

E2272



**Punjab Barrages Improvement  
Phase II Project**

**Executive Summary**

**Environment and Social  
Impact Assessment  
and  
Action Plans**

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**Project Management Office**

**Irrigation and Power  
Department**

**Government of the Punjab**



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## Acronyms

BHU	Basic Health Units
CBO	Community based organization
Cfs	Cubic feet per second
EA	Environmental Assessment
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EPA	Environment Protection Agency
ESMDP	Environmental and Social Management and Development Plan
ESS	Environment and Social Supervisor
GRC	Grievance Redressal Cell
GRM	Grievance Redressal Mechanism
HSES	Health, Safety, Environment and Social
IEE	Initial Environmental Examination
IBIS	Indus Basin Irrigation System
IPD	Irrigation and Power Department
LAA	Land Acquisition Act
MNA	Member National Assembly
MPA	Member Provincial Assembly
M&E	Monitoring and Evaluation

NEQS	National Environmental Quality Standards
NRSP	National Rural Support Program
OP	Operational Policy
PAP	Project Affected Person
PHED	Public Health and Engineering Department
PIC	Project Implementation Consultants
PMO	Project Management Office
PRSP	Punjab Rural Support Program
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDAP	Social Development Action Plan
SFA	Social Framework Agreement
TDS	Total dissolved solids
WAPDA	Water and Power Development Authority
WB	World Bank
WWF	Worldwide Fund for Nature

# 1 Introduction

The Government of Punjab is planning to undertake the Punjab Barrages Improvement Phase-II Project (PBIP-II), and is seeking the World Bank (WB) finances for this purpose. In compliance with the Pakistan's statutory requirements and the WB safeguard policies, an Environmental and Social Impact Assessment (ESIA) study of the proposed project has been carried out. In addition, a Social Development Action Plan (SDAP) has been developed, to address the social issues of the project to a greater depth. This document presents the summary of ESIA and SDAP; the complete versions of ESIA and SDAP are presented under separate covers. The ESIA and SDAP will be collectively referred to as the Environmental Assessment (EA) studies in the rest of this document.

## 1.1 Project Description

The proposed project involves rehabilitation and modernization of the Jinnah Barrage<sup>1</sup>, and improvement and modernization of the irrigation and water management system in the Punjab province.

The Jinnah Barrage is located at 32° 55.1846' North and 71° 31.1812' East across the Indus River, approximately 5 km south of the town of Kalabagh in the Mianwali District of Punjab, Pakistan (see **Figure 1.1**). The area irrigated by the Barrage is spread over the Mianwali, Khushab, Bhakkar, Layyah, and Muzaffargarh districts.

### 1.1.1 Background

**Jinnah Barrage Rehabilitation and Modernization.** Commissioned in 1946, the Jinnah Barrage is one of the most important structures in Pakistan's irrigation system, handling all the Indus river water. Although it has a design discharge capacity of 950,000 cubic feet per second (cfs) corresponding to a 100 year return flood, it is able to handle a flow of 1.1 million cfs, corresponding to a 600 year return flood. There is only one off-take canal – the Thal Canal, which supports agriculture on 2.1 million acres of land in the Mianwali, Khushab, Bhakkar, Layyah, and Muzaffargarh districts of the Punjab province. These districts are situated in the Thal (desert) arid zones where crop production without irrigation can support only subsistence living. About five million people in the five districts inhabit the command area and their livelihoods depend directly or indirectly on the irrigation supplies of the Thal Canal. Roughly 695,000 people derive their livelihoods directly from the irrigation supplies of the Canal. The Canal also recharges the aquifers from which water is pumped to meet water requirements during critical periods. The Canal water is also used for drinking purpose, cattle consumption, and domestic uses in the entire command area. Most significantly, it is the lifeline in 120,421 acres in the Mohajir Branch canal command where the underground water is saline and a population of nearly 328,000 people in 94 villages is totally dependent on the canal water for drinking purpose and crop production.

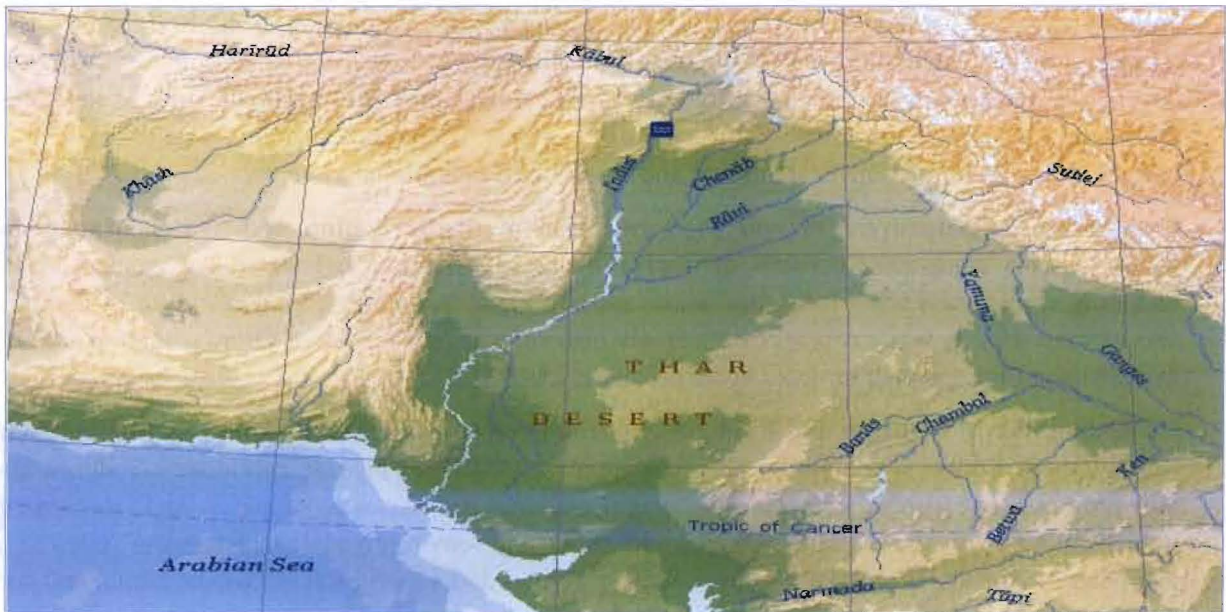
Some defects developed in the mechanical installations and working of the gates of the Barrage, and were repaired during 1992-93. In 1998, the Irrigation and Power Department (IPD), Government of Punjab, reviewed the condition of all the barrages in the province and identified Jinnah Barrage as a priority project for rehabilitation and modernization. Subsequently, a number of studies were carried out to determine the condition of the Jinnah Barrage which identified functional and structural problems. Consequently, in December 2003, the Punjab Government commissioned the feasibility

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<sup>1</sup> The Barrage is named after the founder of Pakistan, Muhammad Ali Jinnah.

study for the rehabilitation and modernization of the Jinnah Barrage. The study confirmed the existence of some serious hydraulic and structural problems at the Barrage.

**Figure 1.1: Project Location**



In 2005, the Pakistan Water and Power Development Authority (WAPDA) finalized the agreement for construction of the Jinnah Hydropower Plant on the right flank of the Jinnah Barrage. The contractor for the construction of the Hydropower Plant under the agreement for the Power Plant will also modernize and automate 14 of the 56 gates of the Jinnah Barrage. The rehabilitation and modernization of the remaining gates of the Jinnah Barrage will be carried out based on the actual survey conducted and design prepared by the design consultants during the proposed project.

**Improving Water/Irrigation Management.** Punjab covers about 60 percent of the Indus Basin Irrigation System (IBIS), and has a complex river and link canal system. Despite of this, water allocation and management in various parts of the system is carried out using hand calculations, including estimation of demands and pattern of releases from the reservoirs. Also, there is no well established and integrated system of water accounting in various parts of the system i.e. at barrages, rivers, link canals, main/branch canals, and distributaries etc. Instrumentation used for measuring water, sediments, cross-sections of the river and canals are outdated and in many cases hand held staff gauges are used. Punjab needs to modernize its water allocation and management system and water accounting system with modern simulation and optimization models and decision support system. The accounting system being initiated by the Punjab Monitoring and Implementation Unit (PMIU) needs further updating and development.

### 1.1.2 Project Components

The proposed project comprises four components, which are discussed below.

**Component A: Jinnah Barrage Rehabilitation and Modernization.** The rehabilitation and modernization measures at the Jinnah Barrage would consist of: (i) a subsidiary weir 600 feet (183 m) downstream of the Barrage main weir to address retrogression and ineffective energy dissipation problems; (ii) repairs to the barrage floor, impact and friction blocks, and guide banks; (iii) extension of downstream guide walls; (iv) alteration to the main Barrage structure, including extension of

abutments and downstream divide walls; (v) replenishing deficient apron downstream of the existing Barrage; (vi) construction of river training works upstream to improve river approach towards the Barrage; (vii) renovation of the Barrage gates and hoist system, and automation of gate operation; (viii) construction of fish ladders; (ix) installation of bulkhead guiders at piers abutments and walls for bulkhead gates; (x) construction of jetty for bulkhead gates; (xi) upgrading of the Barrage monitoring system and basic operation and maintenance facilities; (xii) construction of temporary diversion channel; and (xiii) construction of coffer dams on the downstream and upstream sides of the gates to allow carrying out construction of the subsidiary weir. These modifications would secure a safe barrage structure for passing design flood and modernized operational system.

**Component B: Improvement and Modernization of the Irrigation and Water Management System.** This component consists of improvements in irrigation and water management systems including capacity building for better water allocation and accounting, modernization of equipment and services used in water management. It will also support preparation of future irrigation and water management improvement projects in the province.

**Component C: Monitoring and Evaluation of the Project Impact and Social and Environmental Management Plans.** The monitoring and evaluation (M&E) to provide continuous feedback about the progress and status of project implementation; performance, impacts and to supervise implementation of the overall social/resettlement and environmental management plans. An independent consultant will carry out the M&E activities and supervision of environmental and social development actions plans.

**Component D: Project Management Coordination Technical Assistance and Training.** This component will support the Government in implementing the project by coordinating all project related activities and provide technical assistance and training.

### 1.1.3 Project Construction

Most of the construction activities during the proposed project will be confined to the river corridor; however the following project activities/facilities will be located outside this corridor:

- The project and construction camps, labor camp, equipment and material yards, and additional depots.
- Construction of haul tracks in order to transport construction material.
- Batching plants.
- Borrowing areas for obtaining earth, sand, coarse aggregates, and stone for rip-rap.

The locations for the above facilities have already been identified at the project site.

**Meeting Water Demand Downstream of the Barrage.** Water flows downstream of the Barrage cannot be interrupted during construction as flows going downstream supply water for almost whole of IBIS, covering Punjab, Sindh and Balochistan. Construction is to be done in a manner so that flows to the Thal Canal (off-taking from the Jinnah Barrage) are not compromised. For this purpose, PMO and the Design Consultants carried out hydrological analysis to determine the river flows required/observed for systems downstream from the Jinnah Barrage as well as for the Thal Canal. Data from 1998-2007 on 10-daily basis was used for carrying out this analysis.

Based on this analysis, a decision has been taken to design the coffer dams (called temporary works) to allow passing a maximum discharge of 250,000 cfs downstream that is determined to be adequate for meeting the downstream water requirements. The crest levels of the cofferdams upstream and downstream is determined based on this discharge, and the strength of the coffer dams would be

designed accordingly. This discharge could easily be passed through 45 percent of the available width of the Barrage; hence, sequence of construction and repairs to the gates is determined accordingly.

**Flow to the Thal Canal during Construction Period.** The Thal Canal is a perennial canal i.e. it has the right to draw water in both seasons of the year, winter (*Rabi*) and summer (*Kharif*). As the winter supplies to the Canal and to the river are lower than the summer, the construction would be concentrated during the winter months. Accordingly, winter flows are analyzed here. The official and regular closure for Thal Canal is three weeks, during which no water is supplied to the Canal and inspection and maintenance of the key structures of the canal are carried out. This three-week closure is generally scheduled during winter season in the month of January; however, its timing varies from year to year depending upon the forecast of availability in the river system and some other factors.

**Construction Planning and Sequencing of Works.** The construction is planned to be completed in four calendar years (also called contract years) and three construction years. The construction would be concentrated from October-May/June and the period between the months of June to September when river flows would be high would be used for preparation for the following construction year. The contract has to be awarded in a manner that that contractor is mobilized in May i.e. before first year of construction (October to June). In the first year, construction would be carried out on the right side of the barrage covering gates 27 to 56 (the Barrage has 56 gates and they are numbered 1 to 56 starting from the left to the right bank). The coffer dams would be constructed in winter to secure, cordon and de-water the construction area. The construction would be completed in this section by May of the following year and the coffer dams would be dismantled by end May early June to allow summer flows to pass. The same cycle would be followed on the left side in the winter of second year till summer of the third year. In the winter of the third year gate Number 1 of the Barrage which is close to the Thal Canal would be rehabilitated during the normal canal closure period of three weeks. The detailed sequencing is given in **Table 1.1**, and a schematic diagram of the construction works is given in **Figure 1.2**.

**Table 1.1: Construction Planning and Sequencing of Activities**

Coffer Dam*	Construction Dates	Removal Dates	Area to be Covered	Works to be Executed
<b>First Phase of construction --Right half of the Barrage</b>				
A	October 15 to November 30	After May 31	Gates 27-56	Civil and mechanical works on the right side
B	January (17) to February 28	After May 31	Gates 27-56	
C	February 15 -28	To be converted as mole head before May 31	Gates 27-56	
D	January 15-20 (canal closure period)	After canal closure period	Gates 1-7	Works on Gate No. 3
E	February 15-28	After May 31	Gate 1-7	
	October to February	Completion of gates 29-56 using bulkhead gates		
<b>Second Phase of construction --Left half of the Barrage</b>				
A	October 15 to November 30	After May 31	Gates 3-29	Civil and mechanical works on the right side
B	January (17) to February 28	After May 31	Gates 3- 29	
C	February 15 -28	To be converted as mole head before May 31	Gates 16-56	
D	January 15-20 (canal closure period)	After canal closure period	Gates 1-7	Works on Gate No. 2

Coffer Dam*	Construction Dates	Removal Dates	Area to be Covered	Works to be Executed
E	February 15-28	After May 31	Gate 1-7	
	October to February	Completion of gates 4-28 using bulk head gates		
<b>Third Phase of construction --Left half of the Barrage</b>				
D	January 15-20 (canal closure period)	After canal closure period	Gates 1-7	Works on Gate No. 1 and remaining gate works with installation of bulk head gates.
E	February 15-28	After May 31	Gates 1-7	

**Standby Feeder Canal.** A standby feeder canal is planned to be constructed as part of the proposed project, to supply water to the Mohajir Branch of the Thal Canal, the command area of which is underlain with saline groundwater, to meet critical needs in case there are any delays in completing construction beyond the normal closure period of three weeks. The capacity of this standby canal has been determined to be 1,500 cfs, to meet the requirements during January, and in view of the capacity of the Mohajir Branch.

#### 1.1.4 Project Implementation Arrangements

The Punjab Irrigation and Power Department (IPD) of the Government of Punjab will be responsible for the execution and implementation of the project through the Project Management Office (PMO). PMO has extensive experience in large scale construction projects including Taunsa Barrage Rehabilitation Project. PMO will be headed by a Project Director with four units: (i) Finance Unit; (ii) Procurement Unit; (iii) Engineering Unit; and (iv) Environment and Sociology Unit. PMO would be supported by two sets of consultants: Project Implementation Consultants (PICs) (Supervision Consultants), and the Monitoring and Evaluation (M&E) Consultants.

