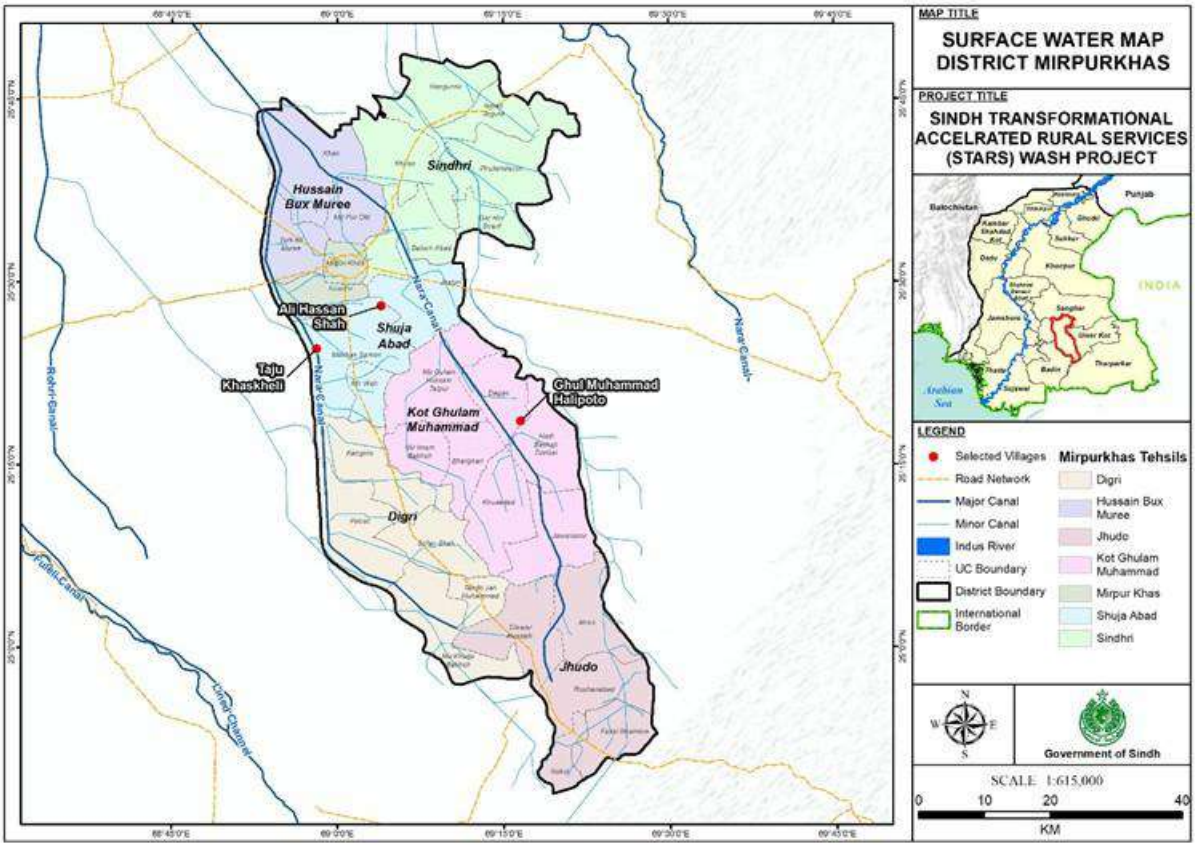


Figure All- 16: Surface Water Map of District Mirpurkhas

The district lies in Zone 2 A of the Seismic Activity Zone Map of Pakistan which means there is low to moderate damage to property due to earthquakes.

The total forest area in Mirpurkhas district is 1,000 HA only. This area mostly consists of rangeland situated in Kot Ghulam Muhammad Bhurgari Taluka.

A Provincial Highway connects Hyderabad with Mirpurkhas via Sultanabad, Tando Allahyar, and Tando Jam. The town of Mirpurkhas serves as a railway junction for both meter and broad gauge lines.

There are no wildlife-protected areas in the Mirpurkhas district. According to the study on ethnobotanical plants of Mirpurkhas district conducted by Faisal Hussain, S. Shahid Shaukat, Muhammad Abid, and Farzana Usman of the Botany Department, Karachi University (2012), there are a large number of plants growing in the district.

Most of the cellular phone companies in Pakistan provide their services in Mirpurkhas

Physical Environment

The environmental baseline study describes the physical conditions and characteristics in the defined or selected districts. This study includes topography, geology, hydrology, land use, climate and weather patterns, air quality, noise, surface water and groundwater quality. The physical features of the proposed area are given in the following sections.

Geography

The province of Sindh forms the Lower Indus basin and lies between 23° 35' and 28° 29' North latitudes and 66° 40' and 71° 05' East longitudes. It is about 579 km in length from North to South and nearly 442 km in extreme breadth (281 km average). It has a total area of 140,915 km^2. Sindh is bordered in the North by Balochistan and the Punjab, in the East by Rajasthan (India), in the South by the Runn of Kutch and the Arabian Sea and in the West by the Hub and Khuzdar districts of the province of Balochistan.

Sindh can be geographically segmented into four distinct regions: the arid and desolate Kirthar Range to the west, a central alluvial plain intersected by the Indus River, a desert stretch to the east, and the Indus delta in the south.

Kirthar Range (Western Hilly Tract):

- The Kirthar Range stretches westward, forming the boundary between the Lower Indus Plain (to the east) and Southern Balochistan (to the west).
- Composed of parallel rock hill ridges, it rises from approximately 1,200 meters (4,000 feet) in the south to nearly 2,500 meters (8,000 feet) in the north.
- Vegetation is scarce due to limited rainfall.
- Notable peaks include Borough Hills (2,151 meters or 7,056 feet) and Kutte-ji-Kabar (Dog's Grave) at 2,097 meters (6,880 feet).
- The Lakki Mountain Range, an offshoot of Kirthar, lies north of Manchar Lake and features thermal springs.

Central Alluvial Plain (Indus River Valley):

- The fertile Central Plains constitute the valley of the Indus River.

- These plains extend about 580 kilometers in length and cover an area of approximately 51,500 square kilometers.
- Gradually sloping from north to south, they rise to a maximum of 100 meters above sea level.
- Flood silt dominates the lower part of this area.
- Notable limestone ridges include the Rohri Cuesta (near Rohri) and the Ganjo Takkar (southward from Hyderabad).

Eastern Desert Belt:

- The easternmost part of Sindh features a desert belt.
- Dry and arid, this region contrasts with the fertile plains and rugged mountains.
- It contributes to the diverse topography of Sindh.

Geology and Geomorphology

The geology of Sindh is divisible into three main regions: the mountain ranges of Kirthar and Pab, containing a chain of minor hills in the west and the east, which is covered by the Thar Desert and part of the Indian Platform, where the main exposure is of Karonjhar Mountains, which is famous for Nagarparkar Granite. In the north, Sindh is surrounded by rocks of the Laki range extending to the Suleiman range and its southernmost part is encircled by the Arabian Sea. The rocks exposed in this area belong to the upper Cretaceous, which is recent in age. The subsurface rocks are about 20,000 feet thick and belong to the Cretaceous and Pre-Cretaceous periods. Mostly the rocks are of sedimentary origin of clastic and non-clastic nature and belong to marine, partly marine and fluviatile depositional environments.

Basin Sindh lies in the lower Indus Basin and its main tectonic features are the platform and fore-deep areas. Thick sequences of Pab sandstone of Upper Cretaceous, Ranikot Group (Khadro, Bara, Lakhra) of Paleocene, Laki, Tiyon, and Kirthar of Eocene age, Nari Formation of Oligocene, Gaj Formation of Lower to Middle Miocene, Manchar of Upper Miocene to Pliocene, Dada Conglomerate of Pleistocene are present in various areas of Sindh. Limestone and sandstones are the most dominant sedimentary rocks in the area.

The geological map of Sindh is shown in **Figure AII-17.**

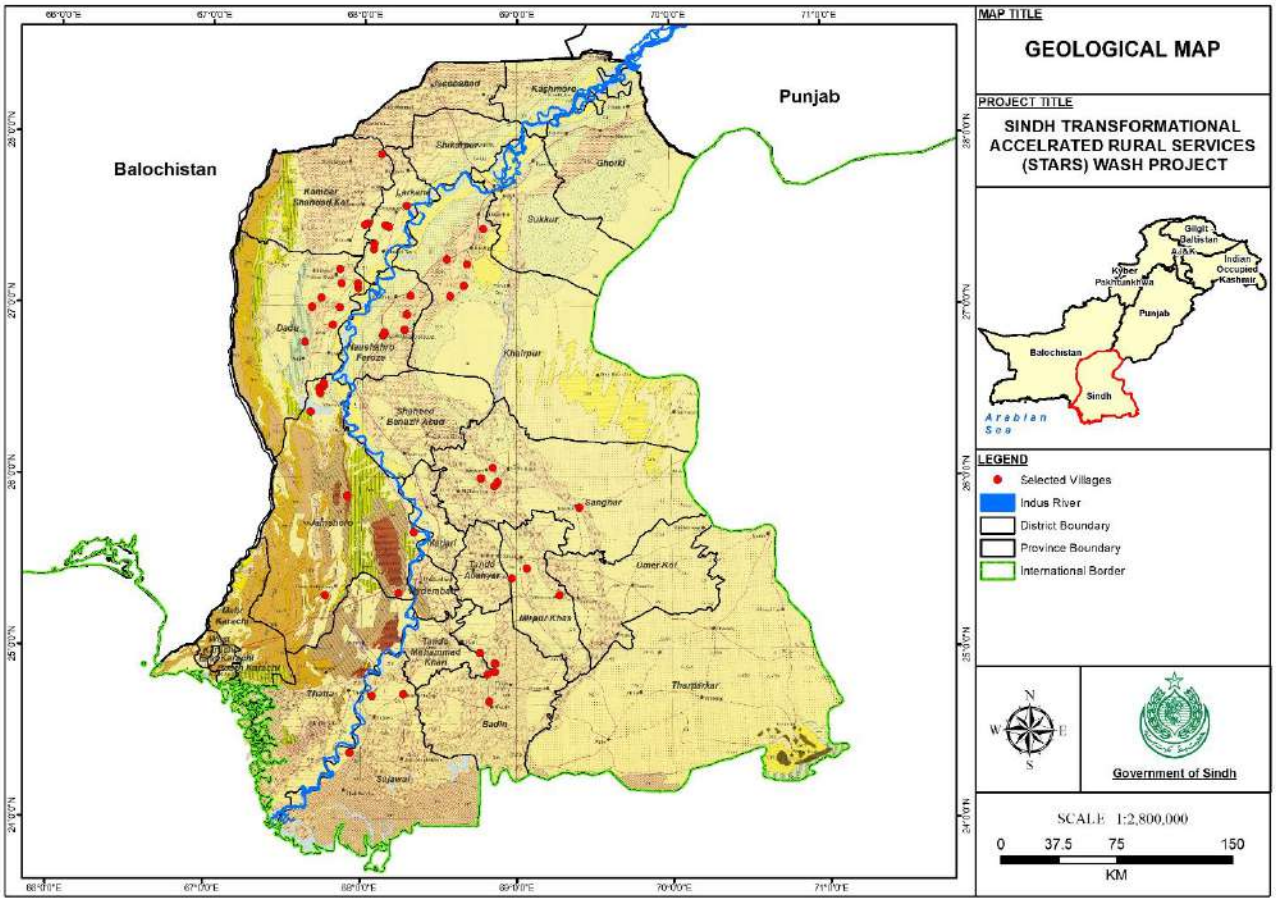


Figure AII- 17: Geological Map of the Sindh

Soil Morphology

The soil in the plains of Sindh is mostly plastic clay that has been deposited by the Indus. When combined with water, it develops into a rich, mouldable clay, and without water, it degenerates into a dry, sandy, desert-like consistency. Nearly the entire Indus valley is rich in soil, which is extremely friable [Friable soil has a crumbly texture and is considered to be ideal for plant growth if it forms a part of loamy soil] and easily disintegrated by flowing water. As a result, the water in Sindh always contains a large amount of suspended silts. The following map, as depicted in **Figure AII-18** shows the location of different types of soils in Sindh.

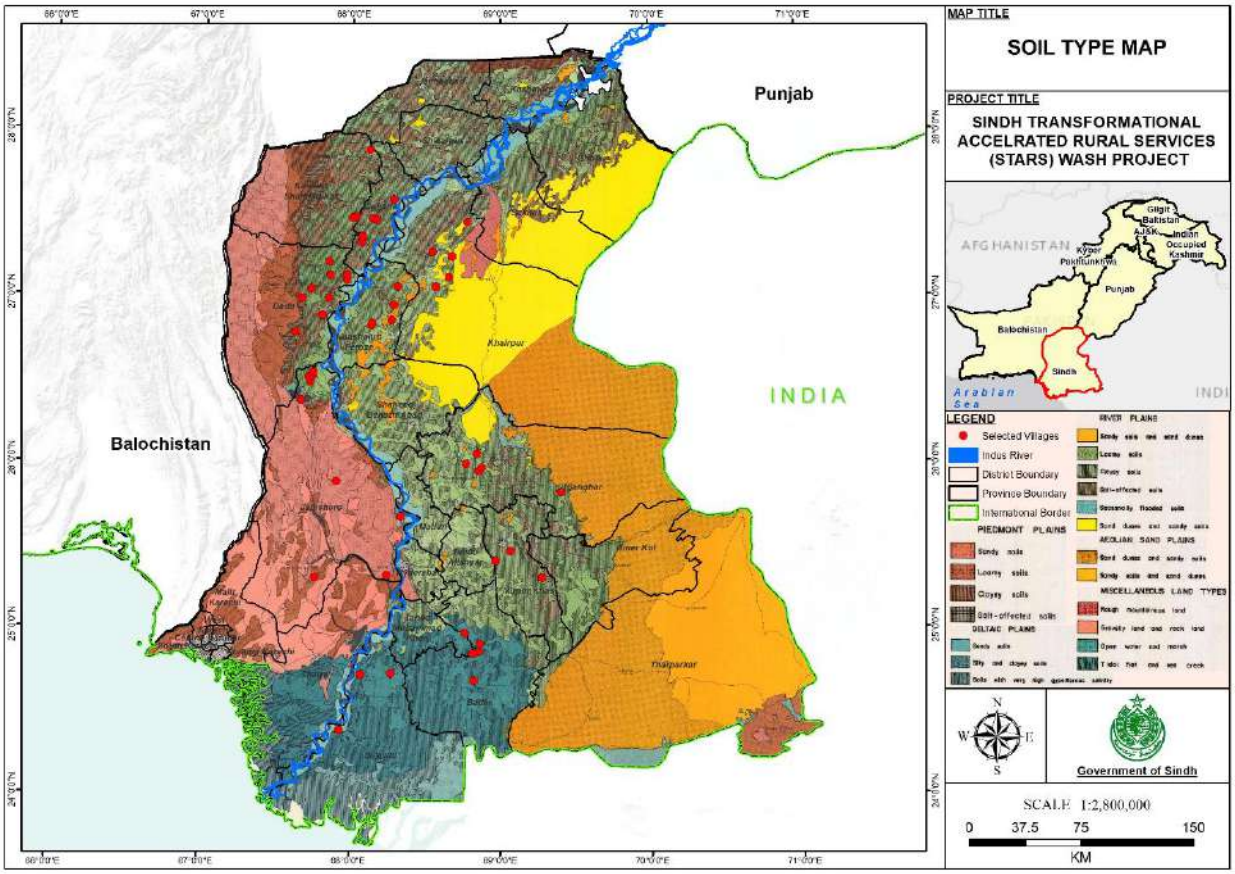


Figure AII- 18: Soil Morphology of Sindh

Seismicity

On the basis of Peak Ground Acceleration (PGA) values obtained through Probabilistic Seismic Hazard Assessment (PSHA), Pakistan is divided into five (05) seismic zones in line with the Uniform Building Code (UBC), 1997 of Pakistan.

According to the seismic map of Pakistan, most parts of the province lie in zone “2A” of the Earthquake Zones Classification of the Uniform Building Code (UBC – 1997) of the United States. This zone is associated with unknown geologic conditions and the earthquake damage is “Low.” However, earthquakes of magnitude up to five on the Richter scale, which generate ground acceleration up to 0.1g, have been reported for this zone. The seismic zoning map of Sindh province is shown in **Figure AII-19.**

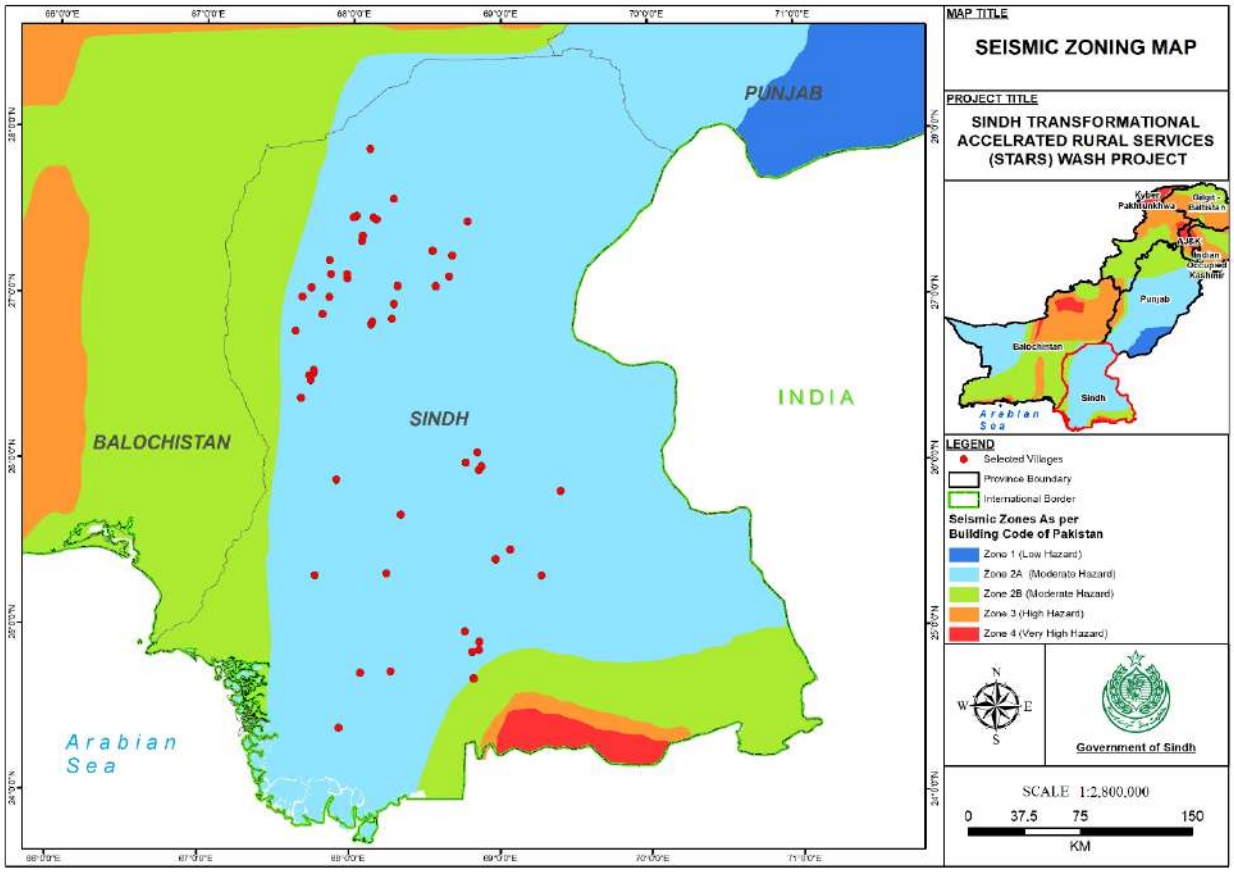


Figure All- 19: Seismic Zoning Map of Sindh

Climate

The climate of Sindh bears resemblance to both the arid conditions of the Sahara and the tropical climates found in low, dry lowlands. Sindh's geographical features, including the Thar Desert to the East, the sea to the South, and the Kirthar Range to the West and Northwest, contribute to its diverse climatic conditions.

In Lower Sindh, August experiences the highest humidity at 75%, while December marks the driest month with 47% humidity. Conversely, April stands out as the most humid month in Upper Sindh, with a humidity level of 47%. Consequently, Upper Sindh tends to be drier and hotter compared to Lower Sindh, yet the lower humidity makes the weather more tolerable. Winds in Upper Sindh are typically calm for approximately half of the year, but closer to the coast, particularly during the Monsoon months, wind velocity is notably high. Dust storms and squally weather are frequent at the onset of the two primary seasons (summer and winter).

Climatically, Sindh is delineated into three sections:

i. Siro (upper section with Jacobabad as its center)

ii. Wicholo (middle section with Hyderabad as its center)

iii. Lar (lower section with Karachi as its center)

Sindh is hot in the summer and cold in winter. Temperatures frequently rise above 46°C between May and August, and the minimum average temperature of 2 °C (36 °F) occurs during December and January. The annual rainfall averages about 179 mm, occurring mainly during July and August. The Southwest Monsoon wind begins to blow in mid-February and continues until the end of September, while the cool Northerly wind blows during the winter months, from October to January.

