Annex 7: Summary of consultations and stakeholder engagement plan

Version 2. June 1, 2023

1. Introduction

1.1. Background to the project and areas

The proposed project will be implemented in areas of the Indus River basin including Dera Ismail (D.I.) Khan in the Khyber Pakhtunkhwa province, Manchar in Sindh, and Chakar Lehri in the Balochistan province. These areas were identified using a three-phase screening mechanism during the development of the Concept Note. The three phases include: i) assessments based on biophysical, socio-economic, and ecological data and information; ii) risk and opportunity assessments based on spatial maps of hazard, vulnerability, exposure and technical feasibility; and iii) suitability assessments based on respective ecosystems. Ecosystem-based adaptation (EbA) and green infrastructure intervention sites within the project areas were selected based on EbA/NbS archetypes (developed in consultation with stakeholders with clear climate objectives, co-benefits and components on preferred intervention types) that were tailored and applied to each selected site.

1.2. Project Objectives and components

The proposed project will contribute to the GCF's fund-level adaptation objective of increased climate-resilient sustainable development by facilitating a shift towards integrated flood and water resources management in Pakistan. This shift will be achieved by improving floodwater and hill torrent management using EbA and green infrastructure solutions, mainstreaming these solutions into policy and planning to catalyze their uptake as key approaches for integrated flood and water resource management, and strengthening the climate resilience of the most vulnerable rural communities in Pakistan through enhanced water management.

Recharge Pakistan is composed of three technical components, which are:

- Component 1: Proofs of concept for EbA and green infrastructure interventions as efficient and effective solutions for flood and drought risk reduction in Pakistan
- Component 2: Enabling a paradigm shift towards EbA and green infrastructure in Pakistan
- Component 3: Enhanced community resilience and adoption of EbA and green infrastructure interventions in Pakistan's Indus Basin.

1.3. Objective of the Stakeholder Engagement Plan (SEP)

The objective of this Stakeholder Engagement Plan (SEP) is to provide guidelines and instructions on stakeholder engagement to ensure smooth and uninterrupted implementation of project activities. This document also provides a summary of engagement carried out to date and provides a list of stakeholders which will need to be engaged during the project duration, their role and relevance in the project, and how often they need to be engaged with.

2. Regulations and Requirements

The Stakeholder Engagement Plan presented here aims to ensure the full and effective participation of all stakeholders in the design, planning, implementation and closure of the Project, according to the international provisions and guidelines of the GCF, the accredited entity WWF-US, WWF Pakistan and national legislation on participation and consultation. This approach aims to guarantee transparency, inclusion, responsibility, integrity and effective participation of all parties affected by and who may affect the project. The main requirements and policies that govern this participation plan are summarized below.

The ESSF requires that projects initiate stakeholder consultations at the very early stage of project design and establish mechanisms that allow communication with affected stakeholders in a form and language that are understandable by, and accessible to, diverse groups, including those who may be marginalized or otherwise vulnerable.

2.1. WWF-US (AE) requirements

WWF has developed and adopted a comprehensive Environmental and Social Safeguards Framework (ESSF) to ensure consistent and comprehensive application of safeguards across all projects supported and implemented throughout the WWF Network[1]. To comply with WWF's ESSF, the project will follow the policies, standards, guidelines and procedures detailed in the Environmental and Social Safeguards Integrated Policies and Procedures (SIPP)[2]. Specifically, relevant for the Stakeholder Engagement Plan is the Standard on Stakeholder Engagement and the associated Procedures for Implementation of the Standard on Stakeholder Engagement[3].

The ESSF requires that all projects supported by WWF undertakes consultation and engagement with potential stakeholders and to disclose project-related information in a transparent manner. This commitment also requires that the project have a grievance mechanism for stakeholders to raise concerns and receive responses.

2.2. Government of Pakistan laws and regulations

As per Article 19A 'Right to information' of the Constitution of the Islamic Republic of Pakistan, 1973, every citizen shall have the right to have access to information in all matters of public importance subject to regulation and reasonable restrictions imposed by law. In addition, as per the provincial laws on Environmental Protection, all environmental assessment impacts need to be presented before a public hearing for input on review by the affected peoples.

[1] https://wwf.panda.org/our_work/people/people_and_conservation/wwf_social_policies/
[2] https://wwf.panda.org/discover/people_and_conservation/?351401
[3] https://wwfgeftracks.com/sites/default/files/2019-02/Procedures%20for%20Implementation%20of%20Standard%20on%20Stakeholder%20Engagement.pdf

2.3. WWF Standard on Stakeholder Engagement

The WWF GCF Agency requires all GCF projects comply with GCF and WWF standards on Stakeholder Engagement, specifically the WWF Standard on Stakeholder Engagement and the associated Procedures for Implementation of the Standard on Stakeholder Engagement. Stakeholder engagement is an overarching term that encompasses a range of activities and interactions with stakeholders throughout the project cycle and is an essential aspect of good project management.

The WWF Standard on Stakeholder Engagement requires the Executing Entity to create site-specific Stakeholder Engagement plans that engage stakeholders throughout the life of the project; communicate significant changes to project stakeholders and consult on potential risks and impacts; establish a grievance redress mechanism and register and respond to grievances throughout project execution, and; disseminate information in a way that is relevant, transparent, objective, meaningful, and easily accessible. In the case of Recharge Pakistan, the site-specific SEPs will closely align with the Social Mobilization Plan model adopted by WWF Pakistan, as detailed in Appendix 6 of Annex 6, as these Plans go above and beyond the requirements of a usual SEP. The Standard on Stakeholder Engagement promotes an inclusive process to support the development of strong, constructive and responsive relationships that help to identify and manage risks, and which encourage positive outcomes for stakeholders and project activities.

3. Summary of Stakeholder Engagement

Stakeholder engagement has been a continuous process throughout the entire course of designing the funding proposal, where it was carried out by not only by WWF-Pakistan, but also its by technical consultants, Watersprint, and its ESMF and Gender consultants, DevCon, and Simi Kemal & Global IRS respectively.

3.1. Concept Note Preparation Stage

During the concept note development phase, WWF-Pakistan held numerous consultations with provincial and national stakeholders. The Ministry of Water Resources (along with its Federal Flood Commission, and Provincial Irrigation Departments) the Ministry of Climate Change, and the Ministry of Planning Development and Reforms were integral in defining proposed interventions, potential sites, implementation strategy, and co-financing options.

National Consultative Sessions were conducted which included representation from all relevant federal and provincial entities. Discussions were held to identify potential sites, criteria, and alignment with Government projects. These sessions reinforced and further validated the need for a project like this in the national context. The need for hill torrents management was also highlighted and led to the inclusion of additional vulnerable sites to the list. Additionally, other multi-stakeholder sessions

and meetings have were held, including with the Ministry of Water Resources, Federal Flood Commission, Pakistan Council of Research in Water Resources, Ministry of Climate Change (GCF NDA), and Provincial Irrigation, Forest, Wildlife, Fisheries, Environment and Disaster Management Authorities. The purpose of these meetings was: a) to discuss the project design; b) to define roles and responsibilities in the proposed project; and c) to obtain formal commitments of support. Endorsements in the form of Letters of Support were obtained from all the national and provincial government agencies.

During the pre-feasibility phase, the detailed assessments were designed to seek first-hand information from the stakeholders for determining the climate impact in their project areas, prioritizing the sites/areas of intervention (AOIs) and possible interventions so that the vulnerable communities/areas can be safeguarded. A series of stakeholder's consultative workshops at provincial headquarters and federal capital were conducted between July—September 2021 to obtain a first-hand opinion on EbA solutions from the relevant and knowledgeable stakeholders. The major outcomes of the multi-stakeholder consultations were: i) All sites within the project areas are impacted by climate change and required interventions (either NbS/EbA or structural measures blended with EbA options) are to be implemented as soon as possible; ii) The proposed inventory of NbS/EbA is suitable for the project areas and required to be tested and evaluated by using hydrological and hydrodynamical models; iii) Stakeholders have shown keen interest in the design, implementation, and replication of the proposed EbA-interventions in the entire Pakistan. Details on outcomes and attendance, as well as accompanying images, are provided in Appendix 2 of this document.

3.2. Pre-Feasibility and Feasibility Stage: WaterSprint

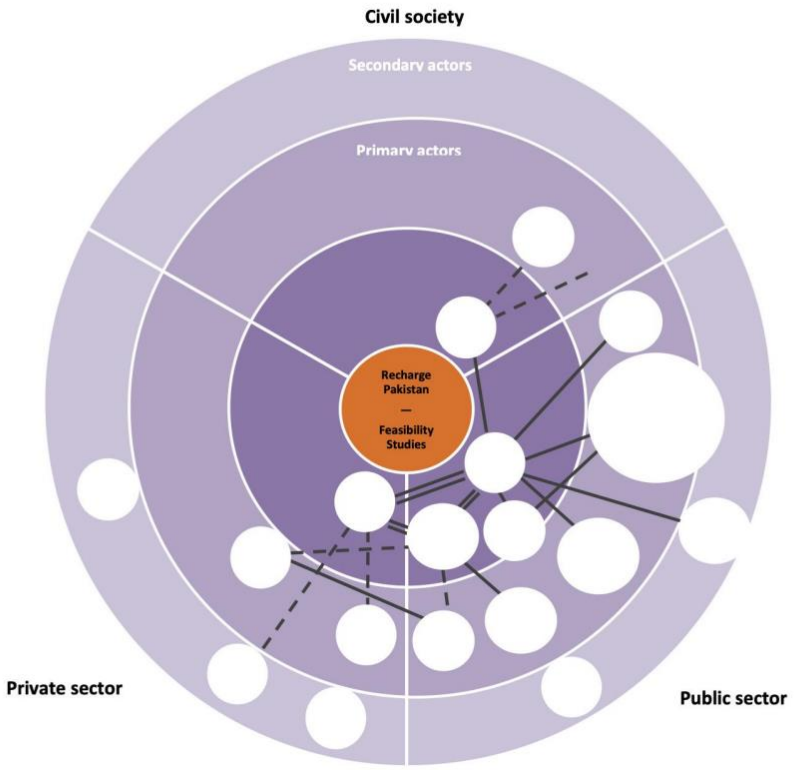
WWF-Pakistan onboarded the services of Watersprint to carry out the pre-feasibility and feasibility studies. As part of the pre-feasibility and feasibility development process, Watersprint first developed an Inception Report wherein it laid out a process for streamlining its stakeholder engagement, including developing a tool to conduct stakeholder and institutional mapping for the project areas. Watersprint also divided project stakeholders into four (4) categories which are:

Definition	
Key actor	Key actors are stakeholders who are able to use their skills, knowledge or position of power to significantly influence a project
Veto player	Key stakeholders who are able to veto the project
Primary actor	Primary actors are those actors who are directly affected by the project, either as designated beneficiaries, or because they stand to gain – or lose – power and privilege, or because they are negatively affected by the project in some other way, for instance if they have to be resettled
Secondary actor	Secondary actors are stakeholders whose involvement in the project is only in direct or temporary, as is the case for instance with intermediary service organisations

Source: Inception Report

Watersprint Stakeholder Mapping Tool:

Tool Stakeholder Map



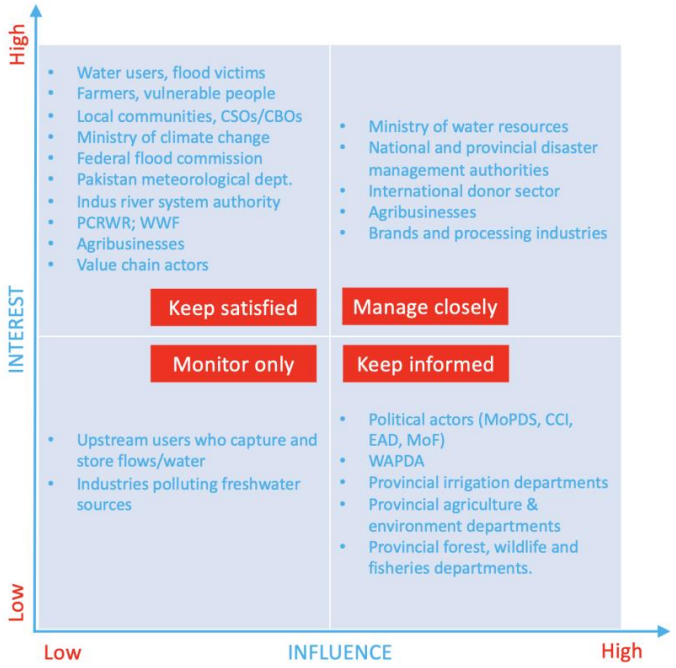
Source: Inception Report

Using this as a guiding principle, WaterSprint in its pre-feasibility stage, from July 2021 to September 2021 began extensive stakeholder consultations for the purposes of not only validating and designing project activities, but also gauging community interest and ownership over the same.

During the prefeasibility phase, a diverse range of factual insights from all actors — public sector, private sector, civil society organizations, communities, victims of climate-related disasters and academia – was obtained. This approach supported the consultants in informing planning processes especially regarding selection of potential sites and NbS-interventions in align with the GCF climate rationale and to develop community-based resilience to the climate change in project areas.

These consultations became the baseline of future deliberations with the relevant, influential and interested stakeholders, while keeping updated and/or satisfied those specific stakeholders who are less influential but highly interested (i.e., the direct beneficiaries) in the project interventions.

i. <u>Project Stakeholders: Influence and Impact</u>



Source: Pre-feasibility Report, WaterSprint

The above figure describes the power, influence and interest of relevant stakeholders. This matrix informed the project team about when and what type of relations regarding stakeholder engagement need to be maintained. For instance, it was noted that links with the Ministry of Water Resources (MoWR), the National Disaster Management Authority (NDMA), the respective provincial Disaster Management Authorities (PDMA), need to be managed strongly and closely, as they do possess the highest power with

clear and strong interests to safeguard of communities most vulnerable to climate change. Similarly, actors who fall in the quadrant of low-power high-interest, for instance, water users, flood victims, local communities, ministry of climate change federal flood commission, etc. need to be kept satisfied, and need to be continuously engagement, from designing until implementation.

The power-interest matrix is a necessary tool in the context of stakeholder engagement as it will provide guidance on: with whom the project team would build the strong relations and synergies to achieve the desired objectives of Recharge Pakistan for the feasibility, designing and implementation of NbS-interventions in the project areas/sites.

ii. Process

As part of the stakeholder engagement process, Watersprint conducted field visits to all possible locations within the project areas, visualized the factual situation in the field, observed the challenges being faced by the victims of climate-related disasters and communities and recorded the stakeholders' viewpoint within the anticipated timeframe of nine days.

Daily online meetings were held between the field team and office/partner teams to:

(1) discuss the field situation for developing a common understanding of the project area;

(2) assess the climate-related challenges; and

(3) explore the opportunities for ecosystem-based designing to create a climate-resilience environment through nature-based interventions in the project areas/sites.

The **main objectives** of these field visits were to:

• identify and map relevant stakeholders and beneficiaries of Recharge Pakistan.

• analyze the mandates, roles and responsibilities of both formal and informal stakeholders and institutions.

• document the gaps and overlaps of institutes responsible/present in the project areas.

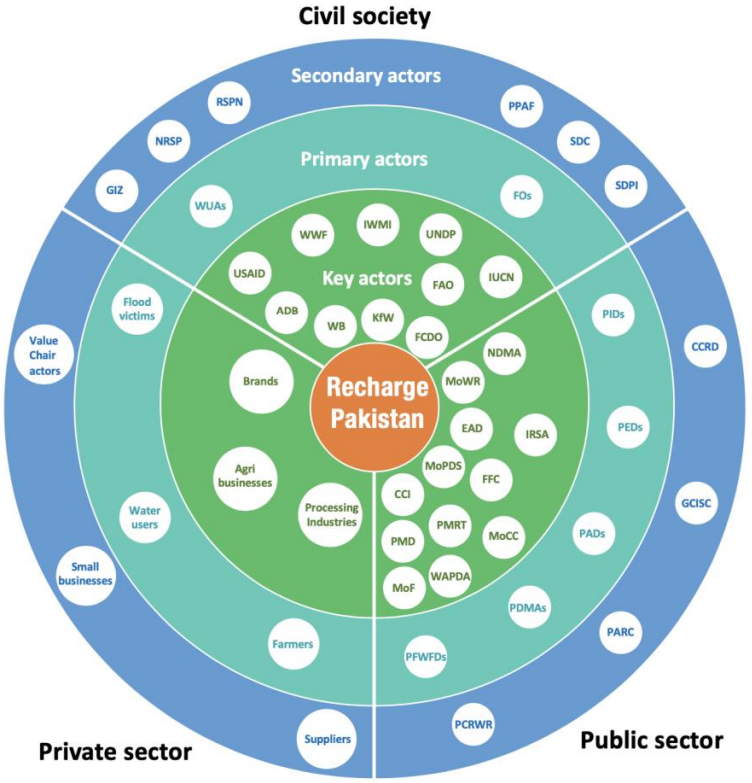
• locate the existing or new or proposed infrastructures (both hard and soft) constructed or to be constructed in the project areas to protect the communities from water-related disasters.

• assess who affected how and when from the climate-related risks?

This process aided WaterSprint in narrowing down the list of relevant stakeholders that would need to be engaged with for the purposes of ensuring smooth implementation and execution of project activities. These are as follows:

List of abbreviations			
MoCC	Ministry of Climate Change	FFC	Federal Flood Commission
NDMA	National Disaster Management Authority	CCI	Council of Common Interests
MoWR	Ministry of Water Resources	EPD	Economic Affairs Division
MoPDS	Ministry of Planning, Development & Special Initiatives	PMRT	Prime Minister's Reform Team on Water & Agriculture
WAPDA	Water & Power Development Authority	MoF	Ministry of Finance
PDMAs	Provincial Disaster Management Authorities	PFWFDs	Provincial Forest, Wildlife & Fisheries Departments
CCRD	Centre for Climate Research & Development	PCRWR	Pakistan Council of Research in Water Resources
GCISC	Global Change Impact Studies Centre	PMD	Pakistan Meteorological Department
PARC	Pakistan Agriculture Research Centre	PIDs	Provincial Irrigation Departments
IWMI	International Water Management Institute	PADs	Provincial Agriculture Departments
WWF	Worldwide Fund for nature	PEDs	Provincial Environment Departments
PPAF	Pakistan Poverty Alleviation Fund	IRSA	Indus River System Authority
SDPI	Sustainable Development Policy Institute	RSPN	Rural Support Program Network
NRSP	National Rural Support Program	WUAs	Water Users Associations
Suppliers	Innovative products	FOs	Farmers Organisations
Banks	WB, ADB, kfW	IUCN	International Union for Conservation of Nature
Donors/cooperation: FCDO, FAO, UNDP, USAID, SDC, GIZ.			

Stakeholder definition	
Key actor	Key actors are stakeholders who can use their skills, knowledge or position of power to significantly influence a project.
Primary actor	Primary actors are those actors who are directly affected by the project, either designated beneficiaries, or because they stand to gain – or lose – power and privilege, or because they are negatively affected by the project in some other way, for instance, if they have to be resettled.
Secondary actor	Secondary actors are stakeholders whose involvement in the project is only indirect or temporary, as is the case for instance with intermediary service organizations.



Source: Pre-feasibility, WaterSprint

3.3. Stakeholder Engagement: Developing the Environmental & Social Management Framework (ESMF)

3.3.1. ESMF Preparation Methodology

For the purposes of developing the ESMF, DevCon consultants were onboarded. DevCon adopted a participatory and need-based approach to develop an Environmental and Social Management Framework and other safeguards documents for the said six sites.

The consultants did both quantitative and qualitative methods that provide access to specific and general information. Individual as well as institutional opinions even declarative statements - including the conscious and unconscious discrepancies between peoples' perceptions and actions. Every bit was systematically noted down to grasp the situation and suggest and generate and disseminate evidence-based information. This process lasted from March 2022 till the end of July 2022.

Summary Methodology

Inception Stage	
• DevCon held an inception meeting with Project staff, agreeing on the scope of the assignment, and respondents to be interviewed. • DevCon coordinated with the Project Development Team (PDT) for the planning and development of the Environmental and Social Management Framework and the associated documentation necessary for the proposal to the GCF. • DevCon developed a comprehensive work plan, including interviews, consultations and meetings with staff.	Production of a work plan and timeline + Planning of study tools
Approach & Methods	
• DevCon comprehensively reviewed documents sent by WWF. • Based on the extensive review of documents, the team established good knowledge of the project and was helpful in designing the Framework and other safeguards documents tools.	Secondary Data Review Tool Development
• Inception report is submitted, and all comments and feedback were incorporated in the final inception report.	Submission of inception report

• *Quantitative and Qualitative* approaches were applied to gather sufficient information • Hazard mapping was done in each site to identify the associated, level of severity, vulnerabilities, dimensions and risks.	Primary Data Collection
• A detailed secondary and primary data analysis has been done, and the results compared, computed and triangulated to validate the findings.	Data Analysis + Report
Draft Compiled Report	
DevCon team developed the first draft and presented it to PROJECT Team	

3.3.2. Pre-Planning

Pre-Field Activities

1. An introductory meeting with Project Staff and DevCon Team was done. The consultant and team reviewed the documents and tools that were developed.

The following documents were reviewed by the consultant and team.

1. Recharge Pakistan: Building Pakistan's Resilience to Climate Change through Ecosystem-Based Adaptation for Integrated Flood Risk Management
2. Prefeasibility Report
3. Hydrological and Soil/Sediment Assessment Report
4. Multi—Stakeholders Consultation Report
5. Final List of interventions DI khan Region
6. Environmental and Social Policy
7. Gender Policy
8. Gap Analysis / List of Questions Recharge Pakistan
9. WWF Environmental & Social Safeguards screening tool for Individual Projects Adapted for GEF/GCF Projects Implemented by WWF
10. WWF Environmental and Social Safeguards -Risk Categorization Memorandum
11. WWF Environmental and social safeguards framework
12. WWF gender policy
13. Safeguards Manuals
14. Environmental and social safeguards Standards and Grievance Mechanism

The following tools were developed and attached at the end of the report.

- Household Survey - Quantitative
- Qualitative Key Informant Interviews (KIIs) schedule for stakeholders- Qualitative

Training of data Collection officers and field teams

The data collection officer training has been done to understand the overall project and tools. The data collection officer has been trained in the said thematic areas and it helped in gathering the primary data.

Field Activities

Household Survey

Sr#	Sites	Sample Size
1	D I Khan Hill Torrents + Zhob River Floodplains	**62**
2	Manchar Wetlands Complex	**62**
3	Taunsa Barrage Wildlife Sanctuary + Lala Creek	**62**
4	Kaha Hill Torrents	**62**
5	Chakar Lehri Sub-basin	**62**
6	Haleji and Hadero Wetlands	**62**
Total		**372**

Key Informant Interviews

Sr#	Stakeholders	Sample Size
1	WWF Project Team	2
2	Local Government Authorities	2 per sites total 12
Total		**14**

In-depth Interviews

Sr#	Stakeholders	Sample Size
1	Research Institutions	3 in each Sites Total 18
2	Development organizations	3 in each Sites Total 18
Total		**36**

3.3.3. New Stakeholder Groups: Identification of Indigenous Peoples, Local Communities, and Tribal groups in DI Khan (KP), and Balochistan.

As part of the development the ESMF, DevCon was also required to identify the presence of any Indigenous Peoples, Local Communities, and Tribal groups in the project sites, and validate the presence of the some identified by WWF-Pakistan and WaterSprint during its field visits.

In the context of Indigenous Peoples & Local Communities (IPLCs), DevCon identified / validated the presence of the following IPLCs:

1. Mohana or Mallah Community in Manchar, Sindh;
2. The Bagris in Chaker Lehri, Balochistan; and
3. The Kehal and Mores in D I Khan, Khyber Pakhtunkhwa

These IPLCs have low influence but will be highly impacted by the project activities and need to be kept informed of all activities which could have an impact, whether negative or positive, on their way of life, and an FPIC process co-created that will ensure their participation and decision-making in those activities.

