Environmental and Social Management Plan (ESMP)
MUSHKAF FLOOD IRRIGATION SCHEME

Executive Summary

Background[1]

Balochistan faces an acute water scarcity problem as compared to Pakistan's other provinces is most at risk from climate change and least able to address and manage water-related development challenges. Floodwater generated by intense but scare and irregular rainfall is the largest usable water resource in Balochistan. Extended droughts and destructive flash floods are common place and are expected to get worse with future climate change. Rainwater is harnessed for irregular spate (or flood) irrigation. Spate irrigation in the province, however, is generally poorly managed and reliant on poor infrastructure, making it both relatively inefficient and unproductive. Given the unreliability of surface water and the limited infrastructure, groundwater is a critical resource. Groundwater is a small fraction of the overall water resource, but its comparative reliability means it is in high demand. Groundwater is significantly overextracted and this has led to major declines in groundwater levels in many parts of the province. Given the low frequency of rainfall events, groundwater recharge is limited.

Agriculture accounts for 97 percent of Balochistan's water use. Due to governance challenges and a lack of investment, the province continues to remain highly dependent on agriculture (more than 30% of provincial GDP for the years 2010-2011[2]) despite the availability of considerable mineral and energy resources. Economic growth has been largely driven by the expansion of tube-well irrigation for high-value agriculture, especially horticulture with key agricultural products, including wheat, apples, grapes, vegetables, barley, milk and meat.

The people most vulnerable to water scarcity in Balochistan are the rural poor, especially women and children. Many rural communities lack a secure water (including drinking water) supplies and adequate sanitation. This has major impacts on health and human development. Water is critical to the irrigation that underpins food security in semi-arid Balochistan. Most of the rural poor in Balochistan depend on unreliable surface water irrigation (either spate irrigation or rainfall harvesting), or livestock-based production across the extensive but relatively unproductive rangelands of the province. In the current context, improving rural livelihoods and stimulating economic growth require vastly improved management of the scarce water resources of the province.

[1] Project Appraisal Document (PAD) BIWRMDP, pp. 2-3

[2] Balochistan Needs Assessment Development Issues and Prospects, 2013. Part I - Main Report, Report No: ACS2258, The World Bank.

Balochistan Integrated Water Resource Management and Development Project (BIWRMDP)

The Government of Balochistan (GoB) has decided to adopt an Integrated Water Resources Management (IWRM) approach, among others, to strengthen capacity for water resource monitoring and management and to improve community-based water management for all related sectors such as, irrigation, agriculture, forest, health, environment, livestock etc. The GoB has received financial support from the World Bank for the Balochistan Integrated Water Resources Management and Development Project (BIWRMDP). The Irrigation Department has started the transformation of water resources management in the province to an integrated multi-sector river basin planning and development approach. With the launch of the BIWRMDP, the GoB intends to lay the foundation for a gradual transition to IWRM with targeted investments to support implementation of IWRM approaches within a framework of community mobilization and participation in the Nari basin.

Mushkaf Flood Irrigation Scheme (FIS)

The Mushkaf flood irrigation scheme includes rehabilitation of a weir alongwith four main branch earthen canals– Mushkaf 1, Mushkaf 2, Lundi 1 and Lundi 2. These four channels are further divided in 23 sub canals as shown in Figure 3.

Environmental and Social Management Plan (ESMP)

This ESMP would be included in the tender/contract as an integral part of the bid document. The specific sections of ESMP such as; introduction to BIWRMDP; regulatory and policy reviews; institutional and implementation arrangements; grievance redress mechanism; and, contractor requirements i.e staffing, Contractors Environment and Social Management Plan (CESMP) and Health & Safety Plan (HSP) as part of this ESMP. Data and information pertaining to the weir and flood irrigation systems has been provided in specific sections of this ESMP i.e. engineering activities; environmental and social baselines (ambient air/noise/water quality), impact and mitigation, community and stakeholder consultation, and implementation budget. The ESMP has been completed in accordance with provincial and national legislation, and the World Bank's Safeguards Operational Policies (OPs).

