Water Use Management Plan (WUMP)

Tehsil Daraban, District Dera Ismail Khan

Water Use Management Plan (WUMP)
Plan for Sustainable Management and Utilisation of Water Resources in Tehsil Daraban, District Dera Ismail Khan

Government of Khyber Pukhtunkhwa, Pakistan and Intercooperation (IC) Pakistan

WUMP: Water Use Management Plan (WUMP) is prepared by Water for Livelihoods Project, Intercooperation (W4L-IC) with support from Swiss Agency for Development and Cooperation

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Glossary of Terms

Glossary of Terms used in Dera Ismail Khan for Rudh Kohi Related Tasks

Term	Definition
Bala Jamal	Common property of the village
Canal Command Area	The area which can be irrigated from a canal
Chahab	The small dam prepared with earth, wood, stones to stop and divert water in the stony terrain or the areas through which water has already passed
Chhal	(Irrigation by) overflow
Dumba	Strengthening and protection of Saad by raising it
Gandi	The small dam made from earth, stone, wood etc. to divert water from one Gaung to another
Gatta or Gatti	A prepared watercourse which is smaller than Saad or Gandi to divert water from Kaas to lands
Gaung	The channel of perennial water
Kaas or Khullah or Waah	The course through which the water is lifted/ diverted through Saad or Gandi flowing in to irrigate lands
Kalapani	Perennial Water flowing from springs etc.
Kuliyat-e-Riwajat-e-Aabpashi	Customary water rights in larger systems of Suleiman Range of Pakistan (D.I. Khan and D.G. Khan) were codified and documented by the Colonial British Revenue administration (in 1905) in the form of Riwajat and *Kuliyat-e-Abpashi.* This is a set of rules for diverting flood flows into head water areas. The original copy of the registers *Kulyat Rudhwar* is kept in the Revenue Department.
Kura	Pakhai/Draw
Raqba mutalliqa and Raqba gher mutalliqa	Land Concerned or land entitled for water from a scheme or canal and land not-concerned is land unentitled for water use from a particular scheme or canal
Morin	The landmarks or signs prepared throughout for distribution of water to the lands
Mouhan	The passage through which water enters the field
Nouz	Water from the mountains that flows through a Pass (Dara) is called Nouz. Its passage is called Dara
Paal or Larra	To prevent water from going into lower level, a canal-like structure (paal) is made to allow water to flow into lands
Saad or Gandi	The dam constructed in the Rudh to stop and divert water
Sailaba	Rudh Kohi System
Sheher Panah	Flood Protection Wall or Embankment
Shull	The wooden scale through which perennial water is distributed
Wakra	The water channel that leads water to the fields/lands from Kaas

Source: Water Use Management Plan for Tank Zam, District Tank, Khyber-Pakhtunkhwa – 2015 (IC)

Acronyms

3Rs	Groundwater Recharge, Retention, Reuse and Rainwater Storage
AC	Assistant Commissioner
AZRI	Arid Zone Research Institute
CRBC	Chashma Right Bank Canal
DCC	District Coordination Committee
DIK	Dera Ismail Khan
DWSS	Drinking Water Supply Schemes
FR	Frontier Region
GLAs	Government Line Agencies
GoP	Government of Pakistan
HEIS	High Efficiency Irrigation Systems
HHs	Households
IC	Intercooperation
IDS	Integrated Development Strategy of Khyber Pakhtunkhwa
INGO	International Non-Governmental Organisation
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
MAF	Million Acre Feet
NGOs	Non-Governmental Organisations
O&M	Operation and Maintenance
OFWM	On-farm Water Management
PARC	Pakistan Agricultural Research Council
PCRWR	Pakistan Council of Research in Water Resources
PHED	Public Health & Education Department
PPAF-LACIP	Pakistan Poverty Alleviation Fund-The Livelihood Support & Promotion of Small Community Infrastructure Project
RWSS	Rural Water Supply Scheme
SDC	Swiss Agency for Development and Cooperation
SCD	Soil Conservation Department
TVO	Trust for Voluntary Organisations
UNDP-GEF	United Nations Development Programme-Global Environment Facility
USAid	The United States Agency for International Development
VCs	Village Councils
VDO	VEER Development Organisation
WUAs	Water User Associations
WUGs	Water User Groups

Foreword

The preparation of Water Use Management Plan (WUMP) at a local level around a single agenda, water, is an important instrument of good governance. This well-thought-out plan was prepared in 2015 by Water for Livelihoods Project after a series of intense discussions on water resources, issues, potentials and priorities. On top of which consultations were carried out with respective District Administration, Government Line Agencies working in Water Sector and communities as important stakeholders.

The Plan provides vision for addressing the water sector issues to ensure equitable access to water for drinking and production purposes apart from catering to water related disasters influencing the mentioned drinking and irrigation objectives. The main theme of WUMP remains to be the community managed initiatives, improving liaison with Government Line Agencies, cost sharing, sharing of responsibilities especially of operation and maintenance with Water User Groups and enhancing role of Water User Associations in dealing with water sector issues in Draban Tehsil and thenceforth bridging with GLAs.

The Swiss Agency for Development and Cooperation (SDC) is much appreciated for financing an initiative such as Water for Livelihoods Project implemented by Intercooperation. It has lead to a path of assisting the district government in preparing this plan that will ultimately help in improving delivery of clean drinking water and water for production through optimum use of technology and participation of locals. A high expectation is also placed in all the officers of the relevant government departments and other development actors to consider this plan while planning their financial targets and providing direly needed assistance in the district.

Executive Summary

Approximately 75% of Pakistan's area falls in arid and semi-arid zone with an annual average rainfall below 250 mm^2. Spate irrigated areas form a substantial proportion of drylands in Pakistan spanning roughly 1.4 million ha (9% of total irrigated area). About 3 million families depend on this resource. Despite the number and the extreme poverty, the population has to survive.Such areas are mostly invisible in programmes and policies of government and civil society. Dera Ismail Khan is Pakistan's home to Spate Irrigation, being either irrigated or rainfed, and at times extremely prone to drought, it is also one of the poorest areas.

WUMP: This Water Use Management Plan (WUMP) is specifically focused on Tehsil Daraban of District DI Khan. The overall purpose of WUMP is to take inventory of various sources of water available in a particular geographical/administrative area, identify community priority in order to achieve an effective, equitable and efficient use of water resources at local level. The preparation of this WUMP document has been technically and financially supported by Water for Livelihoods Project of Intercooperation Pakistan with financial assistance from Swiss Agency for Development and Cooperation (SDC) and is prepared in collaboration with local institutions (Water User Associations/ Water User Groups), district authorities (administration), concerned technical departments of the Government of Pakistan dealing in water, water sector projects and partner NGOs.

WUMP is intrinsically founded on the Integrated Water Resources Management (IWRM) approach. IWRM is a process, which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (Global Water Partnership, 2000).

The specific objectives of WUMP are:

- Assess and determine water resource availability, existing uses and requirements.
- Determine water access and equity issues and balance these rights through interactive dialogues.
- Participatory prioritisation and planning of water resource development and multiple uses, considering climate change and disaster risks.
- Promote coordinated water resources development by different stakeholders (communities, government and non-government organisations).
- Promote conservation of water resources for preservation of the environment.
- Strengthen local institutional capacity in participation of economically and socially disaadvantaged groups.

The WUMP for Tehsil Daraban is fully aligned with Integrated Development Strategy 2014-2018 (IDV) laid out by the Government of Khyber Pakhtunkhwa to integrate priorities in one framework. The Local Government Act 2013 also provides a regulatory framework for delegating responsibility at local level which is aligned for WUMP implementation.The WUMP preparation process followed 6 phases and 13 sub-steps in close coordination with concerned village communities (WUG/WUA), concerned Government Line Agencies (GLAs) and District authorities to ensure commitment and ownership of WUMP.
The highlights of WUMP for Tehsil Daraban are as follows:

The Tehsil: District DI Khan has 5 tehsils two of which are irrigated or water supplied by Rudh Kohi particularly Tehsil Daraban and Tehsil Kulachi. Tehsil Daraban comprises 5 wards, 17 Village Councils comprising 45 revenue villages and 29 hamlets. A total of approximately 24066 households and a population of 192650 thrive in the Tehsil.

The Methodology

For The Villages

- **1st Step:** Two types of questionnaires formulated for Data collection through interviews, (questionnaires)
- **2nd Step:** Two teams selected each comprising a man and a woman for gathering information
- **3rd Step:** Each team visits every village in Tehsil Daraban for social data and for technical data
- **4th Step:** The Water User Associations (if present) for a village or the Village Council are brought together on the same platform to discuss the arising issues from the field. If a village is left out (for security reasons) then the representatives of one such a village are also brought over for the data collection
- **5th Step:** Prioritisation through the PRA approach carried out for every Village Council's water-related needs on a priority but voting basis
- **6th Step:** The gathered data helps in the most pressing needs, beneficial schemes, water sources, water hardships, the defined criteria while the prioritisations are based on water choices

For The Government

- **Representation:** Representatives/Officials from The Rudh Kohi Department, Agriculture Department, Public Health Engineering Department, Livestock Department, On-Farm Water Management Department of Tehsil Daraban were all involved in every step of the way during preparation of this WUMP, including the meetings, discussions, prioritisation exercises and village level data collection
- **Need Identification:** Government Line Departments contributed towards identification of infrastructural rehabilitation and/or construction required in the zams/areas
- **Costing:** Government departments especially Rudh Kohi Department indicated (in figures) the total amount arising out of interventions
- **Governance:** An umbrella priority is that of governance. Though politically inspired gestures towards the locals bring in their support but mostly at the cost of a break-down in governance, laws or rules and regulations

From The Organisations

- Different local organisations aided in identifying duplication of efforts as well as un-materialised, unsupported or previously carried out schemes (by PHED, OFWM, Rudh Kohi, Soil Conservation Department).
- Water User Associations (formed out of previously formed Water User Groups)
- Organisations are imperative for involving all involved parties an equal share in system betterment and important decision-making.
- VDO VEER Development Organisation which is local to DI Khan, provided primary data for all social and technical components of this report

Priority Areas: Together with the WUGs, the partner organisation, W4L team, representatives from the Government Line Departments as well as VCs, the following priority issues were sorted and voted as the most urgently required. The technical assessments have yielded water related priority issues to revolve around:

1. Drinking water: Based on the finding that many locals do not know the difference between clean drinking water and just clean-looking water, 17 Village Councils, 45 villages seek water supply schemes, benefitting a total of 19225 households. Major arising needs are hand pumps, tube wells, pipelines, water storage (tanks), both pacca and katcha ponds for livestock and submersible pumps.

2. Irrigation: Direly needed interventions required in 17 Village Councils, 45 villages benefitting a total of 19225 households – nearly a 100% intervention need. Major interventions required in construction of gates, bunds, inlet structures, lining of channels, rehabilitation of Saads, Pals and Gattis, de-siltation and more.