DevCon also identified several tribal groups in the DI Khan, Ramak, and Chakar Lehri project sites. It was noted that historical conflicts exist between these tribes and was seen as a potential internal risk that could impact project implementation.

The historical tribal conflicts related issues were discussed thoroughly with the AC Rod Kohi (D.I. Khan and Ramak) as well as Chief Engineer (Mr. Irshad Jamali) and Superintendent Engineer (Sheikh Zaman). They were of the opinion that these conflicts are less prevalent now with the education, empowerment, social media, and people's access to the justice and police system. These risks were further mitigated when the status of tribal areas was changed and merged with the Khyber Pakhtunkhwa Province. The chief engineer and S.E also belong to different influential tribes in the project areas.

Source: ESMF, DevCon Consultants

To gain some further insights, the DevCon Consultants also met the elders of different tribes in both D.I. Khan, D. G. Khan and Sibbi. When informed about the project, the tribal elders expressed their excitement about the proposed project activities and ensured full cooperation. However, for the smooth implementation of the project activities, DevCon recommend and emphasized the necessity of ensuring continuous engagement with tribal elders, and to seek their approval for before the commencement of project activities. It is essential to take the tribal elders as well as other community members onboard and gain their trust and confidence to ensure smooth execution of project activities.

3.4. Gender Stakeholder Engagements

For developing the Gender Assessment, and the Gender Action Plan, the services of Ms. Simi Kemal and Global IRS was onboarded.

The gender assessment field work was carried out in 6 locations of all four provinces as identified by WWF. These locations were:

Table 1: Field Sites of the Project

S. No.	Location	District	Province
1.	Manchar Wetlands Complex	Dadu	Sindh
2.	Kaha Hills	Rajanpur	Punjab
3.	Taunsa Barrage Wildlife Sanctuary	Dera Ghazi Khan	Punjab
4.	Chakar Lehri Sub-Basin	Sibi	Balochistan
5.	Hill Torrents	Dera Ismail Khan	Khyber Pakhtunkhwa
6.	Ramak	Dera Ismail Khan	Khyber Pakhtunkhwa.

Sampling Methodology

The sampling methodology for quantitative and qualitative information applied by the Gender Consultants is given below.

- **Household Survey**

Quantitative data collection was the joint responsibility of IRS and DevCon, as requested by WWF. IRS prepare the tool in English and Urdu and shared with DevCon. This tool was incorporated in a wider data collection tool used by DevCon. The household survey was conducted by DevCon and covered a total of 527 households from 6 locations/sites of the total respondents 311 were men and 216 women.

Table 2: Household Survey Respondents

Household Survey Respondents	Numbers
Men	311
Women	216
Total	**527**

Focus Group Discussions (FGDs)

FGDs were conducted with community men and women separately, with 15-17 participants in each FGD. A total of 226 community members participated in a total of 14 FGDs (7 FGDs with men and 7 FGDs with women) in 6 locations.

An additional FGD with 12 women staff members of WWF was conducted online to explore participation and women's leadership in WWF (see list of WWF female staff in Annex-A11).

Table 3: Number of FGDs and Number of Participants

Target Groups	Number of FGDs	Number of Participants
Men Community Members	7	113
Women Community Members	7	113
Women Staff Members of WWF	1	12
Total	**15**	**238**

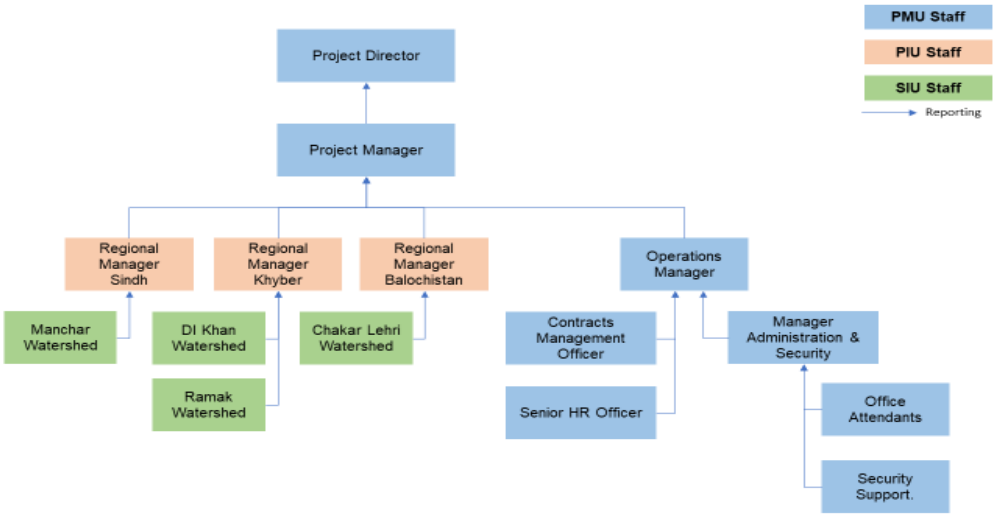
Key Informant Interviews (KII)

Key Informant Interviews were conducted with 10 government officials. Details by province is given below. A list of people interviewed is presented in Annex A10.

Table 4: Key Informant Interviews (KII) Conducted in 4 Provinces

Target	Numbers of KII
Sindh	2
Punjab	4
KPK	2
Balochistan	2
Total	**10**

4. Overview of Governance Structure for Recharge Pakistan project



1. WWF-Pakistan (EE) will establish and host the **Project Management Unit (PMU)** within WWF-Pakistan's office in the Federal Capital, Islamabad (Figure 29). The PMU (through the project Manager) will report to the AE. The PMU will be led by the Project Director and operate under the guidance of the **Project Steering Committee (PSC)** described below. The Project Director will be a full-time staff member of WWF-Pakistan providing 50% of LOE to the project through high-level support and strategic guidance to the PMU and facilitate engagements with high-level government staff where appropriate and necessary during project execution. The PMU will be responsible for overall project management and planning, providing support to the execution of day-to-day activities, coordinating with the national government and project partners, coordination with the AE, direct supervision of contracted project activities, and coordinating project execution across four provinces. The PMU will also be responsible for reporting on the application of resources and results achieved, preparing management reports including annual reports and any proposals for the adaptive management of the project, promoting inter-institutional linkages and coordination with national initiatives, and disseminating project results.

2. The key staff in the PMU will include a: i) Project Director; ii) National Project Manager (PM); iii) Operations Manager, iv) Manager Administration & Security; v) Coordinator Contract Managements; v) M&E Manager; vi) Environment and Social Safeguards (ESS) Manager; vii) Gender Manager; viii) Senior HR Officer; ix) Officer, Contracts Management; x) 9 Office Attendants to support administration; and xi) Security Support. The PM will be a full-time staff member on the project, recruited competitively, who will be responsible for the daily implementation and management of the project. This will include ensuring that the project achieves the targets set out in the Logical Framework (Section E) to the required quality standards, and within the specified time and budget allocations. In line with this mandate, the PM will: i) report directly to the PSC on project management-

related matters; ii) manage the project in accordance with the specified workplans and allocated budget; iii) ensure that all project interventions are implemented according to GCF and WWF rules, policies and standards; iv) work closely with national and local authorities to ensure that the project is managed effectively and that the needs of all beneficiary groups are considered; v) oversee the efficient and effective information- and knowledge-transfer to relevant project partners; vi) oversee the development of annual work plans and budgets; vii) communicate project progress updates to the PSC at biannual PSC meetings, including recommendations from the POCs on project implementation; and viii) develop ToRs for key project staff and implementing partners, including detailed scopes of work and service contracts, in line with the project Procurement Plan (Annex 10). The PM will be required to fulfil the role until project completion and the submission of the final evaluation report — as well as any other required documentation — to WWF US (AE). The Operations Manager will report directly to the PM and be responsible for: i) providing financial support to the PMU; ii) compiling reports on the disbursement procedures for the project and anticipated requirements for project funding during the implementation phase; and iii) ensuring that all project-related tasks are undertaken according to WWF and GCF rules, policies and standards. The Operations Manager will also manage the financial transactions for the project's activities, which will be implemented in accordance with the established project workplan and national priorities.

3. There will be four **Provincial Implementation Units (PIUs)** hosted within WWF-Pakistan's regional offices located in the Provincial Capitals (Khyber Pakhtunkhwa, Sindh and Balochistan). These units will coordinate the implementation of project activities under Components 1, 2 and 3 guided by the Provincial Oversight Committees (POCs) described below. The PIUs will be headed by Regional Managers (one for each of the three provinces), that are full time WWF-Pakistan staff working on the project, each reporting to the PM in Islamabad. The Regional Managers will be responsible for: i) managing the Site Implementation Units (SIUs) defined below, coordinating with provincial line agencies, and managing key service providers on the implementation of project activities; ii) providing technical support and oversight to field teams including ensuring compliance with WWF, GCF and national policies and standards, in collaboration with the Provincial Oversight Committees (POCs); iii) undertaking monitoring and evaluation (M&E) of project activities and developing knowledge products to share lessons learned via the PMU and project partners; and iv) development of ToRs for provincial and field level staff and implementing partners in addition to defining scope of service level agreements and procurement plans.

4. **Site Implementation Units (SIUs)** will be based at field offices in the following locations: i) DI Khan Watershed (this office will cover the DI Khan and Ramak Watershed project areas); ii) Chakar Lehri Watershed; and iii) Manchar Lake Watershed. SIUs are necessary for the successful implementation of project activities as the four target provinces under the project cover large areas with difficult terrain and road networks. Some of the proposed sites are as far as six hours away by car from the PIUs requiring smaller site-based offices to manage the daily execution of project activities. These offices will host full-time WWF-Pakistan staff who will report directly to the respective Regional Managers of the PIUs. The field office staff will be responsible for on-the-ground implementation of project activities and supervising the service providers responsible for executing specific project activities. The SIUs will also provide technical support to the CBOs located in the project areas. SIUs will also provide on-the-ground support to project M&E staff, collect data for project reporting and ensure the timely execution of project activities against the project workplan.

5. Stakeholder Engagement Plan

Executing Entity			
Stakeholder Group	**Interests and Influence / Relevant to the Project**	**Proposed Role in the Project**	**Engagement Strategy**
Recharge Pakistan Entity	The project will be executed by one Executing Entity (EE), WWF-Pakistan, a private independent organization under the international WWF Network. The EE will be responsible for project execution, including the management of grantees, recipients of goods or services, and procured parties and their activities, and reporting to the AE.	WWF-Pakistan will be responsible for the execution of project Activities 1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.3.2, 2.1.1, 2.1.2, 2.2.1, 2.3.1, 3.1.1, 3.2.1, managing all procured parties and their activities, reporting to the AE, and ensuring optimal alignment of the project with the GoP's policies and ministerial contributions to achieve the Project Outcomes and Fund-level impacts, as described in Section B.3. WWF-Pakistan will hold GCF Proceeds, in a new and separate dollar (USD) denominated account. As an EE, WWF-Pakistan will enter into a subsidiary agreement with WWF-US (as the AE), grant agreements with each grantee, consulting agreements with private sector service providers, and cooperative agreements with each recipient of goods or services, such as technical assistance for the project activities, retaining responsibility for any delegated authority over financial management and procurement. As	Project Steering Committee

		part of the AE's due diligence, WWF-US assessed WWF-Pakistan's capacity to execute the project (see Annex 9 for details). This assessment determined WWF-Pakistan to be capable of applying WWF-US and GCF standards and policies in the execution of the project.	
NATIONAL LEVEL STAKEHOLDERS (GOVERNMENT OF PAKISTAN)			
Ministry of Planning, Development, and Special Initiatives (MoPDS)	This stakeholder is relevant for the execution of Component 1 and 2, specifically Sub-activity 2.1.2.1, and 2.1.2.2.	Consultations and feedback, along with obtaining approvals for activities under Component 1 and 2	The Project Director (PMU) will be responsible for engagement with MoPDS in collaboration with the MoCC. Engagement will take place on an annual basis, specifically in the beginning of each financial year. However, where deemed necessary, the Project Manager (PMU) may reach out to the MoPDS. A focal point within the MoPDS needs to be identified so that ad-hoc engagement can take place.
Economic Affairs Division (EAD)	EAD provides NGOs and charitable organizations with permission to work in Pakistan.	Need to be kept in the loop.	The Operations Manager (PMU) will be responsible for engagement with this stakeholder.

	WWF-Pakistan is required to provide updates on new projects, and progress updates on existing projects to the EAD on a bi-annual basis.		Engagement will take place on a bi-annual basis.
Pakistan Meteorological Department (PMD)	Provide long-term (past) time series of precipitation for the assessment of frequency and return periods of flash floods in the project areas.	Access to data, consultative sessions.	Engagement as and when required
National Disaster Management Authority (NDMA)	This stakeholder is relevant for the execution of Component 1, 2 and 3.	Feedback and consultations.	Biannual and ad-hoc Engagement. Responsibility of the Project Manager (PMU) in collaboration with the MoCC.
Pakistan Council of Research in Water Resources (PCRWR)	PCRWR promotes and disseminates new knowledge regarding adaptation to climate change. Is relevant to Component 2.	PCRWR will provide data and be seminal / pivotal in the consultations and feedback sessions for the execution of Component 2.	Engagement to be led by MoCC, Project Manager (PMU) to coordinate.
PROVINCIAL LEVEL STAKEHOLDERS (Sindh, Balochistan, and Khyber Pakhtunkhwa[4])			
Provincial Irrigation Departments (PIDs) (KP, Balochistan, and Sindh**)**	PIDs will be responsible for the implementing of activities under Component 1 and 3.	Construction, maintenance, and operation of irrigation infrastructure.	High level engagement will the responsibility of the Provincial Manager in the Provincial Implementation Unit (PIU). However, for day-to-day business, a coordinator level employee from the Site Implementation Unit (SIU) will be made responsible.

[4] Unless specifically mentioned, reference to "Provincial" shall mean reference to all provinces

			Moreover, since WWF's role in activities being led by the PIDs (excavation and de-silting activities) is oversight and ensuring compliance with the ESMF, bi-annual engagement for the same will be led by the ESSF Manager (PMU), to be followed up by the site level ESSF Coordinators and Officers.
Provincial Agriculture Departments (PADs) (KP, Balochistan, and Sindh)	PADs will provide support to WWF-Pakistan for the execution Components 1 and 3, specifically activities pertaining to Climate Smart Agriculture (CSA).	Liaison with farmers, assisting in developing training materials and delivering the same.	Recharge Pakistan's CSA team at each SIU will be responsible for coordination and engagement
Provincial Forests & Wildlife Departments (KP, Balochistan, and Sindh)	Will support WWF-Pakistan in the procurement of saplings for the purposes of implementing Components 1, 2 and 3, specifically Activity 1.1.1, and 1.1.2, 3.2.1.	Provide technical support for sustainable afforestation in the areas in DI Khan. region (i.e., KP)	High level engagement will the responsibility of the Provincial Manager in the Provincial Implementation Unit (PIU). However, for day-to-day business, a coordinator level employee from the Site Implementation Unit (SIU) will be made responsible. Moreover, since WWF's role in activities being led by the PIDs (excavation and de-silting activities) is oversight and ensuring compliance with the ESMF, bi-annual engagement for the same will be led by the ESSF Manager (PMU), to be followed up by the site level ESSF Coordinators and Officers.

Provincial Disaster Management Authorities (PDMA)	This stakeholder is relevant for the execution of Component 1 and 2.	Feedback and consultations.	Biannual and ad-hoc Engagement. Responsibility of the Provincial Manager (PMU) in collaboration with the MoCC.
District/Tehsil Administration and Law Enforcing Agencies (LEA) including FC, Rangers, and Border Military Police (KP and Balochistan)	The ESMF has identified certain security risks that could arise in the KP and Balochistan project sites. These are largely due to the presence of the Tehreek-e-Taliban Pakistan (TTP), the Pakistan faction of the Taliban, and the Balochi separatists' groups in Balochistan. Hence, engagement with these stakeholders will be necessary to gauge the security situation in these project areas and plan accordingly. In addition, these entities will be requested to provide security to project staff working there or travelling to these areas.	Provide guidance on security arrangements, provide security cover and personnel as and when needed.	Manager Administration & Security from the PMU will be responsible for high level engagement. Each PIU and SIU will have a Coordinator / Sr. Officer Administration & Security who will be engaging with these entities monthly and will reach out them when a project team needs to conduct site visits for the implementation of project activities.
NON-GOVERNMENT STAKEHOLDERS			
Academia in Pakistan offering water, agriculture, and climate-related degree programs including: Center for Water Informatics & Climate Resilience (CWC)-IMSciences Centre of Excellence in Water Resources Engineering, Lahore, Punjab	This stakeholder is relevant for the execution of Component 2.	Feedback and consultations.	Biannual and ad-hoc Engagement. Responsibility of the Project Manager (PMU) in collaboration with the MoCC.

U.S. Pakistan Center for Advanced Studies in Water (USPCAS), Sindh			
Tribal groups in DI Khan and Balochistan.	Tribal groups still exert considerable influence in these project areas. Despite government presence, even government entities are required to engage and seek the approval of tribal elders before the implementation of any work.	Community Engagement, Social Cohesion	Continuous Engagement by relevant focal points in the PIUs and SIU.

6. Monitoring and Progress

Progress against the Stakeholder Engagement Plan will be monitored and reported on throughout implementation, and participatory monitoring will play an important role in the M&E plan of the Project. The following comprises the monitoring and reporting activities to be undertaken with respect to stakeholder engagement by the PMU:

- An annual participatory review workshop in each project site for local stakeholders, particularly project beneficiaries and civil society organizations. As is necessary per location, separate workshops will be held for men and women to ensure effective participation of women in these reviews.
- The SEP will be periodically reviewed and updated as necessary at an annual Reflection Workshop. The review will ensure that the list of project stakeholders and methods of engagement remain appropriate.
- Activities related to stakeholder engagement will be documented and reported by the PMU every 6 months in a Project Progress Report (as part of regular reporting). The project Results Framework and Annual Work Plan and Budget will track beneficiaries of the project and activities related to the Stakeholder Engagement Plan.
- Stakeholder Engagement activities and progress will be monitored through the following indicator: Number of direct and indirect beneficiaries disaggregated by gender as co-benefit of GEF investment

Stakeholder Engagement will be evaluated by independent consultants recruited for the project midterm The SEP will be periodically reviewed and updated as necessary at an annual Reflection Workshop. The review will ensure that the list of project stakeholders and methods of engagement remain appropriate.

The WWF GCF Agency will undertake annual supervision missions to ensure compliance, and report on progress against the Stakeholder Engagement Plan annually to the GCF through Project Implementation Reports.

7. Appendix 1: Multi-stakeholder report

Please see the report on the following page.

MULTI-STAKEHOLDERS CONSULTATION REPORT

Recharge Pakistan

30th January,2022

Recharge Pakistan - Feasibility Studies

Building Pakistan's Resilience to Climate Change through Ecosystem-Based Adaptation for Integrated Flood Risk Management

A GCF funded project for finding nature-based solutions to safeguard the vulnerable people and communities from the climate- and water-related disasters through ecosystem-based adaptation

Delivery and Implementing Partners

WATERSPRINT Deltares Nelen & Schuurmans PEGASYS CHANGING LIVES CHANGING WORLDS

This project is part of the Green Climate Fund (GCF). The WWF Pakistan is the implementing partner of this project in collaboration with public-sector organizations of Pakistan.

WWF GCF

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Table of Contents

○ EXECUTIVE SUMMARY

As envisioned during the pre-feasibility phase, the detailed assessments were designed to seek first-hand information from the stakeholders for determining the climate impact in their project areas, prioritizing the sites/AOIs and possible interventions so that the victim communities/areas can be safeguarded. Detailed field assessments were conducted between August 22—28, 2021 through two different field missions. By following different instruments (KIIs, FGDs), the structured interviews were organized at or near to potential sites, and data and information are compiled and synthesized in this report and as well as hydrological and hydrodynamic models were updated accordingly to take informed decisions while simulating the different model scenarios both for baseline and future periods.

A series of consultative workshops at provincial headquarters and federal capital were conducted between July—September 2021 to obtain a first-hand opinion on EbA solutions from the relevant and knowledgeable stakeholders. The workshops improved our understanding (and resultingly fed data and information into wflow and 3Di models of project areas/sites) that what could be the best possible options in the view of relevant stakeholders to obtain the best possible EbA solutions at the identified project sites within the areas of interest (AOIs). In this context, the stakeholders from the public sector, private sector, community, and civil society organizations were engaged and we actively played the role of a facilitator through workshop [facilitation] toolkits (including introductory material, maps for interactive discussion, explanatory notes, co-designing matrices, etc.) for joint decision making with the multi-sector stakeholders; whereas WWF provided the logistics support by organizing the workshops at DI Khan, Karachi, Quetta, Lahore, and Islamabad.

The stakeholder's consultative report is divided into the following six chapters:

Chapter 1: Introduction and Processes

It discusses the rationale of consultation, GCF requirements for stakeholder engagement, our strategy and processes followed. This section provides a full overview of why the multistakeholder consultations were necessary and what were the objectives, set as their target to achieve.

Chapter 2: Approach and Methodology—Instruments

It describes our approach and framework conditions for reaching out to stakeholders with a clear objective: what is their understanding regarding the project, how they see the proposed interventions could impact them and their livelihoods. It documents the instruments (structured interviews through KIIs and FGDs, field assessments, multistakeholder workshops) used for the engagement and effective consultations with the relevant stakeholders from the public sector, private sector, civil society, and community organizations.

Chapter 3: Stakeholders mapping and recap of consultations

It maps the stakeholders relevant to the project, presents our strategy for their engagement, and recap all the consultations materialized during the pre-feasibility and detailed feasibility phases. This chapter also analyzes the institutes (federal and provincial line departments) and their capacities

in the context what are their mandate, roles, and responsibilities what could be their best possible stakes/interests in the project interventions, and what could they offer/contribute to the RP project within their domain to achieve the desired objectives of the project.

Chapter 4: Design of Multistakeholder Workshops

We designed the workshops, their agenda, and the facilitating material that comprised of brief notes, criteria of selection, maps of project sites and areas of interest (AOIs), process for the attachment of NbS/EbA-archetypes with the potential sites, etc. We organized the participants into two working groups (A & B) with a clear agenda of joint brainstorming and a logical way forward. Each group was given 2—3 areas of interest (AOIs) which included multiple project sites, for instance: in Sindh, one group was allotted a group of lakes and in Punjab, another group was given the group of hill torrents. The stakeholders were quite active in the workshops and openly shared their views about the selection of EbA-based interventions either for hill torrents or the lakes groups. Later, the group leader from each group presented the findings of his/her group in plenary.

Chapter 5: Impact of climate change and its validation

The data and information received from the stakeholders and communities during the consultations were validated through coupled hydrological and climate modeling to determine the impact of climate change in the project areas. This chapter tells how we used the stakeholders' information and data for the validation of our models.

Chapter 6: Outcome of the multi-stakeholder consultations

It presents the findings derived from the entire consultation processes, which were conducted following the instruments and methodological frameworks as discussed above. The key takeaway message is that: the project would be very useful for safeguarding vulnerable people and communities from the shared climate risks and could exponentially raise the livelihood opportunities for the inhabitants of the project areas.

o INTRODUCTION AND PROCESSES

▪ Rationale

The rationale behind the multistakeholder consultations was to: (1) get to know about the impact of climate change in the project areas and difficulties of communities in getting their livelihood due to climate variabilities (floods and droughts); (2) inform them about the framework conditions, processes of feasibility studies and GCF requirements for financing in project interventions in areas impacted by climate-related disasters; (3) seek first-hand information and data from the stakeholders for the design of interventions in the project areas to safeguard them from climate-related disasters; and (4) get their feedback on site-specific EbA-based interventions.