Proposed Works Activities

The main activities consist of raising of the Wier Structure, which will be of 3.4 m height in total. The old weir was of 2.4 m height, whereas the raising of Weir structure under the project subcomponent would be an additional 1 m (thereby, total height will be 3.4 m). The main proposed work activities at Mushkaf flood Irrigation project includes:

- Rehabilitation / Raising of Mushkaf Weir
- Construction of Regulating Structure Lundi 1;
- Construction of Regulating Structure Lundi 2;
- Construction of Regulating Structure Mushkaf 1;

- Construction of Regulating Structure Mushkaf 2;
- Construction of Undersluice
- Rehabilitation, Raising and Elongation of Guide Bunds
- Construction of Division Structures
- Construction of Feeding Canals
- Construction of Outlets;

Associated work activities also include the construction of contractor's temporary camp. A main camp[3] will be constructed to carry out project activities[4]. This camp will house a concrete batching plant, power generators, workshops, offices and residence, storage of materials (i.e. fuel / mixed chemicals, other hazardous materials), sanitation and wellfare facilities, waste disposal systems and parking facilities for vehicles (given in section 3.5 with details).

Environmental and Social Baseline

Mushkaf sub-project area is mainly in Tehsil Dhadar, district Kachchi/Bolan[5].The geology, climate, temperature, air quality and underground water quality has been assessed. Water quality, ambient air quality, noise, soil and ground water tests were conducted through Quality Testing Service (QTS) Karachi in March 2019. Detailed test results (air, noise, water and soil) are provided in sub-section 4.1. Further the certificate of the QTS laboratories is provided in Appendix H.

The ambient air quality pollutant testing was carried out at at areas of Mushkaf Flood Scheme. The pollutants monitored are particulate matter (PM_{10}), nitrogen oxides (NO), total suspended particulate (TSP), sulphur dioxide (SO_2), cordon dioxide (CO_2), lead (PB), nitric oxides (NO_2,). The tested pollutants were compared against the NEQs and World Bank standards and were found within permissible limits, which reflect that ambient air quality in these areas is generally very good. The baseline details of ambient air quality are provided in Section 4.1.3 and test results are provided in sub-section 4.1.3.

During the baseline study, in total, 08 samples of ground and surface water were collected from different locations of Mushkaf Flood Irrigation Scheme (FIS) (07 Surface Water and 01 Ground Water Sample). These samples were examined for physical, biological and chemical parameters and were compared with the National Environmental Quality Standards (NEQS) and World Health Organization (WHO) standards. It is evaluated that total coliform, fecal coliform and Escherichia coli levels were found high in all samples collected from these channels. The water quality results are further discussed in section 4.1.2.

Noise level testing was also conducted in the sub project area. The results are within the permissible limit of NEQs and WHO standards.

[3] The contractor shall utilize same one main camp for construction of weir and four Channels such as Mushkaf 1, Mushkaf 2, Lundi 1 and Lundi 2. These all work activities are to be carried out under Mushkaf flood irrigation Scheme and by the same contractor.

[4] Mushkaf weir and four channels, Mushkaf 1, Mushkaf 2, Lundi 1 and Lundi 2

[5] The district is new and notified in the year of 2017.

There is no tree within the Right of Way (RoW) on the weir, at main four channel sites and 23 sub outlets. A limited number of shrubs are present within and on both sides of channels. There is no loss of trees in subproject area. The shrubs include *Sesbania bispinosa*, *Calotropis procera* (Aak), *Panicum antidotale* (Gam), a wild grass (Cranj or caring), *Haloxylon sp*., and *Alhagae camalorum*. The ground cover is constituted mainly by gras such as: *Aristida depressa*, *Eleusine compressa*, *Panicum antidotale, Saccharum munja, Typha angustifolia, Chrysopogon aucheri* and *Cymbopogon sp*.

The presence of fauna was identified within the project area through literature review and field survey. The faunal species within the subproject area are considered as key species within this study where they meet any one of the following criteria:

- Listed as Near Threatened, Vulnerable, Endangered or Critically Endangered on the
  International Union for Conservation of Nature and Natural Resources (IUCN) Red List;

- Protected in Balochistan Wildlife Protection, Preservation, Conservation and Management Act, 2014 (BWPPCM Act, 2014).