3. Water for Livestock: Separately constructed water ponds (whether katcha or pacca) for livestock were direly indicated by 5 VCs, 5 villages ultimately benefitting 2330 households.

4. Sanitation: Needed measures include drainage facilities as well as washrooms from a total of 5 VCs, 5 villages to benefit a total of 6050 households. Prioritised needs revolved around having a sanitation system, drainage system, street pavements and toilets.

5. Disaster Risk Reduction measures: A total of 8 VCs, 8 villages have voiced disaster risk reduction measures imperative for benefitting a total of 3965 households. The 8 villages called for repairing as well as constructing their DRR structures and building a protection wall around their villages.

While the Social Survey points towards many raised issues which are beyond the scope of this water plan, still such issues help in better understanding the situation under which the population of DI Khan is trying to survive.

Investments Required: For a total of **178** identified and prioritised schemes, the following investments are required for immediate measures (short term), medium term and long term.

Short-Term: Immediately required measures are needed in all 5 mentioned issues. Issues for short term resolve are the ones ranked as the first priority by the locals as well as their representatives. This includes repair, maintenance and reconstructions. An estimated PKR 183.05 million shall see to it in the initial phase. Beneficiary involvement through WUGs, responsibility in managing O & M and cost sharing as pivotal principles in rehabilitating initiatives.

Medium term: Issues which have been categorised in the second and third tier of needs, i.e. construction of bunds, gates, inlets, new water-supply schemes, work on the non-functional schemes where required. An estimated PKR 371.71 shall be required for initiating new schemes.

Long-Term: Although placed in the long-term category, in no way are the long-term schemes to be seen in the distant light. Long-term schemes need to explore new ideas, new research, new methods, new scientific measures ALONGSIDE schemes which shall already be underway (the short and medium term). The long term schemes are the ones ranked at fourth or above, list of priorities. Such schemes shall see to the sustainability, environmental safety, sharing of responsibility, of operation & maintenance with the villagers and their political representatives. Such schemes shall be underlying the currently undertaken schemes and their set up

so as to keep in check the aspects of climate change and water rights. An estimated PKR 78.96 million would be inculcated after undergoing the scrunity specific to the 'Environmentally Smart Options' by experts.

Total Estimated Beneficiaries, Interventions and Investment as per WUMP for Tehsil Daraban

S. NO	Interventions	Total Required Interventions	Estimated cost (Rs. Millions)	Beneficiary HHS
1	**DRINKING WATER SCHEMES**			
1.1	DWSS (New)	29	51.4	
1.2	Improvement in DWSS	11	89.7	
1.3	Tube wells	12	53.39	
1.4	Hand Pumps	7	1.88	
1.5	Construction (kacha and pacca ponds, water tanks, overhead tanks)	10	13.28	
1.6	Submersible Pumps	5	8.1	
1.7	Lining of Ponds/Channels	8	34.1	
1.8	Solar System	5	13.5	
	Total	**87**	**265.35**	**58, 251**
2	**IRRIGATION SCHEMES**			
2.1	De-siltation	16	145.86	
2.2	Rehabilitation/Repair	20	127.66	
2.3	Constructions (gates, saads, walls, roads, inlet structures, lining, etc)	28	122.25	
2.4	Stone Pitching	1	0.4	
2.5	Electricity/Transformer	6	6.8	
	Total	**71**	**339.79**	**48,234**
3	DISASTER RISK REDUCTION			
3.1	Constructions (Village Protection Walls, other structures)	5	5.87	
3.2	Repair of Flood Protection wall	6	13.94	
	Total	**11**	**19.81**	**3345**
4	**LIVESTOCK WATER POND**			
4.1	Construction/Lining or Repair	5	3.45	
	Total	**5**	**3.45**	**2280**
5	**DRAINAGE & SANITATION**			
5.1	Drainage & Sanitation Schemes	3	5.3	
5.2	Toilets/Latrines	1	0.02	
	Total	**4**	**5.32**	**2500**
	Grand Total	**178**	**633.72**	**114,610**

The Key Partners

The following key partners were engaged in the plan preparation for Water Use Management in Tehsil Daraban, district DI Khan:

1. District Administration (AC of concerned Tehsil) as a focal person
2. Public Health Engineering Department, Daraban
3. Irrigation Department, DI Khan
4. Rudh Kohi Department, DI Khan
5. On-Farm Water Management Department, DI Khan
6. Soil Conservation Department, DI Khan
7. Agriculture Department, DI Khan
8. Water User Association/ Water User Groups / VOs Tehsil Daraban
9. Arid Zone Research Institute (AZRI) (Pakistan Agricultural Research Council)
10. Livestock and Dairy Development Department
11. Social Welfare Department
12. Forest Department
13. Local Government Department
14. Village/Tehsil Council members (local politicians)
15. VEER Development Organisation, DI Khan
16. Water for Livelihoods Project-South

Chapter 1
1- Area Profile

1.1 Location, Elevation & Administration

Dera Ismail Khan (henceforth DI Khan) is situated in the southern part of Khyber Pakhtunkhwa Province of Pakistan. The climate of DI Khan is arid to semi-arid with a mean annual rainfall ranging from 180 mm in the south to 305 mm in the north. The annual potential evaporation is around 1500 mm. About 233,000 ha (575755.539 acres) of land is available for cultivation, out of which about 30 % of the area is under Chashma Right Bank Canal and the remaining is under spate irrigation system cultivated through arid agriculture (GoP NWFP, 2003). There are 5 zams irrigating the area of DI Khan division and 30 rudhs, which irrigate 209 villages through spate irrigation system. Total water potential of the area is 1.08 million acre feet (MAF) of which 0.28 MAF is currently being utilised and the balance runoff as 0.80 MAF is available for increasing irrigation intensities and irrigated area (NESPAK 1998).

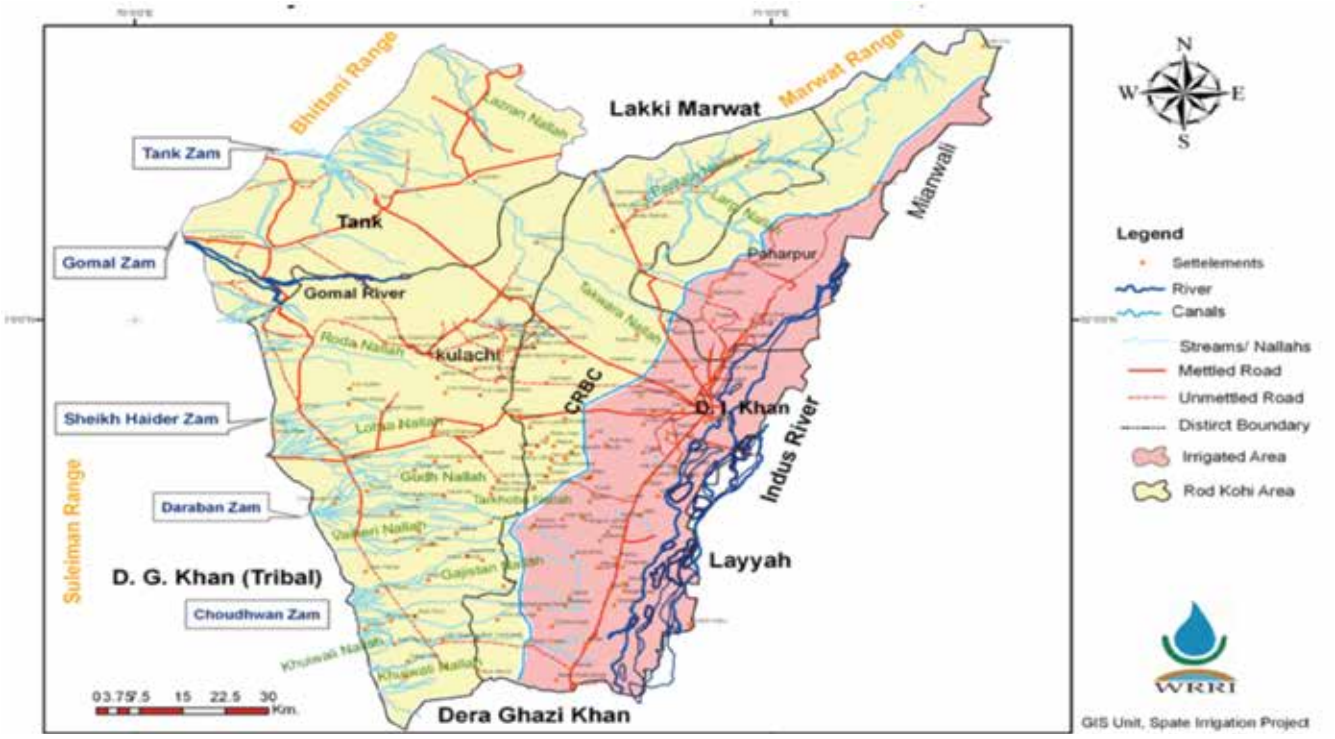


Figure 1: Map of Daraban Tehsil in Dera Ismail Khan

Daraban lies at the foot of the Sulaiman mountains. In winters, the majestic peaks of Takht-e-Sulaiman covered with snow can be seen in Daraban presenting a spectacular view. The Tehsil enjoys privileged geographic position in the whole of the neighbouring region and this accounts for its burgeoning trade and population. Tehsil Daraban is situated near FR DIK on the west of DIK.TheTehsil headquarter Daraban Kalan is connected by road with neighbouring towns of Darazinada FR DIK, Musazai, and Chaudwan. The inhabitants of these towns have to pass through Daraban while journeying to Dera Ismail Khan city. Daraban also lies on the national highway connecting Khyber-Pakhtunkhwa with Baluchistan. The highway has also resulted in increase of trade and commerce in Daraban Tehsil and areas around it.

Table 1: General Profile of Tehsil Daraban

Tehsil council	Daraban
Union Councils/wards	Gara Essa Khan, Musazai, Daraban, Chodwan, Bhuki
Geographic Coordinates	N-Latitude: 31o 49' 45" and E- Longitude: 70o 41' 10"
Northern Boundary touches	Rudh Loni, Gomal Zam
Eastern Boundary touches	Tehsil DIK
Southern Boundary touches	Punjab district, Tehsil Taunsa, district Dera Ghazi Khan
Western Boundary touches	FR DIK
Population	192650
Climate	Moderate cool to extreme hot
Water Resources	Sheikh Haider Zam, Daraban zam, Chodwan zam (flood and perennial water) and Rain water
Landscape pattern/ Terrain	The landscape / terrain can be classified as flat with meagre slope from west to east

1.2. Climatic Conditions

Climatically Daraban Tehsil falls in arid zone with mean annual rainfall of 180-305 mm, increasing from south to north. The mean temperature in June is 42°C and in January it is 12°C. Mainly flood and rainwater as a source of agricultural and house hold use. The rainfall pattern is erratic and uncertain. About 60% of rainfall occurs in monsoon season (July-September) usually in the form of intense showers causing floods. Tehsil Daraban annually receives five to six floods in monsoon season. According to collected data about 70% of the flood water is allowed to escape and fall into the Indus River (see table 2). Out of remaining 30% more than two third is wasted, because it usually runs over and covers the area in a sheet flow and is not utilised for actual irrigation adding on to the annual drought. Secondly due to climate change, sometimes, heavy rainfalls occur which cause heavy floods and destroy the earthen structures. In the last 20 years thrice has a severe drought persisted in the area.