In alignment with the GCF and WWF requirements, the processes of the consultation were started from the phase of pre-feasibility studies when consultants sent their missions in the field for reconnaissance and structured interviews with the multiple stakeholders and communities which were affected by the floods originated from hill torrents (hill torrent group) and in the Indus river (floodplain group) and as well as environmental degradation of the freshwater lake (Manchar) and negative impact in the ecosystem due to salinity (Haleji and Hadero lakes) and salinity/waterlogging (Nara Deh Akro and Chotiari dam).

▪ GCF stakeholder engagement requirements

Stakeholder engagement is one of the key components of GCF engagement for funding. GCF requires meaningful consultation with the stakeholders that incorporate multiple interests and issues of stakeholders while simultaneously complying with a range of policies and regulations (GCF, 2019).

GCF's intention to fund projects is mainly because the communities affected by climate- related disasters must be safeguarded either through adaptation or mitigation measures ultimately leading to contribute to the NDC of a country. Major GCF requirements (GCF, 2019) regarding stakeholders' consultation are:

- Stakeholder engagement plans should be based on the principles of transparency, accountability, inclusiveness, non-discrimination, and "do not harm".
- Communicate effectively with vulnerable and marginalized groups and individuals, who are either affected or potentially affected by proposed interventions.
- The transparent mechanism of disclosure of information to achieve meaningful consultation and informed participation in a culturally appropriate and gender-responsive manner.
- Adaptative proposals must demonstrate that proposed interventions are a response to the threat of a climate change impact.
- The proposed interventions should be conceived as a consensus among stakeholders and owned by the country's public-sector actors.

- The proposed interventions reflect the quantifiable impact on communities living in the project areas ultimately lead to contribute the country's overall objective to reduce their GHG emission to the environment.

Strategy and processes

In alignment with the requirements of GCF, we designed multiple instruments and used them at different stages of pre-feasibility and feasibility phases to ensure that the relevant stakeholders are well-informed, and their feedback is incorporated in all the processes including the final selection of sites and feasible interventions.

Field survey and detailed assessments were designed and conducted during the phase of detailed feasibility studies for the identification of (1) potential areas of interest (AOIs); (2) possible and suitable site-specific EbA-solutions inspired from the best international practices and validated through 3Di modeling; and (3) stakeholders' feedback on both potential sites and EbA-solutions through EbA/NbS-archetypes.

The field assessments and structured interviews were conducted between August 22—28, 2021 through two different field missions. By following different instruments (KIIs, FGDs), the structured interviews were organized at or near to potential sites, and data and information are compiled and synthesized in this report, and as well as models were updated accordingly to make informed decisions while simulating the different model scenarios.

The multistakeholder workshops were also conducted at national and provincial capitals and were attended by a politician, representatives of national and sub-national governments, government (line) departments, academia, environmental experts, social activists, private-sector actors, and communities' members. The workshops were planned to:

- Share the findings of feasibility studies with the relevant stakeholders.
- Capture their thoughts on the results (both sites and project interventions).
- Get their feedback and contribution regarding site selection and proposed EbA solutions for the project areas/sites of Recharge Pakistan.
- Get data and information regarding past impact of climate change/variabilities in their areas and livelihood.
- Discuss the role of gender and vulnerable groups for the development of project areas to safeguard them from climate-related disasters (floods and droughts).
- Role of stakeholders and objectives of Recharge Pakistan.

The role of stakeholders was to select individual sites within each of the project areas where specific investments in the EbA scheme could be prioritized. The terms of references define the following key objectives which are considered/achieved while designing and developing criteria for the selection of sites for Recharge Pakistan:

- Promote ecosystem-based adaptation services to improve resilience to floods and droughts.
- Design project interventions in alignment with EbA for utilizing the surplus floodwater.
- Increase capacity of water-stressed areas by storing surplus flood/rainwater into surface or subsurface space.
- Enhance recharge of groundwater through conservation techniques in floodplain depression areas and possibilities of wetland restoration.
- Manage floodwater originating from hill torrents for social, economic, and environmental co-benefits.

APPROACH AND METHODOLOGY—INSTRUMENTS

Instruments used

We used the following instruments to engage the relevant stakeholders in the selection and finalization of sites for EbA-based solutions and prioritizing the site-specific EbA-solutions:

- Stakeholder mapping and engagement strategy.
- Structured interviews (FGDs, KIIs) at project sites.
- Multistakeholder workshops at national and sub-national levels.
- Gender involvement was ensured in the workshops.
- Design and implementation of EbA-archetypes to attach EbA-solutions with potential sites (based on stakeholder consensus).
- Site-specific climate rationale for need assessment of community for adaptation measures.
- Wflow and 3Di modeling frameworks – iteration with EbA-archetypes and solutions for both baseline and future climate projections (rainfall and high flows) to finalize sites and site-specific EbA solutions.

Framework conditions considered

As this project is seeking GCF funding all the sites were assumed to meet GCF funding criteria. GCF criteria included the following overarching (programmatic) conditions, matrices for site selection, and EbA solutions for Recharge Pakistan:

- **Challenge orientation.** The group hill torrents are affected by the climate change risks and increased flooding and therefore can be protected through climate change adaptation and disaster risk reduction measures. The group lakes are affected by environmental degradation/hazards and fast-scale loss of biodiversity and can be protected through conservation and environmental footprint reduction. The group floodplains are affected by increased floods/droughts, damage to livelihoods, and loss of human lives.
- **Adaptative and resilient to climate.** Sites must show how they fit into framework conditions and evolving climate risk which exacerbates the climate-related disasters. System understanding is developed through field investigations, interpretation of local/global datasets, and by using models. Data from climate models are fed into the hydrological and 3Di hydrodynamic models to clearly show the impact of climate and thus the need for action at the chosen sites.
- **Ecosystem process utilization.** Based on specific biophysical spatial criteria, hydrological models are developed and used for the identification and mapping of EbA opportunity spaces within the

project areas/sites that could function as EbA. Different groups proposed at the inception stage require different possible interventions to be taken from the inventory of EbA (EbA-archetypes as mentioned below). These interventions are evaluated iteratively by developed models and through a series of stakeholder consultations and consensus.

- **Technically feasible and practically viable.** These are the most fundamental criteria for the selection of sites. These are evaluated through spatial and temporal maps, field investigations, catchment delineation, and modeling results from WFLOW and 3Di. However, the consultations with the stakeholders and their requirements are also very important deciding factors for a logical conclusion. Refer to the Process flow diagram (Figure 2.1).
- **Stakeholder consensus.** We built joint consensus over the possible interventions at particular spaces/sites through the instrument (i.e., multi-stakeholder workshops), which through structured and focused-group discussions prioritized the EbA-interventions.
- **Co-benefit generation and sustainable development potential.** EbA co-benefits (e.g., environmental, social, economic, social cohesion, health, biodiversity improvement, job creation, etc.) are desired and considered in shortlisted interventions.
- **Country ownership and ability to scale up.** Alignment of the nationally determined contributions (NDC) with key national policies and international commitments is among key requirements which were discussed with the stakeholders and the outcome is considered while finalizing the sites and prioritizing the EbA-solutions. The proposed project sites must change the way the water resources and river basins management in the areas/region are considered especially in the context of climate change, as GCF intends to see how a project can be scaled up for sector-wide impact.
- **Paradigm shift**. Proposed interventions should have a longer-term impact and vision, even beyond the initial GCF investment. The potential for replication must be a criterion for site selection.
- **Barriers to climate finance for adaptation.** Important to ensure that sites are not already receiving climate funding from other sources so the barriers to finance can be clearly articulated.
- **Impact potential.** Adaptation – reduction in loss of lives value of physical assets livelihoods/or environmental, direct and indirect beneficiary numbers. Adaptation is probably the most important indicator for this project and project sites should be able to quantify the numbers of beneficiaries.

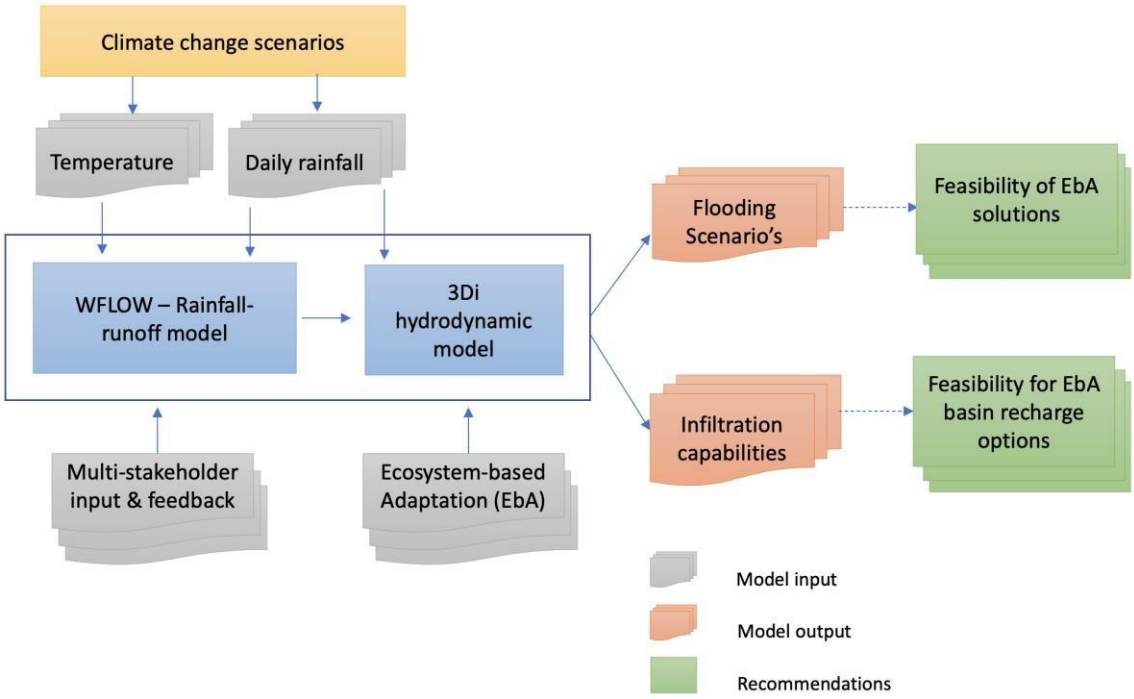

Figure 2.1: Process flow diagram leading to recommend the feasibility of EbA in project areas/regions.

This process is used iteratively with the developed EbA archetypes and models.

These criteria can be seen to complement the existing site selection criteria around flood risk, socio-economic/biophysical vulnerability, and ecological score. It is important to ensure that sites align with the objective/challenge, are practical can make use of potential ecosystem processes to meet the objective and have the potential to generate co-benefits of social-economic criteria.

Beyond the above-mentioned conditions and objectives, a clear climate rationale for each project area is required to select the site for EbA interventions. The climate rationale sets out the climate challenges and differentiates between the development impact (a possible co-benefit) and the primary funding requirement — enhanced climate resilience. Based on science and hydrological modeling, sites must show a clear climate hazard, exposure, and thus vulnerability as well as a requirement for strengthened adaptive capacity at each site (refer to chapter 5 for further details).

- **Approach and methodology**

Based on field investigations and modeling results, we discussed every aspect of the project areas (AOIs) and shared our findings with diversified groups of stakeholders. The stakeholders were provided with brief notes about the project areas and proposed project sites which included basic information about the topography, geology, landcover, and accessibility about the area of interest. The stakeholders were briefed about the set of priorities of projected interventions along with the following data and information:

- Brief introduction about the objectives and framework conditions of the project.
- The structure of consultations, group work of workshops, and expected outcomes.
- Provision of brief notes, maps, and chart sheets to stakeholders for their understanding about each site so that they could share their feedback.
- Brief introduction about EbA solutions and/or archetypes proposed in the specific areas. Groups were tasked to prioritize the site-specific interventions.
- Each group was facilitated by a dedicated representative of the consultant.
- Group works were shared in the plenary for joint consensus and a way forward.

- **Institutional and Stakeholder mapping**

This subsection presents a summary of the role of institutions, organizations, agencies, sectors, academia, not-for-profits organizations, and their roles and responsibilities. It also reflects their stakes and interests and possible contributions to the project (Figure 3.1; Table 3.1).

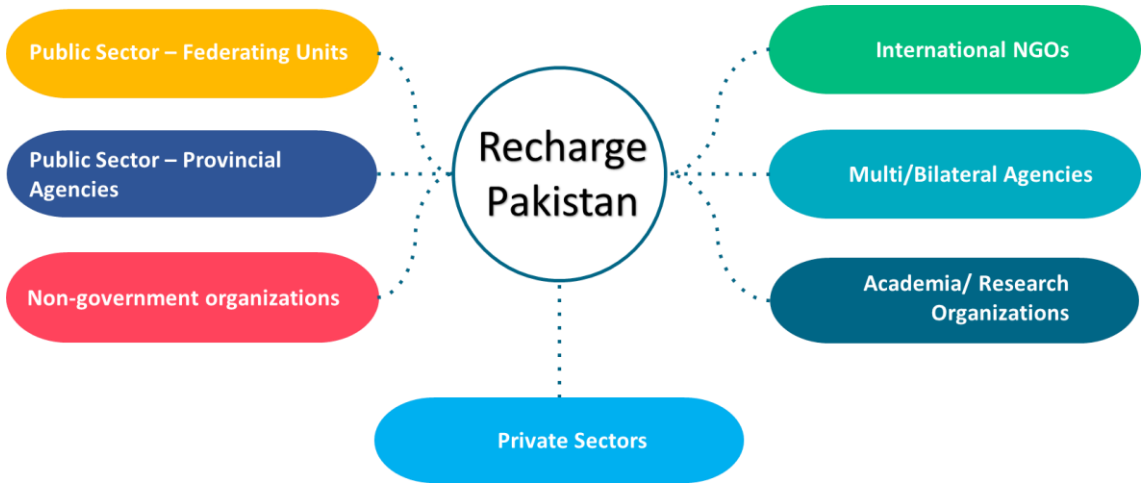

Figure 3.1: Stakeholder mapping (Recharge Pakistan) depicting the contribution of relevant stakeholders from public/private sectors, academia, and civil society organizations.

Table 3.1: Summary matrix of responsibilities and interests of key stakeholders and their possible contributions for the Recharge Pakistan (RP) project.

Stakeholder	Roles/Responsibilities/Stakes/Interests	Contributions
Ministry of Planning, Development, and Reforms (MoPDS)	• To apply government policies in the projects. • Approval and allocation of funds for development projects for all sector projects including the water sector. • Maintaining liaison with the national planning agencies.	• Judicious allocation of budget for all sectors including the water sector. • To facilitate the Recharge Pakistan project including EbS interventions in approval mechanisms.
Ministry of Finance (MoF)	• Collection of funds from various donor agencies. • Allocate budgets for federal ministries and provincial governments. • Liaison with the international donor sector for bilateral agreements.	• After approval of MoPDS, the ministry of finance releases funds to relevant ministries, federating units, and provincial governments. • After approval by MoPDS, the ministry of finance will release funds for the Recharge Pakistan project.
Economic Affairs Division (EAD)	• Formulation and implementation of policies to promote economic growth. • Assessment of requirements and negotiations for external economic assistance from foreign organizations. • Provide NOC to foreign-funded projects.	• EAD will be a binding factor between GCF and WWF through the Ministry of Climate Change. • EAD ministry will implement relevant policies for the Recharge Pakistan project for promoting socio-economic growth.
Ministry of Water Resources (MoWR)	• Development of country's water and hydropower resources to meet current and future challenges of water shortages. • Act as a catalyst in the implementation of the National Water Policy by taking all stakeholders on board, through creativity, initiative, innovation, and technology. • MoWR's main interest in the RP project is to onboard all relevant line departments in the field of water resources.	• MoWR through FFC is committed to contributing to RP to safeguard the vulnerable communities from the risks of climate-related disasters (floods and drought). • MoWR is committed to contributing funds as a co-financing to RP subject to the successful release of GCF funds. • MoWR will ensure that the provincial irrigation departments contribute significantly to RP to achieve the objectives of RP in alignment with national priorities.
Ministry of Climate Change (MoCC) + Global Change Impact Studies Centre (GCISC)	• Conservation and survey of the flora and fauna of Pakistan, forests, and other wilderness areas. • Prevention and control of pollution. • Afforestation, adaptation to climate change and mitigation of climate-related disasters.	• MoCC will take care of the RP project in a way that all GCF requirements are observed in the feasibility studies. • MoCC will oversee the criteria of AR5/RCPs being followed as per GCF's requirements. • MoCC will ensure essential approvals from the GCF secretariat.
Pakistan Meteorological Department (PMD)	• Responsible for providing meteorological service and data throughout Pakistan. • Early warning of natural hazards such as cyclones, heavy rains, heatwaves, floods & earthquakes, etc.	• Provide long-term (past) time series of precipitation for the assessment of frequency and return periods of flash floods in the project areas. • Provide climatic data and models for the assessment of future

Stakeholder	Roles/Responsibilities/Stakes/Interests	Contributions
	Safeguard the vulnerable communities from the risks of climate-related disasters through early warnings.	climatic projections under emission criteria AR5/RCPs.
National Disaster Management Authority (NDMA) + National Disaster and Risk Management Fund (NDRMF)	• Act as the implementing, coordinating, and monitoring body for disaster management. • Collaborate with various government ministries, departments, and NGOs to make efforts to conduct joint disaster management plans for the future. • Provide matching funds in projects of mutual interests.	• NDMA is committed to contributing to replicating the EbA-solutions in other regions of Pakistan. • NDRMF is committed to contributing a matching grant to RP to implement and upscale EbA-interventions in Pakistan.
Water and Power Development Authority (WAPDA) + Indus River System Authority (IRSA) + Federal flood Commission (FFC) + Pakistan Council of Research in Water Resources (PCRWR)	• All relevant agencies ensure equal allocation of river waters among all four provinces of Pakistan. • Federating agencies provide flood protective measures to safeguard communities against floods. • Research and development for the design and implementation of sustainable and nature-based solutions. • Monitor flood protection plans and control systems for flood warnings. • Prepare National Flood Protection Plans and their implementation.	• FFC is committed to contributing co-financing of USD 39.9 million to RP subject to GCF's approval. • WAPDA shares and contributes data and information to avoid duplication in efforts to store surplus rain/flood water. • PCRWR promotes and disseminates new knowledge regarding adaptation to climate change.
Provincial Irrigation Departments (PIDs)	• Provision of irrigation supplies to farmers. • Construction, maintenance, and operation of irrigation infrastructure. • Flood planning and management. • Protection from floods and drought.	• PIDs are committed to providing technical and implementation support to RP for its proposed EbA interventions. • PIDs will ensure all EbA-based solutions are feasible and adaptive to torrential and floodplain floodwaters.
Provincial Agriculture Departments (PADs) + Provincial Forests and Wildlife Departments	• Improve agricultural and water management methods. • Educate and train farmers through modern techniques of agriculture and forestry. • Pursue agricultural and forest/wildlife development on a sustainable basis. • Ensure food security, maintain ecosystems and improve the living standards of smallholders/ farmers and communities.	• PADs contribute to the RP project through their advisory services for food security in project areas, which are affected by climate change. • PADs ensure to promote change in cropping patterns and agricultural practices in project areas to ensure climate-smart agriculture.
Provincial Environment Agency/ departments (PEDs)	• Prepare and establish the provincial Environmental Quality Standards. • Promote research and development for the protection of the environment.	• Support to protect the natural lakes. • Committed to removing the sources of pollution from the

Stakeholder	Roles/Responsibilities/Stakes/Interests	Contributions
	• Ensure the controls on pollution sources.	natural water bodies and preserving the wetlands.
Provincial Disaster Management Authorities (PDMA)	• Formulation of provincial disaster management policy. • Coordination among different provincial and district departments for disaster response. • Evaluate preparedness at all governmental or non-governmental levels to respond to the disaster effectively.	• PDMAs are committed to supporting the implementation of EbA-solutions in the project areas. • PDMAs will replicate and upscale the proposed interventions in the other regions.
Provincial Rural Support Programs + Balochistan Rural Support Programme (BRSP)	• Provide development and humanitarian assistance to rural people in Pakistan. • Enable rural communities to plan, implement and manage developmental activities and programs to ensure productive employment, alleviation of poverty, and improvement in the quality of life. • Raise living standards by enhancing socio-economic conditions through an integrated development approach, which incorporates reduced use of fossil fuels and encourages the exploration of the SDGs (Sustainable Development Goals) while ensuring the protection of flora, fauna, and marine life.	• NGOs working at the provincial level are committed to working with local people and communities to build EbA interventions in the RP project. • NGOs are committed to replicating and upscaling the proposed EbA solutions in their regions.
IWMI – International Water Management Institute	• Works with governments, farmers, water managers, and businesses to solve water problems and scale-up innovative solutions. • Research development in areas related to agriculture, water management, food security, and climate change.	• Provide knowledge products in the domains of agriculture, water, and climate to RP project. • Committed to providing in-kind support and resources for the development and implementation of RP.
Universities in Pakistan offering water, agriculture, and climate-related degree programs + Centre of Excellence in Water Resources Engineering, Lahore, Punjab	• Offer various graduate and post-graduate degree programs related to agriculture, climate change, and water management subjects. • Generate knowledge for global competitive advantage and become a leading world-class institute. • Dissemination and sharing the knowledge to the scientific community and for the public good.	• Providing great examples of how to combat climate change through pledging to hit zero carbon emissions, refitting buildings to be more energy-efficient, and arming students with the knowledge and skills to make individual changes. • Committed to introducing research and development to design and develop ecosystem-based solutions adaptive to climate change.
The World-Wide Fund for Nature (WWF)	• Ensure the sustainable use of renewable natural resources. • Create a climate-resilient and zero-carbon world.	• WWF is working as a key actor in developing and promoting the RP project.

Stakeholder	Roles/Responsibilities/Stakes/Interests	Contributions
	• Promote the reduction of pollution and wasteful consumption. • Protect the existence of wildlife and promote forestation.	• Ensure that the RP project supports EbA-solutions for water conservation and management. • Support and promote the green climate through the RP project.

Stakeholder engagement strategy

Figure 3.2 describes our engagement strategy and instruments used for stakeholder consultations and feedback mechanisms. We followed the 5-steps as shown on the right side of Figure 3.2, which started from institutional and stakeholder mapping. Based on desk review, reconnaissance, and conceptual modeling, we identified the climate-related risks and hotspots (AOIs) for interventions within the project areas. Proposed AOIs and potential sites within the AOIs were discussed with the stakeholders through instruments (focused group discussions [FGDs] and key informant interviews [KIIs]). Multistakeholder workshops were organized both at sub-national and national levels so that potential sites could be prioritized through joint brainstorming sessions (group works). Solutions based on ecosystem-based adaptation (EbA) were also attached to the prioritized sites in consultation with the stakeholders by following the newly developed technique (NbS archetypes), as we discussed in detail in the following chapter.

Partnerships already developed by WWF and existing synergies of consultants with the public-sector actors were used to invite relevant stakeholders during different consultative sessions and workshops. We briefed them about the project and facilitated them to achieve a consensus on potential sites and feasible EbA solutions. We engaged the stakeholders using participatory and interactive approaches (for instance, brainstorming sessions, the properly designed group works, etc.). During the consultative sessions and multistakeholder workshops, we found that the stakeholders are interested and committed to safeguarding the vulnerable communities from climate-related disasters. It is important to highlight that the instruments were designed in such a way that the outcomes of each of consultative sessions were used in the next round of reporting and feedback sessions/workshops to: (1) maintain consistency in thoughts; and (2) update our models.