Once, a remarkably favorable niche for Ibex, Wolf (*Canis lupus*), Common fox (*Vulpes vulpes*), Asiatic Jackal (*Canis aureus*), Honey Badger (*Mellivora capensis*), Grey Mongoose (*Herpestes edwardsi*), Wild Boar (*sus scrofa*), etc. Presently, none of the species is found in the immediate surrounding of the project sites.

The bird community includes, Kingfisher (*Alcedo atthis*), Hud Hud (*Upupa epops*), Common Mayna (*Acridotheres tristis*), Rose-ringed Parakeet, (*Psittacula krameri*), Coppersmith (*Megalaima haemacephala*), White-checked Bulbul (*Pycnonotus leucogenys*), and a number of seasonal/migratory waterfowls, sparrows, falcons, crows etc. during the survey, no nesting of birds found at the sub-project sites.

Socio-economic profile (baseline)

Mushkaf, Mushkaf Station, Dashtari, Lundi Qadeem, Kach Khosa and Lundi Rojhan village profiles;

Language: Balochi and *Brahvi* are the mother languages of all six concerned villages (*Mushkaf, Mushkaf Station, Dashtari, Lundi Qadeem, Kach Khosa and Lundi Rojhan*) however, *Sindhi* and *Urdu* are the also common spoken languages for communications by most of the concerned communities.

Societal institutions: All tribes living in the scheme area are *Baloch* and *Brahvi* tribes and the tribal system prevails in all six villages and is the established and preferred mechanism, in comparison to state systems, for dispute resolution and grievance redress. Residents of Mshkaf village belongs to the *Khosa, Bangulzai, Raisani, Rind, Barozai and Lehri tribes*; in Mashkaf station village the tribes include *Bangulzai and*

Rind; in Dashtari village the tribe is *Bangulzai*; in Lundi Qadeem village tribes include *Khosa and Jamali*; in Lundi Rojhan and Kach Khosa villages, the tribe is *Khosa*.

Government institutions: Presently, elected members of provincial and national assemblies are responsible for development works at their constituencies where as before this arrangement the local government representatives were operating under the Balochistan Local Government Act 2013; and responsible for the development works at union councils, village and district levels respectively. At the union council and village level, union council chairman and councillors were responsible for union council level development activities. However, at the district council level, development works was the responsibility of the district council led by the chairman. The district level bureaucracy consists of the Commissioner, Deputy Commissioner, Additional DeputyCommissioner, Assistant Commissioner, officers' in-charge of line departments, and revenue officials.

State of law and order: Law and order in Kachi district and the four sub-project earthen canals and wier locations is under the control of the district administration and law enforcement agencies (police and levies etc. The security situation is normal.

Education: For boys there are: one middle and one high school in Mushkaf village; one middle school in Lundi Rojhan village; one primary school in village Kach Khosa; one primary school in Dashtari and one Primary school in Mushkaf Station village. For girls there are: one middle school in Mushkaf village; one primary school in Kach Khosa village, one primary school in Mushkaf station village. The girls of village Lundi Qadeem, Lundi Rojhan and Dashtari are enrolled in boy's primary schools

Health: There is only one functional Basic Health Unit (BHU) available in village Mushkaf facilitating community members of all 6 villages. Moreover, there is one defunct BHU in Mushkaf station. The community members of these six villages badely suffers due to lack of basc facilities and availability of professional medical personnel such as, lady doctor etc. It was reveiled that available health unit can only provide minor health treatments to the patients of the area however, in case of emergency and serious health care needs the patients needs to be refered to the District Headquarter Hospital of Sibi or then to Quetta for further treatments.