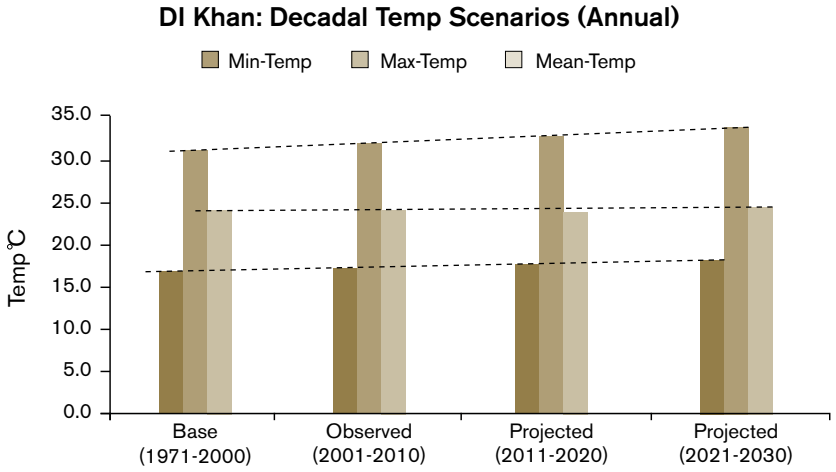
In a research study escaping flood water was observed on July 25 -26, 2004, across four of the selected drains from Daraban and Chodwan zams. The volume of estimated escaping flood water is given in Table 2. The total flood water escape was 20,097 acre-ft during the flood season 2004.

Table 2. Flood Water Escaping From The Project Area Into The Indus River

S.No	Arrival of flood	Number of Drains	Volume of escaping water m3	Volume of escaping water (Acre-feet)
1	July25-26,2004	Drain No 22	24440158	561
2	July25-26,2005	Drain No. 23	103204786.	2,369
3	July25-26,2006	Drain No. 24	-	-
4	July25-26,2007	Drain No. 25	465074593	10,677
5	July25-26,2008	Drain No. 26	282689191	6490
Total Flood water escaped on the above dates			87,5408,728	20,097

Source: PLI-AUP Technical Water Assessment Study Team Survey, 2004

Figure 2: Annual temperature change in DIK (1971 – 2030)



1.3 Hydrology

Tehsil Daraban is divided into three agro-ecological zones i.e. perennial irrigated, flood irrigated, and rain-fed. Summers are dry and usually very hot. Rainfall is low which occurs in the monsoon season and occasionally in spring/winter. Average annual and seasonal precipitation trend is 200 mm. The area is prone to frequent flood and drought.

Figure 3: Average Monthly Rainfall at DIK District

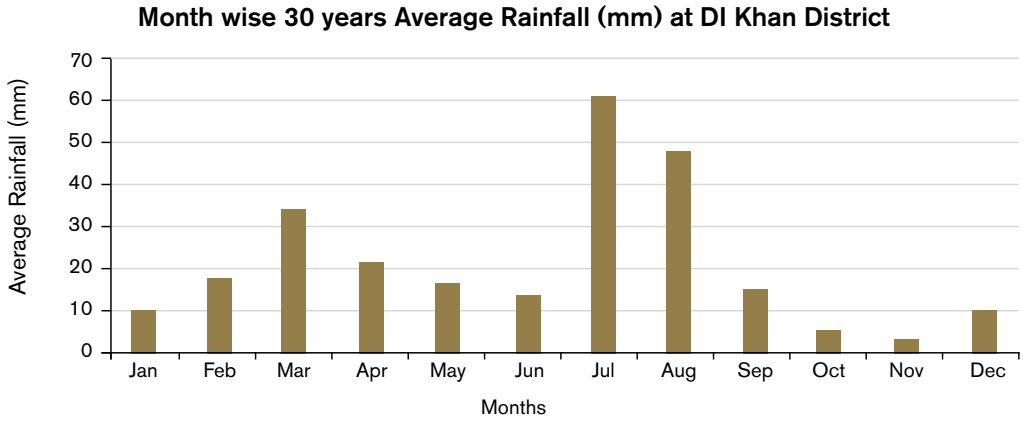
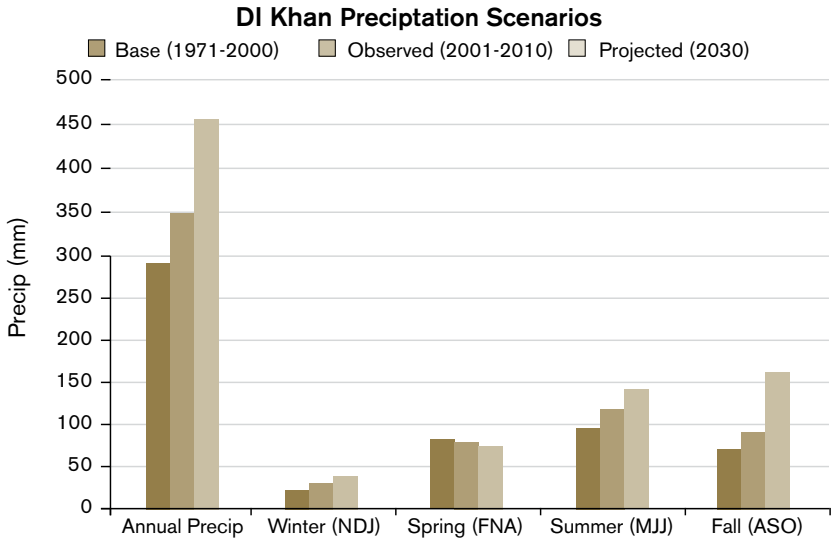


Figure 4: Trends in annual and seasonal precipitation



River system and water resources: Tehsil Daraban area is situated on a plain spreading in all directions. The water resources are natural, occurring through channels (Zams) from the mountain, the flood water flowing into different Rudhs is harnessed by construction of dykes. There are a total of 30 Rudhs in Rudh Kohi system, comprising 620 gatties. According to the government surveys (Rudh Kohi Dept., OFWM and PHED) if the problems of the above are solved, then approximately 547242 acres of land could be brought under cultivation.

Daraban Zam is located between the Sheikh Haider and Chodhwan Zam. The flood and perennial water of the zam is used for irrigation as well as for drinking purposes. Zam water is classified into two categories, Buga pani (flood water) and kala pani (perennial water). Flood water comes from Koh-e-Aspana (mountain) situated 45 kos[1] from Tuman Sain Aba khel and Tuman Shiranian. Perennial water has many springs in the said mountain on the eastern side. When water from these springs passes through Koh-e-Kala (Black Mountain) also known as Koh-e-Suleman then a main spring near a place called Gut merges with it. Shiranian and Abakhel irrigate their land upstream in Dara, and then this water collectively flows in a channel called Gaung and irrigates the land of village Daraban – hence the reason why the Zam is also known as Daraban Zam. Daraban zam merges with Chodhwan zam at village Gara Meharban, this merging point is called (mail) in local language. Flood water of Daraban Zam is distributed in three branches i.e. on south Gud , on north (Shakh Shumali) named as Toya, and on middle Lohra (Iqbal, 2007).

Table 3: Main Water Channels in Daraban

Sheikh Haider Zam	Chodwan Zam	Daraban Zam
Rudh Sawan= 2500 cusecs	Waleri	Gud= 10,000-15,000 cusecs
Rudh Toya=2000 cusecs	Tarkhoba	Lora
Rudh Kori	Kora	

As the main sources of water are rainfall and runoff (flood), the flow rates are difficult to report due to non-availability of gauging station in Sheikh Haider Zam. However, at the main bridges the Rudh Sawan and Toya have reported to have an average discharge of 2500 and 2000 cusecs respectively. Gud has high flood ranging between 10,000 to 15000 cusecs.

The second source for drinking water is perennial which is mostly used to irrigate the upstream land of Tehsil Daraban.The PHED department holds rights in perennial water for drinking purposes for which it is collected at PHED surface tanks on upstream areas and then supplied to the downstream villages through pipelines (as provided by PHED). A substantial quantity of fresh ground water is available in the upstream area of Daraban Tehsil. Data as collected by the PHED officials shows that under-ground water can be exploited through installation of tube wells in the upper areas of Tehsil. In all these areas thewater table ranges between 30 to 250 feet.

[1]The kos is an ancient unit of distance that has been in use in the Indian subcontinent for over three thousand years; evidence exists from Vedic times to the Mughal period, and even now elderly people in rural areas refer to distances from nearby areas in kos. A kos is about 2.25 miles. (Wikipedia, March 8, 2017)

1.4 Climate Change Scenario (as experienced by IC in the last decade)

Climate change is a global phenomenon but its impacts are localised and vary from area to area in Pakistan. The change in Pakistan is higher than global average as the major part of the country falls in arid and semi-arid region which is already a heat-surplus zone. A larger capacity to absorb and store water is, therefore, a key factor in climate change adaptation. In dry regions, climate change may cause floods to more erratic, arriving late and with longer dry spells in between. This places a premium on groundwater management, soil moisture management and supplementary irrigation. Managing groundwater, and the water buffer in general, is at the heart of climate change adaptation in arid and humid areas alike. For the past many years Intercooperation has been actively involved in introducing, sensitising, providing and seeking inputs, in fact seriously pursuing the climate change scenario in Pakistan especially the Khyber Pakhtunkhwa province.

In this regard many workshops specifically on the climate change scenarios based on modeling research on areas such as DI Khan have been presented throughout the last few years. Table 4 shows some of the implications.