Mean temperatures (maximum and minimum) and rainfall data of the selected meteorological stations across the Sindh province are presented in **Table AII-1** and a graphical presentation is shown in **Figure AI-20** for mean temperatures (maximum & minimum) and rainfall, respectively.

Table AII- 1: Mean Temperatures (minimum & maximum) and Rainfall

Meteorological Gauging Station	Mean Minimum Temperature	Mean Maximum Temperature	Rainfall
	(°C)	(°C)	(mm)
North			
Jacobabad	10.33	45.53	83.34 mm/yr
Qambar Shahdadkot	10.06	44.49	86.23 mm/yr
Dadu	10.55	43.97	113.76 mm/yr
Central			
Umerkot	12.01	42.85	179.30 mm/yr
Jamshoro	11.67	41.89	124.66 mm/yr
Mirpurkhas	11.87	43.37	165.69 mm/yr
South			
Sujawal	14.23	37.98	178.84 mm/yr
Thatta	13.9	38.32	151.85 mm/yr
Tharparkar	12.34	40.35	237.47 mm/yr

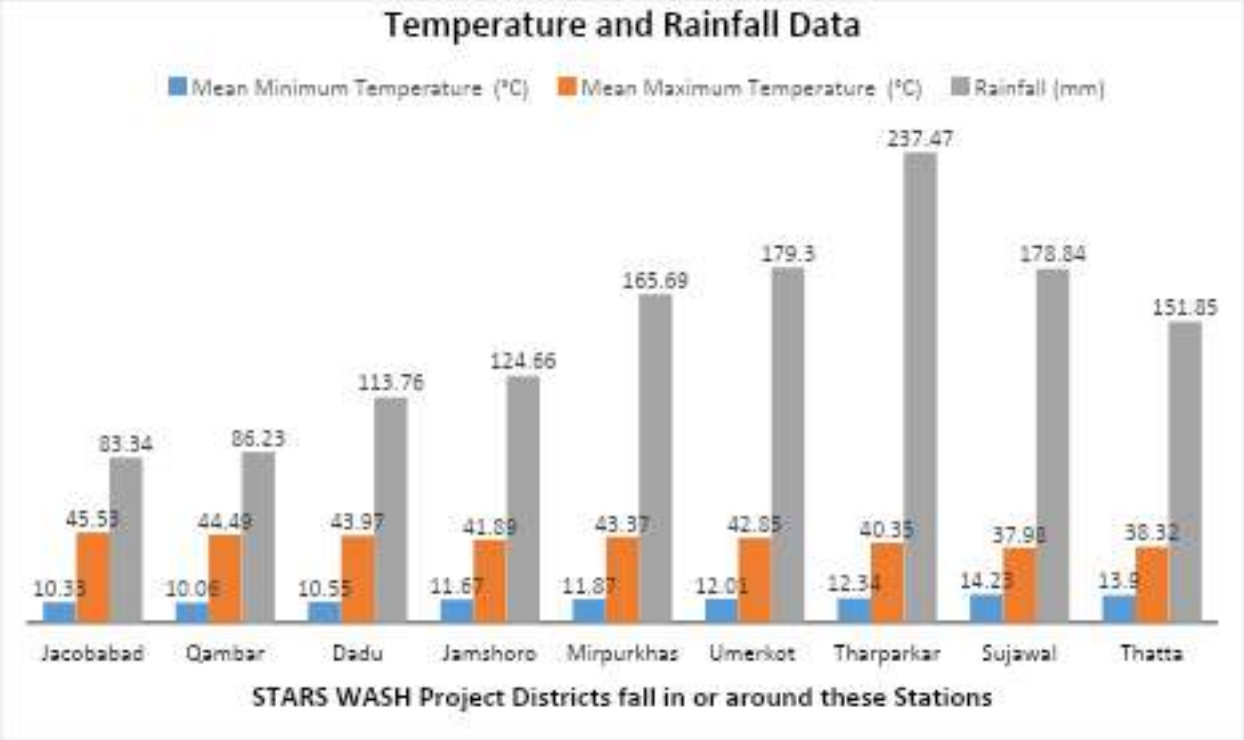


Figure AII- 20: Mean Maximum and Minimum Temperatures and Rainfall Data

Surface Water

Sindh's sustenance and progress hinge entirely on the River Indus. Approximately 95% of Sindh's farmlands rely on the River Indus for irrigation water. The province boasts a significant number of both seasonal and perennial streams. Noteworthy perennial streams include Khadeji in Karachi, Achleshwar and Sardharo in Tharparkar, as well as Gaj and Hab in District Dadu.

Several significant rivers and streams traverse Sindh:

Hub River: Originating from the Pab Range, this perennial stream typically forms shallow pools throughout the year. The Hub dam, constructed on this river, serves as the primary water source for Karachi.

Baran River: Emerging from the Kirthar Range, the Baran River collects water from various nais (small streams) before merging into the Indus.

Malir River: A seasonal stream, the Malir River converges with the perennial Khadeji River. Following heavy rainfall, it eventually joins the Gizri Creek near Karachi.

Lyari River: Flowing into the Kemari Harbor, the Lyari River is another significant watercourse in the region.

Additionally, Sindh is traversed by several smaller rivers originating from the Kirthar Range and its foothills. These include the Mohan or Rani River, which originates east of the Lakki Range, and the Sann River (a section of the Mohan River outside the Lakki Range). Other notable rivers include the Chorlo, Nai Naegh, and Angyi. All of these watercourses eventually flow into either the Indus River or the Arabian Sea.

There are a total of 42 streams in Sindh, of which, 39 are in Dadu district, 1 in Thatta district, and 2 in Karachi. Of the 39 streams in Dadu. There are a large number of lakes and wetlands of international and national importance in Sindh. Some of these are protected under International Wildlife laws.[75]

Irrigation System

Sindh stands as a primary beneficiary of the Indus Basin irrigation system, facilitated by three massive barrages redirecting approximately 48 million acre-feet (MAF) of water annually to 14 main canal commands within the province. The Sindh Irrigation & Drainage Authority (SIDA), an autonomous body, has assumed control over the Sindh Irrigation & Drainage System, initially managed by the Sindh Irrigation Department, notably overseeing operations of the Nara Canal, Left Bank Canal (Fulleli & Akram Wah), and Ghotki through Area Water Management.

The irrigation infrastructure comprises 14 main canals, 1,446 distributaries and minors, and 42,000 watercourses, collectively spanning 75,000 miles in length. Among these, five canals are situated on the Right Bank and nine on the Left Bank of the Indus River, with considerable variations in the culturable command areas (CCA) they serve. The Rohri Canal boasts the largest CCA, in contrast to the K.F. West Canal, which covers the smallest. Originally, canals like Rice Canal and Beghari Feeder on the Right Bank, and Pin yari and Phullelli on the Left Bank, were non-perennial; however, with the exception of Rice Canal, these have been transformed into more or less perennial systems.

Groundwater

Groundwater plays a crucial role in Sindh's agricultural landscape, particularly given that over 80% of the land is underlain by saline groundwater unsuitable for irrigation. The scarcity of irrigation water, compounded by recent drought conditions, has led to an increased reliance on groundwater exploitation, even in areas with marginal water quality. Fresh groundwater is predominantly found in a strip parallel to the left bank of the Indus River and in certain pockets elsewhere. The shallow aquifers exhibit high transmissivity. The installation of over 30,000 tube wells, both in the private and public sectors, is indicative of the extensive efforts to extract water for agricultural use.

[75]https://documents1.worldbank.org/curated/en/882281468286773614/pdf/E12640V10REPLA0isclosed011015020060.pdf

However, this groundwater development presents challenges, such as the potential for secondary soil salinity due to the use of marginal quality groundwater and the intrusion of saline water into fresh water aquifers.

The quality of groundwater ranges from fresh (salinity less than 1000 mg/l TDS) near the major rivers to highly saline farther away, with salinity more than 3000 mg/l TDS. The water table varies from as low as 1 meter in waterlogged areas to as deep as 90 meters in desert areas.

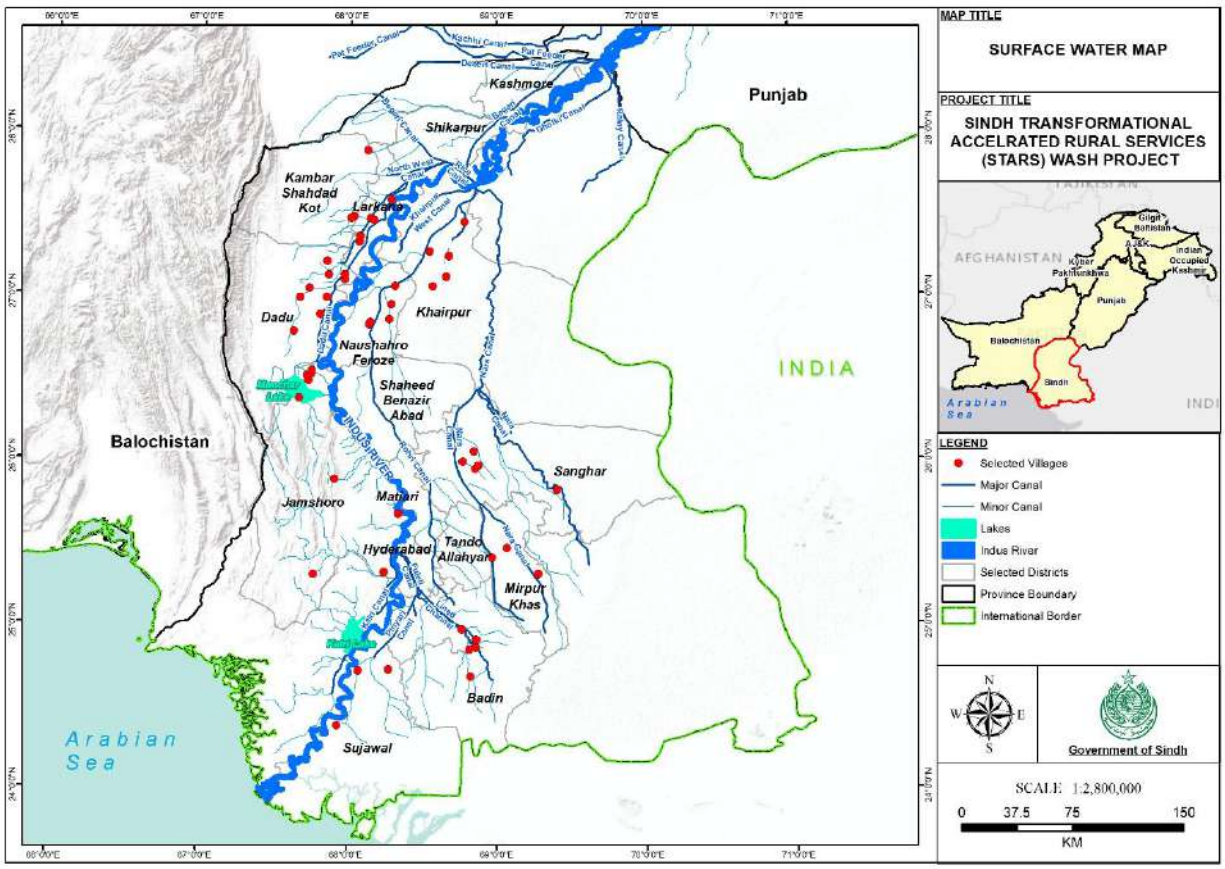


Figure AII- 21: Surface Water Resource & Irrigation System in Sindh

Environmental Monitoring, Sampling and Testing

In order to determine the ambient air, background noise levels, water and wastewater quality of the study area. The exact number of samples will be confirmed following thorough due diligence conducted on all proposed sites. The selection of locations for monitoring has been made with due consideration to socially sensitive receptors, nearby water bodies, i.e., canal, minor, etc. and the proposed camp location. The water testing has been planned and test results will be available before the civil

construction activities. The rationale for the baseline environmental monitoring has been given in **Table A-I. 2**.

The baseline environmental monitoring will be done by the contractor before the start of the civil works. Sampling from different locations in the sub-project area will be done by a Third-party instrumental environmental laboratory, which will be certified by SEPA.

Table AII- 2: Rationale for the Baseline Environmental Monitoring

Sr. No.	Monitoring Parameters	Rationale
1	Ambient Air	One from the proposed camp area, and one from each proposed project intervention.
2	Drinking Water/ Ground Water	One from the proposed camp area, and one from each proposed water source.
3	Waste/ Surface Water	One from the surface water sources i.e., canal, minor, water course, etc.
4	Noise/ Dust	3 from each road/ nearby Socially sensitive receptor

Ambient Air

The proposed-project areas occupy a sparsely populated region devoid of industrial or commercial operations. Dust emissions from vehicular traffic on unpaved roads are limited in scope but still present, predominantly impacting localized areas. Primary pollutants released from vehicle exhaust, including particulate matter, carbon monoxide, sulfur dioxide, and nitrogen oxides, primarily affect air quality in the immediate vicinity of these roads. Nonetheless, traffic volume within the sub-project areas remains notably lower compared to national highways or other major thoroughfares.

Solid Waste and Wastewater Situation

In urban areas, a proper solid waste management system exists. However, in rural areas, there is no proper sewerage and sanitation system available in the study area and only a few villages were observed to be connected with the proper sewerage system. In a majority of the cases, the village's wastewater is disposed of in open spaces or nearby ponds. Ultimately, wastewater is drained into a pond/nullah, becoming a source of pollution. The same is the case with solid waste - there is no proper arrangement for its disposal. Most of the solid waste exists in the form of heaps near the villages. The remaining organic and livestock waste is collected in the designated areas which are used to prepare compost utilized by local farmers in their

agricultural fields. The major constituents of solid waste in the area are paper, plastic, and organic waste (food waste and animal waste) and waste from the nearby houses.

Ecological Environment

The biological environment baseline study describes the floral and faunal conditions and characteristics in the targeted region.

Forest Resource Situation

The total forest cover in the province is 1,034,000 hectares (HA), comprising four different types of forests[76] in Sindh:

Riverine **Forests:** These forests occur along the protective embankments on both sides of the River Indus. They span approximately 241,247 HA and heavily rely on the river's inundation for irrigation. The flora includes sarkanda or wild sugarcane (*Saccharum bengalense*), kans grass (*Saccharum spontaneum*), salt cedar or lai (*Tamarix dioica*), jhau or tamarisk (*Tamarix indica*), bahan or poplar (*Populus euphratica*), prickly acacia or babul (*Acacia nilotica*), khejri or jhand (*Prosopis cineraria*), dub or durva grass (*Cynodon dactylon*), peelu or toothbrush tree (*Salvadora persica*), vann (*Salvadora oleoides*), karir or kair (*Capparis deciduas*), gum Arabica or khumbat (*Acacia senegal*), and baonli (*Acacia jacquemontii*). Riverine forests play a crucial role in providing livelihoods for thousands of people and offer resources such as fuel wood, timber, fodder, honey, and tannin. They also act as carbon sinks and protect surrounding areas from floods.

Irrigated Forests: Also known as Inland forests, these canal-irrigated plantations cover approximately 82,310 HA. Eucalyptus is the predominant tree species, along with semul, mulberry, java plum, and lead tree, which are used as fodder.

Mangroves: These forests are located in the deltaic area of Sindh, covering around 0.344 million HA. Protected under the 1927 Forest Act by the Government of Pakistan, mangroves occupy 73,000 HA in the Indus Delta districts of Thatta, Sujawal, Badin, and Karachi. They consist mainly of *Avicennia marina*, locally known as timer, comprising 97% of the total mangrove tree cover. Other species include R*hizophora macronata, Ceriops tagal, and Aegiceras corniculata*. Mangroves provide a unique ecosystem supporting various marine and brackish water organisms, serving as breeding grounds for fish and shrimp. They also protect ports from silting and cities like Karachi from tsunamis.

Rangelands: Covering an area of 0.457 million HA, rangelands provide forage for cattle and livestock in the desert and dry mountainous areas of Sindh. Main tree

[76] Sindh, State of Environment and Development by IUCN

species include kandi (*Prosopis cineraria*), gum Arabic or kor (*Acacia senegal*), and rohida or desert teak (*Tecomella undulata*). The primary grass species found in rangelands is dhaman or buffle grass (*Cenchrus ciliaris*).

Agricultural Habitats

Most parts of the Sindh are under very intensive irrigated cultivation. Sindh is a major producer of grain, fruits, and vegetables. The province produces 35% of rice, 28% of sugarcane, 20% of cotton and 12% of wheat of the total produced in Pakistan[77]. 30 to 50% of Pakistan's vegetable crops and 12 to 50% of fruit crops are also grown in Sindh. 40% of all onions, 81% of all chilies and 35% of all tomatoes produced in Pakistan are grown in Sindh. In addition, livestock rearing is also practiced extensively, and milk animals are common. Several species of wildlife have adapted to the changed habitat. These include Jackal; Jungle Cat, Bengal Fox, Small Indian Mongoose, Shrew, Rodent pests including Porcupine, Fruit Bats and Wild Boar. The avifauna which survived the modified habitat includes Doves, Black Partridge, Cuckoos, Koel, Woodpeckers, Parakeets, Bulbuls, Babblers, Black Drongo, Bee-eaters, Finches and House Sparrow. The reptilian species of this modified habitat include Krait, Cobra, Saw-scaled Viper, Rat Snake and Monitor Lizard.

Almost all of the project interventions will be undertaken in this habitat type.

Rural and Urban Habitats

These include human habitations within agriculture areas, as well as the urban centers. Scavengers like Jackals are attracted to the garbage dumps and human feces for food. House Sparrows breed in the houses. Bank Mynas and Cattle Egrets feed on grasshoppers in the rangelands with cattle and buffalos. Banyan and Peepal trees still grow in villages. Green Pigeons and barbets feed in these trees. Large populations of Pigeons breed in urban houses. Kites, Crows, Mynas, House Sparrows, and Alexandrine Parakeets breed in the urban areas.

Usually, Shisham and Kikar trees are planted alongside the roads and canals. Mostly Doves breed on such trees.

[77] State of Environment and Development IUCN 2004

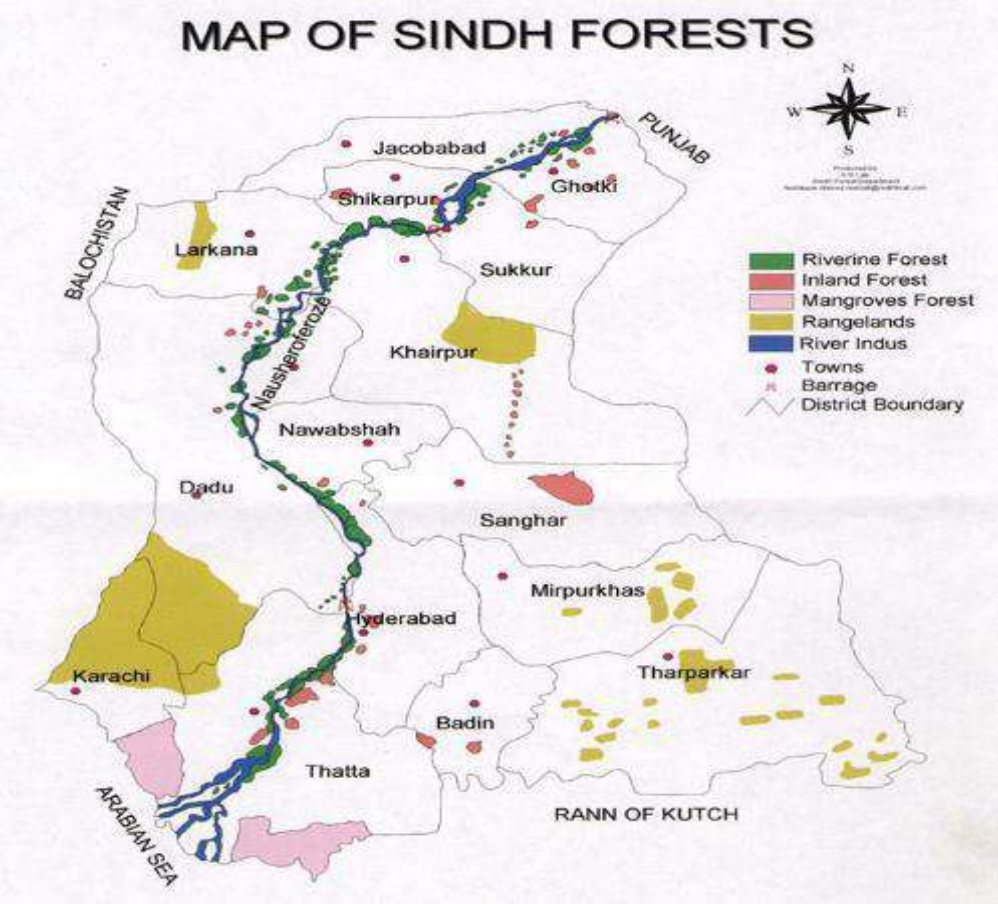


Figure AII- 22: Map of Forests in Sindh

Flora

Comprehensive data regarding the floral species of the study area have been acquired through secondary sources. **Table AII-3** shows district-wise floral resources in detail.