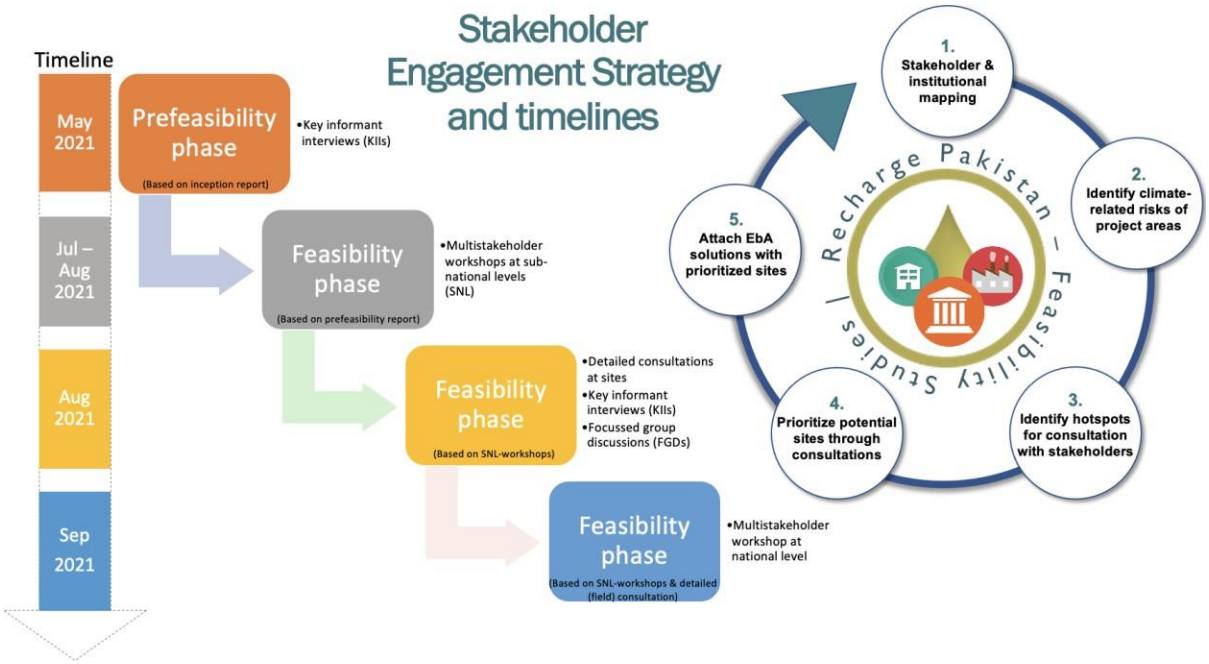

Figure 3.2: Stakeholder engagement strategy.

- **Summary of consultation during the pre-feasibility phase**

The broader context of stakeholder consultations conducted in all the project areas during the pre-feasibility phase was to include a diverse range of factual insights of all actors present in the project areas at the very beginning of the feasibility studies. This approach supported us to inform our planning processes especially regarding the selection of potential sites and EbA-interventions in alignment with the GCF requirements.

In alignment with our agenda of stakeholders' consultations across all project areas, we sent two field missions who visited all possible locations within the project areas, visualized the factual situation in the field, observed the challenges being faced by the victim communities, and recorded the stakeholders' viewpoint. Figure 3.3 shows the fact-finding summary of stakeholders' consultations. It shows that all the catchments are significantly impacted by climate-related disasters and require our urgent attention to make informed decisions.

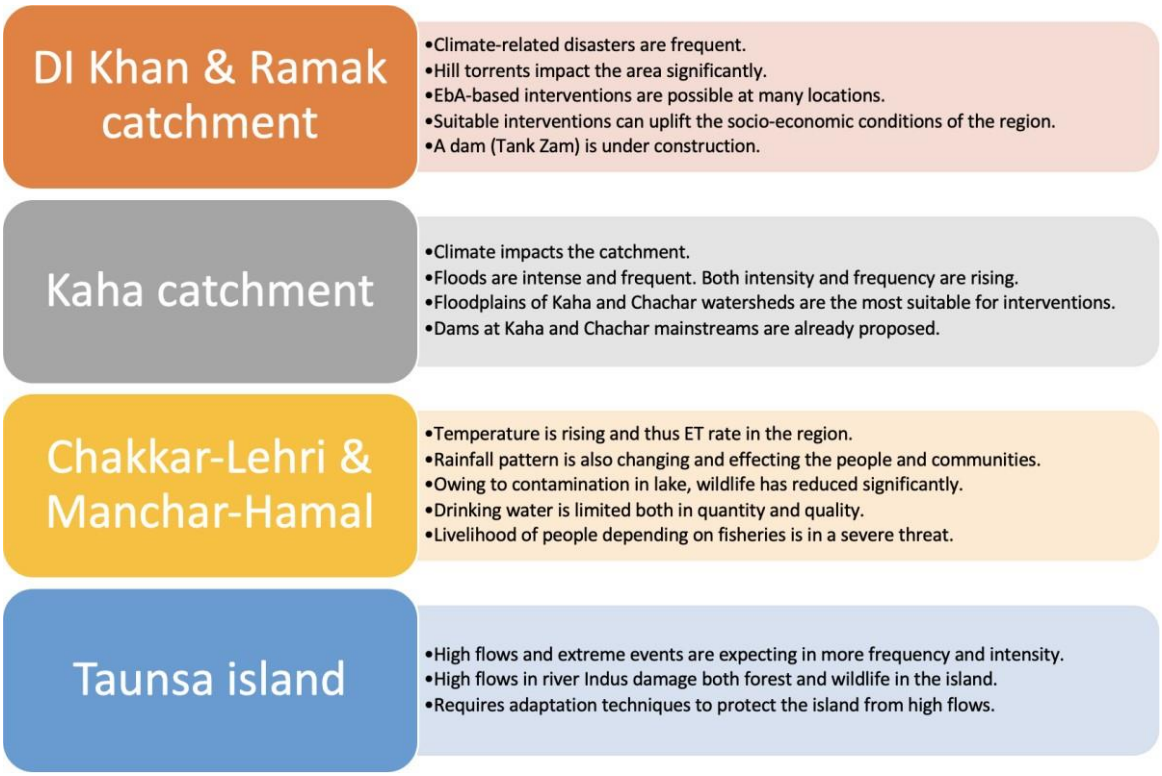

Figure 3.3: Overview and findings of stakeholder consultations during the pre-feasibility phase.

- **Summary of consultation during the detailed feasibility phase**

Field missions were sent to project areas for the assessment of stakeholders through structured interviews (KIIs and FGDs). Interviews were conducted to assess the impact of climate in the areas, situations related to bio-physical parameters, socio-economic conditions of communities living around, barriers to opting for adaptation to climate, and key enabling factors which could lead to upgrade the project areas and safeguard the victim-communities from the climate-related disasters through adaptation. The outcome of the consultation is summarized as below:

- Vulnerable communities are using the ancient methods (retention structures, gully formation, contours ridges across the natural streams, diversion of rainwater to their fields) to keep them safe from climate-related risks and to ensure their continuous livelihood.
- Local interventions opted by them didn't follow the engineering designs and technical specifications, therefore, extreme floods often destroyed locally adapted (indigenous) interventions.
- Smallholders neither know nor are capable to opt for climate-smart agriculture on their own without proper extension services.

- Huge land is barren and sparsely vegetated and EbA-based interventions can easily be designed and implemented.
- Lakes are either natively saline or degraded through human interventions and required to be rehabilitated through solutions suggested by stakeholders, which fall under the category of non-EbA options.

The valuable data and information were also gathered from the victim communities to inform our models/modeling team to validate the models, for instance: *in a year x when the flood hit the area the level of flow was at level y*, *past pictures of inundation around structures, etc.*

DESIGN AND CONDUCT OF MULTISTAKEHOLDER WORKSHOPS

Context

A multistakeholder workshop is a process of collaboration of various stakeholders. Collaboration has been defined as a process that engages a group of autonomous stakeholders interested in a problem or issue in an interactive deliberation using shared values, norms, and structures to share information and/or take coordinated joint actions (Gray and Purdy, 2018).

The objectives of organizing multistakeholder workshops in this project are to:

- Record the shared climate risks to the project areas.
- Quantify the impact of climate-related disasters in the project areas.
- Identify the hotspots/AOIs within the project areas, which are the most affected due to climate change.
- Attach EbA-solutions with the potential sites.
- All the above-mentioned objectives are achieved through deliberation, group work, and joint consensus as explained in the following sections.

Design of multistakeholder workshops

Figure 4.1 shows the design of multistakeholder workshops which were organized both at the national level and sub-national levels. Bio/physical parameters and barriers for adaptation to climate change were discussed, brainstormed to identify and finalize the potential sites by considering the socio-economic parameters and enabling factors for climate resilience. In this regard, the other impact aspects, for instance, physical and easy access to sites, technical viability, hydrologically possible, etc. were also considered and assessed. The EbA-archetypes (as mentioned below) was specifically designed for this project and thus potential sites were tested and evaluated through them. The stakeholders were engaged actively to reach a consensus to prioritize the sites and specific EbA solutions, as we discussed them in the following subsections.

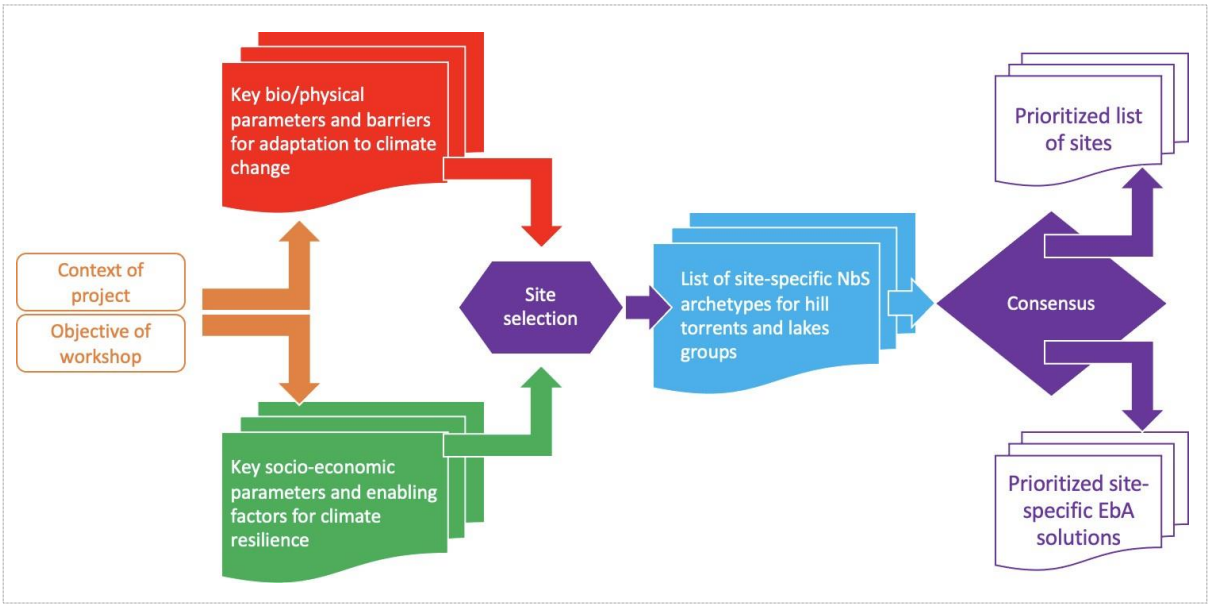

Figure 4.1: Design of multistakeholder workshops for both national and subnational levels.

During the multi-stakeholder workshops, we used the purpose-developed templates for each of the project areas (AOIs) to reach plausible conclusions regarding selection of final sites and solutions concerning ecosystem-based adaptation (EbA). The typical template is shown below however duly-filled templates with site-specific information are discussed in the respective subsections of project areas below.

Site Name/number				
Challenge orientation				
EbA options				
Climate risk	Current		Future	
Technical feasibility	Bio physical (efficiency and effectiveness)		Socio economic (efficiency and effectiveness)	
Impact adaptation and resilience	Climate (e.g., flood peak, return period carbon capture water storage/drought alleviation		No Beneficiaries	
Co benefits	Ecological	Environmental	Social	Economic
Resilience of the intervention				
Stakeholders				
Paradigm shift/scaling up				

Ownership and needs of recipient	Ownership	Needs of recipient
Barriers to finance	Other related investments	Key barriers
Practicality		
Sustainable development		

We have combined the individual interviews of stakeholders (KIIs) and group talks (FGDs) to design and develop facilitating material for the multistakeholder workshops.

- **Decision Support System (DSS) for EbA solutions**

As well as selecting the most appropriate sites to implement projects, the most appropriate EbA intervention at each site must also be selected. To help expedite this process we have developed a set of EbA archetypes that are applied and tailored to each selected site. It is possible that more than one archetype could be applied to a site. The tailoring of the archetype in terms of the exact location, size, and species are determined iteratively with the developed 3Di models. The figure below sets out the process of selecting the sites and the EbA intervention archetypes.

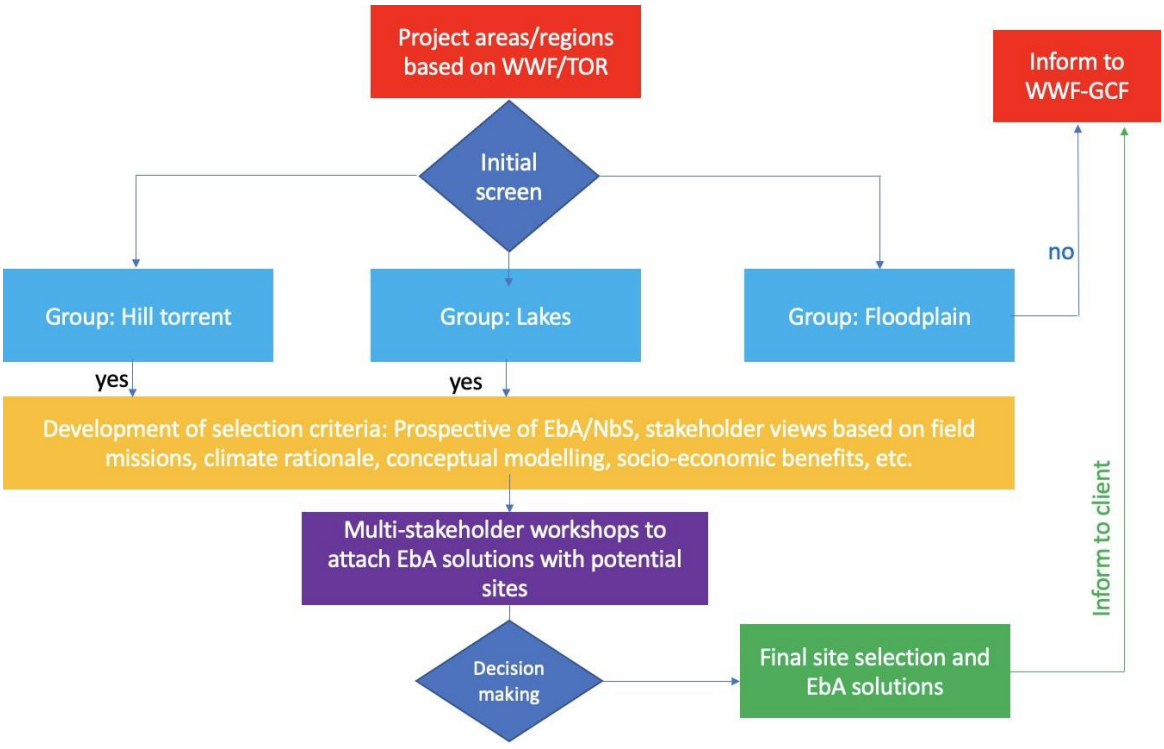

Figure 4.2: Decision Support System for the selection of sites and EbA solutions.

The NbS-archetypes for different types of solutions are set out below (Figures 4.3—4.7). Colors represent the type of solutions. Miscellaneous solutions do not have a clear climate-resilience objective but can be combined with the other templates to solve problems related to water quality and flow obstruction. Based on the type of intervention and lessons learned from other projects, it is

important to note that many projects encompass a range of interventions, and it is not always possible to extract the net result of one type of intervention or archetype in each case.

Nature based Solutions (green)
Community solutions (blue)
Engineering solutions (grey)
Miscellaneous solutions (orange)

Legend for NbS-archetypes.

Nature based Solution Template Type A: *Re-vegetation or afforestation*				
Climate resilience Objective:	Peak flow reduction, increased retention, increased infiltratic reduced risk of flash flooding and landslides			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
	Vegetation should be native and drought resistant	Soil needs to be fertile	sufficient water (rain, discharge) for vegetation growth at planting locations	Relatively fl low-lying areas
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Self-sustaining when conditions are favorable	Recreation, when combined with fruit trees additional food	Artisanal function, firewood	Natural harvesting nee to be in balan with the system
Key enabling factors	Area should be accessible			
Key barriers	Loss of agricultural land, potentially increased flood extent			
Co-Benefits	Improved soil composition, reduced erosion, increased natu value			
Timescales	Depending on the vegetation type and discharge dynami several years before it is effective and self-sustaining wh abiotic conditions are met			

Nature based Solution Template Type B: *Green water retention areas*				
Climate resilience Objective:	Peak flow reduction, increased retention, increased infiltration,			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topograph**
	Native vegetation types	Permeable soil	Discharge duration should be large enough to fill retention area	Needs to constructe in valley ne river
key socio-economic components	**Economic**	**Social**	**Community**	**Engageme**
	Water storage for irrigation, fishing and other food, biomass generation	Recreation	Artisanal function, firewood, drinking water	Natural harvesting needs to in balan with t system
Key enabling factors	Landscape should allow construction, channel morphology should stable near inflow point			
Key barriers	Requires maintenance, reduces water availability downstream			
Co-Benefits	Increased natural value			
Timescales	Works for water retention and flood reduction right after constructio natural functions need several years to develop			

Figure 4.3: NbS-archetypes for EbA solutions.

Nature based Solution Template Type C: *Wetland and lake restoration*				
Climate resilience Objective:	Increased retention, increased infiltration, reduce flood risk			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
	Abiotic conditions should be suitable for aquatic and riparian species	Soil should be permeable	Needs to be connected to fresh water inflow and needs outflow point	Needs to be constructed in valley
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Water storage for irrigation, self-sustaining if conditions are favorable, fishing and other food, biomass generation	Drinking water	Artisanal function, firewood, recreation,	Natural harvesting needs to be in balance with the system
Key enabling factors	Dependson extent, location and, when revegetating, the type of vegetation			
Key barriers	Large spatial requirement			
Co-Benefits	Improved water quality, decreased salinity, natural value			
Timescales	Needs several years to start functioning, requires suitable abiotic conditions to be self-sustaining			

Engineering solution Type A: *Dams (check-dams and sand dams)*				
Climate resilience Objective:	Increased infiltration, increased retention			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
		Permeable soil, but dam site at some impermeable soil	Discharge duration should be large enough to fill reservoir, storage/drainage area sufficient to hold significant water for local communities	Needs to be constructed in valley near to river or stream and close to the community, could generate sufficient water for storage
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Water for irrigation, expensive	Recreation, on-demand water availability	Drinking water	Requires proper design and maintenance
Key enabling factors	Proper design and maintenance are required			
Key barriers	Not a self-sustaining Nature based Solution, requires large construction works, risk of damage after flood, risk of increased flood extent due to backwater effects			
Co-Benefits	reduced erosion, reduced surface water runoff, protection from floods, etc			
Timescales	Works right after construction			

Figure 4.4: NbS-archetypes for EbA and engineering (or hybrid) solutions.

Community solution Type A: *Cropping practices (furrow dikes, reduced tilling, soil mulching, crop rotation, buffer strips)*				
Climate resilience Objective:	Increased infiltration, reduced risk of flooding and landslides,			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
	Crops should be compatible with the local weather, topography, geology.	Soil needs to be fertile, sandy loam, loam	Sufficient water (rain, groundwater, surface water) for crop growth at farm locations	Relatively flat, mild slope or limited drainage
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Initially higher investment in soil cover and mulch	Food and fiber requirements, economic returns	Potential shift in farming culture and types of crops	Farmers need to change cropping practices
Key enabling factors	Depends on willingness of community and farmers and on the geology and hydrology			
Key barriers	Farmers need to be willing to change cropping practices and use water-efficient practices			
Co-Benefits	Decreased evaporation, increased yield, reduced erosion, reduced surface water runoff, increased soil quality, pollution reduction			
Timescales	Several years for implementing new cropping procedures and reaping benefits of improved soil conditions and hydrology			

Community solution Type B: *Landscaping measures (e.g. terracing)*				
Climate resilience Objective:	Increased infiltration, reduced velocity of flow			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
		Soil needs to be fertile or should be easily made fertile	Sufficient rainwater availability or on-farm storage options for dry season	Accessible for the preparation of terracing, i.e. accessible with road network for machinery, equipments, etc
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Higher yield	Food needs, economic return	Potential shift in earning mode, from livestock/labor to farming, etc	Proper design and maintenance are required
Key enabling factors	Willingness to construct and maintain terraces			
Key barriers	When applied in large areas it could negatively affect downstream water balance, when badly maintained it can collapse and cause landslides			
Co-Benefits	Increased yield, reduced erosion			
Timescales	Several years			

Figure 4.5: NbS-archetypes for community-led solutions.

Miscellaneous solution Type A: *Water sanitation plant (grey)*				
Objective:	Filter water flowing into lakes, rivers and wetlands			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
			Needs to be close to polluted water source from agriculture or drains	Needs to be in a flat area
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Possibilities for employment, water for irrigation, expensive		Drinking water	Requires proper design and maintenance
Key enabling factors	Proper design and maintenance are required			
Key barriers	Not a self-sustaining Nature based Solution, requires construction, good operation and maintenance, risk of plant closure and return of bad water quality, needs space to be constructed			
Co-Benefits				
Timescales	Works right after construction			

Miscellaneous solution Type B: *Artificial islands (green)*				
Objective:	Improve water quality and ecology in lakes and wetlands			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
	Abiotic conditions should be suitable for aquatic and riparian species		Should be constructed within a lake	
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	More fish and natural harvesting material, can be constructed out of dredging material, costly	Recreation	Artisanal function, firewood, recreation, fishing and other food, biomass generation	Natural harvesting needs to be in balance with the system
Key enabling factors	Needs to be well constructed to prevent erosion or leakage of dredged sediment			
Key barriers	Construction phase temporarily disturbs aquatic life and increases suspended sediment concentrations. It is a very extensive and costly method.			
Co-Benefits	Natural value, reduction of suspended sediment			
Timescales	Takes several years to develop and after that several years to function			

Figure 4.6: NbS-archetypes for miscellaneous/hybrid solutions.

Miscellaneous solution Type C: *Flushing (blue)*				
Objective:	Improves water quality in lakes and wetlands			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
			There should be enough water available, there should be a steady inflow and outflow point	
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
Key enabling factors	Flushing water quality should be of good quality			
Key barriers				
Co-Benefits				
Timescales	Depending on the quality of the water and sediment: several years to decades			

Miscellaneous solution Type D: *Dredging (grey)*				
Objective:	Improves water quality in lakes and wetlands			
Key Bio/physical components	**Ecology**	**Geology**	**Hydrology**	**Topography**
key socio-economic components	**Economic**	**Social**	**Community**	**Engagement**
	Possibilities for employment on dredge-boats	Temporal disruption for fisherman		
Key enabling factors	Locations with largest soil pollution should be found, inflow water quality needs to be good (combine with water sanitation options like sanitation plants or wetlands) otherwise measure is not sustainable			
Key barriers	Drastic, large and expensive operation, disturbance of aquatic life in the lake, temporary increase of suspended sediment in the lake			
Co-Benefits	Nutrients and chemicals are removed from the sediment, reducing release in the future, increasing storage capacity of the lake, decreasing flood risk, archeological finds, sediment can be used to construct purification islands.			
Timescales	Depending on the quality of the water and sediment: several years to decades			

Figure 4.7: NbS-archetypes for miscellaneous/hybrid solutions.