Table 4: Summary of climate change scenarios for DI.Khan and its implications

Season	Av	Max	Min
Annual	+	+	+
Winter	-	-	-
Spring	+	+	+
Summer	+	+	-
Fall	+	+	+
IMPLICATIONS	• Overall temperatures are increasing • Cooler winters • Hotter springs, summers and fall • Summer days are getting hotter and summer nights are getting cooler		
IMPACT ON AGRICULTURE &WATER	• Decline in winter crop yield due to heat and moisture stress • Cotton yields might increase • Higher evapo-transpiration • Increased water requirements for crops and livestock • Increased nutritional needs for livestock • Decline in livestock productivity • Increased incidence of diseases (human, crops, livestock and poultry)		
ADAPTATION NEEDS	1. Genetic research to develop stress resistant crop varieties 2. Changing the sowing windows (early planting) 3. Changing irrigation scheduling 4. Changing crop scheduling/ patterns 5. Re-introduction of traditional crops under rainfed agriculture 6. Livestock fodder and nutritional requirements		

1.5 Institutional Arrangement and Capacity Building

- **VO/CBOs, Water Users Group, Water Users Association**

A Water User Group (WUG) is a part of the Village Organisation. WUGs work for managing the water resources and water rights of their village with the support of different NGOs, INGOs, GLAs, politicians, and others. During the first phase of W4L in Tehsil Daraban, 30 WUGs were formed and the remaining 15 were formed during the WUMP exercise. Presence of WUGs at village level supported as well as expedited the WUMP process. Community meetings were held at WUGs level and orientation to the community about the objective and need of WUG and WUA were also conducted. Where the WUGs were present, the community reformed these sub groups while in the new villages the community itself formed WUGs. They included members of social institutions, women, teachers, religious leaders, local representatives and farmers. A total of 148 WUGs have been formed in Daraban Tehsil. After their formation and orientation, the Water User Association was formed at Tehsil level with at least three representatives from each zam's WUA. Again orientation was conducted for all the representatives of WUGs and WUAs. The WUA includes local politicians, GLAs and farmer representatives who will work as an advisory body for implementation of WUMP.

WUG have been actively organised to look into the urgent water resource management issue at the community level. Constructive linkages between the WUG and water sector service providers have been supported. The community members understand the need for more efficient water use/management so they support the WUG in their mission in this regard. Operation and maintenance of water schemes, raising of funds/mobilisation of financial resources, core values of transparency, accountability, equality and inclusion are all part of a WUG. The decision making process as well as the election process of the WUG members reflect the core values of the organisation. WUG activities and products address women interests and concerns; also engage in conflict resolution incase necessary. Positive changes have been witnessed in its presence.

Figure 5: Water User Association at Zam Level

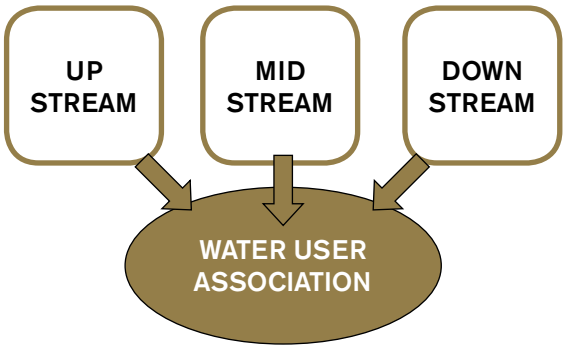
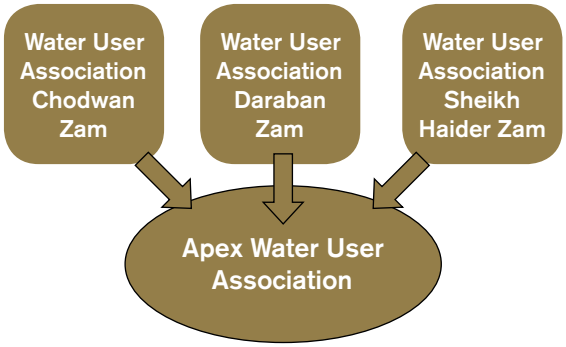


Figure 6: Apex Water Association at Tehsil Daraban System Level



Though the WUA in Daraban, Shiekh Haider and Chodwan Zams have been formed and organised, however for following is the future plan for their strengthening.

- Apex WUA will be registered.
- Building conceptual clarity and the institutional capacity so that they can better understand their role and responsibilities, which will enable them to play a vital role in equitable water distribution at different stages.
- Capacitate WUA members to better understand water related problems, properly document, prioritize and incorporate in WUMP.
- Create effective linkages of WUAs with government line agencies/local government system to mobilise resources in their areas.
- WUA in collaboration with Rudh Kohi Dept and the new local Government system will develop plan to synergise the efforts.
- WUA will have a clear mission and vision regarding water policy in Rudh Kohi area.
- WUA will facilitate the Rudh Kohi Dept like in past Patti Dar did, it will strengthen the WUA.
- Members of Local Government will be sensitised to involve WUA members in water sector planning.
- WUA linkages with GLAs will be developed at all levels.
- WUA will be supported by the Chamber of Agriculture and private sector for better utilisation of resources.
- WUA will be expanded to FR areas so that water should be managed at source level.
- WUA will be effectively linked with WUGs through specific and relevant activities. WUGs will be the general body of WUA and WUA will be accountable to WUGs.
- Lobbying shall be carried out from different sources, for funds allocation.

Water User Groups: At present WUA at apex level (formed by VEER) consists of farmers from a share of Chodwan Zam, Daraban Zam (100%), Sheikh Haider Zam (100%). After the elections for the Local Government the WUA will be effectively involved

at village, union and tehsil level while at apex level WUA will coordinate at district level. The local government system will provide an opportunity to forums like WUA especially in Rudh Kohi area to solve water issues. On the basis of previous experience, knowledge, and manpower the WUA will better facilitate the GLAs, local government and other concerned authorities for effective implementation and addressing of issues.

- **District Coordination Committee (DCC)**

While collation of data and preparation of WUMP was ongoing in the field, an advisory committee i.e. DCC was formed and notified by the Deputy Commissioner (DC) DI Khan of which the Assistant Commissioner, Rudh Kohi serves as the Focal Person. The purpose of the DCC is to steer the WUMP process and implementation at Tehsil level. Such a district steering/coordination committee (of the W4L) was also conceptualised for the 2nd phase to keep track of all developments. The coordination committee is holding meetings bi-annually or when specifically required. The WUMP team maintains close interaction with DCC to update about project interventions and seeks support for timely provision of services by the concerned actors (PHED, Irrigation Dept, Rudh Kohi Dept, OFWM & SCD). The DCC will also ensure ownership for the WUMP at District/Tehsil level.

- **Capacity Building of WUG/WUA and GLAs**

In the beginning of Phase II, before initiating the WUMP preparation, training was conducted of all stakeholders in the Tehsil along with partner organisations. This was meant to conceptualise the IWRM concept and to understand WUMP preparation in the field. This inspires easy flow of information and previous experiences. Multiple workshops on capitalisation of experiences of Rudh Kohi were also conducted.

Chapter 2
2. Socio Economic Factors

2.1 Demography

Daraban Tehsil comprises of 24,066 households, with a total population of 193035. The average household size of the Tehsil is 8 members. The overall male and female ratio is 48.5 % males and 51.5 % females. As such there is no religious divide, majority are Muslims. As mentioned earlier, Daraban Tehsil is divided into 5 wards, comprising 17 village councils and 45 revenue villages.

Figure 7: Population Distribution of Tehsil Daraban (Wards)

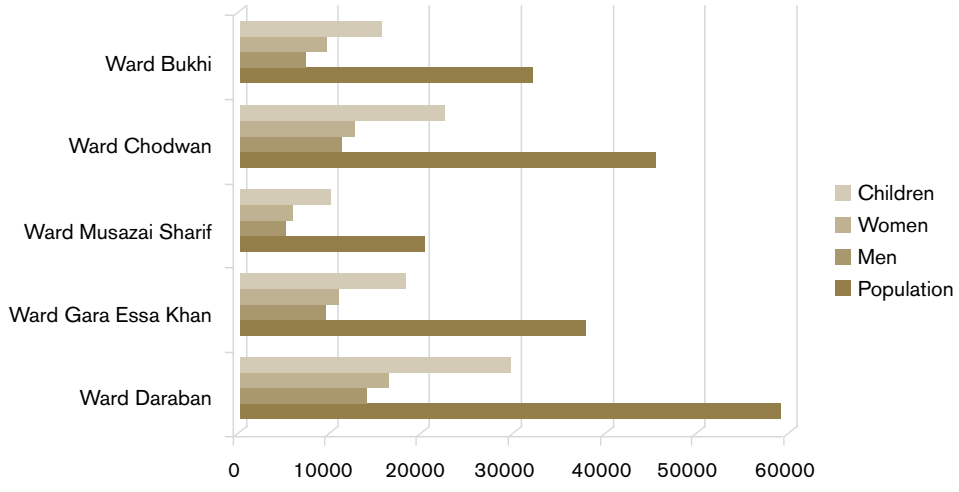


Table 5: Population Distribution of Tehsil Daraban (Wards and Villages)

Village Council	Population	Men	Women	Children	Boys	Girls	Above 80
Ward Daraban	58900	13742	15929	29228			
Daraban 1	20000	4420	5830	9750	4729	5021	0
Daraban 2	31000	7428	8047	15524	7529	7995	0
Zarkani	7900	1894	2052	3954	1918	2036	0
Ward Gara Essa Khan	37450	8982	10413	18055			
Gandi Ashiq	6200	1486	1610	3104	1505	1599	0
Gandi Essab	2930	648	854	1428	693	735	9
Gandi Umar Khan	6870	1518	2003	3349	1624	1725	5
Kot Essa Khan	12830	3082	3410	6338	3074	3264	0
Saggu	8620	2248	2536	3836	1860	1976	0
Ward Musazai Sharif	19975	4700	5625	9625			
Kikiri	4975	1100	1425	2425	1176	1249	0
Musa Zai	15000	3600	4200	7200	3492	3708	25
Ward Chodwan	45160	10879	12254	22027			
Chodwan	32000	7667	8307	16026	7773	8253	0
Gara Nehar	7000	1745	2340	2915	1414	1501	0
Kot Tagga	6160	1467	1607	3086	1497	1589	18
Ward Bukhi	31550	7169	9324	15057			
Bukhi	10800	2584	3274	4942	2397	2545	0
Gara Matt	9000	1989	2624	4387	2128	2259	0
Jandi Baber	6450	1425	1881	3144	1525	1619	0
Kori Hoot	5300	1171	1545	2584	1253	1331	0
Total	**193035**	**45472**	**53545**	**93992**	**45587**	**48405**	**57**

Source: WUMP Database 2014

2.1.1 Types of Houses

According to the data collected in WUMP exercise, Tehsil Daraban 1 shows to have a total of 24, 066 houses out of which 19834 are kacha houses, 1518 pacca houses and 2714 made out of mixed building materials (both kacha and pacca).