#### 1.1.5 Objectives and Scope of EA Studies

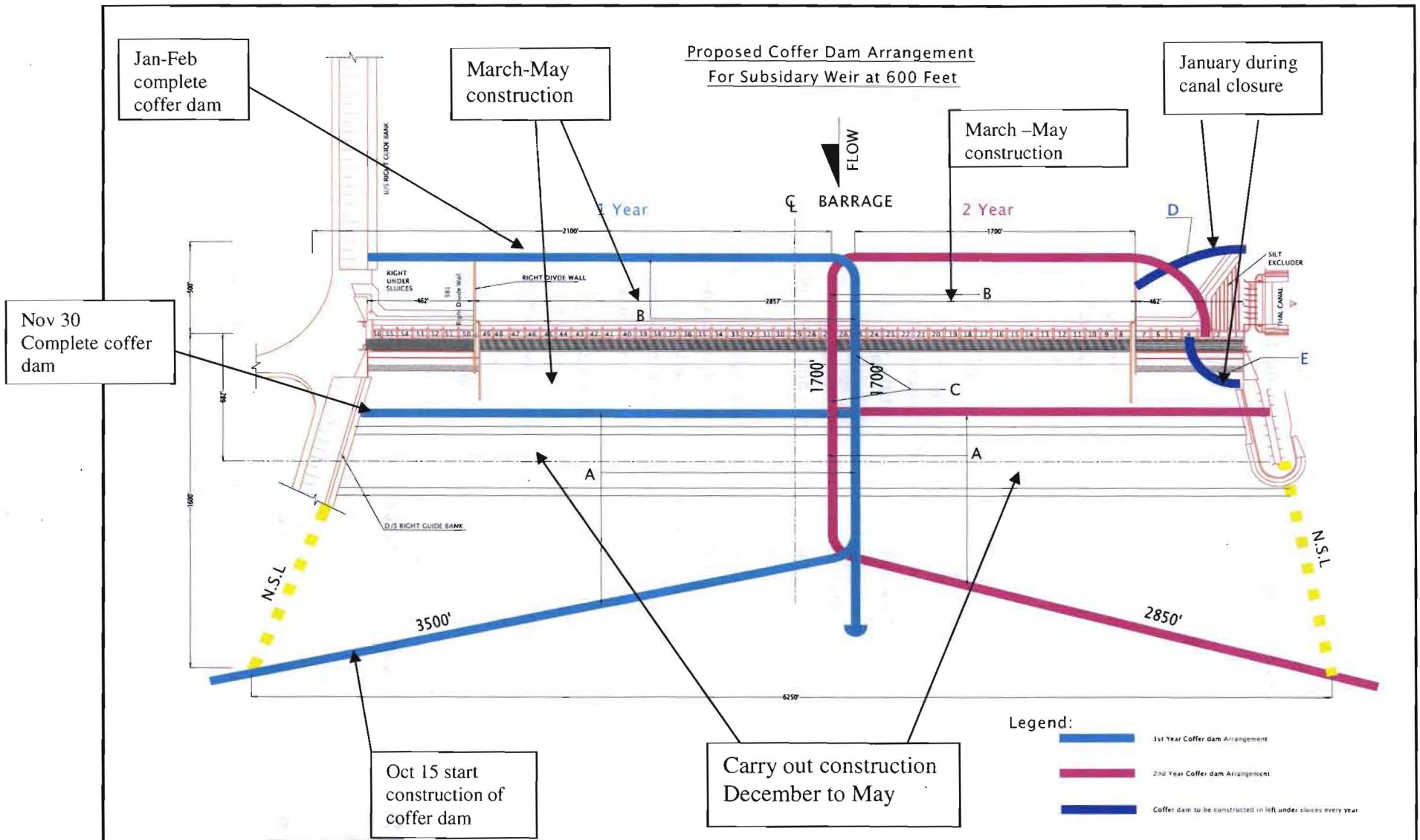
The EA studies have been conducted in response to the Pakistan Environmental Protection Act of 1997, and the WB safeguard policy, OP 4.01. The primary objective of the ESIA study is to identify the potential negative impacts of the proposed project on the physical, biological and social environment; and to propose measures to avoid, reduce or compensate these negative impacts. SDAP augments ESIA, and has primarily been developed to enhance the project benefits to the local communities. The EA studies and hence the present Summary ESIA cover the environmental and social aspects associated with the entire project interventions and facilities described in **Section 1.1.2** above. Also covered under these studies is the Thal Canal command area, which may be affected due to the possible extended canal closure during the project works at the Barrage.

## 1.2 Study Methodology

The EA studies were conducted using a standard methodology of reviewing the project details; identifying and reviewing the secondary literature; screening of potential environmental and social aspects and impacts of the project, collecting baseline data on social and environmental aspects, and developmental needs of the affected communities; carrying out consultations with primary as well as secondary stakeholders to apprise them of the project interventions and to obtain their views, concerns and suggestions regarding the project, its impacts and the way these impacts should be addressed; identifying and characterizing the potential impacts of the project on the environment and communities, and identifying the measures to avoid, mitigate and/or compensate these impacts;



Figure 1.2: Proposed Cofferdam Arrangement



developing the environmental and social management plan (ESMP), which provides the mechanism to effectively implement the mitigation measures described earlier; and developing SDAP, which identifies a program of activities to address public health impacts of the project, and also includes a social assistance program in both the command and barrage areas to enhance the social benefits of the project. ESMP and SDAP have been summarized in the form of the Environmental and Social Management and Development Plan (ESMDP) in the present document.

## **2 Analysis of Alternatives**

As part of the feasibility study and while conducting the EA studies, various project alternatives were considered. These included the no-project alternative (do-nothing alternative), project design alternatives, and alternatives for measures to mitigate the environmental and social impacts of the project. These alternatives are briefly discussed here; more details are provided in the ESIA report of the project.

### **2.1 No-Project Alternative**

The no-project alternative was rejected on the basis of its severe economic, social and environmental consequences. This scenario would involve continuing to carry out operation and maintenance of the Barrage at the present level and not addressing the causes of the ongoing deterioration of the structure. As described in **Section 1.1.1** as well, over the past fifty year, the apron downstream of the weir has undergone erosion, thus adversely affecting the hydraulic characteristics of the water flow over the weir. The continuing deterioration is likely to exacerbate the existing condition and erosion of the main Barrage structure, and may make the Barrage dysfunctional and even place its structural integrity at risk particularly in the high-flood event.

The consequences of the dysfunctional barrage would include disruption of the Thal Canal irrigation system thus severely affecting the cultivation, and loss of freshwater supply for a population up to five million in the canal command area, in addition to adversely affecting the natural flora and fauna in the area. The annual agricultural economic returns and the associated indirect economic activity in the command area have been estimated to be about 5 billion Rupees and 2.5 billion Rupees, respectively.

In the extreme event of the structure failure of the Barrage, significant losses of downstream life and property, disruption of road traffic across the Barrage and in the flooded areas, and large-scale land erosion and sediment deposition on the flooded land will also take place, in addition to the consequences of the dysfunctional barrage described above.

Since the nature and magnitude of these potential losses are quite unacceptable, the no-project alternative has been duly rejected.

### **2.2 Project Location Alternatives**

No alternative for the project location exists, since the project involves works on an existing structure, as described in **Section 1.1**.

### **2.3 Project Design Alternatives**

During the feasibility study, several alternatives were considered. These are discussed below.

The first alternatives would consist of replenishing of stone apron in both under sluices in gabions; and replenishing of stone apron downstream of the existing barrage in weir portion. The main advantage of this alternative would be the absence of any risk to the existing barrage structure, human life, machinery and equipment during construction. However, its disadvantages would include threat to the aquatic life posed by the gabions; negative impacts associated with quarrying and transporting stones for gabions, and gabion construction; and rise of water level upstream of the Barrage, consequently inundating adjacent areas, causing damage to crops and property.

The second alternative would consist of two step weir at 200-250 feet, a 2,807 feet long weir in front of weir portion of the barrage width, two divide walls about 75 feet long, and replenishing of stone apron in both under sluices in gabions. The main advantages of this approach would include the increased safety factor of the Barrage, and the ensured supply of water to the Thal Canal. The disadvantages of this design alternative would include increased risk to the existing barrage structure, and associated loss of human life, machinery and equipment during construction, which would be carried out very near (200 - 250 feet) to existing the structure; potential threat to fish and other aquatic life which can be trapped in the gabions; environmental issues such as induced erosion, loss of natural habitat from where the stones will be brought for the gabions; and dissolution of rock and minerals from the gabions due to continuous flow of high velocity water resulting in deterioration of downstream river water quality.

The third alternative considered would involve carrying out the repairs through intensive maintenance during regular closure periods was considered and found not viable. Such repairs have been made previously also on emergency basis during the regular closure period and running water, and would not be long lasting. In order to carry out proper repairs, drying of construction surface is necessary, requiring construction of coffer dams. Such repairs, even if carried out cannot resolve the hydraulic problems that barrage is facing and is inherent due to original design.

The fourth alternative would consist of the design features already described in **Section 1.1.2**. The main advantages of this alternative include less risk to the existing structure, human life, machinery and equipment during the construction activities, since these would be carried out 600 feet away from the main structure; and provision of fish ladder which will enhance the breeding habitat for fish, ultimately increasing the fish population. This design scheme would eliminate the disadvantages of the other two alternatives described above.

On the basis of the above description, it is quite evident that the fourth alternative is the best option, in view of its advantages over the other three options, with respect to the safety of the existing structure during the construction phase, the possibility of water level rise upstream of the barrage and the associated inundation of a large area, and the potential threat to the aquatic fauna. Therefore this alternative has been selected for the proposed project.

The various engineering designs have undergone extensive tests in a hydraulic model study conducted at the Nandipur Hydraulic Laboratory. The selected alternative was confirmed and approved by the engineers at the Laboratory.

## **2.4 Mitigation Measures Alternatives**

As described in **Section 1.1.3**, the construction planning has been carried out to ensure that construction works which could interrupt the water flow in the Thal Canal are carried out during the normal canal closure period of three weeks. However, any unforeseen delays in these construction works may cause an extended canal closure. To mitigate the consequences of this possible eventuality, the alternatives discussed below were considered during the project design phase.

The first alternative would involve providing assistance to the communities – affected by the possible extended canal closure - for the reduced crops yield and rehabilitation of their water supply schemes.

The second alternative would involve providing a temporary diversion channel in the left guide bank to feed the Mohajir Branch of the Thal Canal. This canal would provide water to the Mohajir Branch, in the unlikely event of the extended canal closure.

The third alternative is essentially a combination of the first two options - providing assistance to the affected communities for the reduced crops yield and rehabilitation of their water supply schemes, and constructing a temporary diversion channel in the left guide bank to feed the Mohajir Branch – in addition to providing wheat seeds of the recommended variety to the affected communities.

The third mitigation alternative has been selected for the proposed project, since it maximizes the project benefits to the affected communities. This alternative was selected after extensive consultations with the stakeholders and it was approved by the community.

### 3 Legislative, Regulatory and Policy Overview

An overview of the national legislative and regulatory framework as well as the WB safeguard policies is provided here. More details are presented in the full versions of ESIA and SDAP.

#### 3.1 National Legislations and Regulations

The Pakistan Environmental Protection Act of 1997 is the apex environmental protection legislation in the country. Section 12 of the Act makes it mandatory for the proponents of any development project to conduct an Initial Environmental Examination (IEE), or an Environmental Impact Assessment (EIA), if the project impacts are significantly adverse and diversified. The EA studies of the proposed project have been conducted in pursuance with this Act.

The National Environmental Quality Standards (NEQS) implemented in 2000 restricts the releasing liquid effluents beyond the prescribed limits into any water body and the gaseous emissions into the atmosphere. The noise levels from running of vehicles, construction machinery and equipment have also been prescribed. These standards will be binding on the contractor during the proposed project.

The Land Acquisition Act (LAA) of 1894 is the primary land acquisition and compensation legislation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. Though no land acquisition is envisaged during the proposed project, the provisions of this Act will be applicable, should any such need arises during the project execution.

The other relevant legal instruments which may be applicable to the proposed project and binding upon the contractor include the Forest Act (1927); the Punjab Wildlife Protection Act (1974); the Antiquities Act (1975); the Punjab Local Government Ordinances (2001); the Regulation of Mines and Oil Fields and Mineral Development Act (1948); the Factories Act (1934), the Explosives Act (1884), the Canal and Drainage Act (1873); the Employment of Child Act (1991); and the Pakistan Penal Code (1860).

#### 3.2 WB Operational Policies

**Environmental Assessment (OP 4.01):** Since the project involves large-scale construction on operational river and irrigation systems, and possible interruption of canal supplies for a short or long duration, the project is categorized as Environmental Category A, in accordance with this OP. The project would generate considerable positive environmental benefits in the long run. The environmental issues that need to be addressed are relevant to the construction period. An EA for the project was carried out which incorporates Environmental Management Plan to mitigate all potential environmental and social impacts arising due to the project interventions.

**Involuntary Resettlement (OP 4.12):** There is no resettlement expected under the project. However, it is a large project on an operational river, therefore a resettlement policy framework (RPF) has been prepared and agreed upfront to guide and manage resettlement planning in case any unexpected land acquisition or resettlement need emerges during project construction.

**Safety of Dams (OP 4.37):** Although barrages are not dams, they are nevertheless major hydraulic structures on which millions of hectares of irrigated land and population are dependent. The dam safety policy is triggered and an independent panel of experts would review the project implementation and construction. The proposed designs for remedial works have already been reviewed by the panel.

**International Waterways (OP 7.50):** The project area is located on the Indus River which is an international waterway thus automatically triggering the international waterways safeguard under

OP 7.50. However, the project essentially involves rehabilitation of existing barrage facilities, and it does not involve works and activities that would exceed the original scheme, change its nature, or alter or expand its scope and extent to make it appear a new or different scheme.

The project team has also reviewed Article VII of the Indus Waters Treaty of 1960 between India and Pakistan and concluded that a notification by Pakistan to India under paragraph (2) of the said Article VII is not required, as the project will not cause interference with the waters of any of the Rivers and will not affect the other riparians materially. Therefore, the Project falls within the exception to the notification requirements of OP 7.50, set forth in paragraph 7(a) of OP 7.50.

**Natural Habitat (OP 4.04):** There are no protected areas, games parks, wildlife sanctuaries or critical habitats in the project area or area or likely to be affected by the project, hence this OP is not triggered. However, PMO and the M&E consultants will monitor during construction period if any natural habitat is affected by the construction activities and remedial measures undertaken as necessary. Also, ESMP includes a program of tree plantation. This investment would be used strategically to improve overall natural habitat around the project area.

**Forestry (OP 4.36):** None of the project components would be located inside any forested areas hence the OP 4.36 is not triggered.

**Pest Management (OP 4.09):** This OP is not triggered since the proposed project does not involve procurement, supply or distribution of pesticides. The project does not involve any increase in the irrigation water supply or command area; hence the project would not induce any increase in pesticide use. The early variety of wheat seeds to be provided to the farmers (discussed later in the document) would also not increase the pesticide use, since it will also not involve any increase in the pesticides usage.

**Physical Cultural Property (OP/BP 4.11):** The construction would not be carried out in the undisturbed areas hence this policy is not triggered. However, the bidding documents would include procedures to handle the “chance find”. PMO, the independent M&E consultants, and PICs would monitor any “chance find” of cultural heritage items during the construction activities and assist in handling them in accordance with the procedures stipulated in Punjab and Bank Guidelines. The “chance find” procedures would be included in the tender documentation for the construction contracts.

**Indigenous People (OP 4.10):** No indigenous people exist in the project area, as confirmed during the EA studies of the proposed project. Hence this OP is not triggered.

**Projects in Disputed Areas (OP 7.60):** No disputed area exists at or in the vicinity of the project sites hence this OP is not triggered.

**Disclosure Policy:** the Bank’s disclosure policy requires the EA report to be disclosed to public, and a copy of the report to be sent to the Bank’s InfoShop, before the Bank commences the project appraisal.

## 4 Environmental and Social Baseline Conditions

The salient features of the baseline conditions of the physical, biological and social environment of the project area are presented here. For the detailed baseline description, please see the ESIA and SDAP reports.

### 4.1 Physical Environment

The Jinnah Barrage is the first major diversion structure on the Indus River after it enters the plains of the Punjab province. It is situated about 126 miles (203 km) downstream of Tarbela Dam and 16 miles (26 km) downstream of the site for the proposed Kalabagh Dam.

The Thal Canal and its command area are located in the Sindh Sagar Doab<sup>2</sup>. Most of this *doab*, the most western of the *doabs* of Punjab, was an unproductive wasteland (known as the Thal Desert) before the construction of the Jinnah Barrage on the Indus River near Kalabagh in 1946. The Thal canal system, which draws water from the barrage, has turned parts of the desert into fertile cultivated land.

The soils of the area are generally heterogenic, showing textural variations both horizontally and vertically. These soils have been derived from the alluvium of the Indus River and piedmont deposits from the surrounding hills. The soils of the downstream flood plain are generally moderately coarse to coarse textured with pockets of medium textured soils, while the soils in the upstream reaches are generally medium to moderately fine textured. The soils are generally salt free and fertile.

The area is generally flat and consists of mostly proprietary lands. The dominant land uses/land forms in the area include flood plains, used for cultivation; pasture lands, used for livestock grazing; irrigated agriculture land in the canal command area; and barren wasteland.

Surface water is dominated by the Indus River. The flows are perennial and provide the main freshwater resource for the area. There are seasonal *nullahs*<sup>3</sup> on both sides of the river which carry rainwater from the adjoining areas into the river during rainfalls. There are no major sources of industrial pollution in the upstream of the Barrage but wastewater from the upstream towns and villages, in particular Kalabagh, Mari and Pacca Shah Mardan does flow into the upstream pond of the barrage. Villages at downstream of the barrage tend to discharge wastewater into the *nullahs* and during the dry season the flows do not reach the river at surface level.

The river water quality is generally suitable for irrigation purposes but surface water testing at barrage site indicates that the available water is not suitable for human consumption.