We have combined the individual interviews of stakeholders (KIIs), group talks (FGDs), global datasets, spatial and temporal maps to formulate the above criteria and NbS/EbA archetypes. These archetypes clearly state the climate objective, co-benefits, and key components related to each generic EbA. Based on the objective and problem definition of selected areas, one or more archetypes are selected in consultation with stakeholders. Subsequently, these solutions are used in an iterative modeling approach where also location, dimensions, and other details like vegetation species selection are considered.

- **Implementation of workshops and outcome of the consensus**

To obtain the objectives of Recharge Pakistan and to follow the mandatory requirements of GCF, multistakeholder workshops were organized at national and provincial headquarters. In alignment with the design of workshops, the views of relevant (key) stakeholders for potential sites and site-specific EbA solutions were mapped and synthesized as below.

- ***Sub-national workshop of province Punjab @ Lahore***

The multistakeholder workshop for the catchment of Kaha and Chachar located in Punjab province was organized on the 12th of August 2021 at Lahore. The relevant provincial stakeholders (Annex-B) were invited to the event through a well-thought agenda (Annex-A). The facilitating kit (including EbA-archetypes) as discussed above was used to conduct the workshops. One key facilitator and two co-facilitators from WSL conducted the workshops. The participants were briefed about the objectives of the project and workshop. Brainstorming sessions were organized through group works with well-defined group tasks and well-thought (facilitating) questions. Participants were able to visualise the detailed maps of sites for interactive and participatory discussions (Figure 4.8). The workshop settings and group work can be seen in Figures 4.9—4.14.

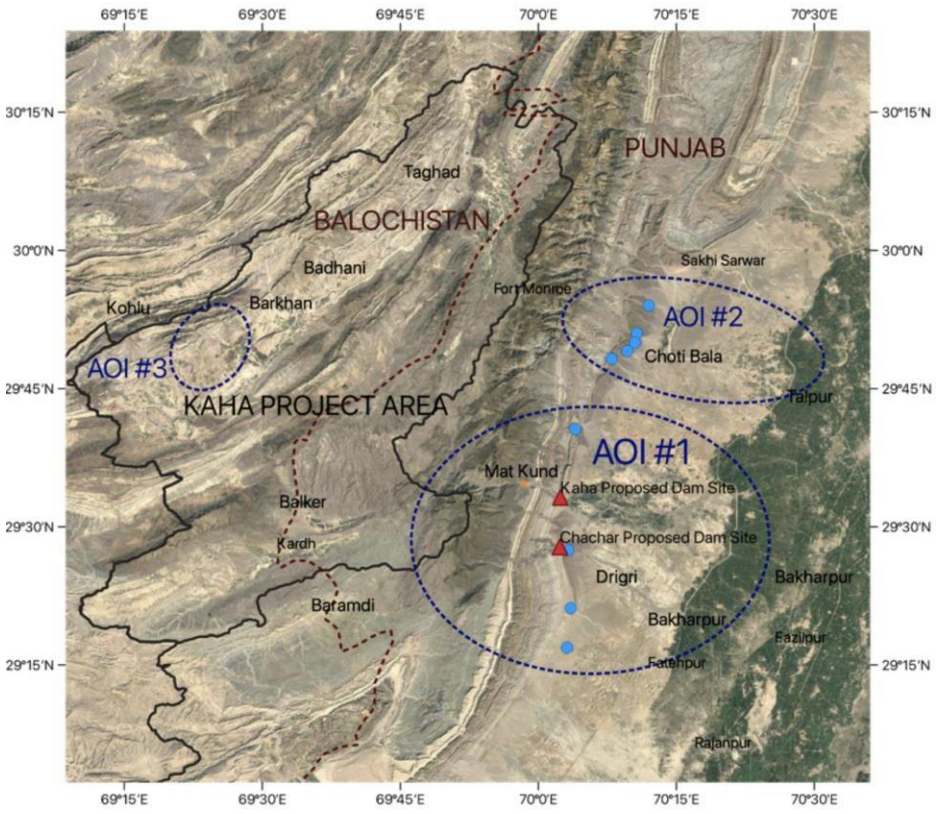

Figure 4.8: Feasible potential sites/AOIs @ Kaha catchment.

Figure 4.9: Workshop settings and facilitating kit @ Lahore.

Figure 4.10: Welcome speech and reception @ Lahore by WWF.

Figure 4.11: Facilitator is briefing the stakeholders about the workshop and group works (left). Welcome speech by DG WWF (right).

Figure 4.12: Stakeholders @ Lahore.

Figure 4.13: Participants are brainstorming during groupwork @ Lahore.

Figure 4.14: Group leaders are presenting their group work in plenary.

The findings of the workshop are summarized as below:

- The old and native 'Rod Kohi system' and 'Gandas' are working effectively and efficiently, and stakeholders were interested in them for their replication and adaptation – these are used for irrigation and diverting floodwater for agricultural purposes.
- Sediment load is a big challenge in the catchment. Whereas the sediment load in the Chachar catchment is higher than that of the Kaha catchment.
- Possible interventions prioritized by stakeholders for Kaha/Chachar catchments are afforestation with native bushes, water retention ponds, flood channels, watershed management, delay dams, etc.
- Taunsa pond area located inside river Indus was also discussed and stakeholders thought to restore it to its original situation, i.e., afforestation.

The summary of deliberation and consensus of stakeholders are summarized in Figure 4.15.

Climate Risk	Challenges and opportunities	Climate adaptation and resilience possibilities	Key bio/physical parameters	Key socio-economic parameters	Key enabling factors and barriers	Feasible/resilient EbA Solutions		Timescales
Current: High rate of floods and sediment loads during monsoon season due to increase in torrential rainfall.	High flows and heavy sediment load in tributaries of Kaha river.	Training/tools on climate-smart agriculture are required for farmers in the project area.	**Ecology:** Bare areas with sparse vegetation and cultivated area at the downstream of flow.	**Economic:** Increased opportunities due to improved agriculture, fuelwood and biomass generation.	**Enabling factors:** Area is accessible for interventions; landscape allows construction, channel morphology is stable near inflow points; possibility of water retention and reduced loss of fertile land; water storage for irrigation, fishing; biomass generation.	Water retention ponds (EbA template type BJ.	Increased natural value.	Works for water retention and flood reduction right after implementation of intervention, natural functions need several years to develop.
Future: An increase in precipitation will consequently generate more flood peaks in the rainy season due to the monsoon drift.	Poor watershed and rangeland management in the catchment.	Efficient irrigation system along with storage water ponds need to be introduced with introduction of low delta crops.	**Geology:** Sandy clay loam.	**Social:** Water retention/storage areas can create recreational value.	**Key barriers:** Interventions require maintenance, reduce water availability downstream; loss of agricultural land.	Introduce indigenous vegetation, shrubs and species in the catchment (EbA template type A).	Improved soil composition; reduced erosion; increased natural value.	Depending on the vegetation type and discharge dynamics several years before it is effective and self-sustaining when abiotic conditions are met.
	Farmers lack modern skills of farming.	Range land and watershed management are required.	**Hydrology:** Annual rainfall is increasing overtime.	**Community:** Drinking water for human and livestock; firewood; improvement in watershed and rangeland management will add aesthetic value and increase land value.		Introduce watershed and rangeland management practices (Community solution type A).	Decreased evaporation; increased agriculture yield; reduced erosion; reduced surface water runoff; increased soil quality.	Several years required for implementing new cropping procedures and reaping benefits of improved soil conditions and hydrology.
	less varieties of species and vegetation are sparsely available, locally.		**Topography:** FAN area, with hills on the upstream and plains on the downstream.	**Engagement/needs of the recipient:** Community will get benefits from additional stored water and afforestation/vegetation.		Check dams, sand dams, etc. to increase infiltration and retention (Engineering solution type A).	Reduced erosion; reduced surface water runoff; protection from floods.	Works right after the implementation of intervention.
	Sites for water retention ponds are available within the floodplains of the watershed.							

	Water retention ponds can provide water for drinking, smart agriculture and livestock.						

benefits and timescales of shortlisted EbA are also discusssed.

Figure 4.15: Summary of stakeholder consensus on possible EbA solutions for Kaha catchment.

- ***Sub-national workshop of province KPK @ DI Khan***

The workshop of KPK province was organized at DI Khan very close to the project area on the 14th of July 2021. All relevant stakeholders of KPK province were invited to the workshop – details of participants can be seen in Appendix C, whereas Figure 4.16 shows the location of feasible sites/AOIs within the project areas. The local indigenous knowledge was gathered through deliberations. The key points of consensus were as:

- Local indigenous knowledge: construction of 'Gandas' across streams to divert floodwater is quite common, which needs to be considered while designing and implementing interventions.
- All the areas of the DI Khan catchment are suitable for EbA-interventions; therefore, the focus should not only be made on AOI#1—5.
- Possible interventions are afforestation, vegetation, water conservation projects (i.e., rainwater harvesting ponds), small/mini/check dams as retention interventions.
- Most of the stakeholders were interested in water conservation facilities and diversion structures for onward utilization of surplus flood/rainwater for agriculture purposes to be aligned with their current practices.

The stakeholders in KPK province are cultural-sensitive for brainstorming sessions and did the workshop in round-table format (Figure 4.17) whereas the facilitators briefed them about the project and presented the pros and cons of interventions in a presentation mode (Figure 4.18). Stakeholders convened the workshop with their comments as all the proposed solutions look feasible in DI Khan and sites/areas outside of the proposed AOIs are also very conducive for the implementation of EbA-interventions.

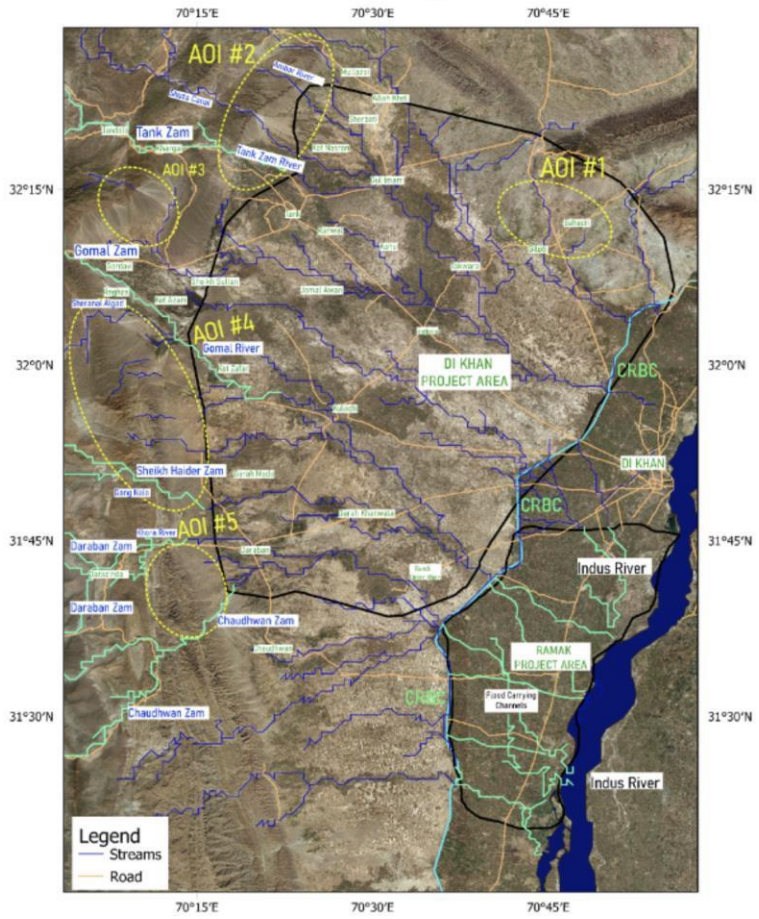

Figure 4.16: DI Khan-Ramak catchment and potential sites/AOIs.

Figure 4.17: Workshop settings and stakeholders @ DI Khan.

Figure 4.18: The facilitator is briefing the participants about the workshop's objective and framework conditions of GCF @ DI Khan (left); participants are brainstorming and discussing the options (right).

The summary of deliberation and consensus of stakeholders are summarized in Figure 4.19.

Climate Risk	Challenges and opportunities	Climate adaptation and resilience possibilities	Key bio/physical parameters	Key socio-economic parameters	Key enabling factors and barriers	Feasible/resilient EbA Solutions	Co-benefits	Timescales
Current High rate of floods and sediment loads during monsoon season due to increase in torrential rainfall.	Flood and drought situation.	Climate-smart agriculture and related satellite-based tools adaptive to flood/drought are essential for the region.	**Ecology:** Bare areas with sparse vegetation in the upper catchment.	**Economic:** Improved agricultural production and crop yield, increased soil fertility for agriculture; increased value of land; opportunities due to additional water availability; biomass generation.	**Enabling factors:** Area is partly accessible for interventions; landscape allows implementation, channel morphology is stable near inflow points; possibility of water retention and reduced loss of fertile land; water storage for irrigation, fishing; biomass generation.	Flood protection works, diversion structures, etc. to safeguard vulnerable communities and additional water for irrigation (Engineering solution type A).	Reduced erosion; reduced surface water runoff; protection from floods.	Works right after the construction of intervention.
Future: An increase in precipitation will consequently generate more flood peaks in the rainy season due to the monsoon drift.	Law and order situation especially in upstream of torrential flows.	Efficient irrigation system along with storage ponds need to be introduced with introduction of low delta crops.	**Geology:** Silty clay loam, silt loan, sandy clay loam; sandy clay and clay loam exist in smaller quantities of the project area.	**Social:** Water diversion, retention and storage can safeguard the infrastructure and create recreational value.	**Key barriers:** Upstream area is fertile and difficult to access for implementation; afforestation at upstream is required to reduce the floods' peak but sustainability of forests is a challenge especially during the drought period.	Water retention ponds (EbA template type B).	Increased natural value.	Works for water retention and flood reduction right after construction, natural functions need several years to develop.
	Farmers limited understanding on farming topics. No rotation of crops observed.	Range land and watershed management are required.	**Hydrology:** The main river and tributaries are Gomal and Kohra rivers and 5 Zams. Rainfall in Tank/ DI Khan is 333 mm/y (average annual value). Small boulders and pebbles are found in the upper catchment and clayey silt in the lower catchment.	**Community:** Drinking water for human, livestock and agriculture; firewood; improvement in watershed management will add aesthetic value and increase land value.		Cropping practices, etc. (Community solution type A).	Decreased evaporation; increased yield; reduced erosion; reduced surface water runoff; increased soil quality.	Several years for implementing new cropping procedures and reaping benefits of improved soil conditions and hydrology.
	Existence of flow obstructions and dysfunctional structures.		**Topography:** It lies on the right bank of the Indus River and elevation varies between 150 and 1,200 m.	**Engagement/needs of the recipient:** Communities living in the area need protection from recurrence floods. They require water for food production.				
	Limited local varieties and species. Less vegetation. Over-grazing in rangelands.							
	Waterlogging and salinity issues in few areas.							

Figure 4.19: Summary of stakeholder consensus on possible EbA solutions for DI Khan/Ramak catchment.

- ***Sub-national workshop of Sindh @ Karachi***

The sub-national workshop at Karachi was organized on the 27th of July 2021 to cover the stakeholders of Sindh. The key stakeholders invited to the workshop are listed in Annex-D. The project areas discussed with stakeholders were: Manchar-Hamal group lakes, Chotiari dam/ reservoir, Haleji, and Hadero lakes. The participants were briefed about the objectives of the project which will only cover the EbA solutions which do not require maintenance and are adaptive to climate-related risks. As the areas do not significantly affect due to floods and only challenge to them is how to maintain the lakes situated in Sindh. Participants discussed the importance of AOIs interactively over the map (Figure 4.20) and their pros and cons; whereas stakeholders knew the status of lakes (Manchar-Hamal, Haleji, and Hadero lakes and Chotiari dam) and challenges to them. The key points discussed and brainstormed with the stakeholders were recorded and are shown in Table 4.1.

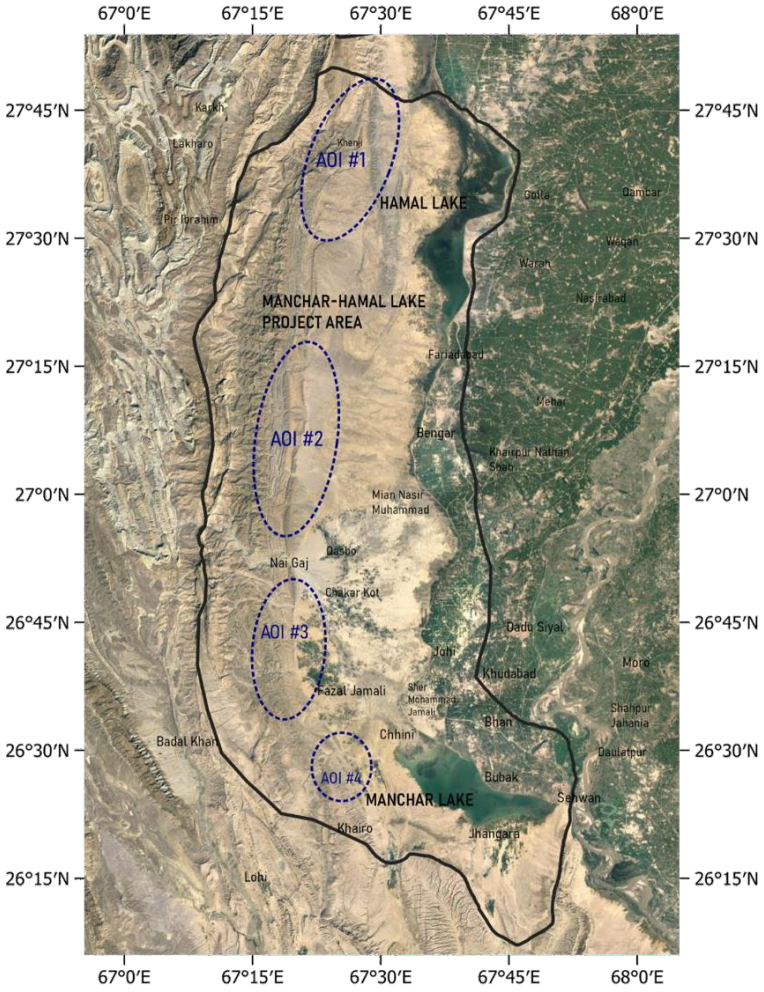

Figure 4.20: AOIs/sites near to Manchar lake, which were discussed with stakeholders.

Table 4.1: Key points which originated from the brainstorming and consultations of stakeholders @ Karachi.

Findings of the workshops
Manchar-Hamal Area (Hill Torrents Group) • The local community was used to develop Kacha bunds up to a height of 3—5 feet to divert floodwater to their farms for agriculture. • The community currently diverts water through temporary structures for their cropping needs. • Stakeholders were agreed to embrace the NbS/EbA. • Stakeholders demanded interventions similar to water retention i.e., ponds, small, mini, check dams, etc. They also see a huge potential in vegetation and forestation.
Manchar-Hamal Area (Lake Group) • Stakeholders were agreed to the closure of the MNV Drain disposing of effluent to Manchar lake. • There was a clear consensus on the revival of Manchar lake through the supply of fresh water and livelihoods improvement. • The current allocation of ~50 cusecs from Nai Gaj to Manchar lake is too little to revive the Manchar lake. • Community participants/community demanded dilution of Manchar lake.
Chotiari Dam/Reservoir • Stakeholders declared Chotiari Reservoir as an environmental disaster. • Before the construction of the bund (embankment), livestock used to graze in the open field which is not now possible. • The mixing of salty and fresh water in the Chotiari reservoir is injurious for crops. • Chotiari dam/reservoir has damaged the local wildlife of the area. • Chotiari dam/reservoir has turned the surrounding groundwater saline and has seriously affected the adjacent lands of the reservoir. • Baqar lakes around/downstream of the reservoir are another environmental hazard to the local environment. • The saline groundwater needs to be vertically drained off through tube wells. • Introduction of salt-resistant crops and trees in the local area. • Freshwater in the reservoir will increase the wildlife.
Hadero Lake • Hadero Lake is natively saline.

- Participants demanded the flushing of the lake and fresh water supply to it.
- Hadero lake currently hardly attracts any wildlife for migratory birds. Whereas fresh water in the lake will increase the wildlife and the inflow of migratory birds.
- Salt-resistant plants were proposed by the participants as an EbA intervention around the Hadero Lake.

Haleji Lake

- All stakeholders were of the view that Haleji lake was originally a freshwater lake and attracted migratory wildlife and now it needs improvements through EbA solutions.
- Plantation around the lake can add value to the lake.
- Stakeholders urged to rehabilitate the existing Jamwah canal for additional flow into the lake, as with increase in freshwater flows, the wildlife, migratory birds, and tourists will increase.

Figures 4.21—4.24 show the settings of the workshop, stakeholders' sessions while they were brainstorming together in different groups.

Figure 4.21: Welcome speech by Senior Director WWF (left). Briefing about the project and objectives of workshop by Lead Facilitator WaterSprint (right).

Figure 4.22: Workshops settings and stakeholders @ Karachi. Gender inclusion in consultations brings additional thoughts into brainstorming sessions.

Figure 4.23: Stakeholders worked in groups and brainstormed for options @ Karachi.

Figure 4.24: Concluding speech and group photo of stakeholders @ Karachi.

- ***Sub-national workshop of Balochistan at Quetta***

The multi-stakeholder workshop of stakeholders belonging to Balochistan (province) was organized on the 30th of July 2021 at Serena hotel Quetta. Several key stakeholders joined the workshop (Annex-E). Among them, the following are important to highlight: Balochistan rural support programme; Irrigation, Environment and Agriculture departments; Integrated water resources management. Figure 4.26 shows the AOIs within the project area of Chakkar Lehri – stakeholders demanded the design and implementation of interventions not only in the project area but also for the entire Balochistan.

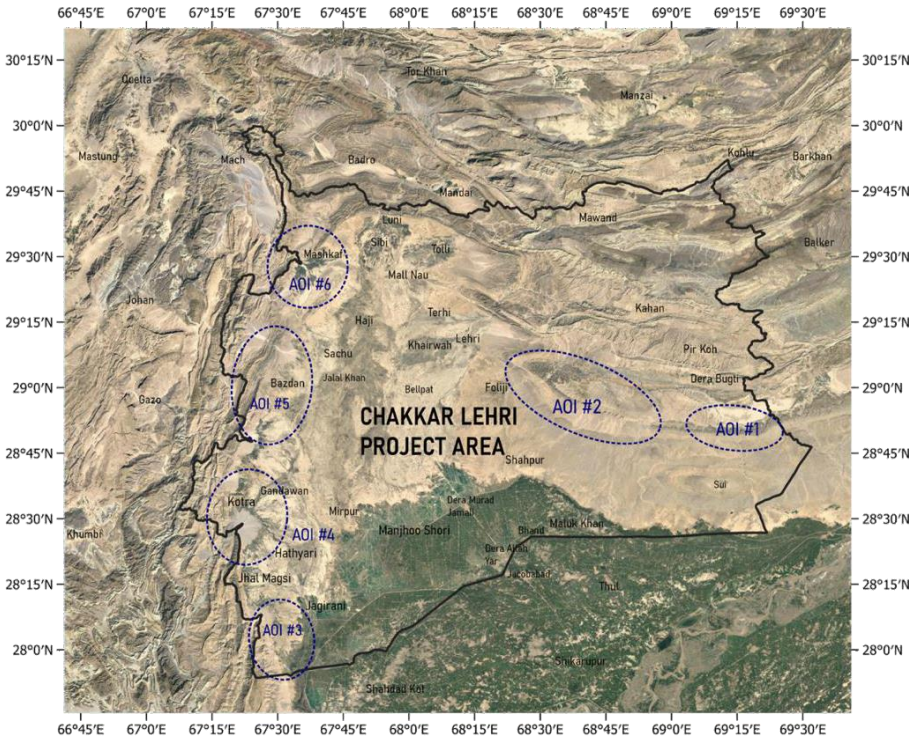

Figure 4.26: Chakkar Lehri boundary and AOIs/sites marked within it –

these were discussed with stakeholders.