Figure 8: Types of Houses

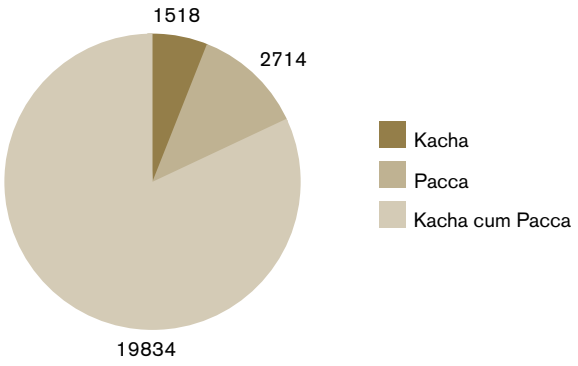


Table 6: Housing Quality

Village Council	Kacha	Pacca	Kacha cum Pacca
Daraban 1	2100	500	900
Daraban 2	2500	200	300
Zarkani	893	0	10
Gandi Ashiq	500	0	10
Gandi Essab	416	0	11
Gandi Umar Khan	956	8	16
Kot Essa Khan	1068	1	55
Saggu	790	50	150
Kikiri	594	1	50
Musa Zai	1000	300	500
Chodwan	2440	452	308
Gara Nehar	625	0	62
Kot Tagga	842	4	28
Bukhi	1580	2	38
Gara Matt	1249	1	122
Jandi Baber	1326	0	100
Kori Hoot	946	0	54
Total	**19834**	**1518**	**2714**

2.2 Educational Facilities

Similar to the rest of rural Pakistan, Daraban tehsil has been neglected in provision of educational facilities. To tend to a population of nearly 93,992 children, there are only 89 primary schools, 16 middle schools (secondary education) and 13 high schools. A total of 53 madrassahs impart Islamic teachings and 9 non-formal schools. Approximately 8,513 children attend government schools, 2,690 attend private, 7,135 go to madrassahs and 856 are attending non-formal educational setups.

Figure 9: Educational Facilities

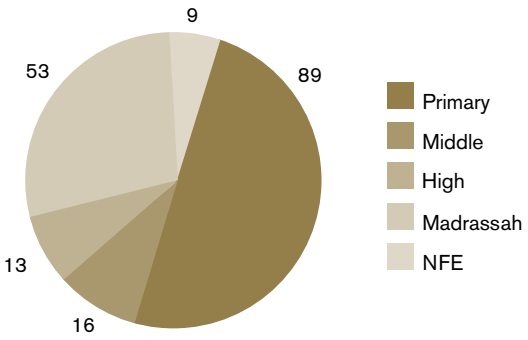


Table 7: Number of Educational Institutions

Village Council	Primary		Middle		High		Madrassah		NFE	
	Girls	Boys	Girls	Boys	Girls	Boys	Boys	Girls	Boys	Girls
Daraban 1	1	1	1	1	0	0	5	1	0	0
Daraban 2	2	3	1	1	1	1	5	2	1	0
Zarkani	3	3	0	1	0	0	3 Co-ed	--	0	0
Gandi Ashiq	1	1	1	1	0	0	2			
Gandi Essab	1	3	0	0	0	0	2	2	2	2
Gandi Umar Khan	4	5	0	0	1	1	3	1	0	0
Kot Essa Khan	3	5	0	0	0	0	1	0	0	0
Saggu	1	1	1	0	0	1	4 Co-ed	0	0	0
Kikiri	2	3	0	1	0	0	2	2 Co-ed	1	1
Musa Zai	2	3	2	2	3	3	5	2	0	0
Chodwan	6	7	1	1	1	1	3	3	1	0
Gara Nehar	1	2	0	0	0	0	2	1 Co-ed	0	0
Kot Tagga	2	2	0	0	0	0	2	0	0	0
Bukhi	1	3	0	0	0	0	0	0	1 Co-ed	0
Gara Matt	1	2	0	0	0	0	0	0	0	0
Jandi Baber	5	5	0	0	0	0	0	0	0	0
Kori Hoot	2	3	0	1	0	0	0	0	0	0
Total	**38**	**51**	**7**	**9**	**6**	**7**	**39**	**14**	**6**	**3**

Source: WUMP Database 2014

Figure10: Number of Educational Institutions

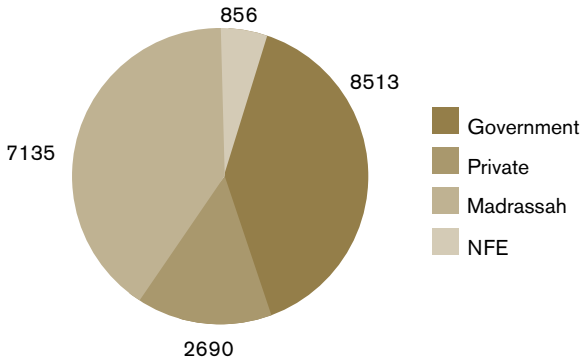


Table 8: Number of Enrolled Students

Village Council	Government		Private		Madrassah		NFE	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Daraban 1	650	200	150	0	1200	110	0	0
Daraban 2	1650	1500	1400 Co-ed	---	500	200	0	250
Zarkani	200	105	0	0	100	20	0	0
Gandi Ashiq	120	70	300	0	100	0	0	0
Gandi Essab	80	76	0	0	67	35	0	0
Gandi Umar Khan	391	175	35	0	55	40	0	0
Kot Essa Khan	150	100	55	0	70	0	0	0
Saggu	148	90	155	0	204	94	0	0
Kikiri	82	0	0	0	320	205	50	65
Musa Zai	55	826	0	0	400	100	0	0
Chodwan	780	520	290	75 (35 35 G.B)	85	100	0	320
Gara Nehar	110	0	0	0	800	700	0	0
Kot Tagga	0	0	30	0	200	0	45 Co-ed(G.B)	0
Bukhi	67	0	200	0	650(G.B)	0	62	24
Gara Matt	40	40	0	0	200 (G.B)	0	0	0
Jandi Baber	188	60	0	0	215	85	15	25
Kori Hoot	40	0	0	0	300	180	0	0
Total	**4751**	**3762**	**2615**	**75**	**5266**	**1869**	**172**	**684**

Source: WUMP Database 2014

Figure 11: Number of Enrolled Students

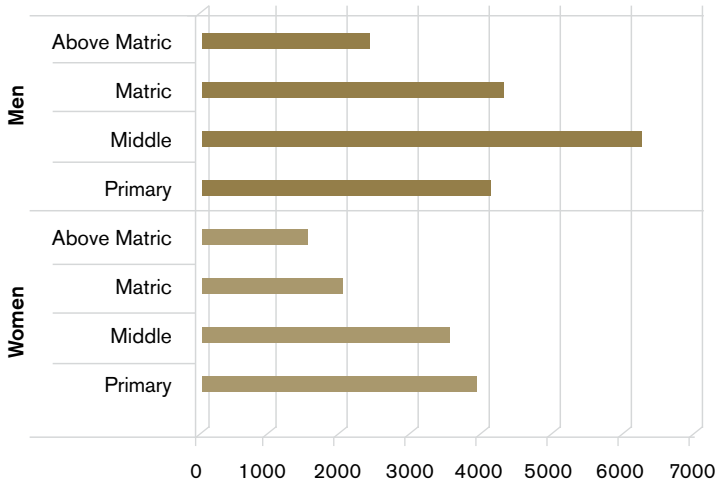


Table 9: Number of Educated Men and Women

Village Council	Women				Men			
	Primary	Middle	Metric	Above Metric	Primary	Middle	Metric	Above Metric
Daraban 1	800	400	150	75	600	200	555	500
Daraban 2	800	2000	900	650	400	2800	1500	1000
Zarkani	0	0	0	0	46	20	11	4
Gandi Ashiq	12	3	1	0	86	30	5	1
Gandi Essab	5	2	5	1	70	45	23	14
Gandi Umar Khan	12	48	17	11	45	85	30	25
Kot Essa Khan	28	12	1	0	47	222	76	34
Saggu	51	27	7	4	20	75	100	116
Kikiri	26	4	11	1	78	44	24	6
Musa Zai	1600	800	800	350	2200	1800	2000	170
Chodwan	355	140	93	351	320	330	240	464
Gara Nehar	10	0	0	0	10	12	9	7
Kot Tagga	25	10	2	0	50	28	24	3
Bukhi	175	24	10	7	30	405	185	84
Gara Matt	1	0	0	0	37	53	11	6
Jandi Baber	10	8	0	0	30	46	20	12
Kori Hoot	0	0	0	0	40	18	11	5
Total	**3908**	**3478**	**1996**	**1450**	**4109**	**6213**	**4324**	**2451**

Source: WUMP Database 2014

2.3 Access to Other Infrastructure

Table 10: Key Services Availability

Village Council	Agricultural Service Centers	Animal Service Centers	Telephone	Electricity office	Post office	Bank	Police Station	Health Facilities
Daraban 1	No	No	Mobile	No	No	No	No	No
Daraban 2	Yes	Yes	Mobile	Yes	Yes	Yes	Yes	Yes
Zarkani	No	No	Mobile	No	No	No	No	No
Gandi Ashiq	No	No	Mobile	No	No	No	No	No
Gandi Essab	No	No	Mobile	No	No	No	No	No
Gandi Umar Khan	No	No	Mobile	No	No	No	No	No
Kot Essa Khan	No	No	Mobile	No	No	No	No	No
Saggu	No	No	Mobile	No	No	No	No	No
Kikiri	No	No	Mobile	No	No	No	No	No
Musa Zai	No	Yes	Mobile	No	Yes	No	No	Yes
Chodwan	Yes	Yes	Mobile	No	No	No	Yes	Yes
Gara Nehar	No	No	Mobile	No	No	No	No	No
Kot Tagga	No	No	Mobile	No	No	No	No	No
Bukhi	No	No	Mobile	No	No	No	No	No
Gara Matt	No	No	Mobile	No	No	No	No	No
Jandi Baber	No	No	Mobile	No	No	No	No	No
Kori Hoot	No	No	Mobile	No	No	No	No	No

Source: WUMP Database 2014

2.4 Off-Farm Income Sources

In Daraban Tehsil 60% of the men and 35 % of the woman cast their votes. Socially, traditionally and culturally women have less involvement in decision making, development activities, representation in local government system and other development forums e.g. village organisations, Water User Groups/Association and other.

Majority of the locals are illiterate, poor, and nutritionally deprived, have no opportunities for participation in local government system, and access to other big markets, heath facilities, educational institutes etc.