Water supply and sanitation: A water supply system is available and functioning in only Mushkaf village. The water supply schemes of Dashtari and Mushkaf station villages are defunct. The community members of Dashtari, Mushkaf station, Lundi Qadeem, Lundi Rojhan and Kach Khosa are deprived from the availability of water. People often fetch water from far flung areas to fulfil their water needs or in some areas they prefer groundwater sources for drinking and domestic purposes. There is no sewerage and sanitation system in all concerened villages.

Transport and Roads: All six villages are 3 to 15 kms far from Dhadar city (district headquarter). Roads connecting the six villages to Dhadar and Sibi are motorable and in a good condition. There is no government operated transport system. Locally, private transporters are operating with Qinchi rickshaws, and Toyota pickups to and from Dhadar and Sibi city however, many individuals have their own motorbikes and

using them as public transport. For long distances private buses are operating from Dhadar to other major cities including Quetta and Sukkur (in Sindh).

Cultural/community sites and properties: There are seven garveyards are in the all six villages (two graveyards in village Mushkaf and one each graveyard in other five villages). There nineteen Masjids (Mosques) (five Masjids (mosques) in Mushkaf village, two Masjids each in Lundi Qadeem, Lundi Rojhan and Kach Khosa, three in Dashtari and five in Mashkaf Station village) are available for the five times of prayres. During the suvey it was revealed that these cultural properties do not fall in the channel alignment area or Right of Way (RoW) and will not be disturbed by the proposed civil works.

Community organisations: Presently, there is one NGO namely Balochistan Education Foundation (BEF) working in Mushkaf and working in education sector.

Awareness about the project: The communities of all six villages were provided adequate information about the implementation schedule and proposed sub-project works to be carried out under the Project. This awareness was provided by the project staff during repeated cycles of public consultations.

***Household level profile*:**

Sample: A 25% percent random samples was selected for the quantitative household baseline survey. A total of 176 (149 males and 27 females) household members in Mushkaf, Lundi Qadeem, Lundi Rojhan, Kach Khosa, Dashtari and Mushkaf Station were interviewed. It was encouraging that female household members actively participated in survey and shared information. Focus groups discussions were also held with women to record their needs and views.

Age Male: The age of male respondents of 20 and below years are 2.7%, 14. 8% of respondent are between 21-30 years, 25.5% are between 31-40 years, 15.4% are between 41-50 years, 20.1% are between 51-60 years, 13.4% are between 61-70 years and 8.1% are 70 and above years of age.

Age Female: Age of female respondest of 20 and below years are 14.8%, 33.3% of respondent are between 21-30 years, 11.1% are between 31-40 years, 25.9 % are between 41-50 years and 14.8% are between 51-60 years of their age.

Family size and pattern: The average family size is 1-5 members in 12% household; 5-10 members in 31% households; 10-15 members in 26% households; and, 15 & above members in 31% households. Around 56.25% of the communities of the six villages prefer to live in a joint family arrangement. In this style of living, the eldest male member takes care of all family members and is the decision-making authority, particularly for matters in the public domain. This system also provides security during periods of un-employment and financial crisis for individual family members. Families living in the six villages often work together on the same land and share their joint incomes to support the entire family, including elder relatives who are unable to work.

Level of education (Male):: 48.3% of the male respondents are uneducated, 6.7% have primary level of education, 9.4% have completed high school education, 24.2% education have completed secondary level qualification, and 11.4% have university level education.

Level of education (Female): 51.9% of the female respondents are uneducated, 29.6% have primary level of education, 7.4 % have completed high school education, and 11.1% education have secondary level qualification.

Health: The most common diseases in these villages include Typhoid, Hepatitis B & C, Diarrhoea, and Malaria.

Land ownership and tenancy patterns: At the tribes' level, the land ownership is distributed among shareholders (families) in all six villages. Record is available in the revenue department. There is also unsettled communal land available in the hillsfoots and at the immediate downstream of weir which is completely barren land. During the survey it was revealed that, the sale of land is not common practices in Mushkaf, Mushkaf station, Dashtari, Lundi Qadeem, Lundi Rojhan and Kach Khosa villages. However, if land is sold, the transfer of ownership is done formally and is recorded with the revenue department.