The groundwater within the immediate project area is plentiful due to the presence of the river, and it is generally suitable for domestic and other uses. However, there are areas to the east of the project area within the canal command area in which the groundwater is saline. In a number of villages the groundwater is unsuitable for potable purpose, whereas in some villages it is even not suitable for non-potable domestic use. Extensive water quality testing was carried out during the EA studies to delineate the saline water zone within the canal command area.

There are no major anthropogenic sources of air pollution in the immediate vicinity of the barrage and the canal command area, except the vehicular traffic on the major roads. During the EA studies, the ambient air quality was tested, indicating that the air quality was reasonably good, and the levels of the criteria pollutants (carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter) were found to be well within the acceptable limits.

## 4.2 Natural Flora and Fauna

The flora of the project area can be divided into two zones: that occupying the riverine areas, and that occupying the higher surrounding areas.

The natural floral species found in the riverine areas include Lai or Salt Cedar (*Tamarix dioica*), Pilchi or French Tamarisk (*Tamarix gallica*), Khaddar or Elephant Grass (*Typha elephantina*), Sarkanda or Bengal Cane (*Saccharum munja*), Kai/Kans or Wild Sugarcane (*Saccharum spontaneum*), Navra or Giant Reed/Spanish Cane (*Arundo donax*), Kikar or Prickly Acacia (*Acacia nilotica indica*), Shisham or Indian Rosewood (*Dalbergia sissoo*), Ber or Jujube (*Zizyphus jujuba*), Mesquette or Mesquite (*Prosopis juliflora*), Jand (*Prosopis cineraria*), Khabbal or Bermuda Grass (*Cynodon dactylon*), and Bhan or Euphrates Poplar (*Populus euphratica*).

<sup>2</sup> *Doab* is a term used in India and Pakistan for a tract of land lying between two confluent rivers.

<sup>3</sup> *Nullah*: natural water stream

The natural floral species found in areas outside the riverine tract include Jandi or Chhenkur (*Prosopis cineraria*), Karir (*Capparis aphylla*), Vann (*Salvadora oleoides*), Peeloo (*Salvadora persica*), Kikar (*Acacia nilotica indica*), Lana or Bush Seepweed (*Suaeda fruticosa*), Lani (*Salsola foetida*), and Khabbal or Bermuda grass (*Cynodon doctylon*).

The expansion of human activities in the area in the form of larger scale agriculture, construction of linear infrastructure and enlargement of populated areas has had negative impacts on the wildlife of the area. As the natural vegetation has been cleared to enlarge and combine agricultural plots, to establish/expand communities, and to develop infrastructure, the natural habitats have been lost and connectivity between the remaining habitats has been disrupted. As a consequence, much of the native fauna has retreated to areas which are less disturbed and less accessible to humans. Only those species, which have adapted to this modified habitat, exist in the area; and species such as wild boar, hare, jackal, porcupine and fox, are rarely seen in the project area and its surroundings.

The project area falls within the Indus Flyway, which is one of the routes of the migratory birds in the region. The migration route from Siberia to the various destinations in Pakistan crosses the Karakorum, Hindu Kush, and Suleiman ranges, and follows the Indus River down to the Indus delta. The southward migration begins in November, and the northward migration starts in March, though these periods may vary depending upon weather conditions in Siberia and/or Pakistan. The Indus Flyway is important for both the abundance and species diversity of the birds using the flyway. The key species using the flyway include waterfowl, cranes, teal, pintail, mallard, gadwall, white-headed duck, houbara bustard and Siberian crane.

The Jinnah Barrage and its surroundings do not provide any attractive habitat for the migratory birds, particularly because of the presence of a large lake adjacent to the Chashma Barrage (about 60 km downstream of Jinnah Barrage), which provides an attractive wintering habitat for these birds. However, some *belas*<sup>4</sup> do exist near the Jinnah Barrage, some of which support a thick reed growth and hence provide habitat for wild birds. Impact on migratory birds due to construction activities and traffic etc, if any, would be limited and temporary.

The common fish species found in the river of the area include Mahsher (*Tormacrolepis*), Khaga/Thaila or Catla (*Catla catla*), Mori/Morakhi or Mrigal Carp (*Cirrhinus mrigala*), Gulfam or Common Carp (*Cyprinus carpio*), Dahee/Kalbano or Orange Fin Labeo (*Labeo calbasu*), Raho/Rohu/Dumbra or Rohu (*Labeo rohita*), Singhari or Long-whiskered Catfish (*Mystus Osteobagrus*), Bachuwa or River Catfish (*Clupisoma garua*), Mullee or Wallago/Freshwater Shark (*Wallago attu*), and Saul (*Challa Marulius*).

According to the officials of the Fisheries Department, most of the above fish species move upstream of the Barrage for breeding, particularly during the high-flow months of June, July and August, using the fish ladder. In addition to the ecological significance, most of these species have economic importance as well, and the annual fish catch between Jinnah and Chashma barrages amounts to about four to five thousand metric tons, with an economic value of about 100 million rupees.

During the EA studies, a 24-hour fish count was carried out at the exit of the fish ladder at the Jinnah Barrage, with the help of a 1-inch mesh. The catch during this fish count included 90 Morakhis, 40 Khagas, and 35 Bachuwas. This fish count also somewhat validated the movement of fish across the fish ladder (though detailed studies are needed to ascertain it more definitively).

Historically the Indus Blind Dolphin (*Plantanista minor*) species was distributed in the Indus River. In the early 60s, Indus River was regulated by construction of barrages, dams and link canals which fragmented the habitat, resulting into a decline in the dolphin population. Now its population is limited between the Chashma Barrage and the Kotri Barrage, which is the last barrage on the river near Hyderabad, Sindh. Though the Worldwide Fund for Nature (WWF) reports the presence of a thin

<sup>4</sup> *Bela*: sort of a river island.

population of the Indus Dolphin between Jinnah and Chashma barrages, the local community and the Wildlife Department assert that this species does not exist in this river tract anymore. A population count conducted in 2001 indicated two dolphins between the Jinnah and Chashma stretch.

No protected areas exist at or in the immediate vicinity of the Barrage or the canal command area.

### 4.3 Socioeconomic Conditions of the Project Area

Administratively, the Jinnah Barrage is located in the Mianwali district of the Punjab Province, whereas the command area of the Thal Canal lies in the Mianwali, Khushab, Bhakkar, Layyah, and Muzaffargarh districts. About 5 million people (based upon 1998 census) inhabit the command area and their livelihoods depend directly or indirectly on the irrigation supplies of the Thal Canal. Roughly 695,000 people (based upon 1998 census) derive their livelihoods directly from the irrigation supplies of the Canal.

The Mohajir Branch command area lies in the Khushab *Tehsil*<sup>5</sup> of the Khushab District. According to the 1998 census, the Khushab District had a total population of 905,711, of which the rural population was 81,457 (75 percent); whereas the Khushab Tehsil had a population 731,028, of which 571,150 (78 percent) were living in the rural areas. The surveys during the EA studies have revealed that about 328,000 persons, comprising of 94 villages, are living in the saline zone of Mohajir Branch command area, which was the focus of the socioeconomic baseline studies, since most of the project's social impacts are likely to take place here.

The majority of families in the area live in joint family system, since the sharing of resources is beneficial in term of joint incomes, manpower (for agricultural practices) and basic amenities like water, electricity, housing and food. About 95 percent population is Muslim whereas five percent consist of Christians and other minorities. Most dominant ethnic group belongs to the *Awan* tribe; other ethnic groups include *Chaudharies*, *Jats*, *Khels*, *Arain*, *Syed*, *Bhatti*, *Khokar* and *Rajputs*. The ethnic minorities include *Pathan* and *Baloch* that are living in the vicinity of Khushab City. About 95 percent of population speaks Punjabi and Saraiki, but Urdu is also commonly understood.

In general women's social status in the area is low as compared to men. It portrays the typical patriarchal society where men dominate in all spheres of life and only they have the decision-making power. Women's public participation in village institutions is minimal, e.g. the women cast their vote only with the consent of male family members. Within the family, mostly men make decisions, although elderly women may be consulted over family or household affairs.

Most of the women in villages are uneducated, but hardworking and perform their duties at home as well as working outside in fields with their male family members. It is reported that about 14 percent of women are engaged in sowing, seven percent in weeding / mowing, and 79 percent in harvesting and cattle rearing.

The basic problem and need of women is availability of clean drinking water. They fetch water from canal, springs, water supply schemes, ponds and hand pumps, but generally the water quality is poor. Sweet water is available from hand pumps installed at the canal banks of the Mohajir Branch. Women fetch water on donkey carts, camel carts, and often by foot. They get poor quality water for washing, cleaning and for other non-potable use from hand pumps installed in their houses.

The education levels in the area are quite low; the primary level education opportunities for boys and girls are 72 percent and 67 percent, respectively. There are few secondary level schools in the surveyed villages of the Mohajir Branch. The higher education opportunities are available only at the town level. The school enrollment rate for girls is much lower than that for the boys, especially after primary level.

<sup>5</sup> *Tehsil* is a subdivision of a district.



During the consultation meetings, participants acknowledged the importance of education, and included it in priority needs of the village. Although people realize the importance of education of their daughters, but they can not manage it because of economic and cultural reasons as well as difficult access to girls' school in the area.

The situation of the health services in the area is also dismal. Out of 94 villages, only 12 villages have the Basic Health Units (BHU); people from the rest of the villages go to the private clinics in the nearby towns, and for the serious illnesses, to the District Head Quarter Hospital at Khushab, or to Lahore and Sargodha. It is found that many people suffer from the skin diseases due to water impurities. The water borne diseases such as cholera, hepatitis, typhoid, goiter, eye problems, and diarrhea are quite common. Some of women expire during delivery cases. Many women are malnourished usually being the last ones to eat their meals in the family.

The major source of income of people in the project area is agriculture and daily-wage labor. According to the baseline survey, agriculture is the most widespread source of income in the project area (65 percent), followed by the daily-wage labor (30 percent). The remaining (five percent) are engaged in miscellaneous employment, including government and private jobs. The economically better-off families mostly belong to the agriculture sector.

The economic opportunities are very limited in the project area, and people face difficulties to find employment other than daily-wage labor, which is usually irregular. Most people lack capacity or skills that could contribute towards their own livelihood as well as in the local economy, and also lack enterprise development capability. The earning level of the non-farm workers, such as cobblers, carpenters, blacksmiths and barbers, is usually very low, and in most of the project area, villagers pay two 100-kg bags of wheat and rice per year to these non-farm workers against their services.

The people usually utilize credit facilities at the local level. Almost everyone has an ongoing credit-account with the village grocery shop, the landlord or influential of the village, or with relatives or neighbors. Once the previous borrowing was taken care, the next started. These loans are usually cleared after a good crop or selling of an animal like a cow, buffalo or goats during festivals. The National Rural Support Program (NRSP) has introduced micro-credit loans at the community level and especially for the poorest groups of the community. Currently only 12 out of 94 villages and *dhoks*<sup>6</sup> of saline zone have been targeted by NRSP.

There exist many small scale industrial units developed by the individual industrialists in the area. In addition, there is one cement factory located in Mouza Chainki and one Soda Ash manufacturing plant functioning in Mouza Warcha. Most of the skilled labor in these industrial units is hired from areas outside the saline-water zone, whereas local labor is hired for low status jobs.

Land is a symbol of prestige and honor and most of the communities do not sell their agriculture land. Land cost depends on type and quality of land. In canal command areas the land value ranges between Rs. 250,000 to 400,000 per acre. Outside the canal command area (rain-fed or *barani* land), the land price varies between Rs. 50,000 to 150,000 per acre.

Livestock is the backbone of agriculture society and third main source of income of the project area. About 80 percent households own livestock having 1-3 animals per household, with cow as the most common animal. Animal feed is available in the shape of green and dry fodder. Some villages have community-owned (*shamelaat*) land, which is used as grazing land for their farm animals.

About 70 percent of the population is engaged in irrigated cultivation in saline-water zone of the Mohajir Branch and its distributaries, which irrigate round about 120,041 acres of land. The majority of the farmers are involved in subsistence farming only, and many families cannot support farming activities

<sup>6</sup> *Dhok*: Small village.

due to limited resources and they have to rely upon other means of income, such as employment and labor.

The major cropping seasons in the area are *Kharif* – for the crops sown in summer, and *Rabi* – for the crops sown in late autumn. A large variety of crops are cultivated in the area, including wheat, gram, oil seeds, lentils, cotton, sugarcane, groundnut, millet (*bajra*), sorghum (*jowar*), fodder, vegetables and fruits. Sugarcane and cotton are the main cash crops of the area. Citrus fruits, mangoes and guavas are exported from the region.

Although most of the land in the project area is irrigated by Mohajir Branch canal, an area of about 101,606 acre is rain-fed. Irrigation in this area is supplemented with tube-wells, to grow crops such as millets and sorghum. Otherwise it is used as grazing land for the livestock.

Electricity is available in almost all the villages in the project area. This energy source is being utilized mainly for lighting of the houses and operation of tube-wells for drinking water supplies and irrigation. The Khushab and Jauharabad cities, and Mitha Tiwana, Hidali and Quaidabad Town Committees are connected with the natural gas network and the gas is consumed mainly for cooking purposes. Pahari kikar (*Prosopis*) specie is used as firewood in the villages, which is abundantly available in the area. Some people purchase firewood and dung cakes for fuel.

Most of the villages in the project area have metalled (asphalt) roads that are in good condition except the few villages like, Chak 59 / MB and Ghous Nagar of Union Council 59 / MB where roads are in very poor condition. Construction and maintenance of village roads is the responsibility of local government. Two provincial highways also pass through the target area and connect Punjab with the North Western Frontier Province (NWFP).

The telecommunication facilities are available only in a few villages; rest of the communities rely upon mobile phones, which are very common among the communities in the area. The concerned *Patwaries* disseminate information such as regarding the annual canal closure to the *Numberdar* through mobile phones.

The institution that provides governance on traditional community and political issues is the *Punchayat* (council of elders) with representation from different clans and castes including, *Numberdar*, *Nazim*, *Naib Nazim* and notables of the area. The council arrives at decisions through consensus and convenes when the need arises, although it has been noted that in many cases no decision is made since no consensus can be arrived at. The group discussions during the EA studies have revealed many informally organized group activities, particularly with respect to shared agriculture labor for watercourse (*Bhal*) cleaning. The informal support of the religious clerics (*Mullah*) is also available particularly in community based works.

In more than 87 percent villages of the project area, no formal community based organization (CBO) is functional. The National Rural Support Program (NRSP) is working in the village areas and has established male and female CBOs for the particular tasks.

Mostly, women and children are responsible for fetching water for drinking and domestic use, and spend four to five hours daily, for this purpose. Out of the 54 water supply schemes, about 60 percent schemes are functional and the remaining are non-functional. Most of the drinking water supply schemes have been abandoned due to lack of coordination and management among community groups.

The groundwater quality was assessed in each surveyed village by using portable electric conductivity meter. The water quality of most of the surveyed villages is brackish, except hand pumps which are installed at banks of Mohajir Branch and its distributaries. The Hidali and Adhikot distributaries have sweet underground water pockets.

In addition to the above, the water samples from different sources including, springs, tube-wells, hand pumps and canal from different localities of the saline zone were collected for detailed chemical analysis.

These analysis indicate that presence of biological contamination is quite common in the area, in addition to having high sulfates, high turbidity and high total dissolved solids (TDS) in some of the samples (the complete results of these analysis are provided in the SDAP report).

## 5 Stakeholder Consultations

Detailed stakeholder consultations were carried out while conducting the EA studies. A summary of the process and outcome of these consultations is provided here.

### 5.1 Consultation Objectives

The objectives of the stakeholder consultations (before and) during the EA studies of the proposed project included apprising the people of the area about the project interventions and their potential impacts, soliciting community concerns and recommendations regarding the proposed project and addressing/incorporating them in the project design to the extent possible, sharing with the local communities the mitigation measures included in the project design to address the potential impacts, ascertaining the developmental needs of the local communities to design SDAP, and promoting among these communities a general goodwill towards the project.

### 5.2 Consultation Process

Consultations and discussions with the people of the area have been continuing since the project's feasibility studies in 2005. This process was intensified during the EA studies, and separate rounds of consultations were held as part of the ESIA and SDAP studies. During the project execution, this process will be continued, particularly during the implementation of the development assistance initiatives proposed in SDAP, and a comprehensive communication strategy has been devised for this purpose (further discussed in the next Section).

The first step employed for the consultations carried out during the EA studies was the identification and categorization of the stakeholders. Two types of the stakeholders were identified: the primary stakeholders, who would be directly affected by the project; and the secondary stakeholders, who would be indirectly affected by the project (or who could indirectly affect the project).

Subsequent to the stakeholder identification, guidelines and questionnaires were prepared for conducting the focus group discussions/meetings, which were arranged through contacting the key persons from the community, such as *Nazims*<sup>7</sup>, village heads, and *patwaris*<sup>8</sup>.