Figure 12: Off-Farm Income Sources

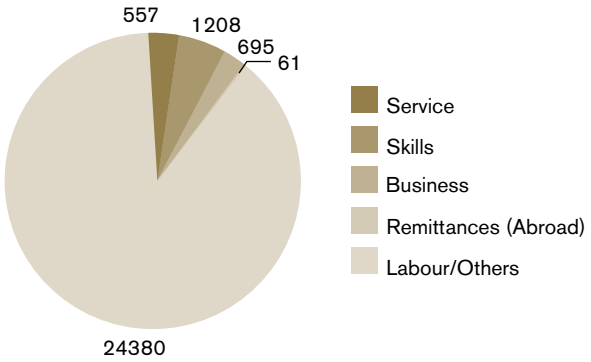
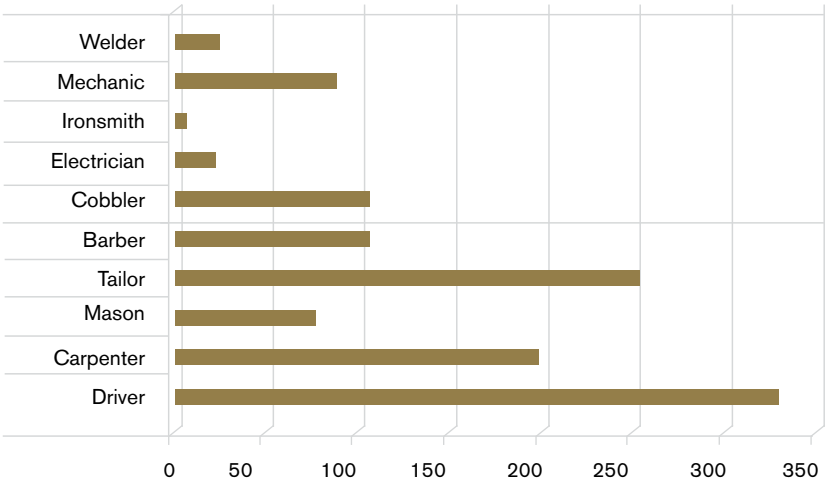


Table 11: Off-Farm Income Sources

Village Council	Services	Skills	Business	Remittances (Abroad)	Labour/Others
Daraban 1	40	115	100	10	11145
Daraban 2	60	175	150	15	2038
Zarkani	8	41	10	1	531
Gandi Ashiq	27	36	15	0	282
Gandi Essab	12	39	8	0	171
Gandi Umar Khan	30	40	25	0	252
Kot Essa Khan	40	73	30	3	649
Saggu	10	38	20	0	610
Kikiri	28	17	12	4	391
Musa Zai	65	300	45	12	650
Chodwan	160	100	120	15	3409
Gara Nehar	13	19	10	0	440
Kot Tagga	12	50	15	0	522
Bukhi	23	40	50	0	1084
Gara Matt	8	20	15	0	1076
Jandi Baber	12	80	50	0	550
Kori Hoot	9	25	20	1	580
Total	**557**	**1208**	**695**	**61**	**24380**

Source: WUMP Database 2014

Figure 13: Number of Skilful Men



Amongst the illiterate men, farming is the most favoured, next to which many prefer working as truck or bus drivers. Amongst the interviewed people in Tehsil Daraban, majority belonged to this profession. Amongst the women, embroidery and working as seamstresses is a popular profession. Dera Ismail Khan is famous for its embroidery and handicrafts with nearly 770 of the interviewed women displaying their skills in this art.

Table 12: Number of Skilful Men

Village Council	Driver	Carpenter	Mason	Tailor	Barber	Cobbler	Electrician	Ironsmith	Mechanic	Welder
Daraban 1	10	12	3	8	5	4			5	
Daraban 2	40	25	2	15	25	20	25			20
Zarkani	27	10		8				6		
Gandi Ashiq	30			3					3	
Gandi Essab	8		12	10		5			4	
Gandi Umar Khan	12	10	1	15	2	3				
Kot Essa Khan	30	14		16	3	10				
Saggu	10	8		10	5	5			5	
Kikiri	6	6	1	3	1				6	
Musa Zai	80	50	35	100	50	30			35	
Chodwan	20	10	5	20	10	10			15	
Gara Nehar	2	8	2	4	1					
Kot Tagga	12	8	5	12		8			5	
Bukhi	14	0	5	8	1	6			2	
Gara Matt	7	6	3	7		1			2	1
Jandi Baber	4	1	2	11					1	
Kori Hoot	10	25		3					2	
Total	**322**	**193**	**76**	**253**	**103**	**102**	**25**	**6**	**85**	**21**

Source: WUMP Database 2014

Figure 14: Number of Skilful Women

Table 13: Number of Skilful Women

Village Council	Seamstresses	Handicraft\Embroidery	Other/Mazri
Daraban 1	25	15	10
Daraban 2	30	15	15
Zarkani	10	82	8
Gandi Ashiq	6	7	0
Gandi Essab	80	45	25
Gandi Umar Khan	21	18	5
Kot Essa Khan	16	130	50
Saggu	18	14	0
Kikiri	18	60	50
Musa Zai	100	200	0
Chodwan	46	47	20
Gara Nehar	10	6	6
Kot Tagga	12	4	4
Bukhi	60	30	10
Gara Matt	32	25	0
Jandi Baber	42	22	30
Kori Hoot	10	50	30
Total	**536**	**770**	**263**

Source: WUMP Database 2014

2.5 Land Use – Agricultural Land

In Daraban Tehsil the main source of irrigation is Rudh Kohi (spate irrigation) of which there are three types:

- **Flood waters or Rudh Kohi**
- **Rainfed**
- **Irrigation from perennial springs or Kala Pani**

The floodwater from the hill torrents reaches the area through the same ravines as the perennial water but the water rights are different. The general rule of right is known as “Siroba Paina” (irrigation turn by turn from upstream to downstream). Besides the regular irrigation from flood water, there is also irrigation by perennial water. In Daraban Zam, irrigation by overflow (Chhal) is also practiced. It is when a torrent is so full that the water overflows into the Khulas without dams. All villagers are at liberty to use this water (Iqbal, 2007). According to the survey carried out for WUMP the total available land is 581,048 acres of which 252191 acres is under irrigation and 287167 acres is un-irrigated.

Figure 15: Distribution of Land

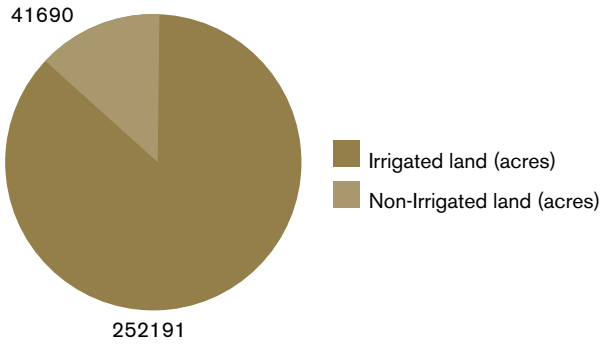


Table 14: Irrigated Land Distribution

Village Council	Irrigated land (acres)	Non-Irrigated land (acres)	Total Land area (acres)
Daraban 1	22767	1120	23887
Daraban 2	22767	1120	23887
Zarkani	25553	1025	26578
Gandi Ashiq	7500	750	8250
Gandi Essab	4078	1237	5315
Gandi Umar Khan	12052	13356	25408
Kot Essa Khan	19793	686	20479
Saggu	14047	1134	15181
Kikiri	10414	0	10414
Musa Zai	26305	63	26367
Chodwan	10729	17964	30156
Gara Nehar	9387	75	1284
Kot Tagga	11170	0	11170
Bukhi	10094	872	10966
Gara Matt	13250	0	13250
Jandi Baber	21705	1130	22835
Kori Hoot	10580	1158	11740
Total	**252191**	**41690**	**287167**

Source: WUMP Database 2014

2.5.1 Land Holding Pattern

According to the statistics collected from EAC Rudh Kohi office, farm size ranges between 100-300 kanal 50-100 kanals and 1-50 kanals. 75 percent of the land owners maintain small farms between 1-50 kanals of land. The farms within these categories are operated by owner-cum-tenants (self-operators). Whereas rest of the farmers are purely tenants. Landless labour is generally 10 percent of total population. Land holdings of small farmers, which they own from the land reforms, are fragmented (KPK agriculture census reports that 77 percent of the farmers are fragmented), which makes agriculture more labour intensive. Women involvement in agriculture is limited to irrigation, harvesting, cleaning and storage. Women are not involved in ploughing and sowing. Most of the poor landless women undertake waged employment outside their villages during harvesting season. In perennial water all the landowners having their rights in water, cultivate a portion of land according to available water and get equal share.

Fig 16: Land Holding Pattern

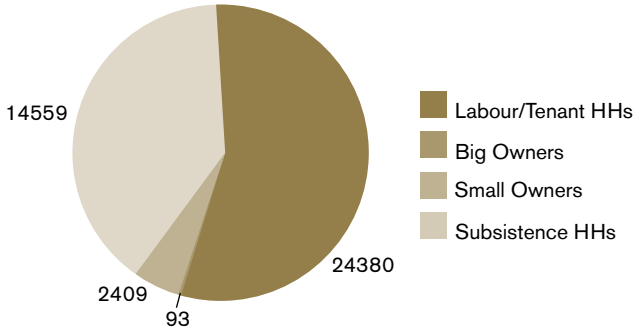


Table 15: Land Owning Distribution

Village Council	# of Big Owner HH	# of Small Owner HH	# of Subsistence HH	# of Labour/Tenant HH
Daraban 1	15	110	830	1045
Daraban 2	12	350	1300	2038
Zarkani	2	115	252	531
Gandi Ashiq	0	238	300	282
Gandi Essab	0	78	142	171
Gandi Umar Khan	5	238	475	252
Kot Essa Khan	0	64	361	649
Saggu	5	60	315	610
Kikiri	0	57	162	391
Musa Zai	12	438	700	650
Chodwan	36	155	400	3409
Gara Nehar	0	105	80	440
Kot Tagga	3	102	223	522
Bukhi	0	161	405	1084
Gara Matt	0	47	127	1076
Jandi Baber	3	41	337	550
Kori Hoot	0	50	250	580
Total	**93**	**2409**	**14559**	**24380**

Source: WUMP Database 2014

2.6 Agriculture and Livestock Status

The major occupations in Tehsil Daraban are agriculture, livestock, labour and small businesses comprising shops and handicrafts. Agriculture is the main occupation or source of income in the area. Agriculture and livestock rearing are mostly on shared basis. If floodwater is not available, then people go to neighbouring villages or further away for harvesting of crops and general labour. Few upstream villages also have spring water (kala pani) which they use for irrigation. Small herds of sheep and goats are maintained as the backup support system to provide cash in emergencies. In off-season mencarry out casual labour within their villages and outside the Tehsil. People in Daraban Tehsil have very little options for diversifying their livelihoods not only due to poverty but also because they are traditionally not skill-oriented, only 15 % men and 8 % women are skilled in different trades such as embroidery, tailoring, cobblers, barbers, mason, electricians, carpenters, and drivers. Women market their skill within their villages due to very limited access to other areas and due to cultural barriers.

2.6.1 Farming Practices

Agriculture in Daraban Tehsil is subsistence for the tenants and for majority of the owners it is meant to ensure food security for their families. The reason being a low productivity level in these areas as the land is hostage to timely availability of water. The major part of the community is associated with agricultural sector which is a major source of income through farming on their own and or as tenants. As Tehsil Daraban is Rudh Kohi (spate irrigated) area and naturally Rudh Kohi agriculture is characterised with flood irrigation. The flood water is stored in the field varying in area from 2 to 10 hectares or more by constructing earthen dikes (Bunds) 3 to 5 feet

high. The floods of July/August are used for Rabi cultivation and those of March/April for the Kharif crops[2]. The main Rabi (spring) crops in Tehsil Daraban are mainly wheat followed by oilseeds such as rapeseed as well as gram, and barley. Sailaba wheat yields typically 600 kg grain per ha. Kharif (monsoon) crops are mainly sorghum and mung bean, often as inter-cropping but rapeseed (mustard) and millet is also sown while the stalks are usually grazed. A small minority of crops are melons, barley and Guar (vetch), (Oosterbaan, 2010).