Table 4.2 summarizes the discussion with stakeholders and the outcome of the workshop, whereas the workshop settings, stakeholders, and group works can be seen in Figures 4.27—4.29. It is pertinent to highlight that: stakeholders were demanding to expand the project to include another catchment, i.e., Zhob river.

Table 4.2: Key points which originated from the brainstorming and consultations of stakeholders @ at Quetta.

Discussions and outcome of the workshop
Chakar Lehri Watershed – (Points as Strength) • Stakeholders proposed the option of retention interventions at identified sites. • Stakeholders viewed that water is quite scanty at all project sites, but flows are in good quality and volume arrives during a good rainfall. • Stakeholders demanded the interventions over the entire province (Balochistan). They also commented that the catchment areas in AOI-1 and 3 could be more useful for developing water retention measures. • Entire project area has a good potential for afforestation, but sustainability is a big challenge – how could we maintain supply of water especially during drought period. • Stakeholders supported the proposed inventory of EbA solutions to be implemented in the province. • Stakeholders were interested in watershed management and water purification plant. • Some special measures for socio-economic uplift including options for better livelihoods, increase in land value and flood mitigation needs to be introduced. **Points as Weaknesses** • Most of the project sites are quite inaccessible. • Flash flood inundates their valuable agricultural lands. • Submergence of domestic and agricultural lands during floods is a big challenge. • Possibility of archeological sites. • Projects maintenance issues.

Figure 4.27: Workshops settings and stakeholders @ Quetta.

Figure 4.28: Stakeholders are brainstorming for consensus in different groups @ Quetta.

Figure 4.29: Concluding sessions and wrap up at the end of workshop @ Quetta.

Figure 4.30 shows the summary of consultations held @ Quetta for the catchment of Chakkar Lehri.

Climate Risk	Challenges and opportunities	Climate adaptation and resilience possibilities	Key bio/physical parameters	Key socio-economic parameters	Key enabling factors and barriers		Feasible/resilient EbA Solutions	Co-benefits	Timescales
Current: Torrential rainfall and frequent floods during monsoon season.	Torrential rain, floods and intermittent drought conditions.	Crop diversification blended with efficient irrigation system.	**Ecology:** Bare areas.	**Economic:** Poor and vulnerable people and communities; storage of surplus water will turn their lives into a decent living, as they could use it for agriculture production.	**Enabling factors:** Area is partly accessible for interventions; channel morphology is stable near inflow points; possibility of water retention and reduced loss of fertile land; water storage for irrigation, fishing; biomass generation.		Flood protection works, diversion structures, etc. to safeguard vulnerable communities and additional water for irrigation (Engineering solution type A).	Reduced erosion; reduced surface water runoff; protection from floods.	Works right after the construction of intervention.
Future: Extremely affected communities from climate change; weighted ensemble mean shows an increase of 16% in rainfall in the future.	Law and order situation in Balochistan.	Promotion of climate-smart agricultural techniques.	**Geology:** Sandy clay.	**Social:** Water diversion, retention and storage can safeguard the infrastructure and create recreational value.	**Key barriers:** Upstream area in Balochistan is fertile and difficult to access for implementation; afforestation at upstream is required to reduce the floods' peak but sustainability of forests is a challenge especially during the drought period.	Facilitated consultations and deliberation of stakeholders result into following consensus. The co-benefits and timescales of shortlisted EbA are also discusssed.	Water retention ponds (EbA template type B).	Increased natural value.	Works for water retention and flood reduction right after construction, natural functions need several years to develop.
	Farmers limited capacities in climate-smart agriculture.	Water storage and conservation are feasible and in high demand.	**Hydrology:** Subsurface space is empty as groundwater table is generally very deep.	**Community:** Drinking water for human, livestock and agriculture; firewood; improvement in watershed management will add aesthetic value and increase land value.			Cropping practices, etc. (Community solution type A).	Decreased evaporation; increased yield; reduced erosion; reduced surface water runoff; increased soil quality.	Several years for implementing new cropping procedures and reaping benefits of improved soil conditions and hydrology.
	High rate of sediment in tributaries of project area (Chakkar Lehri).		**Topography:** FAN area, with hills on the upstream and plains on the downstream.	**Engagement/needs of the recipient** Communities living in the area need protection from recurrence floods and food for survival. They require water for food production and drinking purposes.					
	Storage of surplus flood/rainwater in surface and subsurface space.								

Figure 4.30: Summary of stakeholder consensus on possible EbA solutions for Chakkar Lehri.

- ***The conducive environment of workshops led to conclusions***

The consultative workshops offered a very sound format to bring all relevant and knowledgeable stakeholders to one platform who contributed significantly to prioritizing the sites and attaching the NbS/EbA-archetypes with them. For this purpose, discussions and addressing the specific problem went quite effective in identifying and understanding the nature of the associated problems. Stakeholders participated well and shared their experiences to reach plausible conclusions – all processes of discussion and brainstorming were supported by the facilitator and co-facilitators.

It was learned that the participants were experienced and knowledgeable regarding climate risks and associated disasters of the project areas. Informational or instructional modules and technical experts were divided into break-out groups, whereas individual experts (groups of participants) were allowed to apply the new information to solving the identified problem. An underlying assumption is that knowledgeable stakeholders were in a key position and endorsed to apply new information, to find solutions to problems of project areas. The stakeholder workgroups were much like "think tanks", which produced insightful suggestions about and solutions to the shared risks at hand. When the results of both groups of every sub-national workshop were reported in plenary with the support of facilitators, the group synergy often moves beyond the aggregate results to more refined ways of thinking about the problem. This pattern—the presentation of expert knowledge, followed by other group applications, followed and reconvened by the facilitator — the repeated stuff was deleted during a single consultative workshop, thus making data generation and interpretation a highly iterative process.

- ***Concluding workshop at national level @ Islamabad***

After having detailed consultations and deliberations with the provincial stakeholders and local communities both at fields and in provincial headquarters using the formats (KIIs, FGDs, multi-stakeholder consultations), the key national-level stakeholders were invited to federal capital for discussion on the outcome of provincial consultations and to find a way forward.

In this regard, the Chairman Federal Flood Commission (FFC), Ministry of Water Resources (MOWR), and Ministry of Climate Change (MoCC) played a key role in inviting the key actors, initiating the talks, and wrapping up the workshop.

The stakeholders who were the part of a workshop at national level are shown in Annex-F. The workshop was organized in the office of MoWR on the 15th of September 2021. Apart from others, the Chairman FFC and key members of MoWR and MoCC participated in the workshop. The participants discussed all the aspects of the project, its impact on the area and communities, brainstorm the possible ways of implementation, and all approval mechanisms at national and provincial levels. The WWF-US team joined the workshop online through Zoom and participants have many productive discussions with them. National-level stakeholders endorsed the multi-stakeholder processes organized both at project areas and sub-national levels (Figure 4.34). The workshop ended with a note to proceed further with feasibility

studies and submit the application to GCF within the stipulated timeframe and key stakeholders must follow all the administrative due diligence.

Figure 4.31: Opening and concluding rounds @ Islamabad.

Figure 4.32: Workshop settings and stakeholders @ Islamabad.

Figure 4.33: Participants in discussion @ Islamabad.

Climate Risk	Challenges and opportunities	Climate adaptation and resilience possibilities	Key bio/physical parameters	Key socio-economic parameters	Key enabling factors and barriers		Feasible/resilient EbA Solutions	Co-benefits	Timescales
Current: Torrential rains and recurrent floods	High flows and heavy sediment load in tributaries of project areas.	Training/tools on climate-smart agriculture are required for farmers in the region.	**Ecology:** Bare areas with sparse vegetation and cultivated area at the downstream of flow.	**Economic:** Increased opportunities due to improved agriculture, fishing and biomass generation.	**Enabling factors:** Area is generally accessible for interventions; landscape allows construction, channel morphology is stable near inflow points; possibility of water retention and reduced loss of fertile land; water storage for irrigation, fishing; biomass generation.	Facilitated consultations and deliberation of stakeholders result into following consensus. The co-benefits and timescales of shortlisted EbA are also discusssed.	Water retention ponds (EbA template type B).	Increased natural value	Works for water retention and flood reduction right after construction, natural functions need several years to develop.
Future: Future increase in rainfall by 16-34% in project ares.	Poor rangeland management in the catchments.	Efficient irrigation system along with storage ponds need to be introduced with introduction of low delta crops.	**Geology:** Alluvium with alternate sands and sandy-clay.	**Social:** Water retention/storage areas can create recreational value.	**Key barriers:** Interventions require maintenance, reduce water availability downstream; loss of agricultural land.		Introduce indigenous vegetation, shrubs and species in the catchment (EbA template type A).	Improved soil composition; reduced erosion; increased natural value.	Depending on the vegetation type and discharge dynamics several years before it is effective and self-sustaining when abiotic conditions are met.
	Farmers lack modern skills of farming.	Range land and watershed management are required.	**Hydrology:** Annual rainfall is increasing over time. Periods of high flows and intermittent low flows.	**Community:** Drinking water for human and livestock; fireword; improvement in watershed and rangeland management will add aesthetic value and increase land value.			Introduce watershed and rangeland management practices (Community solution type A).	Decreased evaporation; increased yield; reduced erosion; reduced surface water runoff; increased soil quality.	Several years for implementing new cropping procedures and reaping benefits of improved soil conditions and hydrology.
	Less varieties of species and vegetation are available locally.		**Topography:** FAN area, with hills on the upstream and plains on the downstream.	**Engagement/needs of the recipient:** Community will get benefits from additional stored water and aforestation/vegetation.			Check dams, sand dams, etc to increase infiltration and retention (Engineering solution type A).	Reduced erosion; reduced surface water runoff; protection from floods.	Works right after the consturction of intervention
	Sites for water retention ponds are available within the floodplains of watersheds.								
	Water retention ponds can provide water for drinking, smart agriculture and livestock.								

Figure 4.34: Consensus of provincial consultations (regarding possible EbA solutions in the project areas) were endorsed by the national-level (influential) actors/stakeholders.

Stakeholders during the field consultations (KIIs and FGDs) and multistakeholder workshops (both national and sub-national levels) reported to us regarding the intensity and frequency of extreme precipitation events in their region of interest. One of the main observations recorded by them was: the frequent floods are coming with high intensity since 2010 onwards – such torrential floods impact both loss of lives and livelihood in the project areas ultimately leading to depriving the people of their fundamental rights. Owing to climate-related disasters in the project areas, people are unable to protect their crops, houses, and built infrastructure, therefore, they are living below the poverty thresholds.

To determine and validate the impact of climate change in the project areas, we followed the processes as shown in Figure 5.1.

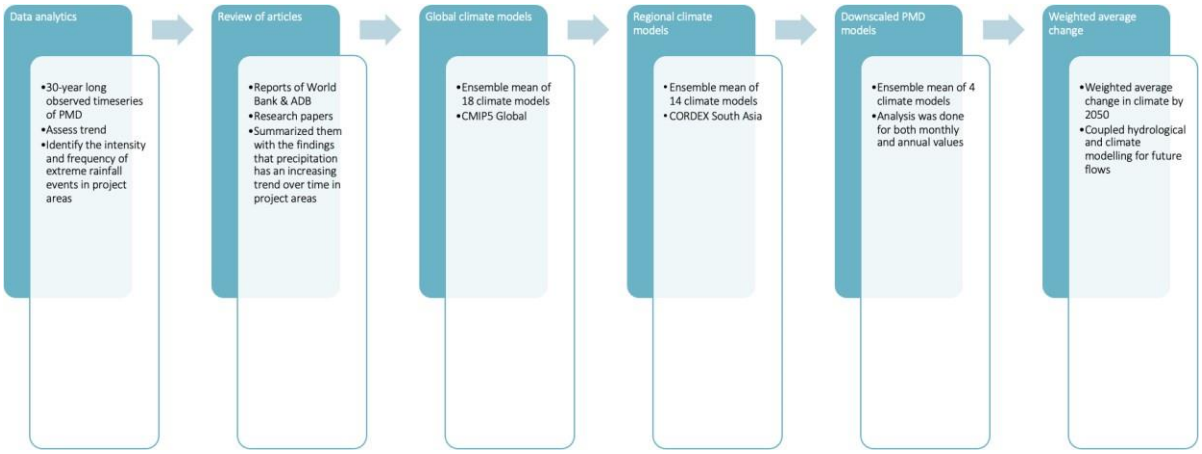

Figure 5.1: Process chain for data analysis, coupled hydrological and climate modeling to determine the impact of climate change in the project areas.

- **Intensity and frequency**

Figure 5.2 shows the number of days when precipitation is equal to or greater than 40 mm/day (intense event from the perspective of flood generation) for DI Khan, Kaha, Chakkar Lehri / Manchar-Hamal catchments. The period between 2004 and 2016 shows that the frequency of rainfall events (40 mm/day) is much higher (represented by the dotted red box) as compared to the period between 1988—2002.

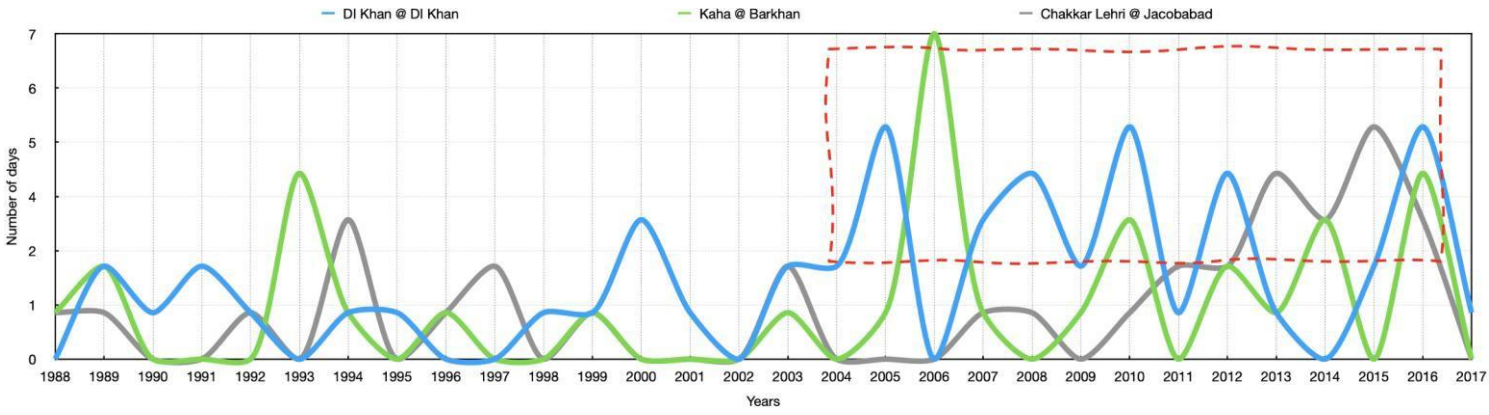

Figure 5.2: Number of days when precipitation is equal to or greater than 40 mm/day.

Climate change impact on the magnitude, intensity, and frequency of water-related disasters is essential to understand the hydrological processes and make informed decisions for both adaptation and mitigation. Climate change is expected to intensify hydrological extremes, potentially leading to increased floods and drought in the future. The expected change is not just the magnitude but also the timing of flood and drought events. Understanding these potential future changes to hydrological extremes in project areas is critical to inform policy decisions, consensus with the stakeholders, and ensure adequate adaptation measures are put in place.

- **Validation of the impact of climate change**

Based on stakeholders' reporting, we analyzed the high flow changes within a consistent framework to identify the flood risks which intensify due to climate change. We also assessed the climate change impact on the magnitude, intensity, and frequency of extreme flows using an ensemble of climate data from the GCMs, RCMs, and downscaled climate models of PMD @ 10km. The results of ensemble members are presented in Figure 5.3, which will be used to develop adaptation strategies and thus design EbA solutions that would cope with a wide range of future changes in hydrological extremes in the project areas.

DI Khan & Ramak catchment	Kaha catchment	Chakkar-Lehri & Manchar-Hamal
+22%	+34%	+16%

Figure 5.3: Weighted change in climate in project areas by 2050.

We translated the stakeholders' observations regarding climate change to evaluate their strengths with a long-term time series of measured values. Based on our scientific analysis, we conclude that the stakeholders' feedback was very useful to update and validate our models. With the information and data gathered from stakeholders, we and our models are now in a better position to evaluate the EbA-solutions endorsed by the stakeholders which will ultimately lead to the design of the best possible site-specific EbA-interventions.

OUTCOME OF MULTI-STAKEHOLDER CONSULTATIONS

Figure 6.1 shows the project areas as proposed in the concept note to GCF. Although people and communities living in/around the project areas are the victims of climate-related disasters only the sites/areas as shown in Figure 6.3 qualified to proceed further. The qualification process considered the following parameters:

- Climate impact in the context of ecosystem-based adaptation.
- Framework conditions (climate-resilient objective, socio-economic conditions, bio-physical parameters) as set by GCF.
- Feasibility of sites from accessibility and hydrological perspectives.
- Multi-stakeholder consultations – climate-resilient impact, recipient needs, and country ownership.

Figure 6.2 shows the processes of consultations, alternate layers of reporting, and feedback mechanism which contributed significantly to conclude the multi-stakeholder consultation and consensus to proceed for the next steps of final designs of site-specific EbA-interventions.

Figure 6.3 summarizes the outcome of multi-stakeholder consultations both in terms of prioritizing the sites and NbS/EbA solutions.

The major outcomes of the multi-stakeholder consultations are:

- All sites within the project areas are impacted by climate change and required interventions (either NbS/EbA or structural measures blended with EbA options) are to be implemented as soon as possible.
- The proposed inventory of NbS/EbA is suitable for the project areas and required to be tested and evaluated by using hydrological and hydrodynamical models.
- Stakeholders have shown keen interest in the design, implementation, and replication of the proposed EbA-interventions in the entire Pakistan (i.e., beyond the project areas). They also demanded the expansion of the RP project, i.e., beyond the project areas.
- It is pertinent to highlight that some of the stakeholders from Balochistan province demanded to include the Zhob river basin in the RP project; which may be difficult to consider as it is beyond the scope of the current project (concerning RP concept note already approved by GCF).

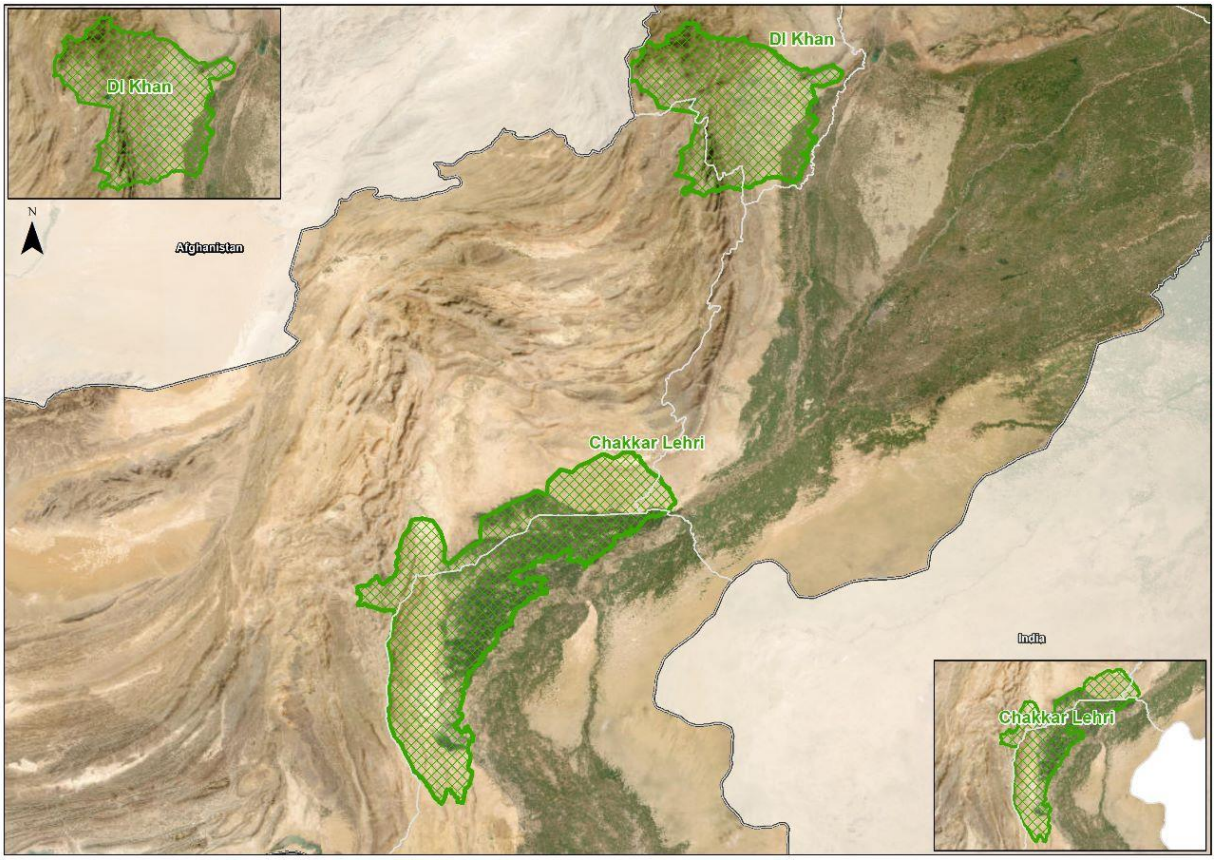

Figure 6.1: The project areas of Recharge Pakistan, as proposed in the concept note to GCF.

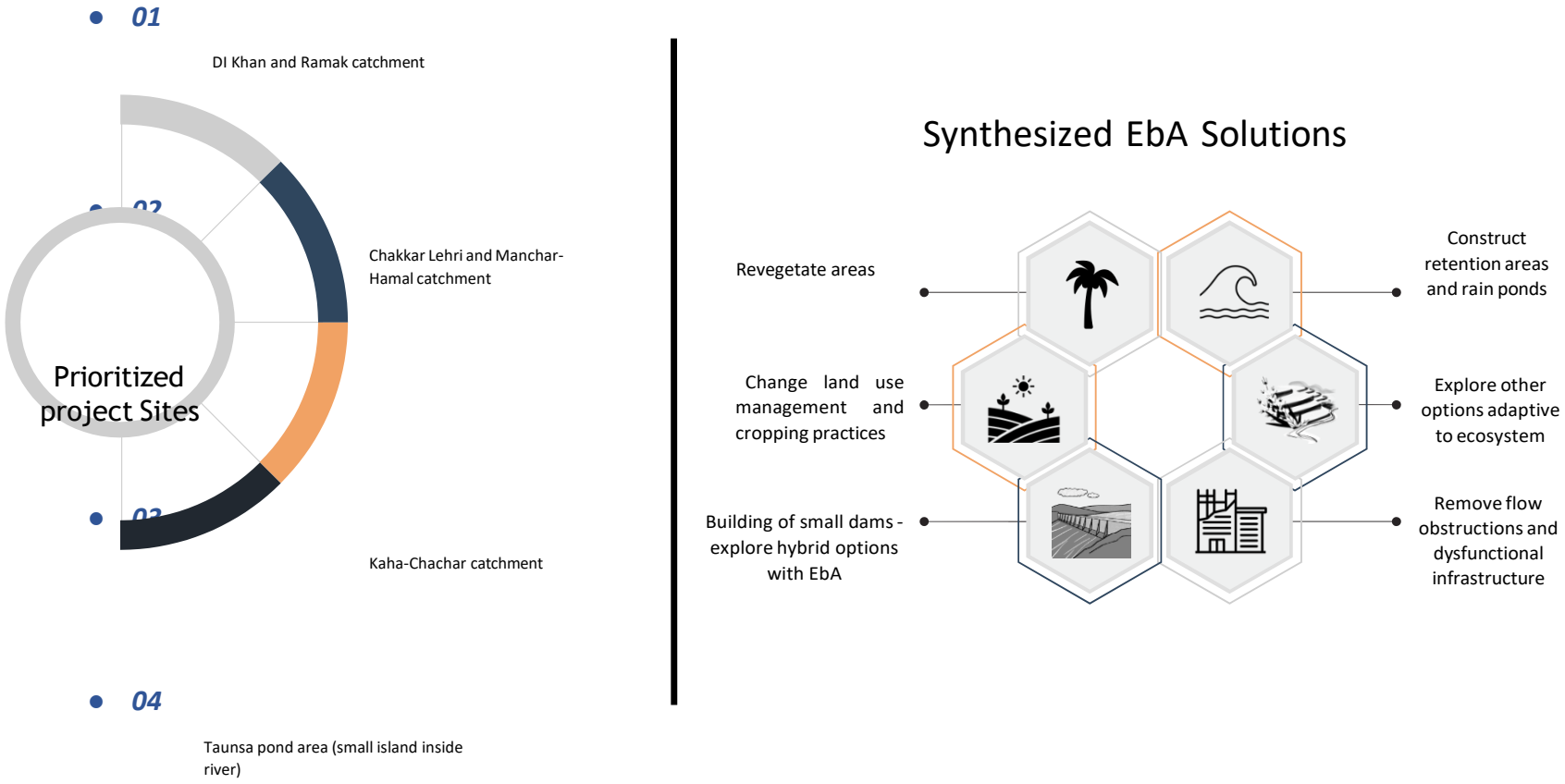

Figure 6.3: Prioritized project sites/areas (left) and feasible EbA interventions (right) for the improvement of socio-economic conditions in Pakistan through ecosystem-based adaptation.