Table AII- 3: Main Floral Species in the Proposed Project Area

District	Common Flora Species
Larkana	*Babul (Acacia nilotica), Bahan (Populus euphratica), Kandi (Prosopis cineraria), Lai (Tamarix dioica), Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Peepal (Ficus religiosa), Siris (Albizia lebbeck), Eucalyptus (Eucalyptus camaldulensis), Simal (Bombax ceiba), Typha (Typha angustata).*
Kambar Shahdadkot	*Babul (Acacia nilotica), Talhi/Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Jar (Salvadora oleoides), Lai (Tamarix gallica), Safaida (Eucalyptus camaldulensis), Date Palm (Phoenix dactylifera), Akk (Calotropis procera), Bui (Aerua javanica), Chota Lona (Salsola barysma), Mallah (Zizyphus nummularia), Mesquit (Prosopis juliflora), Lumb (Arislida depressa), Chemmer (Eleusine compressa), Gorkha (Lasiurus sindicus), Kana (Saccharum bengalensis), Koonder/Dib (Typha angustata).*
Shikarpur	*Babul (Acacia nilotica), Shisham (Dalbergia sissoo), Kandi (Prosopis cineraria), Lai (Tamarix dioica), Peelu (Salvadora oleoides), Neem (Azadirachta indica), Ber (Zizyphus nummularia), Mesquit (Prosopis juliflora), Kana (Saccharum bengalensis), Typha (Typha angustata) (typical Upper Sindh riverine flora).*

District	Common Flora Species
Kashmore	*Babul (Acacia nilotica), Kandi (Prosopis cineraria), Athels (Tamarix aphylla), Lai (Tamarix dioica), Bahan (Populus euphratica), Mesquit (Prosopis juliflora), Neem (Azadirachta indica), Ber (Zizyphus vulgaris), Karir (Capparis aphylla), Kana (Saccharum munja), Typha (Typha angustata).*
Khairpur	*Babul (Acacia nilotica), Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Peelu (Salvadora oleoides), Lai (Tamarix dioica), Date Palm (Phoenix dactylifera), Akk (Calotropis procera), Mesquit (Prosopis juliflora), grasses like Kana (Saccharum bengalensis) (cotton weed flora dominant).*
Naushahro Feroze	*Babul (Acacia nilotica), Bahan (Populus euphratica), Lai (Tamarix aphylla, T. dioica), Kandi (Prosopis cineraria), Shisham (Dalbergia sissoo), Conocarpus (Conocarpus lancifolius), Eucalyptus (Eucalyptus camaldulensis), Typha (Typha angustata), Hydrilla (Hydrilla verticillata).*
Shaheed Benazirabad	*Babul (Acacia nilotica), Kandi (Prosopis cineraria), Bahan (Populus euphratica), Lai (Tamarix gallica, T. dioica), Peelu (Salvadora oleoides), Eucalyptus (Eucalyptus camaldulensis), Ber (Zizyphus nummularia), Mesquit (Prosopis juliflora), Typha (Typha angustata).*
Sanghar	*Shisham (Dalbergia sissoo), Akk (Calotropis procera), Karir (Capparis decidua), Peelu (Salvadora oleoides), Typha (Typha latifolia, T. angustata), Phragmites (Phragmites karka), Kana (Saccharum spontaneum).*
Dadu	*Babul (Acacia nilotica), Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Peelu (Salvadora oleoides), Lai (Tamarix gallica), Safaida (Eucalyptus camaldulensis), Date Palm (Phoenix dactylifera), Akk (Calotropis procera), Bui (Aerua javanica), Chota Lona (Salsola barysma), Mallah (Zizyphus nummularia), Mesquit (Prosopis juliflora), Lumb (Arislida depressa), Chemmer (Eleusine compressa), Gorkha (Lasiurus sindicus), Kana (Saccharum bengalensis), Koonder/Dib (Typha angustata).*
Hyderabad	*Babul (Acacia nilotica), Bahan (Populus euphratica), Lai (Tamarix aphylla, T. dioica), Kandi (Prosopis cineraria), Shisham (Dalbergia sissoo), Typha (Typha spp.), ornamental like roses, jasmine.*
Matiari	*Babul (Acacia nilotica), Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Lai (Tamarix dioica), Kandi (Prosopis cineraria), Peelu (Salvadora oleoides), Kana (Saccharum bengalensis), Typha (Typha angustata) (riverine irrigated typical).*
Tando Allahyar	*Lai (Tamarix spp.), Kana (Saccharum spp.), Bahan (Populus euphratica), Babul (Acacia nilotica), Typha (Typha spp.), Ber (Zizyphus nummularia), Pipal (Ficus religiosa), Neem (Azadirachta indica), Salvadora (Salvadora oleoides), Prosopis (Prosopis juliflora).*
Jamshoro	*Keekar (Acacia nilotica), Safaida (Eucalyptus camaldulensis), Date Palm (Phoenix dactylifera), Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Peelu (Salvadora oleoides), Peeple (Ficus religiosa), Rohiro (Tecomella undulata), Ber (Ziziphus mauritiana), Euphorbia (Euphorbia caducifolia), Phog (Calligonum polygonoides), Akk (Calotropis procera), Bui (Aerua javanica), Mallah (Zizyphus nummularia), Mesquit (Prosopis juliflora), Lumb (Arislida depressa), Chemmer (Eleusine compressa), Gorkha (Lasiurus sindicus), Kana (Saccharum bengalensis), Koonder/Dib (Typha angustata).*
Badin	*Mangroves (Avicennia marina), Babul (Acacia nilotica), Kandi (Prosopis cineraria), Lohirro (Tecomella undulata), Dwarf palm (Acacia rupestris), Kher (Acacia spp.), aquatic/semiaquatic plants in delta.*
Sujawal	*Mangroves (Avicennia marina), Babul (Acacia nilotica), Shisham (Dalbergia sissoo), Neem (Azadirachta indica), Peelu (Salvadora oleoides), Lai (Tamarix gallica), Safaida (Eucalyptus camaldulensis), Date Palm (Phoenix dactylifera), Akk (Calotropis procera), Bui (Aerua javanica), Chota Lona (Salsola barysma), Mallah (Zizyphus nummularia), Mesquit (Prosopis juliflora), Lumb (Arislida depressa), Chemmer (Eleusine compressa), Gorkha (Lasiurus sindicus), Kana (Saccharum bengalensis), Koonder/Dib (Typha angustata).*
Mirpurkhas	*Mango (Mangifera indica), Shisham (Dalbergia sissoo), Kikar (Acacia nilotica), Phulai (Acacia modesta), Simal (Bombax ceiba), Siris (Albizia lebbeck), Toot (Morus nigra), Neem (Azadirachta indica), Jamman (Eugenia jambolana), Safaida (Eucalyptus camaldulensis), Ber (Ziziphus mauritiana), Akk (Calotropis procera), Mesquit (Prosopis juliflora), Kana (Saccharum bengalensis), Peelu (Salvadora oleoides), Lumb (Arislida depressa).*

Fauna

Comprehensive data about the wildlife species of the proposed project area have been obtained through secondary data, as mentioned below.

Larkana: Wild Fauna in Larkana includes typical riverine species plus dragonflies from local surveys. Avifauna and reptiles align with neighboring districts.

Wildlife/ Fauna	Conservation Status -IUCN	Avifauna	Conservation Status -IUCN
Wild Fauna		Partridges (Melanoperdix niger)	VU
Urial (Ovis vignei)	VU	Jackal (Canis aureus)	LC
Jungle Cats (Felis chaus)	LC	Common myna (Acridotheres tristis)	LC
Indian wild boar (Sus scrofa cristatus)	LC	Dove (Spilopelia chinensis)	LC
Quail (Coturnix coturnix)	LC	Indian house crow (Corvus splendens)	LC
Hare (Lepus nigricollis)	LC	Jungle Babbler (Argya striata)	LC
Bengal Monitor Lizard (Varanus bengalensis)	NT	Grey Francolin (Francolinus pondicerianus)	LC
Common Krait Snake (Bungarus caeruleus)	LC	Indian Pond Heron (Ardeola grayii)	LC
Dragonflies (Odonata spp.)	-	Owl (Glaucidium cuculoides)	LC
Domestic Fauna	-	Domestic Buffalo (Bubalus bubalis)	LC
	-	Domestic Goat (Capra aegagrus hircus)	LC
	-	Cow (Bos taurus)	LC
	-	Sheep (Ovis aries)	LC
	-	Donkey (Equus asinus)	LC

Kambar Shahdadkot: Hill districts like Kambar Shahdadkot host Sindh ibex and leopards from Kirthar influence. Lakes support migratory waterfowl.

Wildlife/Fauna	Conservation Status -IUCN	Avifauna	Conservation Status -IUCN
Wild Fauna		Sareh/ Sindh ibex (Capra aegagrus blythi)	VU

Urial (Ovis vignei)	VU	Partridges (Melanoperdix niger)	VU
Leopard (Panthera pardus)	VU	Black bear (Ursus thibetanus)	VU
Indian wild boar (Sus scrofa cristatus)	LC	Quail (Coturnix coturnix)	LC
Jackal (Canis aureus)	LC	Common myna (Acridotheres tristis)	LC
Jungle cat (Felis chaus)	LC	Dove (Spilopelia chinensis)	LC
Pheasant	-	Night herons	LC
Otter	NT	Eurasian teal	LC
Domestic Fauna	-	Domestic Buffalo (Bubalus bubalis)	LC
	-	Domestic Goat (Capra aegagrus hircus)	LC
	-	Cow (Bos taurus)	LC
	-	Sheep (Ovis aries)	LC
	-	Donkey (Equus asinus)	LC

Shikarpur: Shikarpur features Indus dolphin reserves and diverse avifauna like bustards. Mammals include chinkara in riverine areas.

Wildlife/ Fauna	Conservation Status -IUCN	Avifauna	Conservation Status - IUCN
Wild Fauna		Wild boar (Sus scrofa)	LC
Jackal (Canis aureus)	LC	Porcupine (Hystrix indica)	LC
Jungle cat (Felis chaus)	LC	Chinkara gazelle (Gazella bennettii)	LC
Wolf (Canis lupus)	LC	Houbara bustard	VU
Hedgehog (Erinaceinae)	LC	Grey partridge (Francolinus pondicerianus)	LC
Indus dolphin (Platanista gangetica minor)	EN	Vultures	CR
Monitor lizard (Varanus bengalensis)	NT	Eagles, kites	LC
Cobra	LC	Parrots	LC
Domestic Fauna	-	Domestic Buffalo (Bubalus bubalis)	LC
	-	Sheep (Ovis aries)	LC

	-	Cow (Bos taurus)	LC

Kashmore: Kashmore's riverine forests host otters and dolphins. Birds include kingfishers.

Wildlife/ Fauna	Conservation Status -IUCN	Avifauna	Conservation Status -IUCN
Wild Fauna		Jackal (Canis aureus)	LC
Fox (Vulpes spp.)	LC	Indian wild boar	LC
Jungle cat	LC	Common myna	LC
Smooth-coated otter	VU	Bulbul	LC
Indus dolphin	EN	Kingfishers (lesser-pied)	LC
Monitor lizard	NT	Egrets	LC
Viper	LC	Bee-eater	LC
Domestic Fauna		Domestic Buffalo	LC
		Goat	LC
		Cow	LC

Khairpur, Naushahro Feroze, Shaheed Benazirabad, Sanghar: These central districts share hog deer, otters, and wetland birds. Use Jacobabad-like tables with hog deer (EN), smooth-coated otter (VU).

Wildlife/Fauna	Conservation Status -IUCN	Avifauna	Conservation Status -IUCN
Hog deer	EN	Partridges	VU
Wild boar	LC	Quail	LC
Jungle cat	LC	Doves	LC
Smooth-coated otter	VU	Marbled teal	VU
Jackal	LC	Grey partridge	LC
Monitor lizard	NT	Cuckoos, bulbuls	LC
Domestic Fauna	-	Buffalo	LC
	-	Goat, sheep	LC

Hyderabad, Matiari, Tando Allahyar: Urban-riverine mix with sand grouse.

Wildlife/ Fauna	Conservation Status -IUCN	Avifauna	Conservation Status -IUCN
Wild boar	LC	Hog deer	EN
Jackal	LC	Grey partridge	LC
Porcupine	LC	Sand grouse	LC
Wolf	LC	Cattle egret	LC
Domestic Fauna		Buffalo	LC

		Cow	LC

Badin, Sujawal: Delta areas similar to Thatta with otters and waterfowl.

Wildlife/ Fauna	Conservation Status -IUCN	Avifauna	Conservation Status -IUCN
Jackal	LC	Partridges	VU
Wild boar	LC	Quail	LC
Otter	VU	Herons	LC
Monitor lizard	NT	Gulls, terns	LC
Domestic Fauna		Buffalo	LC
		Goat	LC

Protected Areas

Protected areas help maintain the integrity and diversity of ecosystems, protect flora and fauna, and facilitate ecological processes such as water flows, soil regeneration, nutrient cycling and so on, which are vital for all life.

Annexure-III:

Water Quality Assessment

Annex III: Water Quality Assessment

Water Quality Assessment in District Kambar Shahdadkot

The water quality assessment in District Kambar Shahdadkot across different locations, including Ghogharo, Ghoghari, and Kot Lal Bux Mahesar reveals varying levels of parameters crucial for assessing potability and safety. Here are the key findings:

1. **Microbial Contamination**: E-Coli and total coliforms were absent in most samples, indicating good microbial quality overall. However, fecal coliforms were detected in some samples, notably in Ghoghari (104.6/100ml), indicating potential contamination likely from human or animal sources, necessitating further investigation and remedial actions.
2. **Physical Characteristics**: pH levels across samples ranged from 7.443 to 8.320, generally within the acceptable range of 6.5-8.5. Turbidity levels were low, mostly below 5 NTU, indicating clear water suitable for consumption. Color, taste, and odor parameters were non-objectionable across all samples, ensuring that the water is aesthetically acceptable.
3. **Chemical Parameters**: Total Dissolved Solids (TDS) varied significantly, with values ranging from 338 mg/L to 3430 mg/L. Elevated TDS levels were observed in Ghoghari and Kot Lal Bux Mahesar, possibly influenced by geological formations or agricultural activities. Chloride levels were also notable in some samples, potentially affecting taste but generally within permissible limits.
4. **Heavy Metals and Other Chemicals**: Heavy metals such as lead, arsenic, and chromium were below detectable limits (BDL) in all samples, ensuring compliance with safety standards. Manganese was detected in trace amounts in Ghogharo and Kot Lal Bux Mahesar, but within permissible limits.
5. **Additional Parameters**: Sodium and potassium levels varied across locations, reflecting local geological and soil conditions. Iron concentrations were generally low or BDL, except for minor detections in some samples.

Table: Water Quality Results (District Kambar Shahdadkot)

Sr. No.	Parameters	SEQS	District Kambar Shahdadkot							
			Ghogharo		Ghoghari			Kot Lal Bux Mahesar		
			Sample 1 (Ground Water)	Sample 2 (Hand pump)	Sample 1 (Hand pump)	Sample 2 (Hand pump)	Sample 3 (Hand pump)	Sample 1 (Hand pump)	Sample 2 (Hand pump)	Sample 3 (Hand pump)
1	E-Coli	0/100ml	Nil	Nil	Nil	95	Nil	Nil	Nil	Nil
2	Total Coliform	0/100ml	Nil	Nil	Nil	124.8	Nil	Nil	Nil	Nil
3	Fecal Coliform	-	Nil	Nil	Nil	104.6	Nil	Nil	Nil	Nil
4	PH @ 25° C	6.5-8.5	7.757 @ 23 C	7.897 @ 22.5 C	7.773 @ 21.9 C	7.880 @ 22.8 C	8.079 @ 22 C	7.443 @ 21.9 C	8.133 @ 22.4 C	8.320 @ 22.5
5	Color	<15 TCU	0	0	0	0	0	0	0	0
6	Taste	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
7	Odor	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
8	Turbidity	<5	0.38	0.25	0.2	0.45	0.25	0.2	0.2	2.95
9	Total Dissolved Solids	<1000	430	420	338	3430	340	338	245	670
10	Total Suspended Solids	-	BDL	BDL	BDL	2	BDL	BDL	BDL	8
11	Total Hardness as CaCO3	<500	240	240	210	830	190	210	110	240
12	Aluminium	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Antimony	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Arsenic	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Barium	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Boron	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Cadmium	0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Chloride	<250	108	68	44	713	10	44	24	58
19	Chromium	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Copper	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Fluoride	≤1.5	0.4	0.5	0.3	3.9	0.4	0.3	0.4	0.7
22	Lead	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Manganese	≤0.5	BDL	BDL	BDL	0.0736	BDL	BDL	BDL	0.0058
24	Mercury	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Nickel	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Nitrate	≤50	BDL	BDL	BDL	2.96	BDL	BDL	BDL	0.226
27	Selenium	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Residual Chlorine	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc	3	0.0087	0.0453	BDL	0.1051	0.1015	BDL	BDL	0.0265
30	Phenolic Compound	≤0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31	Sodium	-	58.8467	68.29	59.0366	182.8619	70.84	59.0366	49.1773	114.203
32	Potassium	-	7.8846	8.051	7.0548	14.525	5.9998	7.0548	BDL	8.3698
33	Iron	-	0.0025	0.001	0.0028	0.9986	BDL	0.0028	BDL	0.003
34	Cyanide	0.07	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
35	Pesticides	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Water Quality Assessment in District Dadu

The water quality assessment in District Dadu, focusing on various locations including Allahabad, Shahen Jo Daro, Gul Muhammad Chandio, and Muhammad Pur Odho, reveals diverse findings across multiple parameters and sampling points. Key observations from the data include:

1. **Microbial Contamination**: E-Coli was absent across all samples, indicating generally good microbial quality. However, total coliforms were detected in several samples, notably in Allahabad (95/100ml) and Muhammad Pur Odho (112/100ml), suggesting potential contamination sources that need monitoring and remediation. Fecal coliforms were sporadically detected, highlighting localized issues in maintaining sanitary conditions, particularly in agricultural tubewells.
2. **Physical Characteristics**: pH levels were within the acceptable range of 6.5-8.5 across all samples, with slight variations observed. Turbidity levels were generally low, with values well below 5 NTU, indicating clear water quality suitable for consumption. Color measurements were consistently within permissible limits, indicating no aesthetic concerns regarding water appearance.
3. **Chemical Parameters**: Total Dissolved Solids (TDS) exceeded 1000 mg/L in several samples, notably high in locations like Allahabad (1580 mg/L) and Muhammad Pur Odho (6070 mg/L), possibly due to geological factors or agricultural runoff. Chloride levels were also elevated in some samples, potentially influencing taste but remaining below critical thresholds for health concerns. Fluoride levels, though generally low, showed spikes in a few samples, suggesting regional variability in natural water composition.
4. **Heavy Metals and Other Chemicals**: Heavy metals such as lead, arsenic, and chromium were below detectable limits (BDL) in all samples, ensuring compliance with safety standards. Manganese was detected in trace amounts, primarily in samples from Muhammad Pur Odho, yet within permissible limits.
5. **Additional Parameters**: Sodium and potassium levels varied across locations, possibly influenced by local geological formations. Iron concentrations were generally low or BDL, except for minor detections in a few samples.

Table: Water Quality Results (District Dadu)

Sr. No.	Parameters	SEQS	District Dadu									
			Allahabad			Shahen Jo Daro			Gul Muhammad Chandio		Muhammad Pur Odho	
			Sample 1 (Hand pump)	Sample 2 (Hand pump along Pir Gunia Canal)	Sample 3 (Hand pump along road)	Sample 1 (Tubewell along canal)	Sample 2 (Tubewell at bank of Mehar Branch)	Sample 1 (LSR)	Sample 2 (Hand pump in masjid)	Sample 3 (Hand pump in Mosque)	Sample 1 (Handpump in school)	Sample 2 (Agriculture Tubewell 2)
1	E-Coli	0/100ml	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2	Total Coliform	0/100ml	95	Nil	Nil	Nil	Nil	Nil	35.6	Nil	112	Nil
3	Fecal Coliform	-	35	Nil	Nil	Nil	Nil	Nil	Nil	Nil	35.6	Nil
4	PH @ 25° C	6.5-8.5	7.955 @ 22.6	7.9 @ 22.4	7.793 @ 23.2	7.820 @ 22	7.657 @ 23.8	8.228 @ 22.6	8.055 @ 22.8	7.327 @ 23	7.327 @ 23	7.727 @ 23
5	Color	<15 TCU	0	0	0	0	0	0	0	0	0	0
6	Taste	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable	Non-Objectionable
7	Odor	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
8	Turbidity	<5	0.8	0.3	0.35	0.35	0.25	0.28	0.45	0.2	0.85	0.4
9	Total Dissolved Solids	<1000	1580	460	780	840	298	425	1340	1708	6070	995
10	Total Suspended Solids	-	4	BDL	3	BDL	BDL	BDL	BDL	BDL	3	4
11	Total Hardness as CaCO3	<500	230	300	190	350	210	210	230	820	1650	280
12	Aluminium	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Antimony	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Arsenic	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Barium	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Boron	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Cadmium	0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Chloride	<250	238	19	108	83	34	34	359	638	2111	122
19	Chromium	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.1732	BDL
20	Copper	2	BDL	0.0168	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Fluoride	≤1.5	0.9	0.3	0.7	0.9	0.2	0.4	1	0.8	4.8	0.8
22	Lead	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Manganese	≤0.5	0.0479	0.0907	0.0151	0.0407	0.08	BDL	0.0471	0.1243	0.367	0.0085
24	Mercury	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Nickel	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Nitrate	≤50	1.008	0.015	0.086	0.246	BDL	0.02	1.68	1.042	6.88	0.295
27	Selenium	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Residual Chlorine	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc	3	0.0089	0.0161	0.0081	0.0256	0.0063	0.0164	0.0404	BDL	BDL	0.0126
30	Phenolic compound	≤0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31	Sodium	-	162.2361	76.6841	114.3198	120.1528	48.9512	59.1119	149.0727	127.4803	190.4533	118.3118
32	Potassium	-	7.8883	8.0303	6.4388	7.3775	6.6187	9.3932	17.154	10.9689	11.5636	4.7503
33	Iron	-	0.004	0.0012D	0.001	0.0051	BDL	0.0018	0.0053	0.0289	0.0076	0.0025
34	Cyanide	0.07	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
35	Pesticides	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Water Quality Assessment in District Sujawal

The water quality assessment in District Sujawal, focusing on locations like Belo Village, Ahmad Khan Zour, and Gongani, highlights significant variations in water parameters across different sampling points, reflecting diverse sources and potential contamination risks.