After completing the preparatory steps described above, the consultations were carried out in the communities. During the ESIA study, stakeholder meetings and focus group discussions were held in 69 villages of the Thal Canal command area, whereas for developing SDAP, such meetings were held in all of the 94 villages of the Mohajir Branch command area. To meaningfully include the women of the area in the consultation process, separate focus group discussions were arranged both during the ESIA and SDAP studies, and the female sociologists conducted as many as 70 consultation meetings.

The consultations with the secondary stakeholders were carried out in parallel to the community meetings. These consultations were held with officials and representatives of public and private departments/institutions, including IPD (PMO Barrages), Union Councils, Public Health and Engineering Department, Agriculture Department, Forest Department, Livestock Department, Fisheries Department, Education Department, District Government and Tehsil Government.

The consultation process during the EA studies comprised a total of 214 meetings involving 1,963 participants. **Table 5.1** below summarizes these meetings; the details are provided in **Annex A**.

<sup>7</sup> *Nazim*: elected head of the local government at district, tehsil and union council level.

<sup>8</sup> *Patwari*: land revenue clerk.

During the above meetings, the participants were informed about the project objectives and its salient features, and also that during the construction phase, the Thal Canal could be closed for six weeks, including three weeks of routine annual canal closure. The participants were also informed regarding the mitigation measures which were included in the project design to minimize the negative impacts of the project activities. The participants were then asked to share their views, concerns and recommendations with respect to the project impacts and their mitigation measures. Particularly during the women meetings, the development priorities of the communities were also discussed.

**Table 5.1: Summary of Consultation Meetings**

Round	Year	Description	Participants
First	2007	4 meetings with residents of the command area	26
		14 meetings women of the command area	14
		3 meetings with the secondary stakeholders	4
	2008	16 meetings with residents of command area and Barrage	150
		5 meetings with the secondary stakeholders	6
Second	Feb 2009	70 meetings with women of the command area	800
		71 meetings with men of the command area	630
		7 meetings with the secondary stakeholders	9
Third	Sep 2009	15 meetings with residents of the command area	239
		8 meetings with the secondary stakeholders	9
Public Hearing	Oct 2009	Public hearing meeting with residents and officials of the area	76
		<b>A total of 214 meetings.</b>	<b>1,963</b>

### 5.3 Consultation Findings

#### Stakeholder Concerns

The key concerns of the communities included disruption of irrigation water supply during the construction phase, and the associated crop losses; disruption of the freshwater supply in the saline zone of the Mohajir Branch command area, particularly the drinking water supply; possibility of illegal fishing by the construction labor; and the possibility of damage to the habitat/water contamination, thus negatively affecting the fish population in the area. The communities also shared their expectation regarding the employment opportunities to be made available to the local population during the project execution.

All of the above concerns and expectations have been adequately incorporated in the project design in the form of the mitigation measures included in the Environmental and Social Management and Development Plan (ESMDP) (discussed in the next Section), and the communities were so informed during the consultation meetings.

The feedback received during the consultations resulted in revising the initial construction plans in a manner that the canal closure remains limited to the routine three weeks. This would involve construction and dismantling coffer dams D and E (see **Table 1.1** and **Figure 1.2**) every year and rehabilitation of the Barrage gate 3, 2 and 1 in the first, second and third year of construction, respectively. The revised plans also include provision of a feeder canal of 1,500 cusecs to doubly ensure water supplies to the most vulnerable saline groundwater area in case the plans do not work as expected.

## **Development Priorities Shared by Communities**

Separate sets of consultation meetings were held with men and women in the Mohajir Branch command area, to ascertain their development needs and priorities. During the consultation meetings for men, participants from all of the 94 villages of the Mohajir Branch command area ranked their first-, second-, third-, and fourth-priority development needs; whereas during the consultation meetings for women, participants from 60 villages provided similar information.

The above consultations with the men indicated that the drinking water supply was by far the highest priority need, since the participants from 49 (out of 94) villages ranked it as their first priority. It was followed by the educational facilities and health facilities, since participants from nine villages and six villages ranked these facilities as their first priority development needs, respectively.

The findings of the women consultations were quite similar, and participants from 40 villages ranked the drinking water supply as their first priority, participants from nine villages ranked schools, and participants from seven villages ranked health facilities, as their first priority development needs.

The above findings were used to devise the development assistance initiative included in SDAP.

## **6 Environmental and Social Impact Assessment**

### **6.1 Assessment Process**

During the EA studies, a very comprehensive process of the environmental and social impact assessment was employed. During this process, the environmental and social assessment reports of the earlier projects of the similar nature were studied, detailed meetings were held with the project technical personnel to fully understand various aspects of the project, and very extensive field investigations were carried out to collect data on a range of environmental and social resources and parameters. In addition to this, several rounds of consultations were held with the local communities and other stakeholders during the project design and planning stage, to understand their problems and concerns regarding the project, to address these concerns while finalizing the project design and plans, and to understand the local development needs for formulating the development assistance initiative.

Based on the data and information collected through the process described above, an impacts matrix was developed, which identified the potential impacts of various project components and activities on the different aspects of physical, social and biological environment. Through the same matrix, the identified potential impacts were characterized also, as mild, moderate and severe impacts.

The next step in this process was determining the appropriate measures to mitigate the negative impacts and to enhance the benefits of the proposed project for the local communities. An attempt was made to modify and adjust the project design and construction methodology in a manner to avoid the negative impacts. Where this was not possible, mitigation and compensatory measures were identified to minimize if not eliminate the negative impacts.

### **6.2 Potential Impacts and Mitigation**

#### **6.2.1 Environmental Impacts**

Since the project involves rehabilitation of an existing structure, and after completion, no changes in the operational parameters are envisaged, hence the potential environmental impacts are limited to the construction phase only.

The construction-related environmental impacts may include soil erosion, changes in land form and soil quality, blockage of the natural drainage, contamination of soil and water, damage to the natural vegetation and habitat, and threat to the aquatic wildlife and avifauna.

The soil erosion and blockage of natural drainage will be controlled/avoided through employing the sound engineering practices and the appropriate control measures, such as obtaining borrow material from the designated sites and re-contouring the borrow areas, selection of appropriate site/routes for camps and access tracks, and provision of drainage for the rainwater run-off. These measures and the restoration of the construction sites/campsites will ensure that there is no permanent change in the land form either.

The soil and water contamination will be controlled through employing a sound waste management system, which will include: provision of septic tanks for the sewage from camps and offices; protocols to handle and store fuels, oils and chemicals; and segregation and safe disposal of the solid wastes.

Damage to the natural vegetation will be minimized by appropriate site/route selection for the site facilities and access tracks. In addition, compensatory tree plantation will be carried out for any tree felling which might be needed for the construction activities.

Any loss of or threat to the aquatic fauna will be avoided through employing the waste management system mentioned above. No contaminants will be released to soil or water; any increased water turbidity caused by the construction and dismantling of coffer dams will be temporary. Furthermore, the pond level of the Jinnah Barrage would not change during or after the construction, therefore, there would not be any impact on the fish and aquatic life in the stream and Barrage pond. The construction activity will not disturb any avifauna habitat either (such as the *belas* upstream and downstream of the Barrage).

The above assessment indicates that: i) the potential environmental impacts associated with the construction activities are temporary and reversible in nature; and ii) through employing the mitigation and control measures, these impacts will be either altogether avoided, or reduced to an acceptable level. Details of the mitigation measures are provided in the next Section.

### **6.2.2 Social Impacts**

As a result of very careful project design and planning process, no land acquisition is needed, and all the project sites would be either within the river, or on land owned by IDP. Hence no involuntary resettlement issues will be encountered during the project. However, a Resettlement Policy Framework (RPF) has been developed, to be used in the unlikely event of any private land acquisition due to any design changes during the project execution. See **Table 6.1** for entitlement matrix in for RPF.

Other social impacts of the proposed project may include interruption in irrigation and drinking water supply in the Thal Canal command area particularly for the Mohajir Branch, issues associated with influx of labor from other parts of the country, and public health and safety risks for the communities as well as for the project personnel.

The interruption of irrigation and drinking water will be avoided by carrying out the works related to the Thal Canal during the routine annual canal closure. In addition, a feeder channel will be constructed to supply water to the Mohajir Branch in the unlikely event of the extended canal closure due to any unforeseen circumstances during the construction phase. The water theft issues are quite common in the command area resulting in shortages. The IPD staff would carry out extra monitoring during project period, in particular during the low flow period, in order to avoid people associating the water shortages and inequities with project construction.

To mitigate the issues associated with the influx of labor from other parts of the country, strict code of conduct will be followed by the project personnel, privacy of the local women will be respected, liaison will be maintained with the local community, and employment will be provided to the local labor.

To address the public health and safety issues, the contractor will develop and implement a Health, Safety, Environment and Social (HSES) plan. In addition, the contractor will be responsible to maintain medical facilities at the site for its staff, and will also carry out screening of its staff for any communicable diseases such as HIV/AIDS.

With the help of the above measures, the potential social impacts of the project will be adequately mitigated.

### **6.3 Cumulative Impacts**

The only major construction activity which would possibly be carried out in the vicinity of the Barrage simultaneous to the proposed project, and hence might result into cumulative impacts, would be associated with the Jinnah hydropower project. The hydropower project and the potential cumulative impacts are discussed below.

WAPDA is currently constructing a 96 MW hydropower project on the right bank of the Jinnah Barrage. To operate the power plant, approximately 100,000 cusec of water will be diverted during peak flows through a channel to the power house and released back to the river downstream of the powerhouse. The major project interventions include construction of a channel, deep excavation for siting the turbines, setting up work facilities on the right bank of the river, dewatering, disposal of excavated earth and clearing of work site etc. The official completion date of the hydropower project is in the end 2010 but the current delays in the civil works may require an extension in the project completion date. Therefore there is a possibility of a time overlap of the hydropower and barrage rehabilitation works. The proposed construction program for the barrage rehabilitation works envisages using the right bank to start the physical works, which means that the two projects could be competing for the right bank to set up work facilities including batching plant, material store, and labor camps.

To minimize the likelihood of any cumulative impacts associated with the above possibility, all of the proposed project's facilities - including the contractor's office, labor camp, batching plant, borrow areas, consultants' office and others - would be established on the left bank, well away from the hydropower project and its site facilities. Only the work-base area for the Barrage rehabilitation works to be carried out on the right bank will be established on the right bank, however, this location will be selected in consultation with WAPDA and the hydropower project's contractor, to avoid any conflict or the possibility of the cumulative impacts.

All the construction materials, including cement, steel, sand, aggregate, borrow material, rip-rap material and others will be transported from different locations in Punjab, and will not interfere with the hydropower project. Any issues regarding the increased vehicular traffic associated with the two projects will be addressed in the Traffic Management Plan, which will be prepared by the contractor of the proposed project, in consultation with the hydropower project's contractor. The Plan will also address the possible vehicular traffic interruption caused by the works involving heavy machinery on the Barrage itself (such as rehabilitation of the Barrage gates).

The environmental and social monitoring to be carried out during the proposed project (discussed in the next Section) will also include identification and assessment of any cumulative impacts of the two projects. Similarly, this aspect will also be addressed in the scope of the M&E consultants of the proposed project.

A review of the hydropower project indicates that the project has in place a basic environmental management plan to mitigate potential environmental impacts during the construction and the implementation seems reasonable. Assessment of hydropower construction site during the field visits suggests that the contractor is maintaining reasonably well the work area and no major issues were noticed in terms of EMP implementation. PMO will continue to work with WAPDA to address any issues in case the hydropower construction site does not continue to meet the required standards outlined in the Barrage ESMDP (discussed in the next Section). The independent M&E consultants, also responsible for supervision of ESMDP, will monitor the hydropower construction site and help PMO in addressing any significant issues.

**Table 6.1: Entitlement Matrix**

	Type of loss	Application	Definition of Entitled Person	Entitlement Policy
1	Loss of agriculture land	Partial loss of land holding and the remaining holding economically viable and at least equal to or more than 0.5 acres (marginal impact on household income and living standards).	a) Legal owner with valid title or customary or usufruct rights.	Project-affected persons (PAPs) will be entitled to: – Cash compensation for acquired land at replacement value.
			b) Tenant, leaseholder and sharecropper	PAPs will be entitled to: – Compensation in cash for lost income for the remaining period of lease
			c) PAPs without valid title (encroachers, squatters)	PAPs will be entitled to: - Vulnerable squatters will be entitled to assistance for livelihood restoration Encroachers will not be entitled to any compensation.
		Loss of entire land holding lost, or where partial loss but the remaining land is less than 0.5 acre or is rendered economically unviable. (severe impact on household income and living standards)	a) Legal owner with valid title or customary or usufruct rights.	PAPs will be entitled to: – Equivalent area of land with equivalent productive potential at location acceptable to PAP if available, or – Cash compensation for acquired land at replacement value at informed request of the PAP and cash assistance for land preparation – Transition allowance for a period of three months
			b) Tenant, leaseholder and sharecropper	PAPs will be entitled to: – Cash compensation equivalent to market value of gross harvest for one year production or for the remaining period of tenancy/lease, whichever is greater Affected labor will be compensated for loss of income equivalent to three months of wages.
			c) PAPs without valid title (encroachers, squatters)	PAPs will be entitled to: - Vulnerable squatters will be provided assistance for loss of livelihood and incomes. - Compensation at replacement cost for loss of affected structures. Encroachers will not be entitled to any compensation
2	Loss of residential, commercial, industrial or institutional	Partial loss of residential, commercial, industrial or institutional land with remaining land sufficient to reorganize	a) PAPs with valid title or customary & usufruct right.	PAPs will be entitled to the following: - Cash compensation for affected portion of the land at replacement value.
			b) PAPs such as tenants and leaseholders	PAPs will be entitled to the following: – Reimbursement for loss of income for the un-expired lease period



	Type of loss	Application	Definition of Entitled Person	Entitlement Policy
	land		c) PAPs without title (squatters and encroachers) prior to disclosure of ESIA)	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Vulnerable squatters will receive a transitional allowance equivalent to two months' income ( in case of impact on income or livelihood).</li> <li>- Cash compensation for affected structures at replacement cost</li> </ul> Encroachers will not be entitled to compensation.
		Loss of residential, commercial, industrial or institutional land without sufficient remaining land. PAPs will be required to relocate	a) PAPs with valid title or customary and usufruct right.	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- An equivalent area of land of similar characteristics and access to facilities in an acceptable location, or</li> <li>- Cash compensation for the entire land holding at replacement value</li> <li>- Transport allowance for shifting to new location</li> </ul>
			b) PAPs such as tenants and leaseholders	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- An equivalent area of leased land for un-expired lease period or</li> <li>- Reimbursement for un-expired lease period</li> <li>- Transport allowance for shifting to new location</li> </ul>
			c) PAPs without title (squatters and encroachers), prior to disclosure of ESIA	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Cash compensation for affected structure at replacement value (For Vulnerable squatters only).</li> <li>- Transport allowance for shifting to new location.</li> </ul> Encroachers will not be entitled to land compensation.
3	Structures (Residential, commercial, industrial or institutional)	Partial loss of structure and the remaining structure viable for continued use.	a) Legal owner of the affected structure with valid title or customary or usufruct rights.	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Cash compensation for affected part of the structure at replacement value; and</li> <li>- Allowance to cover repair cost of the remaining structure.</li> </ul>
			b) Owner of affected structure without title (squatter / encroacher) prior to disclosure of ESIA)	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Cash compensation for affected part of the structure at replacement value; &amp;</li> <li>- Allowance to cover repair of the remaining structure.</li> </ul>
		Entire loss of structures or where only partial impact, but the remaining structure is rendered unviable for continued use, and sufficient land for reorganization.	a) Legal owner of the affected structure with valid title or customary or usufruct rights	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Structure of equivalent standard in an acceptable location or</li> <li>- Cash compensation for entire structure at replacement value</li> <li>- Transport allowance for shifting to new location</li> </ul>
			b) Owner of affected structure without title (squatter / encroacher)	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Cash compensation for entire structure at replacement value</li> <li>- Shifting allowance to new location</li> </ul>
			c) Tenant / leaseholder in the partially affected structure	PAPs, if displaced, will be entitled to the following: <ul style="list-style-type: none"> <li>- Transition allowance equivalent to two months' rent</li> <li>- Transport allowance for shifting to new location</li> </ul>

	Type of loss	Application	Definition of Entitled Person	Entitlement Policy
4	Loss of trade / livelihood / occupation or business incomes	Agricultural / industrial / commercial or institutional wage employment impacts	Individuals	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Employment in reconstructed enterprise or package for re-employment or starting a business</li> <li>- Transition allowance equivalent to three months incomes / wages in case of permanent closure.</li> <li>- In case of temporary closure, compensation will be wages equivalent to closure period.</li> </ul>
5	Loss of access to common resources and facilities	Loss of access to rural common property resources and urban civic amenities	Communities / Households	PAPs will be entitled to the following: <ul style="list-style-type: none"> <li>- Replacement of common property resources / amenities.</li> <li>- Access to equivalent amenities / services.</li> </ul>
6	Loss of standing crops	Standing Crops that could not be harvested	Owner of affected crops	PAPs will be entitled to cash compensation equivalent to market value of damaged crops.
7	Loss of perennial plants & trees	Affected Plants and trees	Owner of affected plants and trees	PAPs will be entitled to cash compensation equivalent to market value on the basis of type, age & productive value.
8	Loss of public infrastructure	Infrastructure (electric water supply, sewerage & telephone lines; public health center; public water tanks)	Relevant agencies.	Compensation in cash at replacement cost to respective agencies.
9	Temporary Losses	Affected structures or other fixed assets	Affected PAPs	In cash, on the basis of replacement cost of material and labor without deduction for depreciation or salvageable materials for the damages during the period of temporary possession.
		Severely affected structures	Affected PAPs made to shift temporarily from their present location	Entitlement will be in terms of rent allowance to cover the cost of alternate accommodation for the period of temporary displacement.
		Loss of crops and trees	Affected PAPs	compensation at market value and for loss of net income from subsequent crops that cannot be planted for the duration of temporary possession
		Temporary acquisition	Affected PAPs	No compensation for land if returned to the original user, but a monthly rent as per market value will be paid to PAPs. PAPs will be compensated immediately and damaged assets will be restored to its former condition.