Tenancy is not common in sub-project area of Mushkaf. 95% of the land is cultivated by owners themselves, while 5% is tenant operated lands. However, during summar season tenancy rate is high in only Mushkaf village due to seasonal migration of local land owners.

The sub-project area is flood irrigated (khushkaba agriculture). The land is fertile and farmers grow millet, sorghum and vegetables during the late Kharif (autumnal) season (August to November) and wheat, pulses, lentils and vegetables during Rabi (spring) season (November to April). Low delta crops are preferred to cultivate in all six villages.

Housing: All the houses are owned by the local inhabitants of sub-project area. 100% houses have toilets where most of them are pit toilets with very poor hegenic conditions; and these are not connected to a proper sanitation system. The 79% houses in all six villages are Katcha (mud-houses) where 21% are semi pucca. According to baseline survey it was revealed that there is no pacca house (RCC) in the villages. The sub-project area housing plot size is: 41% households is 2500 ft. to 3500 sft; 30% households is 3600 ft. to 5000 sq. ft; and, 29% households is above 5000 sq. ft.

Environmental and Social Impacts and Proposed Mitigations Measures

The impacts due to air and noise emissions will be temporary and short term during construction activities. It is anticipated that after completion of civil works there will not be any such residual impacts.

To prevent any disruption of water supply to farmers during construction, designs include the construction of temporary diversions. These will ensure continued supply of irrigation water during the canal lining and construction of structure works.

Deterioration of ground and surface water quality due to improper treatment and disposal of sanitary waste, and solid wastes generated during construction is expected. Groundwater resources are considered particularly valuable in the subproject channels due to low water table and reliance of the population on groundwater for drinking water supply.

A number of mitigations measures have been suggested in the methodology for water extraction and use, wastewater treatment and disposal, plant wash down, refueling and solid waste management to reduce the impact to ground and surface water resources. To supplement these mitigations, the contractor will be required to submit a pollution control plan upon mobilization, for the approval of the Engineer. The key mitigation will be the contractor will prepare a plan to meet water demand, submit the plan for wastewater treatment using septic systems, to PSIA during mobilization for approval.

A potential adverse short-term impact due to occupational health and safety risks associated with major construction activities is identified for construction laborers employed on the sub-project. The key mitigation will be that the contractor will also be required to prepare and submit a Health and Safety Plan to cover all construction operations and will appoint a full-time health and safety officer on site.

The sub-project area does not fall in any of the wildlife habitat and does not cause any harmful impacts directly and indirectly. There are no major adverse impacts related to operation phase to the habitat and biodiversity.

The proposed works will require the establishment of construction and labor camps which will generate construction, domestic, sanitary, and hazardous woaste. The approximate area of the contractor camp is 10,000 sq ft, and will be constructed on private land, at least 500 m away from settlements. No land is required for temporarily diversions and for establishment of contractor camp.

The contractor is expected to recruit both skilled and unskilled laborer' from the sub-project area. At the height of construction activity, up to 150 laborers are likely to be employed for the works at Mushkaf 1, Mushkaf 2, Lundi 1 and Lundi 2 channels and the Weir. These laborers will reside on site for the construction period, in accordance with the contractor work plan, as given in Section 3.5.

This has potentially impacts on domestic and feral animals of the sub-project site. The likely impacts result from uncontrolled waste disposal and include entanglement of domestic and feral animlas from the labor camps.

There will also be impacts due to labor influx into the area and potential interaction between the non-local labor and the local community especially with women and children. Therefore, there are potential risks of exploitation and abuse in the community, particularly women and children, due to resident labour. To mitigate all

these issues, the contractor will be required to comply contractor's guidelines and agreement with labour to prevent the Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) which is given in the section 6.5. The contractor will also employ a Community Liaison Officer throughout the implementation of works and shall ensrue the compliance of measures to prevent GBV and SEA. The contractor's Health and Safety Plan will also include plans for the emergency transfer of members of the public to suitable medical facilities in the event of a serious accident resulting from the construction works. A social complaints register will be placed at the Contractor's, PIU and Engineer's offices to address complaints effectively to avoid further disturbance to the local community.