1. **Microbial Contamination**: E-Coli was detected in several samples, indicating possible fecal contamination, especially notable in Belo Village (35.6/100ml) and other locations, posing health risks if consumed untreated. Total coliforms were also present in various samples, underscoring the need for improved sanitation and water treatment measures.
2. **Physical Characteristics**: pH levels across samples ranged from 6.905 to 8.582, generally within the acceptable range of 6.5-8.5. Turbidity levels varied significantly, with some samples exhibiting high levels (e.g., 18.4 NTU in one sample), which could affect water clarity and indicate sediment or particulate matter in the water.
3. **Chemical Parameters**: Total Dissolved Solids (TDS) were notably elevated in several samples, exceeding the recommended limit of 1000 mg/L in locations such as Ahmad Khan Zour (3110 mg/L) and Gongani (17910 mg/L). Elevated TDS can affect water taste and may indicate high mineral content, potentially from geological sources or agricultural runoff.
4. **Heavy Metals and Other Chemicals**: Heavy metals like lead, manganese, and iron were detected in trace amounts across various samples but generally remained within safe limits. However, lead concentrations slightly exceeded permissible limits in a few samples, emphasizing the need for ongoing monitoring and remediation efforts.
5. **Additional Parameters**: Fluoride levels were detected above the permissible limit in some samples, which can have dental and skeletal health implications if consistently consumed over long periods. Sodium and potassium levels varied widely across locations, influenced by local soil and geological conditions

Table: Water Quality Results (District Sujjawal)

Sr. No.	Parameters	SEQs	District Sujawal											
			Belo Village					Ahmad Khan Zour				Gongani		
			Handpump in Mosa Kado Goth Settlement	Bore Water from Lal Pump	Sample 2 (Hand pump)	Sample 3 (Injector pump)	Hand Pump near Canal	In house G. W	Sample 1 (Injector pump)	Sample 3 (Hand pump)	Hand Pump near Existing water	G.W from Bore lal Pump	Sample 1 (Hand pump)	Sample 4 (Hand pump)
1	E-Coli	0/100ml	35.6	Nil	Nil	Nil	Nil	Nil	Nil	Nil	95	112.6	Nil	Nil
2	Total Coliform	0/100ml	112	Nil	Nil	Nil	Nil	95	35.6	Nil	289	488	Nil	Nil
3	Fecal Coliform	-	95	Nil	Nil	Nil	Nil	Nil	Nil	Nil	112.6	286.4	Nil	Nil
4	PH @ 25° C	6.5-8.5	7.677	7.802	8.408	8.552	8.185	8.15	8.582	8.423	7.08	7.464	8.423	8.218
5	Color	<15TCU	0	0	0	0	0	0	0	0	0	0	0	18.86
6	Taste	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable	Non-Objectionable	Objectionable	Objectionable
7	Odor	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
8	Turbidity	<5	0.6	0.9	0.28	0.85	0.85	0.4	0.3	0.25	0.5	18.4	0.5	1.85
9	Total Dissolved Solids	<1000	1500	525	582	510	705	3110	486	640	16540	2060	17910	770
10	Total Suspended Solids	-	8	12	BDL	5	6	3	BDL	BDL	5	28	4	12
11	Total Hardness as CaCO3	<500	760	280	300	320	350	420	240	340	7500	1080	7080	320
12	Aluminium	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Antimony	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Arsenic	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Barium	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Boron	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Cadmium	0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Chloride	<250	471	107	88	88	170	1121	93	147	9112	679	9553	162
19	Chromium	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Copper	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0372	0.0975	0.0521	BDL
21	Fluoride	≤1.5	1.6	0.6	0.6	0.6	0.8	2	0.5	0.8	2.5	1.8	4.5	0.8
22	Lead	≤0.05	BDL	0.0576	0.025	0.029	0.1184	0.1119	0.0283	0.036	0.1305	0.1032	0.0347	0.0359
23	Manganese	≤0.5	0.1416	0.0103	0.0124	0.118	0.1139	0.0418	0.0146	0.1315	6.11	1.9582	4.6692	0.0187
24	Mercury	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Nickel	≤0.02	0.323	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Nitrate	≤50	1.886	BDL	0.089	0.07	0.28	2.88	0.02	0.128	5.468	2.14	3.084	0.09
27	Selenium	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Residual Chlorine	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc	3	0.0443	0.0051	0.0042	0.0037	0.7278	0.0608	0.0043	0.1798	0.0197	0.073	0.0062	0.046
30	Phenolic compound	≤0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31	Sodium	-	8.6036	21.156	77.98	77.4339	17.57	0.569	75.6	81.54	BDL	6.27	153.87	93.16
32	Potassium	-	14.25	10.036	8.04	8.299	15.83	35.89	7.43	9.18	89.1103	21.83	787.5	19.25
33	Iron	-	0.0077	BDL	0.0027	0.001	0.0018	0.0106	0.001	0.0035	0.4623	0.008	2.98	0.0141
34	Cyanide	0.07	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
35	Pesticides	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Water Quality Assessment in District Jamshoro

In District Jamshoro, the water quality assessments from various locations such as Dhamach, Dabhoo, Budhapur, and Ranikot reveal a diverse range of parameters that reflect both natural variations and potential anthropogenic influences.

1. **Microbial Contamination**: E-Coli was detected in multiple samples, indicating fecal contamination in some locations. For instance, high levels were found in samples from Dhamach (238.6/100ml) and other sites, suggesting potential health risks due to inadequate sanitation or agricultural runoff. Total coliforms and fecal coliforms were also present across different samples, highlighting the need for improved water treatment and monitoring to ensure microbial safety.
2. **Physical and Chemical Characteristics**: pH levels were generally within the acceptable range of 6.5-8.5 across all samples, although minor variations were observed. Turbidity levels varied significantly, with some samples showing higher values, which can affect water clarity and indicate sediment or particulate matter presence. Total Dissolved Solids (TDS) were notably high in several samples, exceeding the recommended limit of 1000 mg/L in locations like Dhamach (10290 mg/L) and Ranikot (17910 mg/L), suggesting a high mineral content that may affect water taste and quality.
3. **Heavy Metals and Other Chemicals**: Trace amounts of heavy metals such as manganese, iron, and zinc were detected in various samples but generally remained within safe limits. Elevated concentrations of fluoride were observed in some samples, which can have dental and skeletal health implications if consumed over long periods. Additionally, chloride levels were elevated in several samples, indicating potential contamination from agricultural practices or geological sources.
4. **Additional Parameters**: Variations in taste and odor were noted across different samples, with some samples marked objectionable, possibly due to the presence of organic compounds or dissolved minerals. Other parameters like total suspended solids (TSS), arsenic, lead, and pesticide residues were mostly below detection limits or within safe ranges.

Table: Water Quality Results (District Jamshoro)

Sr. No.	Parameters	SEQs	District Jamshoro													
			Dhamach			Dabhoo			Budhapur						Ranikot	
			Hand Pump Near Masjid G. W	Tubewell G. W	Sample 1 (Water Supply Tubewell)	Tubewell near KB Feeder	Tubewell inside village	Sample 2 (Agricultural Tubewell)	Sample 3 (Nai Baran)	G.W Tubewell	GW Hand Pump in School	Sample 4 Ejector Pump	Sample 5 (Water Supply Tubewell)	Tube Well Water from Pump	Hand Pump Near Bridge	Sample 6 (Agricultural Tubewell)
1	E-Coli	0/100ml	238.6	Nil	95	95	95	Nil	Nil	Nil	95	Nil	Nil	35.6	Nil	Nil
2	Total Coliform	0/100ml	428	Nil	282.9	284.6	279	112.4	Nil	95	286	95	Nil	114.8	95	Nil
3	Fecal Coliform	-	312.8	Nil	112.8	112	118.6	35.6	Nil	Nil	114.9	Nil	Nil	95	Nil	Nil
4	PH @ 25° C	6.5-8.5	7.635	7.907	7.7	7.37	7.406	7.066	7.58	7.68	7.49	7.466	7.72	7.699	7.824	7.544
5	Color	<15TCU	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Taste	Non-Objectionable	Objectionable	Non-Objectionable	Non-Objectionable	Objectionable	Objectionable	Non-Objectionable	Non-Objectionable	Objectionable	Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
7	Odor	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
8	Turbidity	<5	0.38	1.85	0.48	0.25	0.2	0.42	0.2	1.82	7.45	0.35	0.3	0.3	3.4	0.38
9	Total Dissolved Solids	<1000	10290	415	740	6050	5960	5730	820	1430	1000	2530	1480	1460	1190	1033
10	Total Suspended Solids	-	BDL	5	2	BDL	BDL	3	BDL	4	3	BDL	BDL	BDL	5	5
11	Total Hardness as CaCO3	<500	4690	180	510	2250	2240	2430	490	570	370	1100	620	820	560	480
12	Aluminium	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Antimony	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Arsenic	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Barium	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Boron	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Cadmium	0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Chloride	<250	5173	87	122	2213	2281	2136	279	330	126	598	309	155	311	122
19	Chromium	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Copper	2	0.0235	BDL	BDL	0.0146	0.0143	0.044	BDL	BDL	BDL	0.035	BDL	BDL	BDL	BDL
21	Fluoride	≤1.5	4	0.5	0.7	4.4	4.3	2.8	0.8	1	0.9	2.4	1.3	1.1	1	1
22	Lead	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23	Manganese	≤0.5	0.0164	BDL	BDL	0.0033	0.00656	0.0139	BDL	0.0117	0.193	0.0033	0.0117	BDL	BDL	0.0058
24	Mercury	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Nickel	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Nitrate	≤50	6.668	BDL	0.092	5.446	5.126	2.968	0.045	2.28	2.11	2.685	1.088	2.411	2.015	0.396
27	Selenium	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Residual Chlorine	-	BDL	BDL	0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc	3	0.0108	0.0075	72	BDL	BDL	BDL	BDL	BDL	0.021	BDL	BDL	0.0088	0.0044	0.0167
30	Phenolic compound	≤0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31	Sodium	-	200.49	86.6256	77.3021	195.36	193.97	169.33	98.4888	145.96	136.51	146.5	131.8474	134.2	129.47	120.96
32	Potassium	-	19.41	7.6861	6.808	32.33	32.18	27.1667	7.82	11.35	8.4134	170.3	11.3527	7.5516	8.54	5.7261
33	Iron	-	0.009	BDL	0.008	0.0095	0.009	0.0244	0.0054	0.0042	0.004	0.024	0.0142	0.0039	0.0028	0.005
34	Cyanide	0.07	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
35	Pesticides	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Water Quality Assessment in District Mirpur Khas

In District Mirpur Khas, the water quality assessments from various locations such as Taju Khaskheli, Ghul Muhammad Halipoto, and Ali Hassan Shah highlight several significant findings and challenges.

1. **Microbial Contamination**: E-Coli was absent or negligible in most samples except in the groundwater sample from a distant borehole in Ali Hassan Shah, where it was detected at 286.8/100ml. Total coliforms and fecal coliforms were also found in varying concentrations across different samples, indicating potential fecal contamination in some instances, which is a concern for public health.
2. **Physical and Chemical Characteristics**: pH levels across the samples generally fell within the acceptable range of 6.5-8.5, although there were slight deviations noted. Turbidity levels varied significantly, with particularly high values observed in samples like the groundwater from a dispensary borehole in Ghul Muhammad Halipoto (150.4 NTU), which suggests potential sediment or particulate matter issues affecting water clarity.
3. **Heavy Metals and Other Chemicals**: Most heavy metals such as arsenic, lead, chromium, and nickel were below detectable limits (BDL) in all samples, indicating low levels or absence of these contaminants. However, manganese was detected in some samples but remained within permissible limits. Fluoride levels were also generally within safe limits, except for slightly elevated levels in a few samples.
4. **Additional Parameters**: Taste and odor were reported as objectionable in some samples, particularly in those from Ali Hassan Shah, possibly due to the presence of dissolved salts or organic matter affecting sensory qualities. Total Dissolved Solids (TDS) varied across samples, with some showing higher concentrations, which can affect water palatability.
5. **Ion Concentrations**: Chloride levels were elevated in several samples, suggesting potential contamination from natural or anthropogenic sources. Sodium and potassium levels varied, reflecting the geological diversity of the sampling locations. Nitrate levels were generally low but detected in a few samples, which may indicate agricultural influences or natural sources.

Table: Water Quality Results (District Mirpurkhas)

Sr. No.	Parameters	SEQS	District Mirpur Khas						
			Taju Khaskheli			Ghul Muhammad Halipoto		Ali Hassan Shah	
			Sample1 (Hand pump)	Sample 2 (Hand pump)	Groundwater (Borehole in dispensary)	Sample1 (Hand pump)	Groundwater (Hand pump from distant borehole)	Sample-2 (Main canal)	Groundwater (Hand pump distant borehole)
1	E-Coli	0/100ml	Nil	Nil	112.8	Nil	Nil	Nil	286.8
2	Total Coliform	0/100ml	35.6	Nil	326.8	95	Nil	112.8	468.8
3	Fecal Coliform	-	Nil	Nil	254.9	Nil	Nil	Nil	328.1
4	PH @ 25° C	6.5-8.5	8.597	9.055	7.428	8.282	8.282	8.416	7.468
5	Color	<15 TCU	0	0	2.962	0	0	14.98	0
6	Taste	Non-Objectionable	Non-Objectionable	Non-Objectionable	Objectionable	Non-Objectionable	Non-Objectionable	Objectionable	Objectionable
7	Odor	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable	Non-Objectionable
8	Turbidity	<5	1	0.35	150.4	0.4	1	0.8	120.9
9	Total Dissolved Solids	<1000	28	740	1440	1280	350	442	620
10	Total Suspended Solids	-	6	BDL	125	BDL	4	-	115
11	Total Hardness as CaCO3	<500	110	50	780	430	150	290	420
12	Aluminium	≤0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13	Antimony	≤0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Arsenic	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Barium	0.7	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Boron	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Cadmium	0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Chloride	<250	24	98	213	294	68	34	58
19	Chromium	≤0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Copper	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21	Fluoride	≤1.5	0.4	0.8	1.6	1.3	0.4	0.4	0.7
22	Lead	≤0.05	0.222	0.0228	BDL	0.3	BDL	0.0308	BDL
23	Manganese	≤0.5	BDL	0.0107	0.0099	0.1589	BDL	0.0365	0.016
24	Mercury	≤0.001	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Nickel	≤0.02	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Nitrate	≤50	BDL	0.286	2.016	1.046	BDL	0.024	0.108
27	Selenium	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Residual Chlorine	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Zinc	3	0.036	0.001	0.0535	0.138	0.0146	0.0697	0.0465
30	Phenolic compound	≤0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31	Sodium	-	56.0407	119.2739	134.3376	20.1593	72.6324	54.9265	80.7801
32	Potassium	-	5.52	5.1287	9.4868	9.6123	6.8937	7.4334	8.6667
33	Iron	-	BDL	0.011	0.0035	0.148	0.0015	0.0076	0.0012
34	Cyanide	0.07	BDL	BDL	BDL	BDL	BDL	BDL	BDL
35	Pesticides	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Annexure-IV:

Screening Checklists

Annex IV: Screening Checklists

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Badin
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve new construction or significant expansion of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a relevant measures based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[78]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A
8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be	N/A

[78] "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

			provided with requisite PPEs to minimize such exposure.	
9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A
ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A

fertilizer assistance, procurement of pesticides)?				
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria), or increase in the risk of traffic related accidents?		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts with the local community regarding the use of their water resources. The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	N/A
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use health services of the community? Would they create pressures on existing community services (water, electricity, health, recreation, others?)		No		N/A
17. Is there a risk that SEA/SH may increase as a result of project works?		No		N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	• Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical	

domain powers to acquire the land)?[79]			displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes			
22. Will the subproject lead to economic displacement (such as loss of assets or livelihoods, or access to resources due to land acquisition or access restrictions)?	Yes			
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[80]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[81]		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected	

[79] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[80] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[81] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range

whether directly or indirectly, or which would lead to adverse impacts on natural habitats[82]?			areas within the subproject area. Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area. Efforts will be undertaken to protect trees from cutting or damage throughout the project implementation process.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		
29. Will this activity require clearance of trees, including inland natural vegetation?		No		
30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No		
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

[82] Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

a) ESMP
b) SEP

Name and title of person who conducted screening:
Date of screening:

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Jamshoro
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve <u>new construction or significant expansion</u> of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes Therefore, a relevant measures based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[83]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A
8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be provided with requisite PPEs to minimize such exposure.	N/A
9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A

[83] "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	● Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. ● Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported, then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	● Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. ● Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and fertilizer assistance, procurement of pesticides)?		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria), or increase in the risk of traffic related accidents?		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts	N/A
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use health services of the community? Would they create pressures on		No		N/A

existing community services (water, electricity, health, recreation, others?)			with the local community regarding the use of their water resources.	
17. Is there a risk that SEA/SH may increase as a result of project works?		No	The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	● Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent domain powers to acquire the land)?[84]	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	● Refer to and apply the project Resettlement Framework (RF).
21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes			
22. Will the subproject lead to economic displacement (such as loss of assets or livelihoods, or access to	Yes			

[84] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

resources due to land acquisition or access restrictions)?				
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[85]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[86] whether directly or indirectly, or which would lead to adverse impacts on natural habitats[87]?		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected areas within the subproject area. Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		
29. Will this activity require clearance of trees, including inland natural vegetation?		No	Efforts will be undertaken to protect trees from cutting or	

[85] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[86] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

[87] Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No	damage throughout the project implementation process.	
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

c) ESMP
d) SEP

Name and title of person who conducted screening:
Date of screening:

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Dadu
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve <u>new construction or significant expansion</u> of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes Therefore, a relevant measures based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[88]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A
8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be provided with requisite PPEs to minimize such exposure.	N/A
9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A

[88] "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and fertilizer assistance, procurement of pesticides)?		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria), or increase in the risk of traffic related accidents?		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts	N/A
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use		No		N/A

health services of the community? Would they create pressures on existing community services (water, electricity, health, recreation, others?)			with the local community regarding the use of their water resources. The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	
17. Is there a risk that SEA/SH may increase as a result of project works?		No		N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	● Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent domain powers to acquire the land)?[89]	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	● Refer to and apply the project Resettlement Framework (RF).
21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes			
22. Will the subproject lead to economic displacement (such as	Yes			

[89] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

loss of assets or livelihoods, or access to resources due to land acquisition or access restrictions)?				
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[90]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[91] whether directly or indirectly, or which would lead to adverse impacts on natural habitats[92]?		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected areas within the subproject area. Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		

[90] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[91] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

[92] Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

29. Will this activity require clearance of trees, including inland natural vegetation?		No	Efforts will be undertaken to protect trees from cutting or damage throughout the project implementation process.	
30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No		
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

e) ESMP
f) SEP

Name and title of person who conducted screening:
Date of screening:

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Khairpur
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve <u>new construction or significant expansion</u> of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a relevant measures based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[93]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A
8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be	N/A

93 "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

			provided with requisite PPEs to minimize such exposure.	
9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A
ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A

fertilizer assistance, procurement of pesticides)?				
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria), or increase in the risk of traffic related accidents?		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts with the local community regarding the use of their water resources. The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	N/A
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use health services of the community? Would they create pressures on existing community services (water, electricity, health, recreation, others?)		No		N/A
17. Is there a risk that SEA/SH may increase as a result of project works?		No		N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	• Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical	

domain powers to acquire the land)?[94]			displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes			
22. Will the subproject lead to economic displacement (such as loss of assets or livelihoods, or access to resources due to land acquisition or access restrictions)?	Yes			
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[95]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[96]		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected	