## 6.4 Residual Impacts and Environment/Social Enhancements

Based upon the assessment presented in Sections 6.2.1, 6.2.2 and 6.2.3, the project will not have any significant and/or lasting impact on the environment or communities, provided the mitigation measures identified during the assessment are implemented.

On the other hand and based upon the recent experience of rehabilitation of the Taunsa Barrage project, a 'development assistance' approach has been adopted for the proposed project, instead of a narrowly focused mitigation (or 'do no harm') approach. The details of the development assistance are provided in the next Section.

To enhance the environmental performance of the project, design of the fish ladders will be reviewed during the project, to assess their effectiveness.

## 7 Environmental and Social Management and Development Plan

The Environmental and Social Management and Development Plan (ESMDP) presented here provides the mechanism to implement the mitigation measures and development assistance identified during the environmental and social assessment.

### 7.1 Institutional Arrangements

The overall responsibility for the implementation of ESMDP rests with PMO. To fulfill this responsibility, the Environment and Sociology Unit (ESU) has been established within PMO. ESU consists of the Director (Environmental and Social), the Deputy Director (Environment), the Deputy Director (Sociology), the Deputy Director (Social Assistance), and the Deputy Director (Communications). See **Figure 7.1** for a simplified version of the PMO's organizational structure.

The Construction Supervision Consultants will appoint a dedicated Environment and Social Supervisor (ESS), to ensure the ESMDP implementation during the project. ESS will supervise the contractor for the ESMDP implementation, particularly the mitigation measures. S/he will also be responsible for implementing the effects monitoring plan (discussed later in the Section).

The contractor will be required to appoint dedicated Environment/Social Officers at the site for the implementation of ESMDP in the field, particularly the mitigation measures. The contractor will also be responsible for communicating with and training of its staff in the environmental/social aspects. The contractor will develop the Health, Safety, Environment and Social (HSES) Plan, and get it approved by the Supervision Consultants before the commencement of the physical works on site. The construction contract will have appropriate clauses to bind the contractor for the above obligations.

### 7.2 Mitigation Plans

The environmental and social mitigation plans, respectively presented in **Tables 7.1** and **7.2**, are the most important elements of ESMDP. The plans provide mitigation actions against each impact, which could be encountered during different project activities.

### 7.3 Social Development Assistance

The objective of the social development assistance is to enhance the project benefits to the local communities in the command and project areas. The components of this initiative are discussed below.

#### 7.3.1 Water Supply Schemes in Saline-Water Zone

The annual canal closure affects the communities in the saline-water zone of the Mohajir Branch command area, since they are dependent upon the canal water even for their drinking water needs. To address this development need, a total of 54 water supply schemes in the Mohajir Branch command area

will be established, rehabilitated, or reconstructed during the proposed project. These include 28 new schemes to be established, 15 existing schemes to be rehabilitated, six existing schemes to be reconstructed, and six new water ponds to be constructed.

The above-mentioned water supply schemes will be rehabilitated/established by the Public Health Engineering Department (PHED), Government of the Punjab. A contract agreement will be signed between IPD and PHED for this purpose.

### **7.3.2 Agricultural Inputs**

The possible extended canal closure during the construction phase may reduce the crop yields (primarily the wheat crop) in the Thal Canal command area. To mitigate this impact, certified seeds of the early variety of wheat seeds will be provided, free of cost, to the small farmers in all the five districts of the Thal Canal command area.

The seed distribution activity will be implemented through the Punjab Rural Support Program (PRSP), who is involved in community mobilization and development activities in the province. A formal agreement between IDP and PRSP will be signed for this purpose.

In addition to the above, extension services will be provided to the targeted farmer households. The project will monitor construction progress and provide up-to-date information to the communities regarding the possibility of canal closure extension.

### **7.3.3 Assistance in Infrastructure Development**

In addition to the establishment/rehabilitation of water supply schemes and distribution of seeds, the following works will also be carried out in the project area, to further enhance the project benefits for the local communities:

1. Rehabilitation/construction of mosque at the Barrage.
2. Rehabilitation/extension of mosque at the Canal Colony.
3. Development of a public park at the Barrage (left-bank, downstream).
4. Establishment of a Basic Health Unit at the Canal Colony.
5. Rehabilitation and up gradation of Government Girls Primary School at the Canal Colony.
6. Rehabilitation and up-gradation of Government Boys Primary School at the Canal Colony.
7. Provision of Natural Gas to the Irrigation Colony
8. Provision of a telephone exchange (200 lines)
9. Reconstruction of approach road to the Irrigation Colony

The above works, implemented by PMO, are not likely to cause any significant environmental or social impacts, nor any cumulative impacts, in view of their nature and small scale.

## **7.4 Monitoring Plans**

### **Activity Monitoring**

The activity monitoring will be carried out at two levels: At the first level, the contractor (for the mitigation measures given in **Tables 7.1** and **7.2**), PHED (for the water supply works), PRSP (for the seed distribution), and PMO (for the infrastructure development works) will carry out internal monitoring to ensure that all the environmental and social requirements are adequately implemented. At the second level, ESS of the Supervision Consultants and ESU will monitor the implementation of the environmental and social mitigation measures. Appropriate checklists and forms will be developed for this purpose.

### **Effects Monitoring**

The effects monitoring will be carried out to determine the effectiveness of the mitigation measures provided in the Mitigation Plans. The Effects Monitoring Plan is provided in **Table 7.3**, and will be implemented by ESS of the Supervision Consultants.

### **Third Party Monitoring**

The M&E Consultants will carry out the third party monitoring of the entire project, and their scope of work will include the monitoring and evaluation of the ESMDP implementation (including Mitigation Plans, Effects Monitoring Plan, Social Development Assistance, and cumulative impacts).

### **7.5 Capacity Building**

The environmental and social trainings will help to ensure that the requirements of the ESIA, ESMDP and SDAP are clearly understood and followed by all project personnel. The primary responsibility of providing these trainings to all project personnel will be that of the contractor and Supervision Consultants. The trainings will be provided to different professional groups separately such as managers, skilled personnel, unskilled labors, and camp staff. An indicative training program is given in **Table 7.4**.

### **7.6 Documentation and Recordkeeping**

**Data Recording and Maintenance.** All forms and checklists to be used for recording information for activities such as the environmental and social monitoring will be prepared on a standard format, which will correspond to the database in to which all the gathered information will be placed. Check boxes will be used as much as possible to facilitate data entry. A tracking system will be developed for each form. A comprehensive system will be established to store the environmental and social data of the project.

**Meetings.** These will include the kick-off meeting, and daily/weekly meetings. The main focus of these meetings will be ESMDP compliance, non-compliances, and the measures to be taken to address them.

**Photographic record.** A comprehensive photographic record will be maintained of the key locations and key events of the project.

**Reports.** The Supervision Consultants will produce daily, monthly, and annual reports, as well as a final report on the social and environmental issues of the project. These reports will document the proceedings of the meetings described above, environmental trainings, the key outstanding issues, and the recommendations regarding their redressal.

### **7.7 Communication Strategy**

Recent experience in the infrastructure sector in Pakistan has increasingly shown the importance of taking into account the real and perceived concerns of stakeholders. Effective communications between the project agency and its stakeholders helps build trust and collaboration which in turn contributes to better project design and speedy implementation. To this end, very extensive stakeholder consultation were conducted during the project design and planning stage and while conducting the EA studies, as discussed in **Section 5** of this document.

The need to continue these consultations and communication with the stakeholders particularly the local communities during the project construction phase cannot be understated, and the success of the project can only be guaranteed by involving all the stakeholders - especially the farming communities in the saline zones, as the inhabitants of these areas are totally dependent on the continuous water supply for irrigation and household purposes - in this consultation and communication process. During the construction phase, it is very important to consult and involve stakeholders, on an on-going basis, to ensure liaison and a high degree of transparency among all the policy makers, IPD/PMO, contractor, consultants, the farming community and the media. Each of them will be encouraged to provide feedback on the design and implementation processes.

To meet the above needs, a Communication Strategy has been developed for the proposed project Lessons learnt from the Taunsa experience has proved invaluable in developing this Strategy. The key objectives and functions of the strategy are: to provide mechanism for two-way communication and consultations between the project personnel and the stakeholders, particularly the farmers in the command area; and to

provide necessary information to the farmers and other stakeholders on the key project activities such as canal closure, to receive their feedback in this respect, and to adjust the construction activities/schedule accordingly, where possible/necessary.

ESU will be responsible to implement the Strategy, and the Deputy Director (Communications) will be appointed in the Unit for this purpose (See **Figure 7.1**).

### **Communications Methods**

The following communication methods will be used as part of the Strategy:

- a) Involvement of policy makers. PMO will initiate a series of direct communication measures to inform and involve the policy makers including the concerned Ministers, members of the National Assembly (MNAs) and members of the Provincial Assembly (MPAs). This can be achieved by making presentations to them and holding briefing sessions with them on a regular basis. They will be invited to participate in the consultation process to ensure transparency and to gain public support for the project. This will be done simultaneously with the mass media campaign.
- b) Involvement of the local elected bodies. The *Nazims*, *Naib Nazims* and Councilors in the union councils are closely associated with the farming community. The project information, such as schedule for the annual or possible extended canal closure, will be disseminated to the communities through these elected representatives.
- c) Communication through *Numberdar* of village and *Imam Masjid* (Muslim prayer leader). Since *Numberdars* and *Imams* are also closely associated with the villagers, the project information can also be disseminated to the communities through them.
- d) Communication through PRSP. Being the project NGO, PRSP will also disseminate the project information, including schedule of the annual canal closure, to the communities, and obtain feedback from them, through its own communication mechanism.
- e) Communication through media: The print and electronic media are very effective means of mass communication, and have a vast reach among all potential project partners. The project will carry out a media analysis, as part of the Communication Strategy, to assess the reach and effectiveness of different publications, television and radio stations among the various target audiences, and to develop the most efficient and effective media campaign for the project.
- f) Involvement of IPD: IPD provides services to the farming community through its functionaries (*Zaildars* and *Canal Patwaris*). The issues regarding irrigation water of farming community are initially resolved through these functionaries. They will also be involved in the dissemination of information to the farmers and obtaining their feedback regarding the matters relating to the canals.

### **7.8 Grievance Redressal**

PMO will establish a Grievance Redressal Mechanism (GRM) for the project, and under this mechanism, a Grievance Redress Cell (GRC) will be established. GRC will be headed by the Director PMO; others members will include the Deputy Director (Sociology), the Deputy Director (Environment), ESS of the Supervision Consultants, Executive Engineer Irrigation at site, one Sub Divisional Officer, a representative of local administration, the supervising engineer, and a representative from the local communities. The sub-divisional officer will be the key grievance redressal officer. The project will establish a Project Information Centre at the Barrage site and a Grievance Register will be placed there for logging complaints and grievances. All written and oral grievances will be recorded in the Register.

All grievances will be responded to within two weeks, and the complainant will be informed about the response/resolution of grievance. If the complainant does not receive a response from GRC within two weeks of the complaint, or is not satisfied with the response or resolution, he/she would submit an appeal to IPD.

## 7.9 Cost Estimates

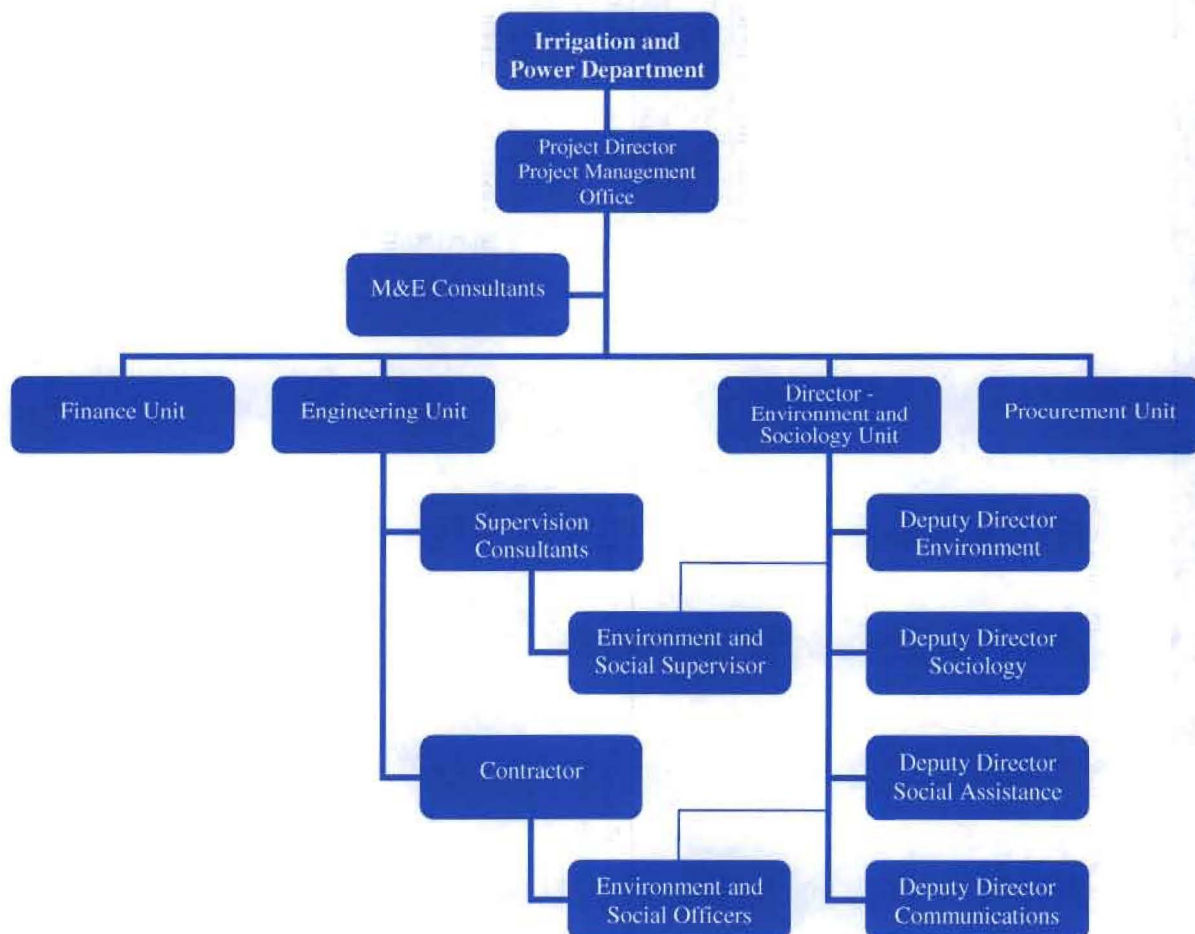
The total cost of the environmental and social management of the proposed project is about 652 million Rupees, or about 9 million US dollars. This includes the cost of environmental and social monitoring, environmental and social trainings, tree plantation, waste disposal plan, emergency response plan, traffic management plan, and third-party monitoring. Also included in this estimate is the cost of the social development assistance discussed in **Section 7.3** above. The cost summary is provided in **Table 7.5**.

## 7.10 Public Disclosure

In accordance with the national regulatory requirements and the WB disclosure policy, two disclosures of the ESIA and SDAP were carried out, first in the third week of September 2009 and second on October 3, 2009 at the project site. The Punjab Environmental Protection Agency (EPA) held the hearing and public meeting in the process of providing no objection to the project and its EA and SDAP reports. Prior to the meeting, the Urdu translation of the summaries of these reports were distributed among the stakeholders; copies of these summaries and the ESIA and SDAP reports were also placed at the IPD office, site office, District libraries of Mianwali and Khushab and at the Punjab EPA. The public meetings were participated by large group of people, and stakeholders including NGOs, women, fishermen, and farmers.