- **REFERENCES**

Gray, B., Purdy, J. (2018). Collaborating for our future: Multistakeholder partnerships solving complex problems. Oxford university press, UK.

GCF (2019). Sustainability Guidance Note: Designing and ensuring meaningful stakeholder engagement on GCF-financed projects. Link.

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- **ANNEXURES**

- **Annex-A: Typical agenda of multistakeholder workshops**

Agenda – Multi-stakeholder Workshop

Recharge Pakistan

(Held at each provincial headquarter and federal capital)

Objective: To present, share and discuss the observations of field missions, modeling results, and initial assessments with the stakeholders to collect their contributions, thoughts, and consent. Moreover, brainstorming sessions, group works, and dialogue on sites and EbA-interventions for consensus.

Participants: Relevant stakeholders from provincial ministries/departments, public sector, private sector, academia, civil society organizations, WWF.

Organizer: WWF Pakistan.

Facilitators: WaterSprint, Pegasys.

Time	Description	Who
09:00—09:45	Registration + welcome tea/coffee	All, to be facilitated by WWF
09:45—10:00	Welcome note	WWF
10:00—10:20	Introduction of participants	All, to be facilitated by WSL
10:20—10:45	Introduction: Objectives of the workshop. Why this project? Why this concept? Why GCF? Why EbA?	WSL
10:45—11:30	Brief/presentation about project, project areas/sites + preliminary assessment/findings + selection criteria + briefing on Groupwork # 1	WSL
11:30—11:45	Tea break	
11:45—12:45	**Group work # 1 – Contribution to site Selection** **Group A:** Key bio/physical parameters and barriers for adaptation to climate change for both groups (hill torrents and lakes. **Group B:** Key socio-economic parameters and enabling factors for climate resilience for both groups (hill torrents and lakes).	Each group will be facilitated by a separate facilitator (WSL). Jeremy will join online for a short brief/discussion with participants.
12:45—13:00	**Group work # 1 – Contribution to site Selection** Presentation of each group in a plenary session	Each group will present its understanding, key findings, and recommendations.

13:00—14:00	Lunch break	
14:00—14:30	Introduction/presentation about EbA, key criteria/parameters to be considered + briefing on Group work # 2	WSL
14:30—16:00	**Group work # 2 – Contribution to EbA solutions/interventions** **Group A:** Hill torrent areas [re-vegetate areas, construct retention areas and rain ponds, change land use management, terracing, building small dams at local scale with community support, remove flow obstructions, etc.] **Group B:** Lakes [reduce pollution of inflow water, increase/maintain freshwater inflow, clean the water and sediment within lakes, helophyte/halophyte filters, artificial islands, increase flushing of the lake, etc.]	Each group will be facilitated by a separate facilitator (WSL).
16:00—16:15	**Group work # 2 – Contribution to EbA solutions/interventions** Presentation of each group in a plenary session	Each group will present its understanding, key findings, and recommendations.
16:15—16:30	Concluding remarks	WWF + WSL + PS
16:30—onwards	Tea, mingling and informal discussions	All

WWF – Worldwide fund for nature

WSL – WaterSprint

PS – Pegasys

- **Annex-B: List of stakeholders of the sub-national workshop of Punjab @ Lahore**

Sr. #	Name	Position	Organization	Contact #	Email ID
1	Jamshaid Fareed-Advocate	President	HELP Foundation Rajanpur	0333-9446363	jamshaid@helpfoundation-pakistan.org
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3	M. Qaisar Abbas	Community Member	HELP Foundation Rajanpur	0333-6116842	-
4	Malik Mohammad Saeed	Community Member	HELP Foundation Rajanpur	0300-7355684	-
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10	Dr. M. Nawaz Bhutta	Consultant	Rehman Habib Consultants	0300-4754050	Nawazbhutta04@gmail.com
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12	Saleha Ali	GIS Analyst	Water Informatics & Technology LUMS Lahore	0323-2588665	
13	Shahid Riaz	President	Helping Hands	0345-6789786	
14	Danial Shahid	Social Organizer	HH Rajanpur	0333-5042525	
15	Faiz Ahmad	Community Person	HH Rajanpur		
16	Ghulam Akber	Community Person	HH Rajanpur		
17	M. Pervaiz	UCDMC		0334-0727578	
18	S. Kousar	UCDMC		0333-8596919	
19	Syed Riaz Hussain	Chief conservator of forest	Punjab Forest & Wildlife Department	0300-8401025	
20	Javed Iqbal	Manager Progress	Doaba Foundation	0300-8607316	javed.iqbal@doabafoundation.org
21	Umar Waqas Liaqat	Researcher	International Water Management Institute Lahore	0300-3718989	
22	Dr. M. Javed	Director	Punjab Irrigation Department	0300-4250856	
23	Zaheer Abbas	Assistant Director	Punjab Mines and Minerals Department	0343-5536800	zaheer_abbas@mnm.punjab.gov.pk
24	Ijaz Kashif	Head PMO Barrages	Punjab Irrigation Department	0321-6801324	ijazkashif@msn.com

25	Saqib Jahangir	Deputy Director-WAPDA	Water and Power Development Authority	0333-7811677	SJKM-84@hotmail.com
26	Shakeel Ahmad	Director Technical	Project Monitoring Office-Canals Lahore	0301-8682357	
27	Fozia Parveen	Faculty	Water Informatics & Technology LUMS Lahore	0348-0001390	
28	Tariq Altaf	Ex. VP	National Engineering Services of Pakistan	0333-4262359	tariqaltaf@hotmail.com
29	Sajawal Bhatti	AD (M&E)	Project Monitoring Office-Canals Lahore	0335-4689877	sajawal.b@hotmail.com
30	Tanveer Ahmed	Deputy Director	Punjab Mines and Minerals Department	0333-4849606	
31	M. Javeid	DD (A&M)	Environment Protection Agency-Punjab	0333-4097258	
32	Zakir Sial	Director	Punjab Irrigation Research Institute-Lahore	0342-4549082	
33	Naeem Naz	Head Operations	Caritas Pakistan Lahore	0321-4928117	naeem@caritaslahore.org
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35	Faiza Shareef	Professor	Government College University-Lahore	0321-4000818	faizashareef@gmail.com
36	Imran Mughal	Director	Provincial Disaster Management Authority	0300-4235791	
37	Nisar Sani	Director ops	Provincial Disaster Management Authority	0343-9209201	

38	Tariq Masood	Add DG	Provincial Disaster Management Authority	0323-4444205	tariqfarooka@gmail.com
39	Sohail Babar	Director PR	Provincial Disaster Management Authority	0322-4666677	sohailbabar@gmail.com
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41	Muhammad Abid	Principal Advisor	WaterSprint Limited	0333-4712975	muhammad.abid@watersprint.io
42	Haseeb Zafar	Hydrologist	WaterSprint Limited	3074399881	haseeb.zafar@watersprint.io
43	Ajmal Rasheed	GIS Analyst	WaterSprint Limited	3059410120	ajmal.rasheed@watersprint.io
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45	Dr. M. Kaleemullah	Groundwater Hydrologist	WaterSprint Limited	0300-4216283	muhammad.kaleemullah@watersprint.io
46	Dr. Sarfraz Munir	COO/Hydrologist	WaterSprint Limited	0333-4340105	sarfraz.munir@watersprint.io
47	Dr. Shahid Ali	Hydrologist	WaterSprint Limited	0335-8295173	shahid.ali@watersprint.io

- **Annex-C: List of stakeholders of the sub-national workshop of KPK @ DI Khan**

Sr. #	Name	Position	Organization	Contact No	Email ID
1	Faisal Amin Khan Gandapur	Minister for Tourism	Government of KP	3345152307	
2	Khalid Mehmood	Additional Commission Revenue	Government of KP	3068792020	
3	Asad Imran	Director-Agri WWF	WWF-P	3324870640	
4	Naimat ullah Kundi	Assistant Commissioner-P	Government of KP	3321147111	
5	Dr Zia ud din Abro	Sr. Manager WWF	WWF Pakistan	3362760017	
6	Muhammad Ishaq	ADCC (F&D)	Government of KP	2219757607	
7	Omer Kundi	Tehsil Municipal Administration	DI Khan-Government of KP	3009098218	
8	Yadullah Khattak	Assistant Commissioner-Parora	DI Khan-Government of KP	3459087087	yadullahkhattak@gmail.com
9	Khalil Kundi	Sub-Divisional-WO	KP Forest & Wildlife Department	332800001	
10	Shahid Noor	District Forest officer	KP Forest & Wildlife Department	3455341640	

11	Khan Malook	District Forest officer	KP Forest & Wildlife Department	3339722121	malook@yahoo.com
12	Sadaqat ullah	Secretary to Commissioner	Commissioner DI Kahn	3471966352	
13	Musarrat Hussain Khan	District Education Elementary(M)	Elementary & Secondary Education	3459875147	
14	Mumtaz Khan	District Officer-Social Welfare	Social Welfare Department	3459785352	
15	Abdul Qayyum Khan	Director	KP Agriculture & Research Institute DI Khan	3459834445	
16	Habib-ur-rehman	Assistant Director	On-farm-water-management	3479808905	
17	Kirmatullah	Ac Kulachi	Government of KP	3009096012	
18	Hizbullah Khan	Deputy Director Admin	Agriculture Department-Extension	3139776330	
19	Amjad khan	Assistant to Faisal Amin	Government of KP	3339968001	
20	Tanveer Ahmed	Assistant Commissioner-(UT)	Government of KP		
21	Khurid Ahmad	Chairman Roda/Tehsil Nazim	Kulachi-Government of KP	3459870324	
22	M.Hashim Azeem	Assistant Commissioner-Paharpur	Government of KP	3400000011	
23	Azizullah Jan	Assistant Commissioner-Darazinda	Government of KP	3319922870	

24	Nawab Sameer	Assistant Commissioner-DI Khan	Government of KP	3333094266	
25	Syeda Anjum	District Education Officer (DEO)-(F)	Elementary & Secondary Education DI Khan	3339956711	
26	Amiqa Huma	District Education Officer (DEO)-(F)	Elementary & Secondary Education DI Khan	3320607901	
27	Muhammad Subhan	P. O	Local Government & Rural Development	3448757576	
28	Dilawar Khan	Assistant Director	Local Government & Rural Development	3459848903	
29	M. Faheem	Research officer	Provincial Disaster Development Authority	3329737678	
30		Personal Staff Officer (PSO)-Commissioner	Commissioner office DI Khan	3339971960	
31	Asmat Ullah	Sub-Divisional Officer	Communication & Works Department	3459891100	
32	Muhammad Abid	Principal Advisor	WaterSprint Limited	3334712975	muhammad.abid@watersprint.io
33	Haseeb Zafar	Hydrologist	WaterSprint Limited	3074399881	haseeb.zafar@watersprint.io
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- **Annex-D: List of stakeholders of the sub-national workshop of Sindh @ Karachi**

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5	Dr. Aneela Memon	Agri Engineer	Pakistan Agriculture Research Council-Tando Jam	3332722273	aneelahameem@gmail.com
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7	Shamsul Haq Memon	Former Secretary of Sindh	Government of Sindh	3008273626	
8	Nasir Ali	Social Safeguard Specialist	Sindh Resilience Project	3003079491	hapabhwar@gmail.com
9	M-Azam Palari	Member	KCN TV CABLE AND FIBER INTERNET	3137838238	Azampl2016@gmail.com
10	Syed Bachal Shah	Member	KCN TV CABLE AND FIBER INTERNET	3157378492	syedbachalshahkazmi@gmail.com
11	Abdul Ghafoor	Member	KCN TV CABLE AND FIBER INTERNET	3218271478	
12	Sajad Ali	Member	KCN TV CABLE AND FIBER INTERNET	3133542383	

13	Wali Muhammad	President	Child Development Organization-Sindh	3313589061	
14	Arz Muhammad	President	Sindh Development Forum	3113835842	arzmuhammad@gmail.com
15	Din Muhammad	President	Sukar Village Development Organization, Sindh	3013911021	
16	Ghulam Hussain	President	Maximum Development Organization-Khairpur	3063454191	
17	Vinod Kumar	Sr. Conservation officer	WWF Pakistan	3003354244	
18	Ashaque Soomro	Executive Director	Research and Development Foundation	3008376467	
19	Mehak Sikander	Senior Officer	WWF Pakistan	3352397291	msikandar@wwwf.org
20	Aihya Hasam	Intern	WWF Pakistan	3458949668	ayhahasam@gmail.com
21	Asad Hassan	I.T	WWF Pakistan	3342531298	
22	Uroosa Khatti	Manager	Sindh Rural Support Organization	3312158281	uroosakhatti@srso.org.pk
23	Dr. Kamran Ansari	Professor	US-Pakistan Center for Advanced Studies in Water - MUET	3368378743	
24	Riaz Ahmad Dooyo	Deputy Secretary	Sindh Agriculture Department	3343936487	
25	Rahmatullah	Assistant Director (Agri)	Agri Department	3337551931	

26	Muneeb Tariq	Coordinator	WWF Pakistan	3334115366	
27	Dr. Masood Arshad	Senior Director	WWF Pakistan	3006245555	
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30	Haider Waseem Butt	Research Associate	WWF	3423338777	
31	Muhammad Abid	Principal Advisor	WaterSprint Ltd	3334712975	
32	Haseeb Zafar	Hydrologist	WaterSprint Ltd	3074399881	
33	Ajmal Rasheed	GIS Analyst	WaterSprint Ltd	3059410120	

- **Annex-E: List of stakeholders of the sub-national workshop of Balochistan @ Quetta**

Sr. No	Name	Position	Organization	Contact No	Email ID
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2	Dr Faiz Kakar	Councilor	-	3337803453	faizkakar@yahoo.com
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4	Mohammad Akbar	Social Worker-Sibi	Free Lance	3368491235	
5	Sanaullah Jamali	Administrative Officer	Balochistan Agriculture & Cooperatives	3337804137	
6	Masood Ahmad	D.G Agriculture	Balochistan Agriculture & Cooperatives	3003885186	
7	Zahoor Bazai	DG-Q. A	University of Balochistan	3337939320	
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10	Imtiaz Ahmed	Deputy Project Director-Balochistan Water Resources Development Sector Project	Balochistan Irrigation Department	3327897008	
11	Anoosh Khan	Deputy Project Director-Balochistan Integrated Water Resources Management Development Project	Balochistan Irrigation Department	3003826245	anooshkhan@hotmail.com

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16	Munir Ahmad			3313231715	
17	Dad Muhammad			3333669241	
18	Alamjeer Khan			3327949674	
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22	Azam Kakar	Director	Balochistan Livestock Department	3337803175	
23	Nasrullah Khan	M & E Lead	Balochistan Integrated Water Resources Management Development Project	3337867131	
24	Ayub Machi	Community	Community	3337723255	

25	Jalal Khan Chandio	Community	Community	3342466210	
26	Mir Ayub	Community	Community	3337768239	
27	Syed Samiullah	Project Manager	Water, Environment and Sanitation Society Quetta	3337828549	
28	Wadera Sobdar	Community	Community		
29	Suboor Kakar	Secretary	Balochistan Environment Department		
30	Sharif-Ud-Din	CCWL Balochistan	Balochistan Forest & Wildlife Department	3343430849	
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35	Haseeb Zafar	Hydrologist	WaterSprint Limited	3074399881	haseeb.zafar@watersprint.io
36	Ajmal Rasheed	GIS Analyst	WaterSprint Limited	3059410120	ajmal.rasheed@watersprint.io

- **Annex-F: List of stakeholders of national workshop @ Islamabad**

Sr. #	Name	Position	Organization	Contact No	Email ID
1	Ahmed Kamal	Chairman	Chief Engineering Advisor/Federal Flood Commission		
2	Alamgir Khan	MCT	Chief Engineering Advisor/Federal Flood Commission		
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4	Shahzad Ali Khan	Chief (Water)	Ministry of Planning, Development & Special Initiatives		shahzad01@yahoo.com
5	Mushtaq Ali Shah		Pakistan Meteorological Department	9250365	
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8	Dr. Muhammad Faraz	Director	Space & Upper Atmosphere Research Commission	3222356545	
9	Abdul Rehman	Deputy Director-Drainage & Flood Zone	Punjab Irrigation Department	3337467740	rehman.malik18@gmail.com
10	Jamaluddin	Secretary	Sindh Irrigation	3337591572	
11	Zahoor Mhammad	Director Hydrology	KP Irrigation department	3009152983	zahoorm1000@gmail.com

12	Engr. Naseebullah	Executive Engineer-Irrigation	Irrigation Balochistan	3468363863	
13	Dr. Arshad Iqbal	Principal Scientific Officer	Pakistan Agricultural Research Council	3235017456	
14	Muhammad Asif Qaisor	Executive Engineer-WAPDA	Water and Power Development Authority	3469510991	asif_qaisor@yahoo.com
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24	Dr. Zia ur Rehman		Global Change Impact Studies Centre-Islamabad	3335575535	ziahashmi77@gmail.com

25	Dr. Naveed Iqbal	Director (hydrology)	Pakistan Council of Research in Water Resources	3004982668	
26	Dr. Hamza Farooq	Prof & HOD	National School of Civil Engineering, National University of Science & Technology Islamabad	3224590247	
27	Amman Najeeb	Assistant Director-DRRCIC	National Disaster Management Authority	3215184331	
28	Dr. Qazi Tauat		Chief Engineering Advisor/Federal Flood Commission	3335254170	
29	Ashok Kumar		Federal Flood Commission	9244628	
30	Ather Hameed		Engineering Associates (EA)	9244615	
31	Dr. Imran Khalid	Director Governance	WWF-Pakistan	3313589700	iskhalid@wwf.org.pk
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34	John-Paul Jaudel	Programme Manager	WWF-US		JP.Jaudel@wwfus.org
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Taking flood as an opportunity and finding possibilities to store surplus flood/rainwater into surface or subsurface space through increased recharge

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8. Appendix 2: Records of stakeholder consultations with community representatives

Stakeholders' engagement tools and design

multi-stakeholder's workshop

As discussed in Inception Report (2021), Focused Group Discussions (FGDs) were not possible to be carried out owing to COVID-related restrictions and strict government SOPs. However, field team managed meeting with the communities' members living in/around the project areas/sites and public-sector representatives and conducted Key Informant Interviews (KIIs) as agreed with the WWF-team before moving out to the field visits.

In align with our discussions with the WWF in the context of relaxed-SOPs, it has been planned to conduct multi-stakeholder sessions at each of the provincial capitals in the month of July 2021 for: (1) sharing the findings of pre-feasibility studies with the relevant stakeholders; (2) capturing their thoughts on the preliminary results; and (3) getting their contribution in regard to site selection and proposed nature-based solutions for the project areas/sites of Recharge Pakistan (refer to Appendix A for the agenda of multi-stakeholder workshops).

The data and information collected through both field missions (chapters 3 and 4) together with the global and satellite data (Inception Report, 2021), analysis of watersheds (chapter 5), initial hydrological and hydrodynamic modelling (chapter 7) and evaluation of potential NbS (chapter 8) in this report will inform and advance the next processes to be taken in the feasibility phase of Recharge Pakistan.

Stakeholder consultation meetings

Table 4.2 presents the summary of Key Informant Interviews (KIIs) and visual observations of project areas recorded by the field teams. The interviews were conducted between May 17— 25, 2021 during the field tour of project areas.

The next few pages show the photos of consultations with the stakeholders in the project areas.

Stakeholder consultations conducted between May 17 – 25, 2021 in project areas.

Dr Bakhsal Lashari (Professor Emeritus) in USPCAS-W, MUET, Jamshoro Sindh, expressing his views about flood risks of hill torrents in Sindh to Mr Abid (WSL) and Dr Zia (WWF), May 17, 2021.

Dr Rasul Bux Mehr, Director-USPCAS-W, MUET, Jamshoro Sindh, briefing watersheds and lakes situation in Sindh to Mr Abid (WSL) and Dr Zia (WWF), May 18, 2021.

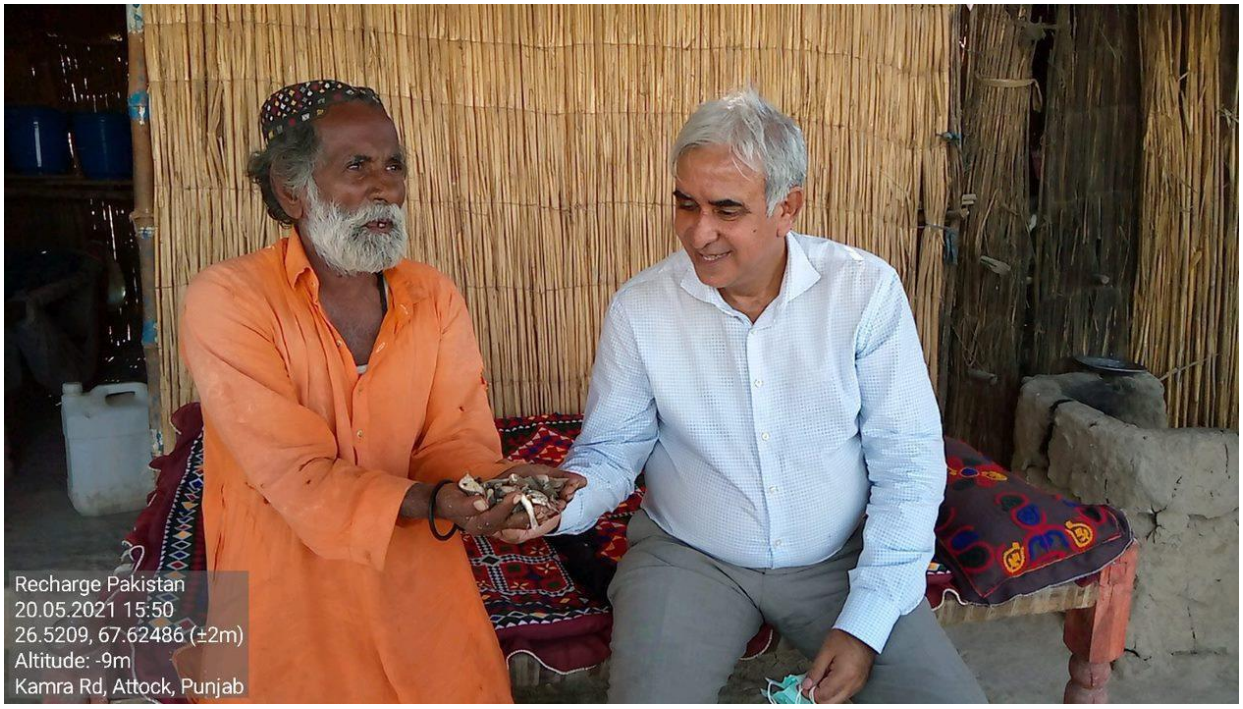
Mr Abid (WSL) and Dr Ziaudin (WWF) with the faculty Dr Rasul Bux (USPCAS-W), Dr Kamran Ansari (USPCAS-W), at UPCAS-W, MUET, Jamshoro

Sindh - May 18, 2021.