[94] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[95] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[96] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range

whether directly or indirectly, or which would lead to adverse impacts on natural habitats[97]?			areas within the subproject area. Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area. Efforts will be undertaken to protect trees from cutting or damage throughout the project implementation process.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		
29. Will this activity require clearance of trees, including inland natural vegetation?		No		
30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No		
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

97 Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

g) ESMP
h) SEP

Name and title of person who conducted screening:
Date of screening:

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Larkana
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve new construction or significant expansion of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a relevant measures based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[98]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A

98 "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be provided with requisite PPEs to minimize such exposure.	N/A
9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A
ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A

fertilizer assistance, procurement of pesticides)?				
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria), or increase in the risk of traffic related accidents?		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts with the local community regarding the use of their water resources. The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	N/A
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use health services of the community? Would they create pressures on existing community services (water, electricity, health, recreation, others?)		No		N/A
17. Is there a risk that SEA/SH may increase as a result of project works?		No		N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	• Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical	

domain powers to acquire the land)?[99]			displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes			
22. Will the subproject lead to economic displacement (such as loss of assets or livelihoods, or access to resources due to land acquisition or access restrictions)?	Yes			
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[100]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[101]		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected	

[99] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[100] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[101] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range

whether directly or indirectly, or which would lead to adverse impacts on natural habitats[102]?			areas within the subproject area. Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area. Efforts will be undertaken to protect trees from cutting or damage throughout the project implementation process.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		
29. Will this activity require clearance of trees, including inland natural vegetation?		No		
30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No		
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

[102] Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

i) ESMP
j) SEP

Name and title of person who conducted screening:
Date of screening:

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Naushero Feroz
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve new construction or significant expansion of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a relevant measures based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[103]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A
8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be provided with requisite PPEs to minimize such exposure.	N/A
9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A

[103] "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and fertilizer assistance, procurement of pesticides)?		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria), or increase in the risk of traffic related accidents?		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts	N/A
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use health services of the community?		No		N/A

Would they create pressures on existing community services (water, electricity, health, recreation, others?)			with the local community regarding the use of their water resources.	
17. Is there a risk that SEA/SH may increase as a result of project works?		No	The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	• Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent domain powers to acquire the land)?[104]	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes			
22. Will the subproject lead to economic displacement (such as	Yes			

[104] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

loss of assets or livelihoods, or access to resources due to land acquisition or access restrictions)?				
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[105]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[106] whether directly or indirectly, or which would lead to adverse impacts on natural habitats[107]?		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected areas within the subproject area. Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		

[105] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[106] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

[107] Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

29. Will this activity require clearance of trees, including inland natural vegetation?		No	Efforts will be undertaken to protect trees from cutting or damage throughout the project implementation process.	
30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No		
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

k) ESMP
l) SEP

Name and title of person who conducted screening:
Date of screening:

1. Subproject Information:

Subproject Title	Sindh Transformational Accelerated Rural Services (STARS) WASH
Subproject Location	District Sanghar
Regional Unit in Charge	-
Estimated Cost	-
Start/Completion Date	-
Brief Description of Subproject	The project aims to establish a sustainable service delivery model in rural Sindh, leveraging lessons from previous projects. Its key features include development of a rural WASH policy, operationalization of a professionalized company for investment planning and O&M and defining financing mechanisms for long-term sustainability. Components: 1. Sector Governance 2. Access to Drinking Water Services 3. Access to Sanitation and Hygiene Services 4. Project Management 5. Contingent Emergency Response Component (CERC)

2. Environmental and Social Screening Questionnaires

Questions	Answer		Remarks	Next Steps
	Yes	**No**		
ESS1				
1. Is the subproject likely to have significant adverse environmental impacts that are sensitive and unprecedented that trigger the 'Ineligible Activities' or other exclusion criteria?		No	The proposed subproject will take place in a rural area within the district, thus minimizing the likelihood of significant adverse risks. Any impacts anticipated are temporary and reversible, and they will be further mitigated. Additionally, none of the interventions will affect critical habitats, such as protected areas.	N/A
2. Does the subproject involve <u>new construction or significant expansion</u> of ponds, solid waste management systems, shelters, roads (including access roads), community centers, schools, bridges and jetties?	yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a Site-Specific Environmental and Social Assessment (ES&S) or Environmental and Social Management Plan (ESMP) will be	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.

			adequate for addressing the project's needs.	
3. Does the subproject involve renovation or rehabilitation of any small-scale infrastructure, such as groundwater wells, latrines, showers/washing facilities, or shelters?	Yes		The project will involve the construction of new schemes and rehabilitation of old schemes. Therefore, a relevant measure based on the ESCOPs in suffices.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
4. Will construction or renovation works require new borrow pits or quarries to be opened?		No	The subproject intervention will involve the utilization of ready mix materials and PVC prefabricated pipes will be used hence no impact will foresee.	N/A
5. Does the project lead to any risks and impacts on, individuals or groups who, because of their particular circumstances, may be disadvantaged or vulnerable.[108]		No	It has been determined during the reconnaissance survey that the water supply and drainage systems will provide services to the entire population in the subproject areas without any discrimination.	N/A
ESS2				
6. Does the subproject involve uses of goods and equipment involving forced labor, child labor, or other harmful or exploitative forms of labor?		No	Materials for the proposed project will be sourced from ISO-certified companies and SEPA-certified vendors, thereby mitigating any associated risks.	N/A
7. Does the subproject involve recruitment of workforce including direct, contracted, primary supply, and/or community workers?		No	Due to a limited workforce, approximately 05-10 individuals will be needed for the execution of the proposed subproject, thus limiting its relevance to ESS2.	N/A
8. Will the workers be exposed to workplace hazards that needs to be managed in accordance with local regulations and EHSGs? Do workers need PPE relative to the potential risks and hazards associated with their work?		No	Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely for a short time with low significance and will be mitigated. Workers will be provided with requisite PPEs to minimize such exposure.	N/A

108 "Disadvantaged or vulnerable" refers to those individuals or groups who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or ethnic peoples status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

9. Is there a risk that women may be underpaid when compared to men when working on the project construction?		No	The labor will receive compensation in accordance with the minimum wage policy of Sindh.	N/A
ESS3				
10. Is the project likely to generate solid or liquid waste that could adversely impact soils, vegetation, rivers, streams or groundwater, or nearby communities?	Yes		This issue typically arises when materials are transported in open or loosely capped containers. However, since prefabricated pipes will be utilized, this impact is not expected for the rehabilitation work. Additionally, the contractor is mandated to implement appropriate mitigation measures, including maintaining good housekeeping, providing staff training, proper waste disposal, and adhering to waste management plans.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
11. Do any of the construction works involve the removal of asbestos or other hazardous materials?		No	If reported then asbestos guidance as provided in the ESCOP will applicable	N/A
12. Are works likely to cause significant negative impacts to air and / or water quality?	Yes		During construction activities, workers may encounter exposure to dust and noise, albeit for brief periods with low significance.	• Prepare a site-specific ESMP for the proposed subproject, based on the template in Annex 3. • Include E&S risk management measures in bidding documents.
13. Does the activity rely on existing infrastructure (such as discharge points) that is inadequate to prevent environmental impacts?				N/A
14. Is there any potential to have impact on soil or water bodies due to agro-chemicals (e.g., pesticides) used in farmlands due to the consequences of the subproject activities (e.g., development of irrigation system, agriculture related activities, seed and fertilizer assistance, procurement of pesticides)?		No	The proposed subproject is The new and rehabilitation of existing water supply and drainage schemes	N/A
ESS4				
15. Is there a risk of increased community exposure to communicable disease (such as COVID-19, HIV/AIDS, Malaria),		No	Given its small-scale nature, the project is not expected to cause a significant influx of people (approximately 05-10 labour per	N/A

or increase in the risk of traffic related accidents?			scheme) among the local population. Nevertheless, during construction, the contractor will ensure the provision of separate sanitary facilities and water to the labor force to prevent any conflicts with the local community regarding the use of their water resources. The contractor will be obligated to employ local individuals for unskilled tasks during construction, thereby minimizing the likelihood of conflicts. Additionally, awareness programs will be organized for both the labor force and the local community to further mitigate potential conflicts.	
16. Is an influx of workers, from outside the community, expected? Would workers be expected to use health services of the community? Would they create pressures on existing community services (water, electricity, health, recreation, others?)		No		N/A
17. Is there a risk that SEA/SH may increase as a result of project works?		No		N/A
18. Would any public facilities, such as schools, health clinic, church be negatively affected by construction?	Yes		Sensitive receptors may be affected by factors such as vibration, noise, and emissions, which will be addressed through the installation of acoustic equipment, silencers, and regular maintenance of machinery. Additionally, specific construction activities near these receptors will be limited in time, and regular monitoring of construction activities in their vicinity will be conducted.	● Apply relevant measures based on the ESCOPs in Annex 2 (unless one of the other questions in the screening form raises specific environmental and social risks and requires a site-specific ESMP).
19. Will the subproject require the government to retain workers to provide security to safeguard the subproject?		No	During the reconnaissance visit to the subproject area, it was observed that religious and social harmony prevails in the area.	N/A
ESS5				
20. Will the subproject require the involuntary acquisition of new land (will the government use eminent domain powers to acquire the land)?[109]	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas	● Refer to and apply the project Resettlement Framework (RF).

[109] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

21. Will the subproject lead to temporary or permanent physical displacement (including people without legal claims to land)?	yes		interventions related to rehabilitation will not require acquiring new land.	
22. Will the subproject lead to economic displacement (such as loss of assets or livelihoods, or access to resources due to land acquisition or access restrictions)?	Yes			
23. Has the site of the subproject been acquired through eminent domain in the past 5 years, in anticipation of the subproject?		No	N/A	N/A
24. Are there any associated facilities needed for the subproject (such as access roads or electricity transmission lines) that will require the involuntary acquisition of new land?	Yes		New schemes might be necessitate land acquisition, temporary or permanent physical displacement, economic displacement, whereas interventions related to rehabilitation will not require acquiring new land.	• Refer to and apply the project Resettlement Framework (RF).
25. Is private land required for the subproject activity being voluntarily donated to the project?[110]				
ESS6				
26. Does the subproject involve activities that have potential to cause any significant loss or degradation of critical habitats[111] whether directly or indirectly, or		No	The subproject area is situated in the rural regions of the District. There are no legally protected areas or buffer zones of protected areas within the subproject area.	

[110] Environmental and Social Standard 5, Footnote 10: "In some circumstances, it may be proposed that part or all of the land to be used by the project is donated on a voluntary basis without payment of full compensation. Subject to prior Bank approval, this may be acceptable providing the Borrower demonstrates that: (a) the potential donor or donors have been appropriately informed and consulted about the project and the choices available to them; (b) potential donors are aware that refusal is an option, and have confirmed in writing their willingness to proceed with the donation; (c) the amount of land being donated is minor and will not reduce the donor's remaining land area below that required to maintain the donor's livelihood at current levels; (d) no household relocation is involved; (e) the donor is expected to benefit directly from the project; and (f) for community or collective land, donation can only occur with the consent of individuals using or occupying the land. The Borrower will maintain a transparent record of all consultations and agreements reached."

[111] Environmental and Social Standard 6, paragraph 23: "Critical habitat is defined as areas with high biodiversity importance or value, including (a) Habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) Habitat of significant importance to endemic or restricted-range species; (c) Habitat supporting globally or nationally significant concentrations of migratory or congregator species; (d) Highly threatened or unique ecosystems; and (e) Ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d)."

which would lead to adverse impacts on natural habitats[112]?			Additionally, there are no estuarine areas, special areas designated for biodiversity protection, mangrove forests, manufactured forests/game reserves, orchards/crops, or any other environmentally significant areas reported within the subproject area. Efforts will be undertaken to protect trees from cutting or damage throughout the project implementation process.	
27. Will the project involve the conversion or degradation of non-critical natural habitats?		No		
28. Will this activity require clearance of mangroves?		No		
29. Will this activity require clearance of trees, including inland natural vegetation?		No		
30. Will there be any significant impact on any ecosystems of importance (especially those supporting rare, threatened or endangered species of flora and fauna)?		No		
ESS7				
31. Are there any Indigenous Peoples or Sub-Saharan African Historically Underserved Traditional Local Communities present in the subproject area and are likely to be affected by the proposed subproject negatively?		No	During the reconnaissance visit, no indigenous peoples were identified in the area.	
ESS8				
32. Is the subproject to be located adjacent to a sensitive site (historical or archaeological or culturally significant site) or facility?		No	No notified Protected Cultural Resources (PCRs) were observed in the sub-project area. However, sites of religious significance such as mosques have been identified within 100 meters of the proposed subproject.	• Apply Chance Find Procedures
33. Locate near buildings, sacred trees or objects having spiritual values to local communities (e.g. memorials, graves or stones) or require excavation near there?	Yes			

3. Conclusion

Based on the result from the screening above, please list the E&S risk management instruments to be prepared / adopt and implemented:

m) ESMP
n) SEP

Name and title of person who conducted screening:

[112] Environmental and Social Standard 6, paragraph 21: "Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition."

Date of screening:

Annexure-V:

Chance Finds Procedure

Annex V: Chance Finds Procedure

The purpose of this document is to address the possibility of archaeological deposits becoming exposed during ground altering activities within the proposed subproject areas and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required.

The proposed subprojects may involve excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the Contractor will immediately report to Project Implementation and Supervision Consultant (PISC). The PISC will immediately report to Directorate General of Archaeology & Museum, Government of Sindh / District office with the consent/approval of SPHF or PIU STAR WASH 1 to take further suitable action to preserve those antique or sensitive remains. Representative of the DG (Antiquities & Archaeology, Government of Sindh) will visit the site and observe the significance of the antique, artifact and cultural (religious) properties and significance of the project. The report will be prepared by representative and will be given to the DG. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance-find procedures should be adopted by Contractor workers as follows:

- Workers will be trained in the location of heritage zones within the construction area and in the identification of potential items of heritage significance;
- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and provincial Archaeological Department;
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties;
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over; and
- After stopping work, the Contractor must immediately report the discovery to the PISC.
- The contact address of the Directorate General of Antiquities & Archaeology, Government of Sindh, is given below:

dgantiquitiessindh@gmail.com

+92-21-99332224
+92-21-99332890

Antiquities House - C-82, Block-2,
Near Bilal Masjid, Clifton, Karachi, Sindh 75600

Annexure-VI:

Guidelines for Occupational Health and Safety Plan

Annex-VI: Guidelines for Occupational Health and Safety Plan

Occupational Health and Safety covers all personnel working under the proposed project, prepared by the Contractors/s based on these guidelines and in line with the World Bank EHS guidelines, 2007.

The Occupational Health and Safety program will aim to ensure that the workplace is safe and healthy by: addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and specifying how consultation, training and information are to be provided to employees at various workplaces.

Some of the risks/hazards associated with workplaces are due to working close to or at sites associated with the various project construction activities. Other risks associated with the project construction phase include the risk of an increase in vector-borne and other diseases.

The following sections will be implemented during the construction phase to address and ensure workers' health and safety.

Roles and Responsibilities

Contractor/s will be responsible for the management and implementation of this occupational and community health and safety. The Contractor/s will prepare a detailed site-specific health and safety plan which defines the roles and responsibilities of the nominated /designated health and safety team.

Screening and regular unannounced checking of workers

As per the procedure for hiring workers, all Contractors/s are required to make all prospective workers undergo medical tests to screen for diseases and sicknesses, prior to selection and employment of any worker. The Contractor/s is also responsible for ensuring that no worker who has a criminal record is employed at the project site. It will be ensured that all workers undergo medical tests to screen diseases at source and at sites in consultation with the nominated person (as per advice of Environmental Specialist).

In addition to this, the Proponent/ PIU STARS WASH 1 will also undertake sudden, unannounced checks on workers to look for diseases such as HIV, STDs, and hepatitis and take necessary steps as mandated by the Contractual agreement between the Contractor/s and the Worker(s).

Minimizing hazards and risks at the workplace

To ensure safety at all work sites, the following will be carried out:

- Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful;
- Construction of barricades around construction sites and excavated pits, to cordon off and deter entry of unauthorized public/children into these areas;
- Providing a safe storage site/area for construction machinery and equipment to prevent misuse and loss;
- Proper Housekeeping: Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse. Brick stacks will not be more than 7 feet in height and concrete blocks will not be more than 6 feet high.
- Removing all scrap timber, waste material and rubbish from the immediate work area as the work progresses;
- Ensure that all ramps or walkways are at least 6 feet wide, have slip-resistant threads and are not inclined at more than a slope of 1 vertical and 3 horizontal;
- Stacking away all excavated earth at least 2 feet from the pit to avoid material from falling back into the excavated area and injuring those working inside the excavated sites;
- Only a trained electrician should be hired to repair and install the electrical equipment (where required) to prevent risks of electrical shocks; and
- Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.

Provision of Personal Protective Equipment

Risks to the health and safety of workers can be prevented by the provision of Personal Protective Equipment (PPEs) to all workers. This will be included in the construction cost for each Contractor/s. Depending on the nature of the work and the risks involved, the Contractor/s must provide, without any cost to the workers, the following protective equipment (as per the advice of the Environmental Specialist):

- High-visibility clothing for all personnel during work must be mandatory.
- Helmet shall be provided to all workers or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects;
- Safety boots shall be provided to all workers for the protection of their feet from impact or penetration of falling objects on the feet;

- Ear-protecting devices (if required/as per the advice of the Environmental Specialist) shall be provided to all workers;
- Eye and face protection equipment shall be provided to all welders to protect against sparks (may be required during installation of solar system); and
- Respiratory protection devices shall be provided to all workers during the occurrence of fumes, dust, or toxic gas/vapor.
- Procedures to Deal with Emergencies such as Accidents, Sudden Illness and Death of Workers
- First aid kits will be made available at all times throughout the entire construction period by the respective Contractor/s. This is very important because most work sites will be at some distance from the nearest hospital.

First Aid Facilities

- First Aid Facility/ kits will be provided at work sites at strategic locations for the entire duration of subproject (s);
- First aid box location will be clearly marked with signage in the local language at working sites along with the contact details of first aiders.
- Workers will also be informed about the location of the first aid box and who the first aider is.
- To be precise, one first aid box will be provided for each subproject or as per the requirement, considering the ratio of 50 workers/ first aid box; and
- Contractor HSE staff will regularly inspect the first aid boxes to check the presence of required items and in sufficient numbers. The missing items will be replenished if found deficient during inspection.
- First Aid kit will be comprised of the below-mentioned first aid items but may not limited to only these: Pyodine solution, Hand Gloves, Gauze Pad, Scissors, Forcep, Thermometer, Saniplast (First Aid Bandage), Vintogeno Balm, Polyfax skin ointment, Cotton Bandage, Crepe Bandage, Paper Tape, Eye Drops and Pain Killer.

In addition to the first aid kits, the following measures should be in place:

- A vehicle shall be on standby so that emergency transportation can be arranged to take severely injured/sick workers to the nearest hospital for immediate medical attention;
- A designated Health Officer/worker for the Project will be identified as a focal person to attend to all health and safety-related issues. This employee's contact

number will be posted at all work sites for speedy delivery of emergency services; and

- Communication arrangements, such as the provision of mobile phones for all work sites, for efficient handling of emergencies, will be made.

Record Maintenance and Remedial Action

The Contractors/s will maintain a record of all accidents and injuries that occur at the work site. Reports prepared by the Contractor/ shall include information on the place, date and time of the incident, names of persons involved, cause of the incident, witnesses present, and their statements (format provided in Guidelines for Emergency Response Plan). Based on such reports, the management can jointly identify any unsafe conditions, acts, or procedures and recommend that the Contractor/s undertake certain mitigation actions to change any unsafe or harmful conditions.

Compensation for Injuries and Death

Any casualty (unlikely, keeping in view the extent of proposed interventions) or injury resulting from occupational activities should be compensated as per the local labor laws. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, a report of the examining doctor and his/her recommendation for treatment. Each individual Contractor/s will be responsible for ensuring compensation for the respective workers.

Awareness Programs

The Contractor/s will undertake awareness programs (as per the advice of the Environmental Specialist) through posters, talks, and meetings to undertake the following activities:

- Dissemination sessions will clarify the rights and responsibilities of the workers regarding interactions with local people (including communicable disease risks), worksite health and safety, waste management (waste separation, recycling, and composting), and the illegality of poaching; and
- Make workers aware of procedures to be followed in case of emergencies, such as informing the focal health person, who in turn will arrange the necessary emergency transportation or treatment.

Nomination of a Health and Safety Focal Person

- For each Contractor/s, a Health and Safety Focal Person will be appointed/ nominated. The Terms of Reference for the focal person will mainly be as follows:
- Function as the focal person/representative for all health and safety matters at the workplace;
- Responsible for maintaining records of all accidents and all health and safety issues at each site, the number of accidents and their causes, actions taken and remedial measures undertaken in case of safety issues;
- Be the link between the Contractors and all workers and submit grievances of the workers to the Contractor/s and instructions/directives on proper health care and safety from the Contractor/s back to the workers;
- Ensure that all workers are adequately informed on the requirement to use PPEs and its correct use; and
- Also responsible for the first aid kit and making sure that the basic immediate medicines are readily available.