The copies of ESIA and SDAP will also be sent to the Bank's InfoShop, in accordance with its disclosure policy.

**Figure 7.1: PMO Organization**



**Table 7.1: Environmental Impact Mitigation Plan**

	Description	Impacts	Mitigation Measures / Actions
1.	Borrow area for extraction of earthen material. Construction and dismantling of coffer dams	Soil erosion; Loss of fertile soil; obstruction in natural drainage	<p>1.1 The contractor has to extract the material from the specified and demarcated borrow areas.</p> <p>1.2. No agricultural land will be used as a borrow area.</p> <p>1.3 Ensure that:</p> <ul style="list-style-type: none"> <li>i. Excavation of borrow areas is as per instructions of the Supervision Consultant's environmentalist.</li> <li>ii. Top six inches top soil is removed and stored separately.</li> <li>iii. Land is excavated not more than 3 feet depth as compared to adjacent leveled fields.</li> <li>iv. The field slopes are maintained</li> <li>v. Top soil has been spread back during restoration process.</li> </ul> <p>1.4 Contractor to get the approval from ESS before start of the construction and dismantling of the coffer dams.</p> <p>1.5 Ensure that the surface drainage is provided to control the surface run off during rainy season.</p> <p>1.6 Ensure that the movement of excavating machinery and vehicles is limited to the work area.</p> <p>1.7 Ensure that erosion protection measures are taken, such as retaining wall and avoidance of steep cuts.</p> <p>1.8 Ensure that the barrow areas are leveled and top soil restored.</p>
2.	Waste generation and disposal	Soil and water contamination; obstruction in natural drainage; obstruction of community paths; aesthetic problem	<p>2.1 Ensure that the site selected for waste disposal is demarked before starting the work (waste could be disposed on: (1) right bank downstream of the barrage adjacent to the disposal site of Jinnah Hydropower Project; and (2) on left bank upstream adjacent to the guide bank.)</p> <p>2.2 Ensure that all the waste generated from different locations must be disposed off according to the Waste Disposal Plan.</p> <p>2.3 Ensure that photographs of selected area are taken prior to and after the waste disposal.</p> <p>2.4 Ensure that all trucks used for the transportation of waste construction material will be airtight and watertight.</p> <p>2.5 Ensure that Contractor obligations defined in contract document and Social Framework Agreement (SFA) are followed.</p> <p>2.6 Ensure that the movement of waste lifting machinery and vehicles is limited to the work area.</p> <p>2.7 Ensure that waste material is properly disposed off in a manner that does not affect the natural drainage.</p> <p>2.8 Ensure that the dumping area has been leveled properly after disposal of waste material.</p> <p>2.9 Ensure that: material suitable for recycling stored separately in three bin system and sold; the combustible waste burnt at burn pit only; non-combustible, non recyclable garbage sent to the designated landfill site in an area; medical waste if any transported to any hospital incineration plant; solid residue from the septic tanks transported to municipal sewage facilities at Mianwali / Daud Khel; and the contaminated soil sent to burn pit or landfill. Minimize smoke emissions from the burn pit by managing the quantity of waste to be burnt at one time.</p>



	Description	Impacts	Mitigation Measures / Actions
3.	Establishment and operation of labor camps, material and equipment yards and approach roads.	Change in land use and land form; contamination of soil and water; soil erosion; resource consumption; additional load on local facilities/utilities such as schools, hospitals, electricity and water supply	<p>3.1 Ensure that the sites for camps and other site facilities are approved by the supervision consultants/PMO, and no private land is used for this purpose.</p> <p>3.2. No involuntary land acquisition will be carried out (otherwise, a Resettlement Action Plan (RAP) will be prepared). Photographic record to be maintained to record the baseline condition before establishing the caps/other facilities.</p> <p>3.3 Ensure that camp size is as per standard specifications.</p> <p>3.4 Ensure that washing areas are demarcated and water from washing areas and kitchen is released in sumps.</p> <p>3.5 Ensure septic tanks of appropriate design have been used for sewage treatment and outlets are released into sumps.</p> <p>3.6 Ensure that the outlets released into sumps must not make a pond of stagnant water.</p> <p>3.7. Ensure that latrines, septic tanks, and sumps are built at a safe distance from water body, stream, or dry streambed, and the sump bottom is above the groundwater level.</p> <p>3.8 Ensure that sumps are in absorbent soil, down slope and away from the camp, downstream from the camp water source and above the high watermark of any nearby water body.</p> <p>3.9 Ensure that effective drainage is in place at the site.</p> <p>3.10 Contractor to make assessment of existing sewerage and drainage system in the canal colony and carry out renovation / expansion works in consultation with IPD.</p> <p>3.11. To avoid the chemical and oil spills in storm water runoff such materials should be properly stored.</p> <p>3.12. In case of emergency spills, standard operating procedures should be developed and followed.</p> <p>3.13. Fuel wood will not be used in the camp or in the field.</p> <p>3.14. Fuel and water consumptions will be recorded.</p> <p>3.15. Contractor to ensure that the local facilities/utilities are used in a manner not to negatively affect the local communities/existing consumers.</p>
4.	Access tracks	Soil erosion; Blockage of natural drainage; dust emission; loss of natural vegetation; safety hazard for communities; damage to public infrastructure; cumulative impacts of PBIP-II and Jinnah hydropower project.	<p>4.1 The moving machinery should remain within the project boundary.</p> <p>4.2 All sections of the access tracks that are prone to dust emission and where sensitive receptor are located within 500 m should be identified and marked on the map of the project area.</p> <p>4.3. Ensure that the access tracks which are prone to dust emissions and marked on the map should be maintained by water spraying daily.</p> <p>4.4 After completion of construction work all the damaged roads / tracks will be restored by the Contractor, as it is included in Contractor's obligations defined in contract document.</p> <p>4.5 Ensure that gravel is dumped only on locations allowed by ESS and dumping of gravel does not result in blocking of traffic or damaging vegetation.</p> <p>4.6 Ensure that construction corridors along the access roads are marked on map.</p> <p>4.7 Ensure that the access roads do not block the natural drainage and culverts are constructed where necessary.</p> <p>4.8 Ensure that surface run-off controls are installed and maintained so as to minimize erosion.</p>

	Description	Impacts	Mitigation Measures / Actions
			<p>4.9 Ensure adherence to the speed limit of 40 km/hr at the access roads.</p> <p>4.10. Ensure that the access tracks particularly on the right bank do not interfere with the Jinnah hydropower project, and that there are no cumulative impacts associated with the establishment and operation of the tracks.</p> <p>4.11 Ensure that vegetation clearing is minimized and no trees are felled without prior permission of ESS. Compensatory tree plantation will be carried out if any trees are felled. If the cutting of more than 100 trees at one place is involved, then the Contractor will consult Forest/Wildlife Departments prior to cutting of these trees.</p>
5.	Linkage with the Jinnah Hydropower Project.	Blockage of road traffic; disruption of works at the other project sites; cumulative impacts of the two projects	<p>5.1. Ensure that Contractor maintains coordination with the hydropower project contractor where needed, and that there are no cumulative impacts.</p> <p>5.2. The Contractor will be responsible for preparation and seeking approval of the Traffic Management Plan at least one month prior to start of mechanical works/rehabilitation of gates on the Barrage, in coordination with the Hydropower project.</p> <p>5.3. The contractor will report any significant violation of EMP at the hydropower project site, particularly those affecting the Barrage project, or causing cumulative impacts.</p>
6.	Construction activities; handling of fuels, lubricants and chemicals	Soil and water contamination; safety hazard; damage to crops; air contamination; noise emissions; damage to natural vegetation, habitat and wildlife	<p>6.1 Ensure that the maintenance of vehicle and other equipment takes place only in designated areas underlined with concrete slabs and a system to collect runoff in to mud pit.</p> <p>6.2 Ensure that no contaminated effluent is released in to the environment.</p> <p>6.3 Ensure machinery wash and other potentially contaminated effluents are released in mud pit.</p> <p>6.4 Ensure that fuels, oils, and other hazardous substances are handled and stored according to standard safety practices such as secondary containment. Fuel tanks should be labeled and stored in impervious lining and dykes etc.</p> <p>6.5 Ensure spills are avoided during fuel and oil transfer operations. Appropriate arrangements, such as concrete base or drip pans, should be used to avoid spills.</p> <p>6.6 Ensure fuels, oil and chemical storage are daily checked for leakage.</p> <p>6.7. Ensure that shovels, plastic bags, sand bags and absorbent materials, are kept available near fuel and oil storage areas.</p> <p>6.8. Ensure that vehicle refueling is planned on need basis to minimize travel and chance spills.</p> <p>6.9. Ensure that operating vehicles are checked regularly for any fuel, oil, or battery fluid leakage.</p> <p>6.10. Ensure that leak /spill record is maintained for each vehicle and such vehicles are operated after proper repair.</p> <p>6.11. Soil contaminated by minor spill (covering an area up to 1 m<sup>2</sup> and 7.5 mm deep) will be collected and disposed at burn pit.</p> <p>6.12. Ensure that soil contaminated by moderate spills or leaks (up to 200 liters) is controlled using shovels, sand and mud. The contaminated soil will be removed from the site and disposed off at landfill or burn pit as required. Major spills (exceeding 200 liters) will be handled and controlled by specialized contractor as suggested in waste disposal plan of ESIA report.</p> <p>6.13. In case if the agriculture land/crops are damaged y the construction activities, proper</p>

Description	Impacts	Mitigation Measures / Actions
		compensation will be paid to the owner by the Contractor.
		6.14. If during the construction activities, any archeological or religious sites (such as graves) are found, these will be protected, in consultation with PMO, the relevant communities and the concerned Departments.
		6.15. Ensure that dust emissions due to vehicular traffic are minimized by reduced speed, vehicular traffic minimized through good traffic management and water sprinkling when required.
		6.16. Ensure that dust emissions at the construction sites are minimized by implementing good housekeeping and sound management practices.
		6.17. Using strict standards for maintenance of construction machinery and sprinkling of water, dust and smoke can be minimized.
		6.18. Ensure that all equipment, generators and vehicles used during the construction are properly tuned and maintained in good working condition in order to minimize the emissions.
		6.19. Contractor obligation is to use appropriate and fit machinery keeping noise levels within NEQS.
		6.20. Ensure prohibition of use of vehicle horns anywhere inside the fenced areas or on the access roads is strictly observed.
		6.21. Ensure that drivers are discouraged from keeping vehicles running in parking lots.
		6.22. At unavoidable noisy places, the workers should be provided ear plugs and other protective devices.
		6.23. Fuel consumption will be recorded.
		6.24. Ensure that during aligning the access roads, and other construction activities, minimum vegetation is lost. If any tree is uprooted, ensure that the Contractor has planted at least three fold of trees lost.
		6.25. Ensure that endangered trees species (if any) indicated in ESIA are not cut.
		6.26. After completion of construction phase the vegetation of the area should be restored through plantation of the indigenous species.
		6.27. Adequate water supply to riverine floral habitat should be maintained during construction phase of the project.
		6.28. Ensure camp waste/food waste is disposed in such a way that animals are not attracted.
		6.29. Natural habitats should be maintained to the maximum extent and undue interference should be avoided during construction phase of the project.
		6.30. Sighting of any endangered species should be documented and activities should be carried out to reduce negative impacts on such species.
		6.31. Contractor's staff should be strictly prohibited from buying any wild animals/birds.
		6.32. Ensure that there is no open defecating in the vicinity of camps or construction site.
		6.33. Ensure that discharging firearms is not allowed.
		6.34. Ensure that safe driving practices are observed so that the accidental killing of reptiles or small animals crossing the roads could be avoided.

	Description	Impacts	Mitigation Measures / Actions
			<p>6.35. Ensure that damage to the natural topography and landscape is minimized.</p> <p>6.36. Ensure that the no-hunting, no-trapping, no-harassing and no-fishing policy is strictly observed.</p> <p>6.37. Ensure that the general awareness of the crew is enhanced regarding the wildlife and natural vegetation, through environmental training, and notices boards.</p> <p>6.38. The construction and dismantling of coffer dam may be done in a way to minimize the water turbidity.</p> <p>6.39. Planning, designing and execution of the project should be carried out through adopting proper mitigation measures to conserve aquatic life. Ensure that no oil/lubricant or other toxic materials are released into the river.</p>
7.	Installation and operation of batching plant	Soil, air and water contamination; safety hazard for communities	<p>7.1 Ensure that no private land is used for installation of the batching plant.</p> <p>7.2 Ensure that location of batching plant must be at least 500 meters away from the settlement.</p> <p>7.3 Ensure that batching material is stocked on specified area in compliance with specifications of installation of batching plant.</p> <p>7.4 Ensure that the batching plant is installed with emission-control mechanism.</p> <p>7.5 Ensure that batching plant does not contaminate the soil and water, or block natural drainage.</p>

Table 7.2: Social Impact Mitigation Plan

	Description	Impacts	Mitigation Measures / Actions
1	Land acquisition	Involuntary resettlement; loss of assets and income opportunities; damage to crops	<p>1.1. All sites required for construction activities, camps, offices and workshops are owned by IDP, and no private land acquisition is envisaged.</p> <p>1.2. In case private land acquisition has to be undertaken, a RAP will be prepared, in accordance with the WB guidelines and RPF agreed under the project, See <b>Table 6.1</b> for entitlement matrix</p>
2	Water consumption	Water shortage for the local communities	<p>2.1 Avoiding wastage of water through conservation techniques and selection of adequate water supply sources, ensuring no impact on local consumptions.</p> <p>2.2. Record will be maintained for water consumption.</p>
3	Interruption of canal water supply	Disruption of irrigation water supply; disruption of drinking water supply in the saline-water zone	<p>3.1. Rehabilitation activities will be carried out during scheduled canal closure periods.</p> <p>3.2. A feeding channel will be constructed to ensure the water supply to Mohajir Branch Canal during any unlikely extended canal closure during the construction phase.</p> <p>3.3. The communities will be kept well informed of the construction activities relating to the Thal Canal</p>
4	Social issues	Local conflicts; privacy of women	<p>4.1 Ensure that conflicts with tribal leaders and local communities are avoided.</p> <p>4.2 Ensure that women are informed through traditional means of communication of the presence of foreigners (if any) in their area.</p> <p>4.3 Ensure that individuals holding titles to private property used in the project (if any) are compensated in accordance with the market rates and all payments are recorded.</p> <p>4.4 Ensure that focus group meetings are conducted with both men and women to identify any</p>

	Description	Impacts	Mitigation Measures / Actions
			<p>water related and other issues related to project implementation.</p> <p>4.5 Ensure that PMO representatives visit the site monthly and gather complaints from Social / Environment Complaints Management Register and provide feedback to the concerned on the compliance status.</p> <p>4.6 Ensure that project staff interaction with local community is minimized.</p> <p>4.7 Ensure that guidelines are prepared and implemented to sensitize laborers to local norms and customs in order to minimize cultural tensions.</p>
5	Public health and safety issues	Safety hazard for local population; health hazard for local population and project staff	<p>5.1. The contractor will develop and implement a Health, Safety, Environment and Social (HSES) plan.</p> <p>5.2. Due precautions shall be taken by the Contractor, to ensure the safety of his staff and labor and, in collaboration with and to the requirement of the local authorities.</p> <p>5.3 Ensure that medical staff headed by qualified medical doctor, first aid equipment and stores, sick bay and suitable ambulance service are available at the camps, housing, and on the site at all times throughout the period of the contract and that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.</p> <p>5.4. Ensure no machinery is left unattended in the project area.</p> <p>5.5. Ensure that a proper ambulance (preferably a four-wheel-drive vehicle should be available at site on 24- hour basis).</p> <p>5.6. Ensuring that all materials, gears and equipment (including personal protective equipment) needed to carry out the job safely has been provided to the workers.</p> <p>5.7. Ensure that employees have access to running potable water at their place of work and also shadow area is provided for rest.</p> <p>5.8. Ensure that use of horns is prohibited, except when necessary.</p> <p>5.9. Ensure all entry points into construction sites are staffed 24 hours a day.</p> <p>5.10. Ensure that safe driving practices are adopted, particularly while passing close to settlements. This includes a speed limit of 40 km per hour if passing within 100 m of settlements anywhere in the project area.</p> <p>5.11. A proper screening of labor should be done at the time of recruitment. Ensure that periodic awareness campaigns for HIV/AIDS are undertaken for the project staff.</p> <p>5.12. Ensure that a risk assessment of the spread of HIV/AIDS is undertaken in the project area on the basis of data from the Punjab HIV/AIDS program.</p>
6	Employment opportunities	Local dissent associated with influx of workers from other parts of the country	<p>6.1. Ensure that maximum employment may be provided to the local people.</p> <p>6.2. Ensure that inter tribal balance is maintained when giving employment to the local population. Preference to be given to the people directly affected by the project.</p>
7	Aesthetic/ scenic quality.	The construction activities could affect the aesthetic / scenic value of the area	<p>7.1. Carry out complete restoration of the construction sites. Remove all waste, debris, unused construction material, and spoil from the worksites.</p> <p>7.2. Develop a public park at the Barrage to increase its value for the communities.</p>