The Environmental and Social Management Plan (ESMP)

This ESMP needs to be implemented for ensuring that the mitigation measures proposed in this document are complied with accordingly. ESMP includes monitoring mechanism, responsibilities and various plans to be submitted by the contractor (i.e. Contractor Health and safety, and Contractor Environmental and Social Management Plan).

On behalf of Balochistan Irrigation Department (BID), the Project Management Unit (PMU), led by a Project Director, is over all responsible for implementation of this ESMP. At the basin levels, there are Project Implementation Units (PIUs). The PMU and PIUs will be supported by Project Supervision and Implementation Assistance (PSIA) and Monitoring and Evaluation (M&E) consultants. The Implementation Completion Report (ICR) of the project will rate and evaluate the performance of the implementing agency.

The contractor appointed under this sub-project will be responsible for the implementation of this ESMP during the sub-project execution phase. The contractor will be required to submit the plans to the PSIA/PMU such as the Contractor's Environmental and Social Management Plans (CESMP) and Health, Safety and Environment Plan (HSEP), reflecting the methodologies of implementation. The details of these management plans are provided in Section 8.1. The Contractor is also required to appoint a safety supervisor, paramedic staff, health and safety officer, human resource officer and environmental officer as given in sub-section 8.1.2.

The Contractor's Environmental and Social Management Plans will include the following:

- Organisational framework;
- Layout plans for all camps;
- Traffic management plan;
- Pollution prevention and control plan;
- Emergency plan;
- Training plan;
- Monitoring plan. and,
- Waste management plan

During the preparation of Contractor Health and Safety, and Contractor Environmental and Social Management Plan, the guidelines of environmental code of practices (ECOPs) given in Appendix B will be followed by the contractor and be implemented accordingly.

The contractor will monitor its own compliance with the environmental and social requirements of this ESMP and their own plans during construction phase. In addition, PSIA will complete day-to-day monitoring of the contractor's compliance with this ESMP. Each party will submit their monthly reports detailing the findings of their monitoring activities which will be distributed among each of the institutional stakeholders of this ESMP as given in section 8. The overall compliance monitoring is underlying with the PMU of the project. The format of monthly monitoring report (PSIA) is given in Appendix E.

Public consultation is one of the key regulatory tools employed to improve transparency, efficiency and effectiveness of regulations for a development project. It involves actively seeking the opinions of those interested in or affected by a project (project beneficiaries). It is a two-way flow of information, which may occur at any stage of development from project identification through planning, design, construction and operation. It may be a process or a continuing dialogue between project implementation authority and the affectees. Consultation is increasingly concerned with the objective of gathering information and finds the acceptable solution. The institutional arrangements in place for this project will ensure and facilitate regular consultation throughout project implementation. The stakeholder's consultation process for this sub-project was carried out in accordance with the national regulatory requirements and the WB's Operational Policies. The purpose of consultation was to: disseminate project information among the project stakeholders; record the perception of the community and their views on project interventions; and, obtain community feedback including regarding severity of impacts and recommendations for mitigation measures. Cycles of consultations were held at the channel level with women from September 12, 2018 to September 26, 2018 and men beneficiaries from November 24, 2018 to November 26, 2018. Consultations were also held with Farmers' Organizations, community representatives and notables, and district administration.

Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) for the project will be operational during the implementation of this ESMP. A grievance redress mechanism (GRM), consistent with the requirements of the World Bank Operational Policies and Guidelines will be established to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances. In this regard, FOs and communities of all four channels were given a detailed orientation about the project GRM and its procedures. An Urdu description of the GRM was also provided and nomination of three focal persons in each FO from the communities as GRM committee noted and approved

by the FOs members themselves. Further detail of GRM is given in section 10 of this ESMP.

Budget

The costs for the implementation of construction stage activities given in this ESMP shall be included within the civil works contract for this sub-project (Mushkaf flood irrigation Scheme) and therefore ultimately borne by the client. The total cost of ESMP implementation is PKR 18,100,000 (USD 115,287) including GRM budget. The detail is given in Section 11.