Dr Abdul Fateh Somro (Director), University of Sindh, expressing his views about socio-economic conditions in hill torrents of Sindh to Mr Abid (WSL) and Ms Humera Qasim (WSL), Jamshoro - May 18, 2021.

Mr Abid (WSL) in discussion with Mr Haji Ghulam Rasul (Community Activist), about Chotiari Reservoir's environment issues, Sanghar, Sindh - May 19, 2021.

Mr Abid (WSL), Dr Ziauddin (WWF) and Mr Mushtaq (community activist) discussing the potential of watersheds d/s Nai Gaj Dam (under construction), near Qasbo Village, district Dadu, Sindh - May 20, 2021.



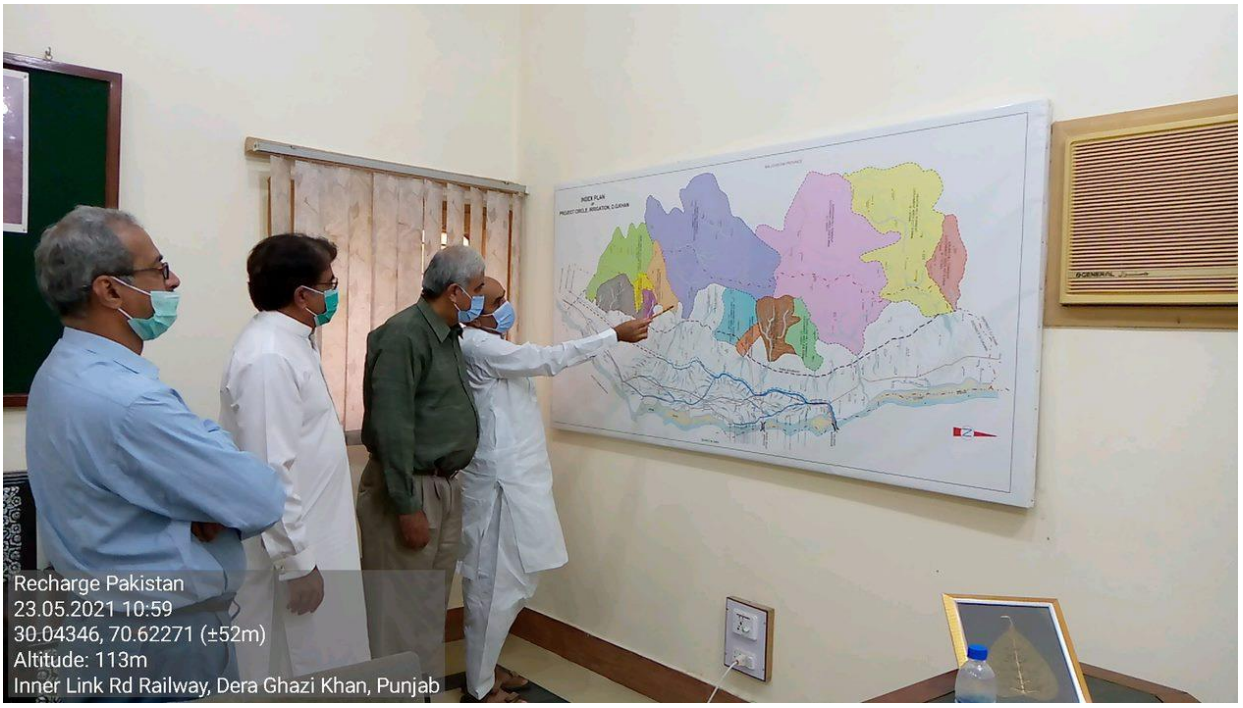
A community member showing their only source of livelihood (fish), to Mr Abid (WSL), during an interview with MOHANA tribe, at Manchar Lake, district Jamshoro, Sindh - May 20, 2021.

MOHANA tribe community children curiously watching the interview being held with their elders at Manchar Lake, district Jamshoro, Sindh - May 20, 2021.

Mr Akbar Solangi (Community Activist) briefing the visitors, Mr Abid (WSL and Dr Zia (WWF) about the potential sites in Chakar Lehri Watershed, district Nasirabad, Balochistan - May 21, 2021.

A group of community members-village Matt Kund (Kaha hill torrent), expressing their views of desired interventions to Mr Abid (WSL) and Dr Zia (WWF), district Rajanpur, Punjab, May 22, 2021.

Mr Abid (WSL) and Dr Zia (WWF) taking brief notes of Kaha/Chachar hill torrents from Mr Zafar (SE-PID), Mr Faiz (SDO-PID) at Project Circle Office Punjab Irrigation Department, DG Khan, Punjab - May 23, 2021



Mr Faiz (SDO-PID) and Mr Zafar (SE-PID) briefing the flood devastations of Kaha/Chachar hill torrents to Mr Abid (WSL) and Dr Zia (WWF), PID office- DG Khan, May 23, 2021

Mr Zafar Hussain (SE) highlighting significant features of Kaha/Chachar hill torrents to Mr Abid (WSL), Dr Zia (WWF) and Mr Faiz (SDO), DG Khan, May 23, 2021.

Mr Abid (WSL) and Dr Zia during an interview session with Rodh Kohi Flood Bund Division Engineers, Mr Inayat Ullah (sub-engineer-KP irrigation) and Mr Khawar Naveed (SDO-KP irrigation department), KP Irrigation Department, DI Khan, May 24, 2021.

A group of community members expressing their views about potential sites at Isa Khel hill torrents to Mr Abid (WSL), district Mianwali – Punjab - May 25, 2021.

Table 4.2: Summary of Key Informant Interviews (KIIs) and field observations.

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
Isa Khel	Muhammad Sarfraz (Sub- engineer, Punjab irrigation department) Kaleemulllah (Gauge reader, Punjab irrigation department)	KII at Jinnah Barrage, Daud Khel, Punjab KII at Isa Khel, Punjab	May 24, 2021 May 25, 2021	Record public-sector views regarding Isa Khel watershed. • Identify possible interventions for protection or water storage either in the main watershed or floodplain area near to the main road. • Possibility of any NbS interventions in the watershed or floodplain area.	• Government representatives were of the view that Isa Khel watershed does not offer much good sites for water conservation. • Main five streams of watershed carry huge sediment load before their merger with the Indus River basin at its right bank. • Chapri dam is under-construction in Chichali sub-watershed, which eliminates the need of any further water conservation or NbS interventions in Isa Khel watershed.	• Five main streams of Isa Khel fall in the right bank of the Indus River. • All main streams of Isa Khel watershed carry huge sediment load, which makes the possibility of intervention a difficult proposition. • Entire area is highly cultivated, and the streams are nearly choked before they fall into the right bank of the Indus River. • During field visit, no appropriate site was found suitable for NbS interventions.
DI Khan	Khawar Naveed (Sub-divisional officer, Rodh Kohi flood bund division, KPK irrigation department)	KII at DI Khan, KPK	May 24, 2021	• Record public-sector views regarding watersheds in DI Khan. • Possible intervention, adaptation with floods, protection or water storage in	• Government officials were of the view that DI Khan area offers a few water conservation sites in its watershed.	• Tank Zam watershed has rocky formation where a dam is under construction, and we do not find any other suitable site for NbS interventions.

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
	Inayatullah Khan (Sub-engineer, Rodh Kohi flood bund division, KPK irrigation department)	KII at DI Khan, KPK	May 24, 2021	main watershed or floodplain areas. • Possibility of any NbS interventions in above watershed or floodplain areas. • Any sort of retention or other possibilities.	• Emphasize to intervene in floodplain sites on the south-west of small watersheds for water storage. • A dam was under- construction in the Tank Zam watershed for drinking purposes.	• Watersheds in south-west of DI Khan watershed contain a few suitable project sites where sub-watershed can be delineated to determine the possibility of NbS interventions.
Ramak	Khawar Naveed (Sub-divisional officer, Rodh Kohi flood bund division, KP irrigation department) Inayatullah Khan (Sub-engineer, Rodh Kohi flood bund division, KP irrigation department) Faisal Amin Gandapur	KII at DI Khan, KPK KII at DI Khan, KPK KII at DI Khan, KPK	May 24, 2021 May 24, 2021 May 20, 2021	• Government official's views were taken regarding watersheds in Ramak. • Possible storages in main watershed or floodplain area. • Possibility of any NbS interventions in above watershed or floodplain area. • Construction of small dams or surface or subsurface storage within the project area.	• Government representatives informed that the water table is high owing to the river and a canal on both ends of project area and the possibility of recharge to the aquifer is difficult nor required, as subsurface space is limited. • Sweet water does exist between the area of CRBC canal and the Indus River of the Ramak watershed, and project area is highly irrigated and suitable for good crop production.	• Ramak area contains many flood carrying channels which discharge their flows to the right bank of the Indus River. • Entire area is highly fertile and cultivated and is sandwiched between CRBC canal and Indus River. • We do not find any possibility of NbS interventions in this project area.

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
	(Minister for Agriculture), Member Provincial Assembly, KP Khizar (Farmer and Contractor), KP Province.	KII at DI Khan, KPK	May 20, 2021		• No need of any water conservation or NbS interventions, as we do not suffer from water shortage.	
Kaha	Zafar Husain (Superintending engineer, Project Circle, DG Khan zone, Punjab irrigation department) Qazi Faizul Hassan (Sub- divisional officer, Jampur Construction division, Project Circle, DG Khan zone, Punjab irrigation department)	KII at DG Khan, Punjab KII at Kaha/Chachar hill torrents, district Rajanpur, Punjab	May 23, 2021 May 23, 2021	• Government views were taken regarding Kaha/Chachar watersheds. • Explore the possibilities of any NbS interventions from climate rational in the main watersheds and their floodplain areas. • Role of WAPDA dam in the mainstream of Kaha/Chachar watersheds. The havoc created due to flashy floods with respect to communities and possibilities to fill the gaps were also discussed.	• Irrigation department who is responsible to safeguard the vulnerable communities of Kaha/Chachar catchment from hill torrents supported the field visit team's views to intervene in multiple locations within the project areas. Those areas which have been visited and marked for further investigations. • Based on their experience of hill torrents in the area and from the perspective of accessibility to sites, they suggested some sites that exist in the floodplains of Kaha and Chachar hill torrents,	• NbS interventions in the main Kaha/Chachar watersheds might get hindered due to WAPDA's proposed dam. • Feasible project sites for NbS interventions are more suitable in the floodplains of Kaha and Chachar watersheds. • Floodplain watersheds of Kaha and Chachar need to be delineated at the downstream of the proposed dam sites. • Small-to-medium sized watersheds can easily be

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
	Safdar Mastoye (Sub-engineer, Jampur Construction division, Project Circle, DG Khan zone, Punjab irrigation department)	KII at Kaha hill torrent, district Rajanpur, Punjab	May 22, 2021		very close to their drainage points. • Dams at Kaha and Chachar mainstreams are being proposed by WAPDA.	delineated to capture rain/flood water or inflows to developing small/medium- sized reservoir/pond in the flood plain areas of both hill torrents.
	Raja Nasir (Sub-engineer, Jampur Construction division, Project Circle, DG Khan zone, Punjab irrigation department)	KII at Kaha hill torrent, district Rajanpur, Punjab	May 23, 2021			
	Kaha Watershed Farmers community (Bashir Ahmad, Kaleem Ullah, Yar Muhammad, Muhammad Esa, Mian Faiz Karim,	KII at Kaha hill torrent, district Rajanpur, Punjab	May 22, 2021			

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
	Abdul Karim, Zari Khan, Shah Nawaz, Qadir Bux, Meer Khan, Shafi, Ali Muhammad) Chachar Watershed Farmers community (Zia Ullah, Ghulam Nabi, Aman Ullah, Basheer Ahmad, Muneer Jhangar, Abdul Majeed, Inam Ullah, Sulaiman, Bilal, Ghulam Haidir Shah)	KII at Chachar hill torrent, district Rajanpur, Punjab	May 22, 2021			
Chakkar Lehri	Akbar Solangi (Community activist)	KII at Bakhtiarabad, Nasirabad district, Balochistan	May 21, 2021	• Views of local community about the existence of watersheds in their local area. The intensity of floods, climate variability, etc.	• Local community activist was of the view that small watersheds do exist in the vicinity of Bakhtiarabad. • Community activist was of the view that small storage ponds	• Watersheds need to be delineated in the main Chakkar Lehri watershed. • Medium sized reservoirs/ponds need to be suggested as the

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
				• An idea that whether local watersheds can generate enough flows for water conservation into small-to-medium ponds to increase recharge • Does wildlife or migratory birds exist in this area?	could be built in/around this locality. • Wildlife and migratory birds were hardly seen in this area.	evapotranspiration rate in the watershed is very high. • Specific NbS interventions will be required to reduce the climate variability and for sustainable production.
Manchar lake	Mushtaq (Community activist) Shahpassand (Community activist) Ali Asghar (hotel owner) Amanullah (Farmer)	KII at the banks of MNV drain, which falls into the Manchar lake, districts Jamshoro and Dadu, Sindh KII at Qasbo, District Dadu, Sindh KII at Wahi Pandi, District Dadu, Sindh KII at Tando Rahim Khan,	May 20, 2021 May 20, 2021 May 20, 2021 May 25, 2021	• Reasons of deterioration of water quality at Manchar Lake over the last few decades. • Wildlife and aquaculture existing position in the lake. • Livelihoods of the community living around the lake.	• Manchar Lake watershed generates enough freshwater, but the net inflow is considerably reduced due to the various built infrastructures between the watershed and the lake. • Owing to water contamination, wildlife in the Manchar Lake has significantly been reduced since the last 2- 3 decades. • Aquaculture in Manchar Lake is still surviving despite heavy contamination. As out of 200 species of fish, only 7-8	• Manchar Lake presents a dead look due to heavy intake of MNV drain effluents. • Fish caught from the lake is too dangerous even to be given as feed to the poultry and for human consumption. • The injection of freshwater (by suitable interventions) in the lake can bring back migratory birds to the Manchar Lake.

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
	A few poor fishermen residing at the Manchar Lake	District Dadu, Sindh KII at Manchar Lake, District Jamshoro, Sindh	May 20, 2021		types are still surviving whereas the size of fish is now too small. • Small-size fish from Manchar Lake is transported to Karachi factories and is turned into feed for the poultry. • Being contaminated, this fish is not good for human consumption.	
Haleji and Hadero lakes	Dr Bakshal Lashari (Professor Emeritus, USPCAS-W-W, Mehran University of Engineering and Technology, Jamshoro, Sindh) Dr Muhammad Rasul Bux Mehr	KII at USPCAS-W, Mehran University of Engineering and Technology, Jamshoro, Sindh KII at USPCAS-W, Mehran University of	May 17, 2021 May 18, 2021	• Existing position of freshwater inflow into Haleji Lake from its watershed and abandoned canal. • Current survival of wildlife in Haleji Lake. • Freshwater inflow into the watershed of Hadero Lake. • Prevailing aquaculture and wildlife in Hadero and Haleji Lakes.	• Freshwater inflow into Haleji Lake from the canal is abandoned due to Jamwah canal non-maintenance and as its water is now being supplied to Karachi. • Hadero Lake watershed generates low volume of freshwater to feed the lake. • Aquaculture life is dead in Hadero Lake due to high salinity in its water.	• Haleji Lake is still surviving but might receive more freshwater deficits in future. • Haleji Lake reduced inflow from its watershed needs to be investigated for its quality and quantity. • Haleji Lake outlet structure and intake Jamwah canal are in total deteriorated condition and need to be repaired/functional to face any emergency situation.

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	(Director, USPCAS-W-W, Mehran University of Engineering and Technology, Jamshoro, Sindh)	Engineering and Technology, Jamshoro, Sindh			• Wildlife in Haleji Lake is still surviving, i.e., fish, crocodiles, turtles, hog deer, migratory birds etc.	• Hadero Lake watershed is too small to provide freshwater inflow. Whereas interconnectivity with Keenjhar Lake or directly from Indus River as freshwater intake can revive it for aquaculture and migratory birds.
	Dr Kamran Ansari (Professor, USPCAS-W, Mehran University of Engineering and Technology, Jamshoro, Sindh)	KII at USPCAS-W, Mehran University of Engineering and Technology, Jamshoro, Sindh	May 18, 2021			
	Dr Muhammad Latif Qureshi (Professor, USPCAS-W, Mehran University of Engineering and	KII at USPCAS-W, Mehran University of Engineering and Technology, Jamshoro, Sindh	May 18, 2021			

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
	Technology, Jamshoro, Sindh) Community persons living in the vicinity of the Haleji-Hadero lakes	KII held at the banks of Haleji-Hadero lakes, district Thatta, Sindh	May 18, 2021			
Nara Deh Akro and Chotiari	Zulifkar Kunbhar (Environment journalist) Nawaz (Environment activist) Ali Jan (Watchman) Haji Ghulam Rasul. (Community activist)	KII at Sanghar city, Sindh KII at Sanghar city, Sindh KII at Chotiari reservoir/dam in district Sanghar Sindh KII at Chotiari reservoir/dam in district Sanghar Sindh	May 19, 2021 May 19, 2021 May 19, 2021 May 19, 2021	• Current views of local community and environmentalist regarding Chotiari reservoir/dam situation. • Waterlogging and salinity position downstream, around the reservoir/dam. • Existing wildlife and aquaculture situation after construction of reservoir.	• Community considered Chotiari reservoir as an environmental disaster, as this deteriorated their areas. • Waterlogging and salinity have appeared at reservoir's downstream area and have severely damaged farmer's agriculture lands. • People wished to get rid of this unusual environmental degradation by using any means.	• Waterlogging and salinity issue seem to be quite dominant in/around the Chotiari reservoir. • Tubewells which were planned to be installed in/around the reservoir may reduce the waterlogging and salinity issues for the agriculture farms. • Chotiari complex is composed of a very big reservoir spreading in/around 18,000 Ha whereas 6-7 "Baqar" lakes are around it. This wetland complex was not properly designed, which has now created an

Project area	Stakeholder	Interview held at	Date	Agenda of meeting (Key points)	Summary of information	Summary of field team visual observations
						unwanted situation in the local area. • NbS interventions can be provided around these water bodies, but they may affect the original purpose of the complex which stores the surface water. This requires careful deliberations with the most relevant stakeholders of this project area.

Outcome of mapping and consultations

Based on literature review, existing initiatives (Inception Report, 2021), roles, responsibilities and interests and contributions of relevant stakeholders (Table 4.1), we derive the following insights:

- Many actors with similar and overlapping mandate and responsibilities coexist.
- Roles and responsibilities overlap between the federation and provinces. After 18th constitutional amendment: although devolution is completed, yet provincial departments do not function well to take their responsibilities efficiently. Moreover, rules and regulations exist and promulgate, yet their enforcement and implementation require time and efforts.
- The funds of donor sector and international bi/multi-lateral cooperation need to be efficiently utilized through the coordinated efforts of all sectors to avoid the double work.
- The Ministry of Climate Change is quite new and requires many years to develop to initiate projects of significant value. However, its role to promote projects allowing stakeholders to reduce the GHG-emissions, adapt and mitigate the climate-related disasters and ultimately contribute to reduce the NDC are some of the remarkable achievements to be appreciated.

The above insights will inform the project team while coordinating and establishing the strong synergies with the relevant stakeholders.

The outcome of the consultation with stakeholders is summarized herewith as:

- **Isa Khel.** The floods in the identified watersheds of Isa Khel are fast flowing and carry huge sediments load due to mining activities in all of its sub-watersheds. Stakeholders do not show any interest for possible interventions.
- **DI Khan.** The floods in the identified watersheds need to be studied for dry and peak flows. Spilled and flood water in sub-watersheds can be conserved in small reservoirs and ponds. NbS interventions like gully formation, stone check terracing with good vegetation can be introduced. NbS interventions will supplement to increase the resilience of project area against climate change related issues. Refer to chapter 8 for NbS.
- **Darya Khan — Ramak.** The floods in the identified watersheds are channelized through flood carrying channels by the public sector, which eliminate the need of any immediate interventions. The area is fertile with sufficient groundwater and does not require any intervention.
- **Kaha.** NbS interventions in the main Kaha watershed might get hindered due to WAPDA's proposed dam. Feasible project sites for NbS interventions are more suitable in the floodplains of Kaha and Chachar watersheds. The peak-flows volume fluctuates in discharge pattern and found erratic, which needs to be impounded in reservoirs and/or ponds. Topography of watershed is generally barren and have very limited vegetation cover. NbS interventions are required to accommodate dry and flash flood events in

small reservoirs and ponds. Vegetative cover needs to be increased in the vicinity of possible interventions to attract wildlife and migratory birds. Refer to chapter 8 for NbS.

- **Chakkar Lehri.** Local community was of the view that small watersheds can be traced out in the vicinity of Bakhtiarabad, where NbS-interventions can be provided. Potential solutions are green and grey which can be defined based on the general problems in the identified watersheds of Chakkar Lehri.
  - Re-vegetate the sub-watershed.
  - Introduce interventions like retention or rain ponds.
  - Change the management of land use and existing cropping practices.
  - Stone terracing may be introduced to check erosion.
  - Remove flow obstructions and dysfunctional infrastructure.
- **Manchar Lake.** It has been suffering from water quality issues. Due to the construction of the Main Nara Valley (MNV) drain — connecting the lake to Hamal Lake — sewage inflow has deteriorated the original water quality significantly. The salinity also increased in it due to saline [runoff] water from the agricultural fields of Balochistan. Owing to climate change, constructed obstructions between the lake and foot of hills (originating torrents) and splitting/diversions of streams, run-off reaching to the lake is reduced significantly. The lake used to be the home a variety of fish and migratory birds, but these numbers have fallen considerably due to the lake's contamination. It was an important freshwater source for irrigation and for the livelihood of the Mohana tribe, who depended on fishing. Currently, the water quality is so bad, that it is not potable anymore. Lake Manchar is also an important historical area — home to several archeological sites. To improve the water quality of lake, following four interventions can be considered:
  - Reduce pollution in the inflow water.
  - Clean the water and sediment within the lake.
  - Increase flushing of the lake.
  - Positive results can only be achieved when Main Nara Valley (MNV) drain will completely be decoupled from the Manchar Lake.
- **Haleji and Hadero Lakes.** Inflow to Haleji Lake may be increased either through watershed flows or revival of existing abandoned Jamwah canal. Deteriorating water quality of Haleji lake is also a big question mark for the stakeholders. Stakeholders' interest in Hadero Lake are to convert it from saltwater to freshwater, increase vegetation around it and enhance the fishery in it. Refer to chapter 8 for detailed discussion.
- **Nara Deh Akro and Chotiari.** Stakeholders considered Chotiari reservoir as an environmental disaster, as it deteriorated their agricultural fields. Water table in the vicinity of reservoir is high and stakeholders' interests are to lower it either through the vertical drainage or close the reservoir and associated infrastructure so that they (communities living around) could keep their areas environment-friendly and lands fertile for crop production. Refer to chapter 8 for detailed discussion.