**Table 7.3: Effects Monitoring Plan**

	Description	Monitoring Location	Monitoring Parameters	Frequency of Measurement
1.	<b>Construction Phase</b> Ambient air quality	Barrage, batching plant site, labor camp site and borrow areas.	NO <sub>x</sub> , SO <sub>x</sub> , CO and Particulate matter (PM <sub>10</sub> ).	Quarterly
2.	Quantity and quality of ground water used for domestic purposes.	Camp site and 1 km away from the camp site.	Water table depth, discharge, physical-chemical parameters, biological contamination, heavy metals and toxic organic compounds.	Quarterly
3.	Quality of surface water used for construction activities	At source of surface water used.	pH, EC, SAR and RSC	Quarterly
4.	Emission of dust, smoke and potential air pollutants from the construction machinery.	Construction sites, campsite, access roads, borrow areas.	Dust, smoke, gases	Throughout construction phase
5.	Visual check for exhaust emissions from the vehicles.	Construction sites, campsite, access roads, borrow areas.	Visible emissions.	During routine monitoring.
6.	Visual check for vegetation loss	Construction site, campsite, access roads, borrow area.	Type and number of tree species uprooted.	At the beginning of construction activities.
7.	Noise	Construction site, camp site, access roads, communities within 500 m of construction site.	Noise measurement	Once a week throughout the construction phase.
8.	Soil erosion	Construction site, campsite, access roads, borrow area.	Visual observations for street or rill/gully erosion.	During routine monitoring of entire project activities especially after rains.
9.	Resource utilization	Project site.	Quantity of material used including water and fuel	Daily during construction phase.
10.	Solid Waste Generation	On camp site and Construction site.	Any sign of soil or water contamination; any un-disposed waste	Daily during whole construction phase.
11.	Wastewater generation	Camp site, offices, colony and construction site.	Waste water generation rate, integrity and maintenance of the septic tanks and soaking pits, any sign of soil or water contamination	To be determined through water management techniques.
12.	Oil wastes /spills	Oil storage area, vehicle washing lines; any other spill area.	Facilities to control the accidental oil spill as per oil spill contingency plan; any sign of soil or water contamination	Daily during construction phase
13.	Socioeconomic issues	At project locations; settlements	Local people recruited for all manual labor and other jobs for which local skill are available; grievances of and conflicts with communities;	During construction phase

	Description	Monitoring Location	Monitoring Parameters	Frequency of Measurement
14.	Monitoring of Indus Dolphin (The M&E consultants will contract Punjab Wildlife Research Institute and/or WWF to monitor the dolphins and other aquatic life. They would prepare plan needed to deal with dolphin/fish sightings and distress.)	Immediately upstream and downstream of Jinnah Barrage	Dolphin population survey through observing surfacing; fish survey; effectiveness of the fish ladders.	Throughout the construction phase
15.	Monitoring of water flows in the river and Thal Canal	Jinnah Barrage and various location in the Thal Canal	Water flows. Also vigilance on any water thefts in particular during low flow periods	Throughout the construction period
16	Monitoring of cumulative impacts	All project sites, particularly near hydropower project sites; community schemes under SDAP	All environmental and social parameters such as soil erosion, soil/water contamination, noise, air contamination, vehicular traffic, local resource utilization, and other impacts on communities.	Throughout the construction period
<b>Operation Phase</b>				
1.	Restoration	At all project locations (construction sites, camp sites, offices, tracks and others)	Restoration and rehabilitation as per Restoration Plan	At the end of the construction phase
2.	Surface Water quantity and Quality	Upstream and downstream of the Barrage, at the same locations where design- and construction-phase monitoring was done	Flows, pH, conductivity, TSS, TDS, BOD and COD.	Once in pre and post monsoon season for 2 years. Flows on a regular basis
3.	Ground water Quality	Water sources used for construction purposes and dug wells within 1 km from wastewater mud ponds (if any). At the same location where construction-phase monitoring was done	Physical- chemical parameters, heavy metals and toxic organic compounds.	Once in pre and post monsoon season for 2 years.
4.	Soil Erosion	At project sites and along the aligned borrow areas; at locations prone to soil erosion.	Visual observations.	After site restoration.
5.	Habitat Disturbance	Within the project boundaries.	Visual Observation.	At the end of the construction phase
6.	Compensatory tree plantation	According to the tree plantation plan.	Survival rate of tree saplings.	Once/twice in a year for three years.

**Table 7.4: Training Plan**

Staff	Trainer	Contents	Schedule
Selected field staff of PMO	ESU Specialists; ESS of the Construction Supervision Consultants	Environmental and social aspects, particularly sensitivities of the project; Key finding of the ESIA, SDAP and ESMDP; Social and cultural values of the area; Leadership dynamics.	Before construction activities
All site personnel <ul style="list-style-type: none"> <li>Contractor: Managerial staff, engineers, Environment, social, health and safety staff.</li> <li>Consultants: Managerial staff and engineers</li> </ul>	ESS of the Construction Supervision Consultants	Environmental and social aspects, particularly the sensitivities of the project; Wildlife and vegetation related sensitivities of the project; Key finding of the ESIA, SDAP and ESMDP; Mitigation measures; Contingency plan; Community issues; Social and cultural values of the area	Before and during construction stage
Construction crew	ESS of the Construction Supervision consultants; Environmental and Social Officers of the contractor	ESMP; ESMDP; Waste disposal; HSES plan	Before and during construction stage
Drivers	Environmental and Social Officers of the contractor	HSES plan; Road safety; Road restrictions; Vehicle restrictions; Defensive driving; Waste disposal; Social and cultural values of the area.	Before and during the construction
Mechanics	Environmental and Social Officers of the contractor	Waste disposal; HSES plan; Vehicle restriction	Before and during the construction
Camp staff	Environmental and Social Officers of the contractor	HSES plan; Camp operation Waste disposal Natural resource conservation Housekeeping	Before and during the construction
Restoration team	ESS of the Construction Supervision consultants; Environmental and Social Officers of the contractor	Waste disposal; Site restoration; Leveling and dewatering of burrow area	Before the start of the restoration activity



**Table 7.5: Environmental and Social Management Cost**

	Description	Cost (Million Rupees)
<b>Environmental Management Plan (EMP)</b>		
1	Environmental Monitoring	1.00
2	Trainings	0.30
3	Tree Plantation	0.80
4	Emergency Plan	1.00
5	Traffic Management Plan	2.00
6	Waste Disposal Plan	0.50
7	Water Supply and Wastewater Treatment	0.85
8	Site Visits by Regulators and Authorities	0.20
9	Environmental and Social Audit (3 Annual Audits)	0.90
<b>Social Development Action Plan (SDAP)</b>		
10	Assistance for Seed for Thal Canal Command Area	450.00
11	Water Supply Schemes (Saline-water zone of Mohajir Branch)	154.00
12	Social Development Initiatives in Barrage Area	40.50
13	Contingencies	70.00
<b>Total EMP and SDAP</b>		<b>722.05</b>
		<b>Say US\$ 9 million</b>

## Annex A: Consultation Details

### Summary:

**Total Consultations: 214;**

**Total Participants: 1963**

### First Round of Public Consultations / Disclosure

	Date	No. of Participant	Status	Venue	Purpose of Meeting
<b>Focus Group Meeting</b>					
1	11/10/2007	6	Farmers/ Inhabitants	Kacha Arain, Daud Khel, District Mianwali	(i) To inform the farmers about the existing nature of the project and the scope of work involved in the execution of project about the project; (ii) provide a forum for the initial definition of critical environmental and social issues; (ii) To thrash out the community concerns, problems and demands; (iii) to sort out possible solution of the problems; (iv) to motivate the local community for having project partnership and active cooperation for implementation and successful completion of project
2	11/11/2007	4	Farmers/ Inhabitants	Chandana, Daud Khel, District Mianwali	
3	25/12/2007	6	Farmers/ Inhabitants	Mouza Arain	
4	15/02/2008	22	Farmers/ Inhabitants	Jinnah Barrage, Daud Khel, District Mianwali	
5	26/12/2007	10	Farmers/ Inhabitants	Mitha Tiwana Mohajir Branch	To collect data about the socio economic condition in the village. The key issues identified by the farmers were 1. Irrigation Water is problem 2. The distributaries do not flow at design discharge 3. Water theft ratio is very high 4. Political interference causes irrigational problems
6	17/02/2008	5	Farmers/ Inhabitants	Chak No. 386 TDA, Head Anayat Disty	(i) to inform the farmers about the existing nature of the project and the scope of work involved in the execution of project about the project; (ii) provide a forum for the initial definition of critical environmental and social issues;(ii) To thrash out the community concerns, problems and demands; (iii) to sort out possible solution of the problems; (iv) to motivate the local community for having project partnership and active cooperation for implementation and successful completion of project
7	17/02/2008	8	Farmers/ Inhabitants	Chak No. 537 TDA, Middle Anayat Disty	
8	17/02/2008	10	Farmers/ Inhabitants	Chak No.578 TDA, Tail Anayat Disty	
9	17/02/2008	10	Farmers/ Inhabitants	Chak No. 360 TDA, Head Machoo Disty	
10	17/02/2008	10	Farmers/ Inhabitants	Chak No. 625 TDA,Middle Machoo Disty	
11	17/02/2008	9	Farmers/ Inhabitants	Chak No. 641 TDA,Tail Machoo Disty	
12	18/02/2008	9	Farmers/ Inhabitants	Chak No. 352 TDA, Head Hayat Disty	
13	18/02/2008	8	Farmers/ Inhabitants	Chak No.645 TDA, Middle Hayat Disty	
14	18/02/2008	8	Farmers/ Inhabitants	Chak No.510 TDA, Tail Hayat Disty	
15	18/02/2008	9	Farmers/ Inhabitants	Chak No. 132 TDA, Head Bhaghal Disty	
16	18/02/2008	10	Farmers/ Inhabitants	Chak No. 170 TDA, Middle Bhaghal Disty	
17	18/02/2008	6	Farmers/ Inhabitants	Chak No. 523 TDA,Tail Bhaghal Disty	
18	18/02/2008	11	Farmers/ Inhabitants	Chak No. 120 TDA, Head Layyah Disty	
19	18/02/2008	7	Farmers/ Inhabitants	Chak No. 148 A, Middle Layyah Disty	
20	18/02/2008	8	Farmers/ Inhabitants	Chak No. 149 A, Tail Layyah Disty	
<b>Interview /Official Consultation</b>					
21	24/11/2007	1	Head PMO	Office of the PMO Barrages	1. To discuss the possibility of there being cumulative environmental impacts resulting from the rehabilitation works. 2. To identify potential areas for construction facilities and the residential camps, and potential environmental and social issues.
22	11/09/2007	2	Executive Engineer IPD; and SDO	Jinnah Barrage	Collection of secondary data regarding flow and other barrage related activities.
23	15/02/2007	1	Ing Jose Ignacio Gori B, Project Manager	Jinnah Hydropower Project	To discuss the possibility of there being cumulative environmental impacts resulting from construction works for the JHPP and the Barrage Rehabilitation project being

	Date	No. of Participant	Status	Venue	Purpose of Meeting
					carried out simultaneously.
24	15/02/2008	1	Local Fishermen	Jinnah Barrage	He said that the main period for upstream migration was from the middle of March to the middle of July. Species which he had observed using the ladder was, Khaga (Thaila), Morakha, Raho (Rahu) and Mali (Mullee).
25	15/02/2008	2	Asstt Director Fisheries; and Wildlife Inspector	Mianwali	Informed about the project.
26	16/02/2008	1	Range Management Officer	Forestry Department Mianwali	He said that the Forestry Department would be keen to assist in any replanting scheme which the ESMP proposed. They would be keen to help identify suitable areas in which replanting could be undertaken and would identify species suitable for the location and which were diseased resistant.
27	16/02/2008	1	Assistt Director Fishery Deptt.	Mianwali	To identify concerns which the Fisheries Department might have with regard to the functioning of the existing fish ladder at Jinnah Barrage and to note any suggestions which they might have regarding the possibility for improvement as part of the proposed project.
28	16/02/2008	1	District Wildlife Officer	Mianwali	To inform the Department of the Project and that as a result of the rehabilitation changes in the flows in the river would be unlikely to have any significant impacts on the downstream protected areas.
<b>Individual Women Consultation Meeting</b>					
29	11/09/2007	1	Resident	Chanki Mouza	Informed about the project and collected information regarding socio economic conditions
30	11/09/2007	1	Resident	Jabbi Mouza	
31	11/09/2007	1	Resident	Nali Mouza	
32	11/09/2007	1	Resident	Khaligabad	
33	11/10/2007	1	Resident	Waheer Mouza	
34	11/10/2007	1	Resident	Pul Pindi Mouza	
35	25/12/2007	1	Resident	Paki Shah Mardan	
36	25/12/2007	1	Resident	Kot Chandana	
37	25/12/2007	1	Resident	Mouza Arain	
38	25/12/2007	1	Resident	Neher Colony settlement	
39	25/12/2007	1	Resident	Jalalpur	
40	26/12/2007	1	Resident	Hadli Mouza	
41	26/12/2007	1	Resident	Mitha Tiwana Muhajier Branch	
42	26/12/2007	1	Resident	Gunjal Mouza	
<b>Total</b>		<b>200</b>			

### Second Round of Public Consultations / Disclosure

	Date	No. of Participant	Status	Venue	Purpose of Meeting
<b>Focus Group Meetings</b>					
1	01-02-2009	8	Female Participants	Village Nari Shumali, Numberdar House	Survey team explained to the women about the proposed project objectives and the purpose of the current assignment (Social Development Action Plan) in detail, consultation meetings were held with the female participants in the surveyed villages and information was shared about project potential inputs on the area and obtained the key concerns highlighted by the women
2	01-02-2009	11	Female Participants	Village Nari Janubii, Numberdar House	
3	01-02-2009	10	Female Participants	Village Ghous Nagar, Numberdar House	
4	01-02-2009	12	Female Participants	Chak No. 65 MB, Councilor House	
5	01-02-2009	4	Female Participants	Nali Shumali, Councilor House	
6	01-02-2009	3	Female Participants	Pindi Shumali, Councilor House	

	Date	No. of Participant	Status	Venue	Purpose of Meeting
7	02-02-2009	15	Female Participants	Waheer Shumali, Numberdar House	relating to the barrage rehabilitation projects are (i) extended canal closure of Thal canal (ii) opportunities of employment in the construction phase, (iii) privacy of women, (iv) resolution of conflicts during construction phase.
8	02-02-2009	11	Female Participants	Waheer Janubi, Numberdar House	
9	02-02-2009	11	Female Participants	Village Pindi Janubi, Numberdar House	
10	02-02-2009	8	Female Participants	Village Kund Janubi, Numberdar House	
11	02-02-2009	12	Female Participants	Village Kund Shumali, Nazim House	
12	02-02-2009	8	Female Participants	Village Kund Janubi, Nazim House	
13	02-02-2009	5	Female Participants	Heru Dakhli Chanki, Nazim House	
14	02-02-2009	6	Female Participants	Kund Wala Siphon, Nazim House	
15	02-02-2009	3	Female Participants	Basti Hafizabad, Village Head House	
16	03-02-2009	19	Female Participants	Dera Sagrali, Numberdar House	
17	03-02-2009	19	Female Participants	Khaliqabad, Numberdar House	
18	03-02-2009	8	Female Participants	Chak No. 59 MB, Councilor House	
19	03-02-2009	7	Female Participants	Chak No. 60 MB, Councilor House	
20	03-02-2009	12	Female Participants	Chak No. 58 MB, Numberdar House	
21	03-02-2009	5	Female Participants	Chak No. 61 MB, Livestock Farm	
22	03-02-2009	4	Female Participants	Dera Malik Saleem Nehaj	
23	04-02-2009	36	Female Participants	Village Sandral, Numberdar House	
24	04-02-2009	35	Female Participants	Kora, Councilor House	
25	04-02-2009	19	Female Participants	Village Har du Ghanj, Numberdar House	
26	04-02-2009	4	Female Participants	Araik Pur, Numberdar House	
27	04-02-2009	12	Female Participants	Namawali, Numberdar House	
28	04-02-2009	10	Female Participants	Thati Kalrani, Nazim House	
29	05-02-2009	28	Female Participants	Tilokar Shumali, Numberdar House	
30	05-02-2009	12	Female Participants	Tilokar Janubi,, Numberdar House	
31	05-02-2009	39	Female Participants	Kurar, Numberdar House	
32	05-02-2009	18	Female Participants	Dhok, Numberdar House	
33	05-02-2009	23	Female Participants	Bansi, Numberdar House	
34	05-02-2009	7	Female Participants	Bhalwal, Numberdar House	
35	05-02-2009	19	Female Participants	Rajar, Numberdar House	
36	06-02-2009	11	Female Participants	Village 54 MB, Numberdar House	
37	06-02-2009	16	Female Participants	Village 55 MB, Councilor House	
38	06-02-2009	19	Female Participants	Village 56 MB, Numberdar House	
39	06-02-2009	19	Female Participants	Village 57 MB, Numberdar House	
	06-02-2009	19	Female Participants	Village Shiwala, Numberdar House	
40	07-02-2009	14	Female Participants	Village Noor wana, Councilor House	
41	07-02-2009	15	Female Participants	Village Khair Pur, Numberdar House	
42	07-02-2009	6	Female Participants	Jandran, Numberdar House	
43	07-02-2009	3	Female Participants	Shera Doodi Dera, Councilor House	
44	08-02-2009	6	Female Participants	Chak 63 M, Councilor House	
45	08-02-2009	10	Female Participants	Chanki Shumali, Numberdar House	
46	08-02-2009	5	Female Participants	Nara Shumali, Numberdar House	
47	08-02-2009	3	Female Participants	Pul Pindi Kora, Councilor House	
48	08-02-2009	4	Female Participants	Nara Janubi, Numberdar House	
49	08-02-2009	3	Female Participants	Chanki Janubi, Numberdar House	
50	08-02-2009	6	Female Participants	Mangoor, Numberdar House	
51	08-02-2009	10	Female Participants	Kurpalka, Councilor House	
52	08-02-2009	8	Female Participants	Jalalpur, Numberdar House	
53	08-02-2009	4	Female Participants	Village Muhammad Shah, Numberdar House	
54	08-02-2009	12	Female Participants	Jabbi Shumali, Numberdar House	
55	08-02-2009	4	Female Participants	Dhok Khana Kahail, Numberdar House	
56	08-02-2009	13	Female Participants	Jabbi Janubi, Numberdar House	
57	09-02-2009	7	Female Participants	Botala, Numberdar House	