Suggested Contents of Occupational Health and Safety Plan

The suggested contents of the Occupational Health and Safety Plan to be developed by the Contractor(s) are described below:

1. Purpose
2. Scope of Application
3. Contractual and Legal Requirements
4. Occupational Health and Safety Objectives
5. Organization and Responsibility
6. Contractor's HSE Management
7. Medical Arrangements of the Contractor(s)
8. Occupational Health and Safety

Annexure-VII:

Traffic & Access Management Plan

Annex VII: Traffic & Access Management Plan

Need for Plan

During the construction period of the proposed project, considerable vehicular movement carrying construction material is expected. This may interrupt the local traffic and is therefore important to manage the traffic to avoid the nuisance to local residents in terms of noise, dust, congestion and inconvenience.

The Plan

The objective of Traffic & Access Management Plan (TAMP) is to define the requirements that should be implemented to mitigate any potential negative risks to the environment, workers or the community resulting from construction traffic.

The TAMP will advise and inform Contractor/s and external suppliers of equipment and materials of access and entry points along with other key information such as tipping areas and wash-out areas. The TMP will be classed as “live” and therefore be subjected to updates as required.

The Contractor/s at the time of the execution of the proposed project, will prepare a comprehensive TMP in coordination with the local traffic police department (where required), Client, emergency services, and local administrative department with the support and consent of the Environmental and Social Staff of SPHF or PIU STARS WASH 1. The Client and Project Implementation Supervision Consultant (PISC) will review and approve the Contractor/s TAMP. The plan will be developed in such a way that it will comply with the provisions of the ESMF and requirements of the World Bank General EHS Guidelines, 2007. The Contractor/s. TMP shall include the following mitigation measures during its preparation:

- Undertake a road conditions assessment prior to and following the peak construction period, to assess any damage to road infrastructure that can be attributed to STARS WASH 1 Project development;
- Repair damage as appropriate or enter into a voluntary agreement with the relevant road authority to reimburse the cost of any repairs required to the public road network as a result of the proposed STARS WASH 1 Project;
- Spoil dumpsites located close to subproject sites to minimize journey distance and limit movements to site access roads;
- Construction of worker accommodation on site (if needed) to reduce light vehicle movements relating to travel to/ from the site;
- Schedule deliveries and road movements to avoid peak periods;

- Speed restrictions for project traffic traveling through communities;
- Run a safety campaign to improve the people's knowledge of the traffic hazard on their roads, public information and other activities to address the issues;
- Run a pedestrian awareness program; and
- Install Temporary signage.

Other Recommendations

It is important to manage public access routes during construction because it can cause delays to local traffic and create a safety hazard both on and offsite. People working and living near the construction sites would be annoyed by the emissions, noise and visual intrusion of queuing vehicles. Some important factors involved in access routes and site traffic are as follows:

Public Access Routes

The use of the public road for site access may be restricted in terms of:

- Vehicle size, width and type of load;
- Time limits;
- Parking; and
- Pedestrian conflicts.

The Contractor/s should have consultation with the local police to address these issues and to effectively manage them before the beginning of the construction.

Site Workers Traffic

Site personnel should not be permitted to park vehicles right on the road; this will lead to disruption in material deliveries. Designated parking areas with appropriate parking space will be needed for this purpose; any plain area near construction site can be used for this purpose.

Site Rules

1. The need for vehicles to reverse will be avoided where possible as reversing is a major cause of accidents. One-way systems will be preferred as far as reasonably practicable to reduce the risk, especially in storage areas and at construction sites and near public settlements;
2. Access to and from the site must be only via the specified entrance;
3. On leaving the site, vehicles must be directed to follow the directions given;

4. Drivers must adhere to the site speed limits (20 km/h is recommended);
5. Drivers will be educated to observe the on-site speed limit and consider the safety of the workers in the surroundings while driving through the area.
6. All material deliveries to the site must keep allocated time limits;
7. No material or rubbish should be left in the loading-unloading area;
8. Develop a map for alternate routes showing material delivery services;
9. Ensure periodic inspection of vehicles, if required;
10. Monitor vehicle movement to reduce the likelihood of queuing or causing congestion in and around the subproject areas; and
11. Project vehicles should have a unanimous badge or logo on the windscreen displaying that they belong to the proposed project if required.

Driver Competency

The Contractor/s, in coordination with the service providers, shall ensure that the drivers/operators are competent and meet the following.

- All drivers shall have valid driving licenses for the respective category;
- All drivers/operators must be mentally sound and medically fit;
- Preference shall be given to the drivers/operators who have prior experience in similar arrangements; and
- The drivers and operators shall be carefully assessed considering their respective categories of operation.

Driver's Induction and Training

The contractor/s, in coordination with the service providers (construction materials, pipes, solar system, etc.), will ensure the provision of training to the drivers on the principles of defensive driving techniques;

Periodic HSE briefings, meetings and refresher training shall be conducted for drivers as and when required; and

HSE induction shall be provided to drivers before they are deputed at site.

Loading Unloading Management

Contractor/s will ensure that service providers are adopting best possible practices to eliminate or control the risks arising during loading/unloading of materials/ luggage.

Traffic Violation/ Offence

Disciplinary action will be taken against violations of traffic rules and regulations. The action will be subject to the nature of violation that may result in various consequences such as verbal, written warning and in some cases termination as well.

Contractor's Obligation

The TAMP of the Contractor/s should be safe enough and widening of any access roads and construction of the detours (if required) must be completed prior to start of proposed project construction activities so that vehicular transportation for construction activities do not hinder the normal course of traffic lanes. The Contractor/s obligation must include the display of traffic signs according to the need to divert the traffic and to guide the road users in advance (where applicable). The traffic sign, traffic light should be placed from any diverting route or road marking.

The Contractor/s should consider the environmental and social impacts of the traffic during construction. It will be sole responsibility of the Contractor/s to implement a plan which produces minimum nuisance to the local people and to the environment. Safety of the people should be given due importance. It will be under Contractor/s obligation to notify the TAMP and its later changes to Client, emergency services and Traffic Police, and also publish weekly program in the local newspaper (where applicable, as per advice of Environmental Specialist).

Annexure-VIII:

Code of Conduct

Annex-VIII: Code of Conduct

CONTRACTORS CODE OF CONDUCT

1. Aim of The Code of Conduct

The main aim of the Code of Conduct is to prevent and/or mitigate the social risks within the context of Rehabilitation of Rain/Flood Affected Roads. The Codes of Conduct are to be adopted by contractors. The social risks that may arise include but not limited to Gender Based Violence (GBV), Violence Against Children (VAC), HIV and AIDS infection/spread, and occupational health and safety.

"ضابطه اخلاق جو بنيادي مقصد برسات/ ٻوڏ متاثر روڈن جي بحالي ۽ جي حوالي سان سماجي خطرن کي روڪڻ ۽/يا گھٽائڻ آهي. ضابطا اخلاق ٺيڪيدارن پاران اختيار ڪيا ويندا. سماجي خطرا جيڪي پيدا ٿي سگھن ٿا پر صنفي بنيادن تي تشدد(GBV) ، ٻارن جي خلاف تشدد(VAC) ، HIV ۽ AIDS انفيڪشن/پکڑجڻ، ۽ پيشه ورانه صحت ۽ حفاظت شامل آهن پر ان تائين محدود نه آهن".

2. Codes of Conduct

This chapter presents three Codes of Conduct (CoC) for use (note all COC must be translated into Sindhi as well):

"هي باب استعمال لاءِ ٽي ضابطا اخلاق (CoC) پيش ڪري ٿو) نوٽ ڪريو COC لازمي طور تي سنڌي ۾ ترجمو ڪيو وڃي"

i. **Contractors Code of Conduct**: Commits the contractor to addressing GBV and VAC issues;

i۔ ٺيڪيدار جو ضابطو GBV ۽ VAC مسئلن کي حل ڪرڻ لاءِ ڪانٽريڪٽر کي پابند ڪندو آهي؛

ii. **Construction Site Supervisor /Manager's Code of Conduct**: Commits managers to implementing the Code of Conduct,as well as those signed by individuals; and

ii۔ تعميراتي سائيٽ سپروائيزر / منيجر جو ضابطو اخلاق: ڪميٽس منيجرز کي لاڳو ڪرڻ لاءِ ضابطا اخلاق ، ۽ انهي سان گڏ جيڪي ماڻهو دستخط ٿيل آهن؛ ۽

iii. **Individual Code of Conduct**: Code of Conduct for each individual working on project funded projects

iii۔ انفرادي ڪوڊ آف ڪنڈڪٽ: هر فرد لاءِ ضابطو اخلاق جيڪو ڪم ڪري رهيو آهي پراجيڪٽ جي فنڊ ڪيل منصوبن تي

2.1 Contractors Code of Conduct

Contractors are obliged to create and maintain an environment which prevents social risks. They have the responsibility to communicate clearly to all those engaged on the project the behaviors which guard against any form of abuse and exploitation. In order to prevent Social risks, the following core principles and minimum standards of behavior will apply to all employees without exception:

"ٺيڪيدار هڪ ماحول پيدا ڪرڻ ۽ برقرار رکڻ جو پابند آهي جيڪو سماجي خطرن کي روڪي ٿو. انهن جي ذميواري آهي ته اهي واضح طور تي انهن سڀني ماڻهن سان رابطو ڪن جيڪي مصوبي تي مصروف آهن اهي رويي جيڪي کنهن به قسم جي بدسلوڪي ۽ استحصال جي خلاف حفاظت ڪن ٿا. سماجي خطرن کي روڪڻ لاءِ، هيٺيان بنيادي اصول ۽ رويي جا گھٽ ۾ گھٽ معيار سڀني ملازمن تي بغير ڪنهن استثناء جي لاڳو ٿيندا:"

i. GBV or VAC constitutes acts of gross misconduct and are therefore grounds for sanctions,penalties and/or termination of employment and/or contract. All forms of Social risks including grooming are unacceptable be it on the work site, the work site surroundings, or at worker's camps of those who commit GBV or VAC will be pursued.

i. GBV يا VAC مجموعي بدانتظامي جي عملن کي ترتيب ڏئي ٿو ۽ ان کي پابنديون، ڏنڊ ۽/يا ملازمت ۽/يا معاهدو ختم ڪرڻ جا بنياد آهن. گرومنگ سميت سماجي خطرن جا سڀ روپ ناقابل قبول آهن، ڀلي اهو ڪم جي سائيٽ تي هجي، ڪم جي سائيٽ جي آس پاس، يا انهن جي ڪارڪنن جي ڪيمپن تي جيڪي GBV يا VAC ڪن تا انهن جي پيروي ڪئي ويندي .

ii. Treat women, children (persons under the age of 18) and people with disability with respect regardless of race, colour, language, religion, political or other opinion, national, ethnic, cultural beliefs/practices, or other status.

ii. عورتن، ٻارن (18 سالن کان گھٽ عمر وارا ماڻهو) ۽ معذور ماڻهن سان عزت سان علاج ڪريو بغير ڪنهن نسل ، رنگ ، ٻولي ، مذهب، سياسي يا ٻي راءِ، قومي ، نسلي ، ثقافتي عقيدن/عملن ، يا ٻي حيثيت جي.

iii. Do not use language or behavior towards men, women or children that is inappropriate,harassing, abusive, sexually provocative, demeaning or culturally inappropriate.

iii. مردن، عورتن يا ٻارن لاءِ اهڙي ٻولي يا رويي جو استعمال نه ڪريو جيڪو نامناسب ، ايذاءُ، بدسلوڪي، جنسي طور اشتعال انگيز، توهين آميز يا ثقافتي طور تي نامناسب هجي .

iv. Sexual activity with children/learners under 18 (including through digital media) is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defence.

iv. 18سالن کان گھٽ عمر وارن ٻارن / سکيا ڏيندڙن سان جنسي سرگرمي (بشمول ڊجيٽل ميڊيا ذريعي) منع ٿيل آهي. ٻار جي عمر بابت غلط عقيدو ۽ ٻار جي رضامندي دفاع نه آهي.

v. Exchange of money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading or exploitative behavior is prohibited.

v. جنس جي بدلي رقم، روزگار، سامان، يا خدمتن جي بدلي ، بشمول جنسي احسان يا ذلت آميز، ذلت آميز يا استحصالي رويو جا پيا روپ.

vi. Sexual interactions between contractor's employees and communities surrounding the work place that are not agreed to with full consent by all parties involved in the sexual act are prohibited. This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex.

vi. ٹيڪيدار جي ملازمن ۽ ڪم جي جڳهه جي پرياسي برادرين جي وچ ۾ جنسي رابطي جيڪي جنسي عمل ۽ ملوث سيني ڏرين طرفان مڪمل رضامندي سان متفق نه آهن ممنوع آهن. هن ۾ لاڳاپا شامل آهن جن ۾ جنس جي بدلي ۾ ڪميونٽي جي ميمبرن کي فائدي جي حقيقي روزي (مالي يا غير مالي) جو واعدو شامل آهي.

vii. Where an employee develops concerns or suspicions regarding acts of GBV or VAC by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with established Grievance Redress Mechanism (GRM) that protects the identities of victims and whistle-blowers.

vii. جڏهن ڪو ملازم GBV يا VAC جي عملن جي حوالي سان خدشو يا شڪ پيدا ڪري تو، چاهي ساڳئي ڪانٽريڪٽنگ فرم ۾ هجي يا نه، هن کي لازمي طور تي قائم ڪيل شڪايت ريڊريس ميڪنزم (GRM) جي مطابق اهڙن خدشن جي رپورٽ ڪرڻ گهرجي جيڪا متاثرين جي سڃاڻپ جي حفاظت ڪري ٿي. ۽ whistle blowers.

viii. All contractors are required to attend an induction prior to commencing work on site to ensure they are familiar with the social risks and Codes of Conduct.

viii. سيني ٽيڪيدارن کي سائيٽ تي ڪم شروع ڪرڻ کان اڳ ۾ شامل ٿيڻ جي ضرورت آهي انهي کي يقيني بڻائڻ لاءِ ته اهي سماجي خطرن ۽ ضابطن جي ضابطن کان واقف آهن.

ix. All employees must attend a mandatory training once a month for the duration of the contract starting from the first induction prior to commencement of work to reinforce the understanding of the institutional social risks and Code of Conduct.

ix. سيني ملازمن کي لازمي طور تي لازمي تربيت ۾ شرڪت ڪرڻ لازمي آهي هڪ مهيني ۾ هڪ پيرو معاهدي جي مدت لاءِ جيڪو ڪم شروع ڪرڻ کان پهرين انڊڪشن کان شروع ٿئي تو آداري جي سماجي خطرن ۽ ضابطه اخلاق جي سمجھ کي مضبوط ڪرڻ لاءِ.

x. The Contractor shall ensure provision of financial resources and support compliance to occupation health and safety requirements for all workers. The Contractor shall ensure that workers dress appropriately i.e. dress in a way that:

x. ٽيڪيدار مالي وسيلن جي فراهمي کي يقيني بڻائيندو ۽ سيني ڪارڪنن لاءِ پيشه ورانه صحت ۽ حفاظت جي گهرج جي تعميل ۾ مدد ڪندو. ٽيڪيدار ان ڳالهه کي يقيني بڻائيندو ته مزدور مناسب لباس پائيندا آهن يعني اهڙي طرح جو لباس:

- Is unlikely to be viewed as offensive, revealing, or sexually provocative.
- Does not distract, cause embarrassment or give rise to misunderstanding.
- Is absent of any political or otherwise contentious slogans
- Is not considered to be discriminatory and is culturally sensitive.

- ممڪن ناهي ته ڏنو وڃي جارحاڻي، ظاهر ڪندڙ، يا جنسي طور اشتعال انگيز.
- پريشان نه ڪئي، شرمندگي، جو سبب ڪئي يا غلط فهمي کي جنم ڏئي.
- ڪنهن به سياسي يا بي صورت ۾ تڪراري نعرن کان غير حاضر آهي.
- تبعيض نه سمجهيو ويندو آهي ۽ ثقافتي طور تي حساس آهي.

xi. The Company shall ensure provision of financial resources and trainings to prevent spread of communicable disease including COVID 19, HIVand AIDS.

xi. ڪمپني مالي وسيلن ۽ تربيت جي فراهمي کي يقيني بڻائيندي ته جيئن وبائي مرض جي پکيڙ کي روڪن لاءِ بشمول COVID 19 ، HIV ۽ AIDS.

xii The company shall comply with all the applicable provincial legislation includinggiving terminal benefits to workers who have served for at least three months;

xii. ڪمپني سيني قابل اطلاق صوبائي قانون سازي جي تعميل ڪندي جنهن ۾ مزدورن کي ترمينل فائدا ڏيڻ شامل آهن جن گهٽ ۾ گهٽ ٽن مهينن تائين خدمتون سرانجام ڏنيون آهن؛

xiii. All contractors must ensure that their employees sign an individual Code of Conduct confirmingtheir agreement to support prevention of social risks activities.

xiii. سيني ٽيڪيدارن کي يقيني بڻائن گهرجي ته انهن جا ملازم هڪ انفرادي ضابطه اخلاق تي دستخط ڪن تا جيڪي انهن جي معاهدي جي تصديق ڪن تا ته جيئن سماجي خطرن جي سرگرمين جي روڪٿام ۾ مدد ڪن.

xiv The contractor should ensure equitable access to limited natural resources (e.g water points) to avoid conflicts with local communities.

xiv. ٽيڪيدار کي مقامي برادرين سان تڪراءَ کان بچڻ لاءِ محدود قدرتي وسيلن (مثال طور واٽر پوائنٽس) تائين برابري جي رسائي کي يقيني بڻائن گهرجي.

xv. Where possible, the contractor should ensure employment of local workforces especially where unskilled labour is required to mitigate social risks

xv. جتي ممڪن هجي، ٽيڪيدار کي مقامي افرادي قوت جي روزگار کي يقيني بڻائن گهرجي خاص طور تي جتي غير ماهر مزدورن جي ضرورت هجي ته سماجي خطرن کي گهٽائڻ لاءِ.

I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein and understand my roles and responsibilities. I understand that any action inconsistent with this Code of Conduct or failure to take action mandated by this Code of Conduct may result in termination of the contract.

"مان هن ريت تسليم ڪريان تو ته مون اڳئين ضابطه اخلاق کي پڙهيو آهي ۽ ان ۾ موجود معيارن جي تعميل ڪرڻ تي متفق آهيان ۽ منهنجي ڪردار ۾ ذميوارين کي سمجهان تو. مان سمجهان تو ته ڪوبه عمل هن ضابطه اخلاق سان مطابقت رکي تو يا هن ضابطه اخلاق پاران لازمي قدم کڻڻ ۾ ناڪامي جي نتيجي ۾ معاهدو ختم ٿي سگهي تو".

For the Contractor

Signed by:

- Signature:_____
- Title:_____
- Date_____

ٺيڪيدار لاء

پاران دستخط ڪيل:_____

دستخط:_____

عنوان:_____

تاريخ_____

Annexure-IX:

Guidelines for Emergency Response Plan (ERP) and SOP for Rainfall & Flood Events

Part A: Guidelines for Emergency Response Plan

General

An Emergency Response Plan (ERP) is a documented series of steps that Contractor /s will take during an emergency to ensure workers' safety and minimize the impacts on the proposed subprojects' activities. The purpose of this ERP is to provide measures and guidance for the establishment and implementation of ERP for the proposed subprojects.

Objectives

The following are the core objectives of the ERP:

1. Prevent fatalities and injuries;
2. Reduce damage to project structures, stock, and equipment;
3. Protect the environment and the community; and
4. Accelerate the resumption of normal operations.

Scope of ERP

The ERP will be applied to proposed subproject activities. The following are some emergencies that may require an emergency response.

1. Occupational accidents (including injuries due to falls, slips, construction machinery/instruments, or structure collapse or loss of life, etc.);
2. Community accidents (including construction machinery/traffic accidents);
3. Hazardous material spills;
4. Natural disasters, e.g., flooding, earthquake[113], etc.;
5. Fire.

Emergency Response Team

In case of any emergency, the Contractor /s, along with their field staff, will act as the emergency response team. The Contractor /s will also designate a coordinator and other team members with the consent and approval of the concerned SPHF officials. The coordinator will coordinate with site staff, RESCUE-1122, Police-15 (if needed) and make an official statement (when needed).

[113] In case of natural disaster, guidelines under the updated/ latest Provincial Disaster Response Plan may be followed (where applicable).

First Aid Persons

Upon advice of a medical emergency, the coordinator will make an immediate assessment to determine the response required and, if necessary, advise a call to an ambulance or medical assistance. The qualified first aid attendant should also, in case of a natural disaster, follow the guidelines under the updated/latest Provincial Disaster Response Plan (where applicable).

- Provide treatment to the victim(s) to the best of his/her ability;
- Ensure the safety of victims by ceasing any work activity in the area;
- Protect the injured from further danger and weather; and
- Assist medical services personnel when they arrive.