Agriculture is the major water user, the productivity and sustainability of agriculture depends on timely and adequate availability of water. Water is the most limiting factor affecting the livelihoods of the villagers and the availability of sufficient water at the right time is the most crucial factor for agriculture production and income generation of the Rudh Kohi and rain-fed areas.

To ensure community participation and to plan community based activities it is important to determine the time and periods when they are sowing and harvesting their crops.

Table 16: Seasonal Calendar

Crops	Sowing Months	Harvesting
Wheat	October/November	April
Gram	October	April
Sorghum	August	March
Millet	August	November
Brassica	September	March
Barley	October	March

Source: WUMP Database 2014

2.6.2 Livestock Holding

The vast range area and low population density is favorable for sheep and goat production. In fact the environmental conditions are more suitable for keeping goats than other animals. Livestock is the main component of this ecology and people are very much dependent on it. It plays an integral role in the farming system of the area. Sheep and goats are commonly keptand cows and buffaloes are common in areas with better water availability. Poultry is kept in almost every household. On an average there are 10-15 sheep, 20-25 goats with 2-3 cattle per household. Around 5% herds are large animals with more than 100 animals mainly kept for subsistence, marketing of livestock products, is also quite common if need arises. The livestock play a primary role in food security and earning cash especially when agricultural activities are halted due to drought. It is an important source of direct income, productive investment in terms of time and a symbol of status and prestige especially for women. The major problems in this area include low productivity, fodder scarcity, disease prevalence, poor management practices, lack of knowledge and information about animal husbandry and poor marketing channels.

In each household 2 Cows, 2-3 goats, and 8-10 poultry are found for income generation and self-use. Other livestock animals such as buffaloes, camels, donkeys, etc. are also to be seen in villages. In June-August livestock suffer from different diseases e.g. moukhar, galghoto and vill. For the treatment people use local traditional methods and only consult the veterinary doctor in case of severity. Women are mostly responsible for caring of animals, watering, feeding, waste cleaning, hygienic aspect infact all activities at a household level but men are responsible for the animals' outdoor grazing. Usually every VC has two separate ponds for livestock.

[2]Although there are distinct winter, spring, summer, and autumn seasons in Pakistan, crops are not classified according to these seasons. For the purpose of planting, water charges, and government revenues, crops are divided into two major seasons – Kharif and Rabi (Hatam, 1994).

Table 17: Number of Livestock

Village Council	# Buffaloes	#cows	#goats& sheep	#poultry	#donkeys
Daraban 1	110	4000	6000	4000	45
Daraban 2	110	7400	11100	14800	40
Zarkani	27	6200	5750	6000	140
Gandi Ashiq	20	1020	1022	1260	40
Gandi Essab	28	416	2225	1791	22
Gandi Umar Khan	20	2640	3905	4150	45
Kot Essa Khan	25	988	3148	4702	40
Saggu	155	2220	4330	7870	50
Kikiri	28	1140	2730	3000	157
Musa Zai	250	3600	7200	10000	70
Chodwan	4000	10800	3000	24200	60
Gara Nehar	25	8250	20250	5750	35
Kot Tagga	10	2580	5860	5000	45
Bukhi	38	3300	4950	4500	90
Gara Matt	60	3250	9000	5500	50
Jandi Baber	100	6680	9870	8760	140
Kori Hoot	50	4000	18100	4500	55
Total	**5056**	**68484**	**118440**	**115783**	**1128**

Source: WUMP Database 2014

2.7 Mapping of Stakeholders, Local NGOs and Government Line Departments

There are some civil society organisations in Daraban Tehsil dealing with water sector issues. These include W4L-IC project, PPAF, and local organisations such as VEER Development organisation, Sabawon and more mentioned below. In Tehsil Daraban, IC had started off by working on the water sector in its Phase I, especially focusing on the irrigation bund, flood and village protection wall, gatted structure, inlet/outlet structures, livestock drinking water ponds. DWSS, desiltation of water channels and more. People in the villages have access to Rudh Kohi department and PHED, because both sectors are very important for their livelihood and health. People have poor access and linkages with Agriculture, Livestock, Forest and Health Departments, GLAs and other non-governmental agencies, whereas the religious leaders maintain good relations with all.

Table 18: Key Development Organisations

Name of Organisation	Type of Organisation	Number of projects Implemented	Key Areas of Interventions
Sabawon	National Organisation	1	Hand Pumps, Streets and Protection wall
VEER	Local Organisation	1	Kitchen Gardening. Protection walls, water conveyance system
VEER	Local Organisation	1	Gated structure, Inlets/out lets, retaining walls
VEER	Local Organisation	2	Food items, non-food items
VEER	Local Organisation	1	Non-food items, community based infrastructure
VEER	Local Organisation	1	Fruit orchards, forest plants nurserydevelopment, range land management, Land management, village development plan
VEER	Local Organisation	1	School safety and DRR
VEER	Local Organisation	1	Seed and livestock distribution
VEER	Local Organisation	1	Employable skills and Embroidery Center
Sabawon Oxfam/VEER	National and INGO	1	Water pond construction
VEER	Local Organisation	1	Drinking water pond
Sabawon Oxfam/VEER	National and INGO	1	Hand Pump, Latrine
Sabawon Oxfam/VEER	National and INGO	1	Latrine, Hand Pump
Sabawon Oxfam	National and INGO	1	Streets and Latrine
SPO/Sabawon	National Organisations	1	Hand Pump, Livestock, Fund for smallbusinesses, Gati, Inlets
Sabawon Oxfam	National and INGO	1	Latrine, Filtration Galleries, Road, 25 Bio sand Filters
SPO	National Organisation	1	Plants, Protection wall, Embroidery and livestock
Sabawon Oxfam	National and INGO	1	Filtration plant, Latrine

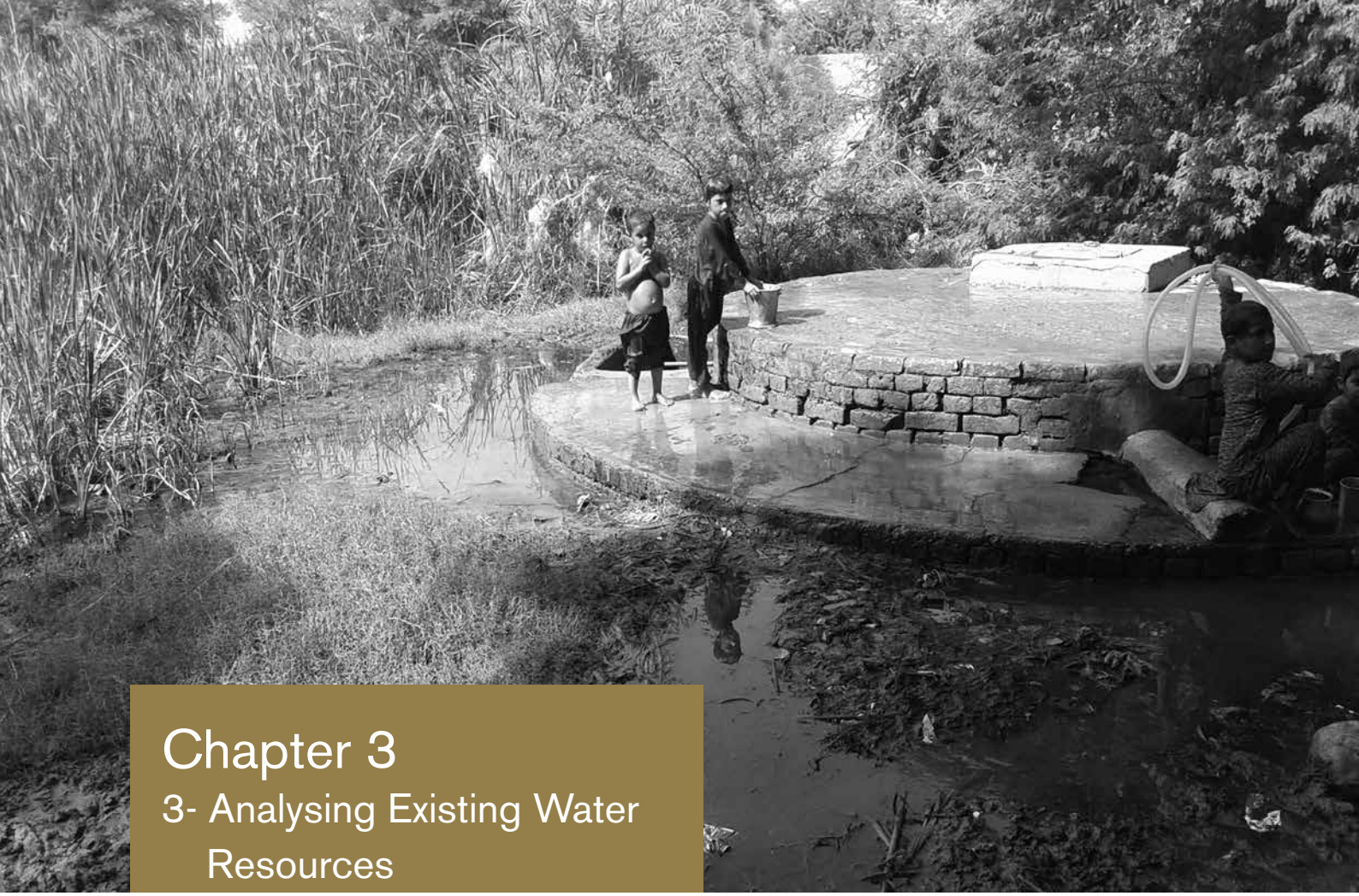
Source: WUMP Database 2014

2.8 Water Sector Interventions

The above mentioned management units have worked on drinking water resources, availability of safe and clean drinking water, multiplication of wheat, gram, millet, sorghum, mustard, increase in vegetation, reduction in soil erosion, fodder production, poverty reduction and increase in income of poor households, improvement of village infrastructure, water inlets, gated structures, water harvesting ponds, Farm Forestry, social service linkages, transfer of technology, community infrastructure specially in Sanitation System and more.