	Date	No. of Participant	Status	Venue	Purpose of Meeting
58	09-02-2009	31	Female Participants	Chak 42-MB, Councilor House	
59	10-02-2009	24	Female Participants	Bijar Janubi, Numberdar House	
60	10-02-2009	6	Female Participants	Sheikhu, Numberdar House	
61	10-02-2009	17	Female Participants	Village Choosu, Numberdar House	
62	10-02-2009	5	Female Participants	Okhli Mola, Councilor House	
63	10-02-2009	4	Female Participants	Chak 6 MB Numberdar House	
64	10-02-2009	4	Female Participants	Chak 7 MB, Numberdar House	
65	10-02-2009	4	Female Participants	Chak 8 MB, Numberdar House	
66	10-02-2009	5	Female Participants	Dera Pul Pindi, Numberdar House	
67	10-02-2009	5	Female Participants	Okhli Mola Shumali, Councilor House	
68	11-02-2009	7	Female Participants	Chak 51 MB, Councilor House	
69	11-02-2009	4	Female Participants	Village Bandial Janubi, Numberdar House	
70	11-02-2009	4	Female Participants	Village 5 TDA, Numberdar House	
71	01-02-2009	3	Farmers/Inhabitants	Village Nari Shumali, Numberdar House	Survey team explained to the farmers / inhabitants about the proposed project objectives and the purpose of the current assignment (Social Development Action Plan) in detail, consultation meetings were held with the farmers / Inhabitants participants in the surveyed villages and information was shared about project potential inputs on the area and obtained the key concerns highlighted by the farmers / Inhabitants relating to the barrage rehabilitation projects are (i) To thrash out the community concerns, problems and demands; (ii) to sort out possible solution of the problems; (iii) to motivate the local community for having project partnership and active cooperation for implementation and successful completion of project
72	01-02-2009	15	Farmers/Inhabitants	Village Nari Janubii, Numberdar House	
73	01-02-2009	14	Farmers/Inhabitants	Village Ghous Nagar, Numberdar House	
74	01-02-2009	4	Farmers/Inhabitants	Chak No. 65 MB, Councilor House	
75	01-02-2009	6	Farmers/Inhabitants	Nali Shumali, Councilor House	
76	01-02-2009	7	Farmers/Inhabitants	Pindi Shumali, Councilor House	
77	02-02-2009	6	Farmers/Inhabitants	Waheer Shumali, Numberdar House	
78	02-02-2009	5	Farmers/Inhabitants	Waheer Janubi, Numberdar House	
79	02-02-2009	16	Farmers/Inhabitants	Village Pindi Janubi, Numberdar House	
80	02-02-2009	7	Farmers/Inhabitants	Village Kund Janubi, Numberdar House	
81	02-02-2009	6	Farmers/Inhabitants	Village Kund Shumali, Nazim House	
82	02-02-2009	22	Farmers/Inhabitants	Heru Dakhli Chanki, Nazim House	
83	02-02-2009	6	Farmers/Inhabitants	Village Colony Pindi Dakhli Botala	
84	02-02-2009	3	Farmers/Inhabitants	Nehar Pul Jabbi, Dera Sher Awan	
85	03-02-2009	16	Farmers/Inhabitants	Pindi Janubi,	
86	03-02-2009	7	Farmers/Inhabitants	Buttiawala, Chanki	
87	03-02-2009	3	Farmers/Inhabitants	Chak No. 59 MB, Councilor House	
88	03-02-2009	11	Farmers/Inhabitants	Chak No. 60 MB, Councilor House	
89	03-02-2009	9	Farmers/Inhabitants	Chak No. 58 MB, Numberdar House	
90	03-02-2009	5	Farmers/Inhabitants	Chak No. 61 MB, Livestock Farm	
91	03-02-2009	3	Farmers/Inhabitants	Mitha Tiwana	
92	04-02-2009	8	Farmers/Inhabitants	Village Sandral, Numberdar House	
93	04-02-2009	6	Farmers/Inhabitants	Kora, Councilor House	
94	04-02-2009	6	Farmers/Inhabitants	Village Har du Ghanj, Numberdar House	
95	04-02-2009	7	Farmers/Inhabitants	Araik Pur, Numberdar House	
96	04-02-2009	6	Farmers/Inhabitants	Namawali, Numberdar House	
97	04-02-2009	4	Farmers/Inhabitants	Thati Kalrani, Nazim House	
98	05-02-2009	8	Farmers/Inhabitants	Tilokar Shumali, Numberdar House	
99	05-02-2009	15	Farmers/Inhabitants	Tilokar Janubi,, Numberdar House	
100	05-02-2009	15	Farmers/Inhabitants	Kurar, Numberdar House	
101	05-02-2009	15	Farmers/Inhabitants	Dhok, Numberdar House	
102	05-02-2009	8	Farmers/Inhabitants	Bansi, Numberdar House	
103	05-02-2009	6	Farmers/Inhabitants	Bhalwal, Numberdar House	
104	05-02-2009	13	Farmers/Inhabitants	Rajar, Numberdar House	
105	06-02-2009	3	Farmers/Inhabitants	Village 54 MB, Numberdar House	
106	06-02-2009	4	Farmers/Inhabitants	Village 55 MB, Councilor House	

	Date	No. of Participant	Status	Venue	Purpose of Meeting
107	06-02-2009	5	Farmers Inhabitants	Village 56 MB, Numberdar House	
108	06-02-2009	3	Farmers/Inhabitants	Village 57 MB, Numberdar House	
109	06-02-2009	15	Farmers/Inhabitants	Village Shiwala, Numberdar House	
110	07-02-2009	15	Farmers/Inhabitants	Village Noor wana, Councilor House	
111	07-02-2009	10	Farmers/Inhabitants	Village Khair Pur, Numberdar House	
112	07-02-2009	8	Farmers/Inhabitants	Jandran, Numberdar House	
113	07-02-2009	8	Farmers/Inhabitants	Takooch	
114	08-02-2009	6	Farmers/Inhabitants	Chak 63 MB, Councilor House	
115	08-02-2009	11	Farmers/Inhabitants	Chanki Shumali, Numberdar House	
116	08-02-2009	4	Farmers/Inhabitants	Nara Shumali, Numberdar House	
117	08-02-2009	4	Farmers/Inhabitants	Pul Pindi Kora, Councilor House	
118	08-02-2009	7	Farmers/Inhabitants	Nara Janubi, Numberdar House	
119	08-02-2009	5	Farmers/Inhabitants	Chanki Janubi, Numberdar House	
120	08-02-2009	6	Farmers/Inhabitants	Mangoor, Numberdar House	
121	08-02-2009	7	Farmers/Inhabitants	Kurpalka, Councilor House	
122	08-02-2009	5	Farmers/Inhabitants	Jalalpur, Numberdar House	
123	08-02-2009	11	Farmers/Inhabitants	Village Muhammad Shah, Numberdar House	
124	08-02-2009	28	Farmers/Inhabitants	Jabbi Shumali, Numberdar House	
125	08-02-2009	7	Farmers/Inhabitants	Dhok Khana Khail, Numberdar House	
126	08-02-2009	23	Farmers/Inhabitants	Jabbi Janubi, Numberdar House	
127	09-02-2009	25	Farmers/Inhabitants	Botala, Numberdar House	
128	09-02-2009	11	Farmers/Inhabitants	Chak 42-MB, Councilor House	
129	10-02-2009	5	Farmers/Inhabitants	Bijar Janubi, Numberdar House	
130	10-02-2009	4	Farmers/Inhabitants	Sheikhu, Numberdar House	
131	10-02-2009	11	Farmers/Inhabitants	Village Choosu, Numberdar House	
132	10-02-2009	4	Farmers/Inhabitants	Okhli Mola, Councilor House	
133	10-02-2009	6	Farmers/Inhabitants	Chak 6 MB Numberdar House	
134	10-02-2009	6	Farmers/Inhabitants	Chak 7 MB, Numberdar House	
135	10-02-2009	4	Farmers/Inhabitants	Chak 8 MB, Numberdar House	
136	10-02-2009	23	Farmers/Inhabitants	Village Gatti,	
137	10-02-2009	5	Farmers/Inhabitants	Chak 61 NB, Livestock Farm	
138	11-02-2009	7	Farmers/Inhabitants	Chak 51 MB, Councilor House	
139	11-02-2009	3	Farmers/Inhabitants	Village Bandial Janubi, Numberdar House	
140	11-02-2009	3	Farmers/Inhabitants	Village 5 TDM, Numberdar House	
141	12-02-2009	27	IPD Department Officer/Official	Canal Rest House, Khaushab	
<b>Interview / Official Consultation</b>					
142	13-02-2009	1	Tehsil Officer Infrastructure and Services	In their Concerned Office in Khaushab	Informed about the project and noted their key concerns
143	13-02-2009	3	PHE Department, SDO, Sub Engineer, C/DO PHED Khaushab	In their Concerned Office in Khaushab	
144	13-02-2009	1	Assistant Director, Live Stock	In their Concerned Office/Khaushab	
145	13-02-2009	1	Education Department	In their Concerned Office/Khaushab	
146	13-02-2009	1	Agriculture Officer	In their Concerned Office/Khaushab	
147	13-02-2009	1	Forest Department	In their Concerned Office Khaushab	
148	13-02-2009	1	Social Worker	In their Concerned Office Khaushab	
<b>Total</b>		<b>1,439</b>			

### Detail of Final Round of Public Consultations / Disclosure and Public Hearing

	Date	No. of Participant	Status	Name of Village/ Venue	Purpose of Consultation/Meeting
<b>Focus Group Discussions</b>					
1	16-09-2009	16	Farmers / Inhabitants	Ada Khaliq Abad Distt. Khushab	i) To inform regarding introduction of project, objectives, detail of works, project impacts and mitigation measures; ii) To inform about the recommendations made in the final draft of SDAP such as provision of water supply schemes, its nature and cost in the saline zone of Mohajir Branch and provision of seed to the small farmers of Thal Canal Command Area. iii) To note the concerns of the participants of focus group meetings and question wise replies were given
2	16-09-2009	21	Farmers / Inhabitants	Chak No. 54-MB, Distt. Khaushab	
3	17-09-2009	13	Farmers / Inhabitants	Chak Chanki, Distt. Khaushab	
4	17-09-2009	29	Farmers / Inhabitants	Jabbi Shumali, Distt. Khaushab	
5	17-09-2009	16	Farmers / Inhabitants	Mitha Tiwana, Distt. Khaushab	
6	17-09-2009	25	Farmers / Inhabitants	Kurar Taloker, Distt. Khaushab	
7	17-09-2009	30	Farmers / Inhabitants	Okhli Mola, Distt. Khaushab	
8	18-09-2009	10	Farmers / Inhabitants	Tibbi, Distt. Mianwali	
9	18-09-2009	10	Farmers / Inhabitants	Chak No. 19-AML, Distt. Mianwali	
10	18-09-2009	12	Farmers / Inhabitants	Chak No.205-206- TDA,Distt. Bhakkar	
11	18-09-2009	13	Farmers / Inhabitants	Mouza Ghous, Distt. Bhakkar	
12	19-09-2009	11	Farmers / Inhabitants	Chak No.352- TDA, Distt. Layyah	
13	19-09-2009	11	Farmers / Inhabitants	Chak No. 360/383- TDA, Distt. Layyah	
14	19-09-2009	11	Farmers / Inhabitants	Chak No. 536-537- TDA, Distt. Mozaffargrah	
15	19-09-2009	11	Farmers / Inhabitants	Chak No. 641-TDA, Distt. Muzaffargrah	
<b>Interview / Official Consultation</b>					
16	16-09-2009.	2	Tehsil Nazim Khaushab & SDO Public Health Engineering	Canal Colony Rest House, Khaushab	Informed about the Project and Tehsil Nazim appreciated the provision of Water Supply Scheme proposed under SDAP and promised to extend his cooperation at all levels of the project. SDO (PHE) commented that some of the schemes proposed by PHED has not been included in the SDAP.
17	16-09-2009.	1	Nasir Masih SDO IPD Khaushab	Canal Colony Rest House, Khaushab	In his view the diversion channel should feed the entire Thal Canal instead of feeding only the Mohajir Branch Canal. He explained that there will be political pressure from other districts for their water share if the canal is partially operated
18	18-09-2009.	1	Mian Muhammad Aslam Asstt. Agronomist OFWM Mianwali	Office of District Officer OFWM, Mianwali	He told that wheat is usually sown after harvesting of cotton, sugarcane and lentil crops and the wheat sowing continues up to the end of December, hence the schedule of canal closure should be designed in a way to provide second watering well in time to the wheat crop otherwise, crop yield will be affected.
19	18-09-2009.	1	Mian Muhammad Manzoor DDO Agri Ext. Mianwali	Office of the DDO Agri. Ext. Mianwali	He supported SDAP and commented that there will be no significant loss in crop yield in case of extended canal closure as fresh groundwater is available in entire command area, however there will be economic burden on the farmers due to cost of diesel / electricity utilized for groundwater extraction although provision of wheat seed will reduce the economic pressure.
20	18-09-2009.	1	Mian Muhammad Zubair DO Evn. Mianwali	Office of the DO. Mianwali	He arranged meeting with the DCO Mianwali and also appreciated the social assistance proposed in the SDAP. He expressed all the necessary support from his organization during execution of the project.
21	18-09-2009.	1	Ashiq Ali Numberdar	Chak No. 1DB- Union Council Kundian,Distt. Mianwali	Mr. Ashiq Ali has the idea that there will be negative impact of extended canal closure and the farmers have to spend more money for watering their crops. He supported the idea of

	Date	No. of Participant	Status	Name of Village/ Venue	Purpose of Consultation/Meeting
					seed distribution because it will provide sufficient support to the small farmers.
22	18-09-2009.	1	Muhammad Raza Numberdar	Chak No. 3, Rakh Dulay Wala, Union Council Bhranga, Daraya Khan, Distt. Bhakkar	He said that there will be no affect of extended canal closure on the big farmers as they have tube well as an alternative source of Irrigation. In his view, the extended canal closure will affect the small farmers. He supported the idea of seed distribution free of cost.
23	19-09-2009.	1	Pro. Dr. Muhammad Amin Baig Chairman NGO SADOORI	Chowk Azam, Distt. Layyah	In his view, the extended canal closure may result in deterioration of ground water quality to some extent. He suggested proper water quality monitoring during execution of the project. He supported the idea of seed distribution.
<b>Public Hearing</b>					
24	03-10-2009.	76	Farmers / Inhabitant of Thal Canal Command Area	Canal Colony Rest House, Daud Khel. Distt. Mianwali	DPD (Jinnah) informed about the project in detail. The EPA representative explained the importance and objective of public hearing. The consultant informed the audience about the impacts, mitigation measures and action taken and threw light on SDAP. Then forum was opened for comments, discussions and suggestions. PMO Staff of Social and Environment unit gave the appropriate replies of the questions asked by the participants. The participants were satisfied with the answers.
<b>Total</b>		<b>324</b>			