First Aid Facilities

1. First Aid Facility/ kits will be provided at work sites at strategic locations for the entire duration of subproject (s);
2. First aid box location will be clearly marked with signage in the local language at working sites along with the contact details of first aiders.
3. Workers will also be informed about the location of the first aid box and who the first aider is.
4. To be precise, one first aid box will be provided for each subproject or as per the requirement, considering the ratio of 50 workers/ first aid box; and
5. Contractor HSE staff will regularly inspect the first aid boxes to check the presence of required items and in sufficient numbers. The missing items will be replenished if found deficient during inspection.

First Aid kit will be comprised of the following first aid items, but may not be limited to only these:

First Aid Kit Contents

- Pyodine solution;
- Hand Gloves;
- Gauze Pad;
- Scissors;
- Forcep;
- Thermometer;
- Saniplast (First Aid Bandage);

- Vintogeno Balm;
- Polyfax skin ointment;
- Cotton Bandage;
- Crepe Bandage;
- Paper Tape;
- Eye Drops; and
- Pain Killer.

Procedure

Emergency situations and injuries to persons can occur at any time or place, either on proposed subproject sites or elsewhere. The most anticipated types of emergencies on subproject sites are fire and serious accidents (occupational / community), that's why procedures to cope with them are provided hereunder.

Apart from the above-mentioned emergencies, ERP should also be prepared in accordance with that follow the Centers for Disease Control and Prevention (CDC), OSHA, state/ territorial, and local guidelines for preventing the spread of infection.

Emergency Trainings

The HSE personnel of Contractor/s, with the support and consent of SPHF or PIU-nominated staff and PISC, will ensure that appropriate training is carried out for all subproject personnel. The entire emergency plan will be tested, reviewed and developed through periodic exercises to ensure that data is accurate, trigger mechanisms and levels are reasonable, communications are effective, hazard warnings are effective and sufficient, and response procedures are proportional to the hazard posed and are efficient and effective.

Incident Management Training

The designated staff of the Contractor/s will review the emergency preparedness plan and be aware of the actions required if trigger events are met. Staff will be fully involved in any exercises so that their roles and responsibilities are clear. Staff will be provided with feedback on their performance and will be retrained as appropriate.

Suggested Contents of Site-Specific ERP

The Contractor/s should prepare the site-specific ERP based on the guidelines provided in the above sections. The site-specific ERP should have the names and

contact details of the emergency response team as well. The suggested structure of the ERP, but not limited to, is listed below:

1. Purpose
2. Applicable Scope
3. Emergency Response System along with Responsibilities
4. Major Safety Risks
5. Precautionary Measures
6. Training and Exercise
7. Hazard Source Monitor
8. Alert Action
9. Management Measures
10. Control Measures
11. Response
12. Response Procedures
13. Emergency Response
14. Emergency Completion and Restoration
15. Supporting Measures
16. Communication
17. Emergency Team
18. Provisions and Resources
19. Reporting and Records/Revision
20. First Aid Facilities and Medical Facilities

Part – B: STAR WASH-1 Standard Operating Procedure (SOP) for Civil Works During Heavy Rainfall and Flood Events

1.0 Purpose

This Standard Operating Procedure (SOP) establishes comprehensive safety protocols, environmental protection measures, and operational continuity requirements for all civil works contractors, sub-contractors, PISC and SPHF or PIU staff during heavy rainfall and flood events in Sindh. The SOP ensures full compliance with World Bank Environmental and Social Standards (ESS3), IFC Performance Standards (PS2), SEPA guidelines, and the project Environmental and Social Management Plan (ESMP) and Emergency Response Plan (ERP). It addresses worker safety, public protection, prevention of silt runoff and untreated water discharge, and equitable safeguards for vulnerable groups, including women, children, and low-income communities.

2.0 Scope

This SOP applies to all project activities involving excavation, dewatering, material stockpiling, vehicle/ equipment operations, and site management when rainfall exceeds 10 mm/hour or when the Pakistan Meteorological Department (PMD) issues yellow/orange flood alerts. It covers all STAR WASH-1 subprojects across urban and rural sites in Sindh province.

3.0 Responsibilities

Site Engineer/ Supervisor shall monitor PMD weather forecasts daily, make work stoppage/ resumption decisions, conduct post-rain stability inspections, and maintain daily rain log records.

HSE Officer shall activate the ERP during rain events, coordinate Grievance Redress Mechanism (GRM) communications, investigate all rain-related incidents, and submit 24-hour reports to the PIU Environmental Specialist.

Contractor shall implement all specified physical controls (silt traps, barricades, dewatering systems), provide documented training to 100% of workers annually, and maintain verifiable compliance records for PIU endorsement.

PIU Environmental & Social Team shall conduct monthly oversight audits, issue community notifications via SMS/ WhatsApp in Urdu and Sindhi, and verify contractor compliance through site inspections and record reviews.

4.0 Pre-Rainfall Preparations

Site Supervisors must monitor PMD forecasts 48 hours in advance using official apps or websites. No new excavations deeper than 1.5 meters shall commence if rainfall is predicted within 24 hours. All material stockpiles (sand, aggregate, backfill) must be covered with UV-resistant tarpaulins secured on all sides, with peripheral berms (30 cm high) directing surface runoff to silt traps having a minimum 10 m³ settling capacity. Communities adjacent to work sites shall receive 24-hour advance notification through megaphones, SMS, or WhatsApp using the standard template: "STAR WASH-1 Rain Alert: Construction paused for safety. Contact GRM hotline [number] for updates."

5.0 Excavation & Trench Safety During Rainfall

All excavation activities shall cease immediately upon light to moderate rainfall (>5 mm/hour). Personnel in low-lying areas must evacuate to designated high-ground muster points. Post-rain inspections shall verify shoring stability for trenches deeper than 1.5 meters, scaling back any cracked or sloughed walls before re-entry. Open trenches adjacent to public areas must be covered with steel plates load-rated for 20 tons or protected by double-layered Jersey barricades. Sandbags (minimum 20 per trench end) shall divert surface water away from excavations toward designated silt traps.

6.0 Dewatering & Stagnant Water Management

Dewatering shall utilize submersible pumps equipped with non-return valves, discharging first into settling tanks or silt bags (50-micron mesh) before connection to PIU-approved storm drains or manholes. Direct discharge onto public roads is strictly prohibited. All pumped water must achieve turbidity below 50 NTU before release, verified by visual inspection or field turbidimeter. Stagnant water in work areas must be removed within 4 hours to prevent mosquito breeding (target vector index <5 larvae/m²), with fogging conducted if standing water persists beyond 24 hours.

7.0 Vehicle & Equipment Operations During Rain

Pre-Trip Vehicle Checks require a minimum 3 mm tire tread depth, functioning headlights/taillights/brake lights/wipers, and full fluid levels. Vehicles failing these criteria shall not be dispatched during rain alerts. All operations must follow designated haul routes; flood-prone shortcuts are prohibited.

Operational Controls limit site speeds to 20 km/h maximum and public road speeds to 30% below posted limits. Vehicles must maintain a minimum 5-vehicle-length following distance. Water crossings deeper than 30 cm are prohibited; essential crossings require low gear/ low RPM operation. Equipment tracks must be cleared of mud before crossing paved public roads.

Stuck Vehicle Protocol prohibits wheel spinning, requiring immediate driver evacuation to high ground if water levels rise. Only rated recovery vehicles shall attempt extraction, with all incidents reported to PIU HSE within 1 hour.

8.0 Public & Community Safety Measures

All open excavations require continuous high-visibility Jersey barricades or plastic barriers with bilingual signage ("خطرہ: گہرا کنواں / DANGER: DEEP EXCAVATION" and "کام جاری / MEN WORKING") positioned at 30-meter intervals. Night operations or rain-delayed excavations shall install flashing amber lights and reflective tape on all barriers. Pedestrian crossings over trenches must provide steel plate covers with anti-skid treatment or temporary wooden walkways with handrails. GRM hotline numbers shall be prominently displayed, with priority response (<4 hours) for complaints from women, the elderly, and low-income households.

9.0 Electrical & Chemical Safety

All electrical tools and temporary connections in flood-prone areas must be immediately isolated. Dewatering pumps require Earth Leakage Circuit Breakers (ELCB) with trip sensitivity <0.1 seconds. Electrical cables must be elevated above potential flood levels or protected in waterproof conduits. No operations involving chlorine or hazardous chemicals shall occur during active rainfall; storage areas must remain locked and bunded.

10.0 Post-Rain Work Resumption Protocol

Civil works shall resume only after the Site Supervisor completes and signs the mandatory Post-Rain Checklist, countersigned by the PIU HSE Officer.

The checklist verifies:

(1) trenches are fully dewatered and geotechnically stable;

(2) no utility line exposures or gas leaks;

(3) all electrical tools are dry and inspected;

(4) barricades and signage remain intact and visible;

(5) haul roads support heavy vehicle loads; and

(6) adjacent communities receive "work resumption" notification.

All rain-related incidents must be logged in the ESMP incident register with root cause analysis completed within 72 hours.

11.0 Training Requirements and Monitoring

Contractors shall deliver annual 2-hour rain safety training to 100% of workers, verified by attendance sheets and quizzes (minimum 80% pass rate). Key Performance Indicators include zero Lost Time Injuries from rain events, 95% checklist compliance rate, and monthly PIU audit scores above 90%. The SOP shall be reviewed annually or following any monsoon-related incident requiring ERP activation.

Annexure-X:

TOR for PIU E&S Staff, Senior Environment Specialist (PIU)

Annexure X- TOR for PIU E&S Staff

Senior Environmental Specialist

- Reports to Project Director (PD), PIU
- Coordinates with Social Specialist, Gender Specialist, Contractors, Supervision Consultants, and relevant government agencies
- Ensure implementation of ESMF and ESMPs in line with ESS1 and relevant provisions of ESS2 and ESS4
- Lead implementation of ESMF and site-specific ESMPs
- Integrate environmental considerations into project planning and design
- Review and approve environmental screening and ESMPs
- Ensure compliance with World Bank ESSs and national/provincial regulations
- Conduct regular field monitoring and site inspections
- Identify non-compliance and ensure corrective actions
- Prepare bi-annual E&S monitoring reports for the World Bank
- Ensure contractors prepare and implement SSEMPs
- Monitor contractor compliance with environmental clauses
- Conduct environmental audits of project sites
- Develop and deliver environmental training programs (EHS, OHS, waste management)
- Monitor community health and safety risks (dust, noise, water pollution, hazardous materials)
- Maintain environmental records, reports, and databases
- Support updating/revision of ESMF
- Deliverables: approved ESMPs and screening reports; bi-annual monitoring reports; training reports; non-compliance reports; inputs to ESMF updates
- Qualifications: Master's in Environmental Sciences/Engineering or related field; 8–10 years' experience; donor/World Bank experience preferred; strong knowledge of EHS Guidelines
- Duration: full project duration
- Performance indicators: timely reporting; contractor compliance; effectiveness of mitigation; quality of monitoring documentation

Senior Social Development Officer (PIU)

- Reports to Project Director (PD), PIU
- Coordinates with Environment Specialist, Gender Specialist, Contractors, local authorities, and communities
- Manage social risks and impacts in line with ESS1, ESS2, and ESS10
- Lead implementation of social components of ESMF
- Conduct and review social screening and impact assessments

- Monitor impacts on livelihoods and vulnerable groups
- Prepare/review Resettlement Action Plans (RAPs), if required
- Ensure compensation and livelihood restoration measures
- Monitor resettlement implementation and outcomes
- Ensure implementation of Labor Management Procedures (LMP)
- Monitor labor risks (child labor, forced labor, labor influx)
- Ensure worker GRM is functional
- Support implementation of Stakeholder Engagement Plan (SEP)
- Conduct inclusive stakeholder consultations
- Establish and manage project GRM
- Maintain grievance logs and ensure timely resolution
- Prepare grievance analysis and reporting
- Monitor community conflicts and access-related issues
- Maintain social records and documentation
- Contribute to bi-annual E&S monitoring reports
- Deliverables: social screening reports; RAPs (if applicable); GRM records and reports; consultation records; inputs to monitoring reports
- Qualifications: Master's in Social Sciences/Sociology/Anthropology or related field; 8–10 years' experience; resettlement and donor project experience preferred; strong knowledge of ESS10
- Duration: full project duration
- Performance indicators: GRM effectiveness; stakeholder engagement quality; compliance with social safeguards; timely reporting

Gender Specialist (PIU)

- Reports to Project Director (PD), PIU
- Coordinates with Social Specialist, Environment Specialist, NGOs, and community representatives
- Ensure gender mainstreaming and management of GBV/SEA/SH risks in line with ESS1, ESS2, ESS4, and ESS10
- Develop and implement Gender Action Plan
- Integrate gender considerations into project design and implementation
- Promote participation of women and vulnerable groups
- Develop and implement GBV/SEA/SH Action Plan
- Ensure Codes of Conduct (CoC) are signed and enforced
- Conduct GBV/SEA/SH awareness and training sessions
- Ensure gender-sensitive and confidential GRM
- Establish referral pathways for GBV survivors
- Conduct gender sensitization for staff, contractors, and communities
- Develop IEC materials on gender and inclusion
- Coordinate with NGOs and service providers
- Monitor gender outcomes and indicators

- Maintain gender-disaggregated data
- Contribute to E&S monitoring and reporting
- Deliverables: Gender Action Plan; GBV/SEA/SH Action Plan; training reports; gender-disaggregated data; inputs to E&S reports
- Qualifications: Master's in Gender Studies/Social Sciences or related field; 5–8 years' experience; GBV risk mitigation experience preferred
- Duration: full project duration
- Performance indicators: implementation of gender measures; effectiveness of GBV mitigation; participation of women and vulnerable groups; quality of reporting

Senior Behavior Change Specialist

- Senior Behavior Change Specialist will support the PIU in planning, implementing, monitoring and improving behavior change communication, hygiene promotion and community mobilization activities under the STARS-WASH-1 Project.
- The Specialist will ensure that behavior change activities are aligned with the ESMF, SEP, LMP, GRM, SEA/SH Action Plan, World Bank ESF requirements, and relevant WASH sector good practices.
- Develop and implement the project-level Behavior Change Communication Strategy and district/village-level BCC plans covering safe drinking water, sanitation, hygiene, fecal sludge management, wastewater management, water conservation, source protection and community participation in O&M.
- Identify key behavioral barriers in rural Sindh, including unsafe water storage, poor handwashing practices, open defecation, irregular toilet use, unsafe desludging, weak willingness to pay, low participation of women, and limited awareness of service delivery responsibilities.
- Design and supervise awareness campaigns on safe water handling, household water treatment, handwashing with soap, toilet use and maintenance, safe sanitation, timely desludging, wastewater management, menstrual hygiene management, and prevention of groundwater contamination.
- Prepare culturally appropriate IEC/BCC materials such as posters, brochures, flipcharts, pictorial guides, radio messages, school materials, community session guides and digital messages in simple language, including Sindhi and Urdu where required.
- Ensure targeted and inclusive communication for women, adolescent girls, children, elderly persons, persons with disabilities, minorities, landless households, low-literacy groups and remote rural communities.

- Conduct separate awareness sessions for women and adolescent girls where culturally required, including messages on menstrual hygiene, privacy, dignity, safety and equitable access to WASH services.
- Coordinate with the Gender Specialist and Social Development Specialist to integrate SEA/SH-sensitive communication, including acceptable worker conduct, confidential complaint channels, survivor-centered referral pathways and community safety messages.
- Train and guide PIU staff, district teams, SPVOs, DBO contractors, local operators, community mobilizers, teachers, health workers and community representatives on WASH behavior change, hygiene promotion, sanitation, FSM, inclusive engagement, GRM awareness and SEA/SH-sensitive outreach.
- Support field teams in delivering consistent community messages before, during and after construction, including safe use of water supply schemes, sanitation facilities, ABRs, drainage systems and desludging arrangements.
- Coordinate with PHED, LGD, SPHF, SPVOs, DBO contractors, local governments and community institutions to synchronize BCC activities with project design, construction, commissioning and operation.
- Provide inputs to site-specific ESMPs, SEP updates, stakeholder engagement plans, GRM outreach, community health and safety measures, annual work plans, procurement packages and contract requirements.
- Develop measurable BCC indicators and monitor changes in hygiene behavior, toilet use, safe water handling, sanitation service uptake, safe desludging practices, community participation, GRM awareness and inclusion of vulnerable groups.
- Conduct field monitoring visits, review reports from SPVOs, contractors and community mobilizers, identify implementation gaps and recommend corrective actions.
- Maintain records of awareness sessions, trainings, attendance, feedback, campaign materials, monitoring findings and corrective actions.
- Prepare monthly, quarterly and annual progress inputs for PIU and World Bank reporting, including evidence of outreach coverage, participation of women and vulnerable groups, behavior change progress and key implementation challenges.

Annexure-XI:

Generic TORs for the Preparation of ESMP

Annex-XI: Generic TORs for the Preparation of ESMP

Scope of the Work

The PIU STARS WASH 1 will engage a team of consultants to prepare the Environmental and Social Management Plan (ESMPs) for moderate-risk subprojects identified under Environmental and Social Management Framework (ESMF) of the Project, in order to ensure that the activities carried out under the proposed Project are (i) environmentally sound and sustainable in the long run; and (ii) consistent with the environmental safeguard guidelines, rules and regulations of the Government of Sindh (only those which are applicable), as well as those of the World Bank's Environmental and Social Standards (ESS).

The Consultants will carry out the tasks including, but not limited to the following:

i. Review available/ secondary environmental data, baseline studies, and results of screening checklists; Carry out detailed surveys and investigations for collection of adequate primary baseline data;
ii. Collect primary data on the biophysical environment of the project area;
iii. Collect primary data on the socioeconomic conditions of the local communities;
iv. Work with the PIU and its consultants in carrying out an alternative analysis of the proposed subproject locations and designs (if required);
v. Assess all potential environmental direct and indirect impacts of the subprojects during planning and design / pre-construction, implementation/construction and completion /operation phases in the project area of influence;
vi. Provide an independent opinion on the approach and adequacy to integrate appropriate environmental management measures with related costs into the detailed design, specifications and project contract documents;
vii. Undertake public consultation and disclose the outcome of the environmental and social assessment;
viii. Provide support and advice to PIU and SPHF in all matters relating to the environmental aspects of the project; and
ix. Any additional work required to achieve the objective of the assignment.
x. All the required ESMPs will be subject to the Bank's review and approval.

Proposed ESMP Structure

An ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation of a project to eliminate adverse

environmental and social risks and impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the measures and actions needed to implement these measures. The Borrower will (a) identify the set of responses to potentially adverse impacts; (b) determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.

The content of the ESMP will include, but not be limited to the following:

- Introduction, including background, and a brief description of the Project.
- Legal and policy framework, an overview of the relevant legal and policy framework.
- A simplified description of the proposed subprojects, including its layout and location, resource requirements, wastes to be generated, manpower requirement, a brief description of construction activities, and a brief description of operation and maintenance activities.
- Baseline description, primarily describing the proposed site and its immediate surrounding aided with maps, photographs and schematics, key environmental and social aspects/resources of the surroundings such as land form and land use, land ownership, water resources, settlements, any critical habitat or protected area, any cultural heritage sites or graveyards, any sensitive receptor such as schools and hospitals, access routes, and other relevant details.
- Stakeholder consultations, recording the key concerns and suggestions of the community regarding the proposed subprojects and its potential impacts, and a description of the way these concerns will be addressed.
- Impact assessment: The anticipated impacts are identified and summarized along with their significance.
- Mitigation plans, listing all the impacts, their mitigation measures, assigning responsibility of implementing these measures, and also assigning responsibility for monitoring. Also identifying cumulative impacts if applicable.
- Monitoring plan, describing the monitoring requirements, frequency, and responsibility of conducting the monitoring.
- Capacity development and training plan, describing the training requirements, contents, frequency, training recipients, and responsibility of conducting the desired trainings.
- Documentation and reporting, describing the requirement, frequency, and responsibility of documentation and reporting.

- Grievances redress mechanism (GRM), a mechanism to define roles and responsibilities of the persons responsible to address the grievances of the affectees.
- ESMP implementation budget, providing the cost estimate of its implementation.

Duration of Assignment

The duration of the assignment for the preparation of each ESMP is approximately two (02)[114] months. The overall duration of the consultancy services depends on the number of subprojects for which ESMPs need to be carried out.

[114] This is a tentative duration, however, it will be finalized by Environmental and Social Safeguards Specialists of PIU upon finalization of project footprints and scope of subproject (s) activities.

Annexure-XII:

Terms of Reference (ToR) for Third Party Validation (TPV)

Annexure – XII: Terms of Reference (ToR) for Third Party Validation (TPV)

- Review project documentation including ESMF, site-specific instruments (ESMPs/SSEMPs), Labor Management Procedures (LMP), Stakeholder Engagement Plan (SEP), Resettlement Plans (RPs/ARPs, if applicable), and contractor E&S records to assess adequacy and implementation status.
- Conduct field-based validation through site inspections, consultations with affected communities (including women and vulnerable groups), workers, contractors, and local authorities to verify ground-level compliance.
- Assess contractor performanc on implementation of mitigation measures, occupational health and safety (OHS), labor and working conditions (ESS2), community health and safety (ESS4), waste and hazardous material management, and code of conduct including SEA/SH provisions.
- Verify the functionality, accessibility, and effectiveness of the Grievance Redress Mechanism (GRM), including GMIS and non-digital channels, with attention to inclusion of remote and vulnerable populations (ESS10).
- Validate reported outputs and outcomes, including infrastructure functionality, service delivery improvements, and beneficiary satisfaction.
- Identify non-compliances, gaps, and systemic issues, and assess associated environmental and social risks and severity.
- Recommend corrective and preventive actions, including time-bound Corrective Action Plans (CAPs), with clear assignment of responsibilities.
- Apply a risk-based sampling strategy covering a representative selection of districts, subprojects, and typologies (water supply, sanitation, drainage), including high-risk and remote locations.
- Ensure inclusion of gender-sensitive approaches, and assess SEA/SH risk mitigation measures in line with the World Bank Good Practice Note.
- Prepare and submit inception report (methodology, sampling plan, tools), biannual TPV reports, and ad hoc thematic/spot-check reports as required.

- Reports to include: executive summary, methodology, findings by ESS, compliance rating, photographic evidence, case studies, stakeholder feedback, and CAPs.
- Present findings to PIU and participate in review meetings with SPHF and the World Bank, as required.
- Maintain independence, objectivity, and confidentiality; disclose any conflict of interest.
- Use qualified, multidisciplinary team (environmental, social, gender/SEA-SH, OHS specialists) with demonstrated experience in World Bank–funded projects.
- Ensure all data collection complies with ethical standards, including informed consent and protection of sensitive information (especially SEA/SH-related).
- Support knowledge transfer by highlighting lessons learned and good practices to inform adaptive management and continuous improvement.
- Duration: throughout project implementation, with periodic assignments aligned to the agreed monitoring schedule.
- Deliverables and timelines to be contractually defined, with penalties for delays and quality assurance provisions.

Annexure-XIII:

Proposed Grievance Types under STAR-WASH-1 GRM

Annexure – XIII: Proposed Grievance Types under STAR-WASH-1 GRM

Grievance Category	Code	Grievance Type (Description)
1. Targeting, Eligibility & Inclusion	G-0100	Grievances related to eligibility, selection, and inclusion in project-supported WASH services.
	G-0101	Exclusion from beneficiary selection due to bias (gender, disability, poverty, social group).
	G-0102	Lack of transparency or unclear eligibility criteria.
	G-0103	Households or communities not considered during planning or assessment.
	G-0104	Disputes affecting access to WASH services (e.g., shared facilities, land-use constraints).
2. Project Implementation & Service Quality	G-0200	Issues related to construction, installation, and functionality of WASH systems.
	G-0201	Delays in construction or installation of WASH facilities.
	G-0202	Poor design or inappropriate technology (e.g., non-functional drainage, water points).
	G-0203	Use of substandard materials or poor workmanship.
	G-0204	Disruption to water supply or access during construction.
	G-0205	Non-functionality or early breakdown of WASH infrastructure.
3. Environmental & Social Impacts	G-0300	Complaints related to environmental and social impacts of project activities.
	G-0301	Water contamination or deterioration of water quality.
	G-0302	Poor wastewater or sludge disposal practices.
	G-0303	Dust, noise, or construction-related nuisance.
	G-0304	Damage to community or private assets during works.
4. Community Health & Safety (ESS4)	G-0400	Risks to community health and safety arising from project activities.
	G-0401	Unsafe construction sites (open pits, exposed pipelines, etc.).
	G-0402	Risk of accidents or injuries to community members.
	G-0403	Inadequate safety measures around water points or sanitation facilities.
5. Labor & Working Conditions (ESS2)	G-0500	Grievances related to labor and working conditions.
	G-0501	Non-payment or delayed payment of wages.
	G-0502	Unsafe working conditions or lack of protective equipment.
	G-0503	Child labor or forced labor concerns.
	G-0504	Worker misconduct affecting communities.
6. Gender, SEA/SH & Social Inclusion (ESS1, ESS10)	G-0600	Gender-related issues, including SEA/SH and exclusion risks.
	G-0601	Gender-based discrimination in access to WASH services.
	G-0602	Lack of gender-sensitive design (privacy, safety, accessibility).

	G-0603	Sexual Exploitation and Abuse (SEA) / Sexual Harassment (SH) complaints.
	G-0604	Barriers to access for persons with disabilities, elderly, or marginalized groups.
7. Financial & Contractual Issues	G-0700	Issues related to payments, compensation, and contracts.
	G-0701	Delayed payments to contractors, suppliers, or workers.
	G-0702	Disputes over costs or payments for materials/services.
	G-0703	Compensation (if applicable) considered inadequate or delayed.
8. Stakeholder Engagement & Communication (ESS10)	G-0800	Complaints related to information disclosure and community engagement.
	G-0801	Lack of consultation or community participation in planning.
	G-0802	Inadequate dissemination of project information.
	G-0803	Poor responsiveness of project staff to community concerns.
9. Governance, Transparency & External Interference	G-0900	Issues related to governance, transparency, and external influence.
	G-0901	Lack of transparency in decision-making or resource allocation.
	G-0902	Political or local elite interference in project implementation.
10. Other Grievances	G-1000	Any grievance not covered above but within project scope.

Annexure-XIV:

Checklist for VLD

Annexure-XIV: Checklist for VLD

CHECK LIST FOR VOLUNTARY LAND DONATION (VLD)			
Name of Scheme		Name of Village	
UC		Tehsil	
Name of Title Holder/ Details		Name and Father/ Husband's Name	
CNIC No		Mobile No.	
Age		Gender:	
Occupation:		Income	
Total owned land (Kanal)		Donated land (Kanal)	
Residence at site		Distance of piece of land from village	
Land use status (agricultural, structure vacant etc.)		Status of Land (free of encumbrances and not subject to other claims / claimants)	
Type of crop		Estimated cost of land	
If crop then cost of crop		If structure then cost of structure	
Land map (aks shijra)		Ownership record (fard malkiyat)	
Khewat no.		Khatooni no.	
Muraba no.		Khusra no.	
North Boundary of the Donated land		East Boundary of the Donated land	
West Boundary of the Donated land		South Boundary of the Donated land	
		Village Counciler /Notable/Numberdar (Witness	
Name		Name	
CNIC No		CNIC No	

Signature		Signature	

Tehsil Team's Representative, Name: _____, Signature: _____

B- Checklist for Government-Owned Land

CHECK LIST FOR VOLUNTARY LAND DONATION (VLD)					
1. Name of Scheme			**2. Name of Village**		
3. Name of Union Council (UC)			**4. Name of Tehsil**		
5. Ownership status	(a)Provincial Government	(b) Federal government	(c) Evacuate Trust Property Board	(d) Muslim Auqaf/Waqf Property	(e) Others
6. Land use, under possession of which department, status of land (lease, tenant, encroachment etc.)					
7. Is there any litigation on the land? Yes/No. If yes provide details					
8. Total government land in Village (Kanals)			**9. Required land for the scheme (Kanals)**		
10. Distance of piece of land from the edge of the village			**11. Status of Land**	(a) Free of encumbrance	(b) Under possession /claim
12. Land use status (agricultural/ structure/vacant/Other)			**13. Estimated cost of land**		
14. If crop on the land, type and cost of crop			**15. If structure on the land, type and cost of structure**		
16. If trees, type and cost of trees			**17. Ownership record (Fard Malkiat)**		
18. Land map (Aks Shajrah)			**19. Required land for the scheme (Kanal)**		
20. Khewat no.			**21. Khatoni no.**		
22. Muraba no.			**23. Khusra no.**		
24. Northern boundary of the proposed land to be donated (Coordinates)			**25. Eastern boundary of the proposed land to be donated (Coordinates)**		
26. Western boundary of the proposed land to be donated (Coordinates)			**27. Southern boundary of the proposed land to be donated (Coordinates)**		
Title holder			**Village Counciler /Notable/Numberdar (Witness)**		
Name			Name		

CNIC No		CNIC No	
Signature		Signature	

Tehsil Team's Representative, Name: _____,
Designation_____, Signature: _____

Annexure-XV:

Voluntary Land Donation (VLD) Deed

Annexure-XV: Voluntary Land Donation (VLD) Deed

This Deed of Voluntary Land Donation (hereinafter referred to as the "Deed") is made and executed on this ___ day of _____***, 2026*** by and between:

Donor:

Mr./Ms. _____, Son/Daughter of _____, CNIC No. _____, Mobile No. _____, aged __ years, occupation _____, with a monthly income of _____, resident of _____ village, Tehsil _____, District _____ (hereinafter referred to as the "Owner").

Recipient:

The Government of Sindh, acting through the Sindh People's Housing for Flood (SPHF), a Government of Sindh agency, under the project titled _____ (hereinafter referred to as the "Recipient"). For the purposes of this deed, the term "Recipient" refers to and includes the Project Management Unit (PMU) of the Sindh Transformational Accelerated Rural Services (STARS) WASH Project, Government of Sindh, and its successors, nominees, and assignees.

WHEREAS:

1. The Owner is the lawful and registered owner of the land located at _____, Tehsil _____, District _____, which is more particularly described in Schedule A hereto (the "Land").

2. The Owner has voluntarily agreed to donate a portion of the Land to the Government of Sindh through the Recipient for the development and implementation of public services related to water supply and sanitation infrastructure, behavioral change, capacity development, and project management and monitoring under the project titled _____ in the village _____, Tehsil _____, District _____ (the "Project").

3. The Owner affirms that the Land being donated is free from any encumbrances, liens, or legal claims and is being voluntarily donated without any form of coercion or compensation, for the purposes set forth herein.

NOW, THEREFORE, THIS DEED WITNESSETH AS FOLLOWS:

1. **Voluntary Donation:** The Owner hereby voluntarily and irrevocably donates and transfers the ownership of the portion of the Land described in Schedule A (the "Donated Land") to the Government of Sindh, through the Recipient, for the purposes of the Project.

2. **Purpose of Donation:** The Donated Land shall be used exclusively for the execution of public services related to water supply and sanitation infrastructure, behavioural change, capacity development, and project management and monitoring under the Project titled _____ in the village _____, Tehsil _____, District _____.

3. **Indemnity and Warranty:** The Owner warrants that the Land is free from all encumbrances and legal claims. The Owner shall indemnify and hold harmless the Recipient from any claims, demands, or legal actions arising out of any defect in the title of the Land, or from any third-party claims in connection with the Land.

4. **No Compensation:** The Owner acknowledges and agrees that this donation is made voluntarily and without expectation of compensation. The Owner further acknowledges that the Government of Sindh, through the Recipient, will not be liable for any form of financial compensation, reimbursement, or other consideration related to the donation.

5. **Effective Date:** This donation shall be effective from the date of execution of this Deed and shall remain irrevocable, subject to the terms hereof.

6. **Legal Compliance:** The parties shall comply with all relevant laws, rules, and regulations in relation to the donation, transfer, and use of the Land.

7. **Binding Effect:** This Deed shall be binding upon the parties, their successors, heirs, legal representatives, and assigns.

IN WITNESS WHEREOF, the Owner and the Recipient have executed this Deed of Voluntary Land Donation on the day and year first above written.

SIGNED by the Owner:

(Owner's Name)
CNIC: _____
Address: _____
Date: _____

SIGNED by the Representative of the Recipient:

(Name and Title of Representative)
Sindh People's Housing for Flood (SPHF)
Date: _____

WITNESSES:

1. _____

Name: _____
CNIC: _____
Address: _____
Date: _____

2. _____

Name: _____
CNIC: _____
Address: _____
Date: _____

Annexure-XVI:

Entitlement Matrix

Annexure XVI- Entitlement Matrix

Table Entitlement Matrix

Type of Loss	Specification	Eligibility	Entitlements
Land			
Land – Permanent impact on arable land	All land losses regardless of severity	Owner (titleholder / traditional rights holder)	Land-for-land compensation of equal value/productivity OR cash compensation at full replacement cost (fair market value + all costs + 15% surcharge as per LAA Section 23)
			If BoR compensation is below replacement cost, the difference paid as resettlement assistance
			Additional resettlement assistance equal to 6 months provincial minimum wage if ≥10% productive land is affected
		Leaseholder (titled/untitled)	Lease refund/adjustment for remaining period (up to 2 years)
			Crop compensation + additional crop
			Transitional support as applicable
		Sharecropper/tenant	Cash compensation equal to gross market value of crop share as per agreement
		Agricultural laborer	Income rehabilitation allowance equal to 1 crop season net value OR 3 months minimum wage
		Encroacher	No land compensation• Income rehabilitation allowance equal to annual crop value + rehabilitation support as per RP/ARP
Temporary land occupation	Civil works use	Owner/lessee/tenant	Rental payment for occupation period
			Land restored to original condition
			Continued access to remaining land and utilities
		Non-titled users	Access maintained• Land restored
			Crop/tree compensation if applicable
Structures – Partial loss	Structure remains functional	Owner (incl. non-titled users)	Cash compensation for affected portion at full replacement cost (no depreciation)
			Repair cost at market rates• Right to salvage materials
		Tenant/lessee	Rent refund proportionate to affected portion and remaining lease period
			Compensation for improvements as agreed

Type of Loss	Specification	Eligibility	Entitlements
Stalls/kiosks	Temporary commercial structures	Vendors (titled/non-titled)	Alternative site OR cash compensation for relocation (no depreciation)
			Salvage rights
Crops	Standing crops	Cultivators	One-year crop compensation based on gross market value (yield × area × crop type)
		Sharecroppers	Compensation shared as per agreement
Trees – Fruit trees	Fruit bearing/non-bearing	Owner/cultivator	Compensation based on yield × years to maturity (5 years standard if applicable)
			Seedling replacement cost
Trees – Timber trees	Timber species	Owner/cultivator	Timber value at market rate + seedling replacement cost
Relocation assistance	All affected structures	All APs	Logistic support for relocation• Access to civic amenities (water, electricity, schools, health if applicable)
Security of tenure	Resettlement sites	Relocated APs	Secure tenure for replacement land/structures
Transport allowance	Relocation	APs	PKR 30,000 (residential) / PKR 20,000 (commercial/agricultural) or higher if required
Rent assistance	Temporary housing/business	APs	3–6 months rent assistance based on market rates
Transition allowance	Relocation period	APs	Up to 3 months income or minimum wage equivalent
Income restoration – land loss (partial)	Productive land impact	APs	Productivity support (irrigation, seeds, tools, land improvement)
			Grants/micro-credit if needed
Income restoration – land loss (full)	Full livelihood loss	APs	Project employment OR training• Business/livelihood support
Vulnerable APs	Poor, landless, female-headed, disabled, elderly	Vulnerable households	3 months subsistence allowance (minimum wage basis)
			Priority employment
			Additional rehabilitation support

Annexure-XVII:

Photo Log

Annex-XVII: Photo Log

1. District Badin

Village Name: Mazarpur Mallah

	
The E&S consultant conducting Focus Group Discussion (FGD) at village Mazarpur Mallah	**Women highlighting challenges in water access and absence of drainage systems at village Ahmed Mallah**
	
The PWD asking for PWD considerations in project designs	**An elderly widow highlighting difficulties in traveling long distances for water access**

	
Focus Group Discussion (FGD) conducted in the village Mian Pota	**The villagers discussing the Proposed Project and existing WASH situation in the village Syed Zain ul Abidin**
	
PWD male highlighting difficulties faced by him	**A woman with a disabled child highlighting caregiving challenges and mobility constraints**

2. District Nosharo Feroze

Village Nasir Khan Mari

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Mothers sharing concerns over child health linked to poor water quality village Nasir Khan Mari</td><td>FGD participants expressing impact of floods on water availability at village Muhammad Umar Kalo</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Men and women sharing concerns on poor water quality and hygiene practices at village Bakhshu Khan Rind</td><td>Dialogue on water scarcity and inclusive project design at village Chanhen Manumal</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>FGD session regarding project planning at village Khoro Sharif</td><td>Village elders reflecting on the rise of waterborne diseases following recent floods</td></tr>
</table>

3. District Sanghar

	
The E&S consultant conducting Focus Group Discussion (FGD) at village Ghulam Muhammad Lashari	**Consultation with village notable regarding VLD.**
	
Vulnerable groups (poor families) highlighting challenges due to lack of sanitation facilities at village Usman Laghari	**Vulnerable group (minority) women participants highlighting long distances, unsafe water sources, and lack of sanitation facilities at village 39 Jamrao**

	
Interviewing PWD male	**The GEMS E&S team conducting Focus Group Discussion (FGD) at village Ubhpur**
	
Focus Group Discussion (FGD) conducted in the village at village Muhammad Hayat Jalbani	**The GEMS E&S team conducting Focus Group Discussion (FGD) at village at village Muhammad Hayat Jalbani**

4. District Khairpur

	
Men discussing water and hygiene issues in the village at village Malheer Khan Pato	**Village FGD session on WASH challenges and community needs at village Maroro**
	
Participants highlighting gaps in safe water availability and sanitation at village Sanghar Shar	**Women discussing the impact of floods on water availability at village Malko Wahan**
	
FGD participants identifying key water and sanitation issues at village Raban Rajpar	**FGD session focusing on equitable access to water services at village Raban Rajpar**

5. District Dadu

	
Villagers participating in FGD at village Arab Gogani	**Villager highlighting needs for water at village Abdul Hameed**
	
women discussing WASH issues caused by limited and unsafe water	**Community men brainstorming solutions for water challenges at village Khairpur Nathan Shah**
	
Direct engagement with a community member to assess WASH-related needs and concerns at village Peroz Shah	**Women discussing barriers to accessing clean water at village Daud Dero**

	
During the consultation session at village Shehan Jo Daro	**During the consultation session at village Ibrahim Laghari**
	
Female FGD at village Allahbad	**During the consultation session at village Gul Muhammad Chandio**

6. District Larkana

	
Women participants jointly highlighted key challenges and concerns Village Faqeer Muhammad Junejo	**Community participants engaged in a focus group discussion, highlighting key health, hygiene, and WASH-related challenges and concerns.**
	
PWD discussing challenges in maintaining proper hygiene and sanitation	**Women highlighting key gaps in water, sanitation, and hygiene services at village Wadi Wahani**

	
Community–GEMS E&S dialogue on WASH issues at village Ramzan Kalhoro	**Women highlighting hygiene issues linked to water scarcity at village Bungal Khan Abro**
	
Dialogue on improving water quality, hygiene, and sanitation at village Lahino Samtio	**Women voicing concerns over insufficient water supply and sanitation services at village Ramzan Kalhoro**

7. District Jamshoro

	
The GEMS E&S team conducting Focus Group Discussion (FGD) at village Bhan Saeedabad	**PWD female highlights her difficulties and limitations caused by the unavailability of WASH facilities**
	
Women Community member highlighting challenges related to water access, sanitation, and daily hardships at village Pakka Radhan	**An elderly woman highlighting challenges caused by poor WASH conditions**

	
The GEMS E&S team conducting Focus Group Discussion (FGD) at Jaddani Panhwar	**A female participant highlighting concerns regarding WASH conditions at village Tehni**
	
A widow participant highlighting difficulties in accessing safe water and sanitation services	**The GEMS E&S team conducting Focus Group Discussion (FGD) at village Gaher**

	
During the consultation at village Dhamaach	**During the female FGD at village Dabhoon**
	
During the consultation at village Ranikot	**The GEMS Gender Specialist conducting Focus Group Discussion (FGD)**

8. Qambar Shadadkot,

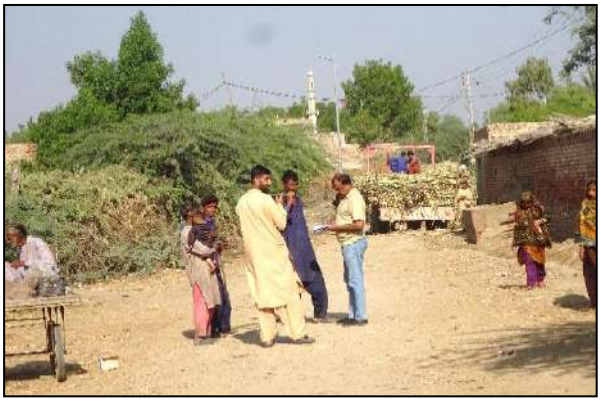
	
During the consultation at village Ghoghari	**During the consultation at village Ghogharo**
	
During the consultation at village Kot Lal Bux Mahesar	**The respondent highlighting water fetching issues**

9. District Sujawal

	
Dissemination of Invitation Letter at Village Ahmad Khan Zour	**During the male FGD at Village Ahmad Khan Zour**
	
During the female FGD at Village Ahmad Khan Zour	**During the consultation session at Village Belo**

	
During the female FGD (poor families) at Village Belo	**During the consultation session at Village Goonghani**
	
During the consultation session at Village Belo	**During the consultation with villagers at Village Belo**

10. District Mirpurkhas

	
During the consultation session with women at village Ali Hasan Shah	**During the consultation session at village Ali Hasan Shah**
	
During the Consultation session at village Taju Khaskheli	**During the female FGD at village Taju Khaskheli**
	
During the Consultation session at village Gul Muhammad Halepoto	**During the Consultation session at village Taju Khaskheli**