Table 19: Water Sector Interventions

Village Council	DWSS	Irrigation Channel	Others
Daraban 1	Hand Pumps, tube wells	Desiltation of perennial water channels	Protection wall
Daraban 2	Hand pumps	Construction of bunds, gated structures, inlets /out lets	Livestock pond DRR
Zarkani	Hand pumps	Desiltation of perennial water out let structure	Protection wall
Gandi Ashiq	-	Construction of bunds, gated structures, inlets /out lets, protection wall	-
Gandi Essab	Water tank	Construction of bunds, gated structures, inlets /out lets	Protection wall
Gandi Umar Khan	Water tank	Construction of inlets/out lets	
Kot Essa Khan	Drinking water pond	Band Rehabilitation (Toya)	Protection wall
Saggu	Tube well	Construction of bunds Gated structure	
Kikiri	Drinking water pond Hand Pump	Construction of Gati	
Chodwan	Hand Pump	Construction of bunds, gated structures, inlets /out lets	
Bukhi	Hand Pump 25 Bio Sand Filter Filtration galleries		
Jandi Baber	Provide pipe line of Chodwan		Protection wall
Kori Hoot	Filtration Plant		



Chapter 3
3- Analysing Existing Water Resources

Water is often a sensitive subject, especially in water scarce situations. Based on how well a project deals with the above issues, it can either flare conflict or act as a social bridge to enhance coherence at local level. A do-no-harm approach therefore is fundamental to analyse if any initiative follow approaches which do not contribute to flaring tension in the community. Being a life-force and a burning issue, water has been severely impacted upon by climate change as well as hazards evolving out of the same.

3.1 General Water Resources

At the end of phase, I, W4L produced multiple documents shedding light on issues and how to address them (as per the possible research carried out). In the table below, the portion on DIK is reproduced to shed light on this dire problem.

Figure 17: Existing potentials and constraints in District DI Khan

District	Existing potentials / issues	What can be done
DI Khan 	• Flood irrigation system called Rudh Kohi • Scarcity for quality drinking water for humans and livestock • Zam/ watershed based conflicts on water distribution. • Clearly defined water rights – lack of implementation • Mainstreaming potential for DRR	• Technology, for improving drinking water quality • Improved irrigation system (developing RudhKohi system) and water storage. • Huge scope for further improving Water User Associations and mediating conflicts • Policy dialogue on Rudh Kohi system and access to services

3.2 Water Resources and Classification

There are 3 types of drinking water sources assessed in Daraban Tehsil

- Rain water traditional pond
- PHED scheme which was laid down by PHED in 1973 in Daraban and Chodwan Towns, where water is collected in sub-surface tanks then distributed to rest of the villages.
- Groundwater in upstream villages where under-ground water is available for drinking purposes. Currently there are 9 cemented water tanks in which 3 are functional and 6 are non-functional.

Major water related problems

- According to the information obtained main water related problems are:
- Scarcity and quality of water
- Rainfall is uncertain and erratic
- Floods are unresponsive.
- No efficient water use technologies are practiced.
- No rainwater and flood water harvesting structures and practices found.
- The situation of sanitation and hygiene are worse.
- There is no specific drainage system and the rainfall runoff becomes the part of streets and having big trouble rainy season.

The main sources of water are rainfall and runoff (flood) obtained from Sheikh Haider Zam, Rudh Sawan & Toya and Daraban zam, Lora & Gudh and waleri. As the total area is rain fed and depends upon flood water, the Tehsil has been divided into different units on the basis of drinking water, irrigation water and sanitation i.e.

- **Drinking Water Unit**
- **Flood water irrigated and Rain-fed (barani) lands Unit**
- **Village Sanitation System Unit**

Daraban Zam after emerging from hills, divides into two creeks viz Toya, Lohra and Gud. The annual runoff of about 3,700 Ha-m (30,000 MAF) has been estimated with a perennial discharge of about 1.00 cms (35 cfts). The recorded flow is 1,980 cms (70,00 cfs). Area under zam is about 1290 ha (30980 acres).

Daraban Nallah, after exiting the gorge naturally divides into two branches. The left branch named Toya-2 has a peak discharge of 120cms (4,200 cfs) while Lohra on the right takes 850cms (30,000 cfs) of the 25-year flood peak.

Figure 18: Total Number of Hill Torrents and their Discharge

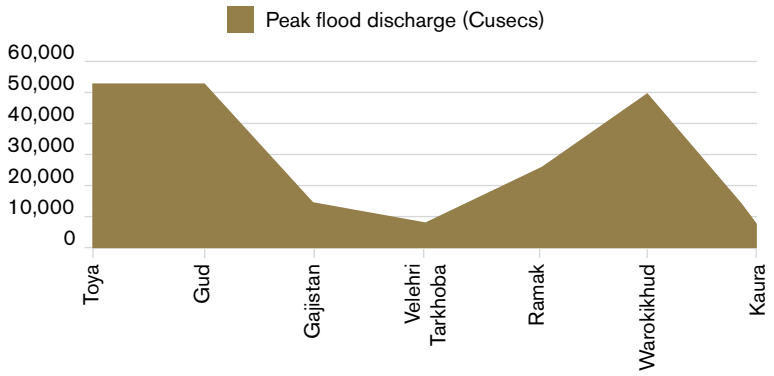


Table 20: Total number of Hill torrents and their peak discharge

S.NO	Name of Hill torrent	Peak flood discharge (Cusecs)
2	Toya	53,600
5	Gud	53,000
6	Gajistan	14,500
7	Velehri, Tarkhoba	9,000
8	Ramak	25,800
9	Waroki khud	49,100
10	Kaura	8,800

3.3 Water Management/Governance System

3.3.1 Water Distribution Laws

The water distribution laws (Kuliyat and Riwajat) are strictly followed in perennial streams command areas in Daraban zam as indicated by majority of the respondents. In a study carried out in 2013 (Assessment of Water Availability and Evaluation of Traditional Rudh-Kohi Irrigation System in Dera Ismail Khan) most of the respondents (88% in Daraban) mentioned that water laws are adhered to at Riwajat level while at Kuliyat level they showed their dissatisfaction, and pointed out the water laws are not followed and 12% show their satisfaction. In general the downstream farmers were relatively less satisfied with the flood water distribution system as compared to the upstream.

3.3.2 Water Related Disputes

An Upstream – Downstream dilemma! The local system of Rudh Kohi irrigation was constituted in the form of irrigation rights during the last decade of 19th century, which was updated during 1904-1905 and 1967-1968. Normally people owning land on both sides of the zams (Hill Torrents), its branches, wahs and wahis have rights for irrigation based on the general principle of “Siroba Paina”,

which means irrigation turn by turn from upstream to downstream. But some lands and certain areas have no water rights. Under Siroba Paina the basic rule according to which water is allowed to flow is that until it stands as high as the embankments of the field. The upstream irrigators are entitled to receive irrigation supply before the downstream. The enforcement of rules related to cutting of Saads/Gandies in Rudh-Kohi irrigation systems are constant trouble-brewers for the inhabitants especially for poor peasants.

- Larger landlords usually capture available water as and when needed. Neither Government nor local people are in a position to control water distribution or to prevent violation of water rights.
- Inequitable distribution and wastage of water causes conflicts & disputes among communities.
- Lack of coordination among different stakeholders.
- Illiteracy hampers empowerment of water users, particularly women.

3.3.3 Local Resolution Mechanisms

Where essential, related project actors engaged in Water Use Management Planning exercises will be required to indulge in conflict mediation for ensuring that the key drivers of conflict around water are addressed. If that is not done, there is a fear that a shared plan may not be achievable in the long run. In this process the role of Water User Association and District Administration is really crucial. Any project unit (as a relatively outsider actor), can only facilitate dialogues and continue to remind that key conflicts must not be avoided but discussed. It would be necessary to build capacity of key actors in these areas since conflict mediation is a daunting task and needs special skills.

3.4 Irrigation Systems & Water Rights

In Tehsil Daraban there are three types of land for crop production - flood irrigated, rainfed and perennial water. For flood irrigation, land is documented and identified as each and every field in "*Riwajat e Abpashi*[3]" and water rights are defined in "*Kuliyat Abpashi*[4]", while for perennial water the same system exists. The difference being that the land is used according to the water available and all the landowners and water right holders hold their shares.

Customary water rights were codified by the colonial District administration in 1905 in the form of Riwajat and Kuliyat-e-Abpashi the original copy of which is kept in the Revenue Department. These registers are still consulted and contain the lists of all the villages responsible for labour on each bund (Gandi / Saad).Both were documented in the era when there was no or little technology available for the construction of Gandies (earthen bunds) and field embankment.A special functionary was responsible for the enforcement of these rules, exhorting farmers to plug gullies and rebuild their bunds (Gandi / Saad) in that era. The Riwajat and Kuliyat are followed (locally called SirobaPaina, upstream-downstream water shares) in the streams and in the command areas.

One cannot claim that all the farmers are following water rights. Most often downstream farmers are relatively less satisfied and consider themselves on the losing side. During the social & technical assessment careful attention was given to identify the disputes if any, in the past, present utilisation and future plan. Duringthe assessment process, no major disputes currently exist but sometimes women quarrel with each other during water fetching when it is available in fewer amount.

3&4 See glosssary

Table 21: Cultivated Area with Flood Water Rights in Daraban Zam

Nallah	Village	Total area (ha)	Area with irrigation rights (ha)	Cultivated area (ha)	Area with water rights (%)	No of Gatties
Jind	Gud(South)	1,012	810	712	80	1
Lohra	Kot Zafar	405	336	290	83	3
	Shadi Khel	895	810	574	91	4
Toya-I	Shadi Khel	4858	3603	2850	74	6
Chute Wae	Shadi Khel	2328	1822	1560	78	17
Nehara	Gandi Umar	162	142	99	88	1
	Sarkari	1215	1012	954	83	1
	Garah Murid Shah	526	445	413	85	1
	Rashid	810	688	602	85	6
	Malkani	2024	1660	1509	82	5
	Paroa	526	405	355	77	4
	Makar	567	486	421	86	3
	Sub-total	**5830**	**4838**	**4352**	**83**	**21**
Kand Attaullah	Musazai	405	324	243	80	1
Gud Rud (North)	Daraban	510	510	287	100	5
	Musazai	896	896	540	100	2
	Gandi Umar Khan	5512	5512	4534	100	7
	Kiran Fateh	1619	1417	930	88	1
	Mochiwal	814	814	455	100	2
	Garah Murid Shah	420	420	219	100	1
	Sub-total	**9351**	**9148**	**6747**	**98**	**17**

Source: Assessment of Water Availability & Evaluation of Traditional Rudh-Kohi Irrigation Systems in DI Khan-AUP IC 2004

Table 22: Cultivated Area with Flood Water Rights In Chodwan Zam

Nallah	Village	Total area (ha)	Area with irrigation rights (ha)	Cultivated area(ha)	Percent area with water rights	No of Gatties
Valahri	Chodwan	1155	1155	239	100	3
	Gara Abdullah	651	651	486	100	1
	Bhukki	838	838	528	100	2
	Mail Wali	931	810	729	87	6
	Kot-Musa	655	655	1515	100	3
	Jandi	1568	1568	91	100	1
	Sub-total	**5798**	**5677**	**3588**	**98**	**16**
Terkhoba	Chodwan	1621	789	0	49	2
	Gara Hamza	219	219	0	100	1
	Terkhoba	215	215	0	100	1
	Sub-total	**2055**	**1223**	**0**	**60**	**90**

Source: Assessment of Water Availability & Evaluation of Traditional Rudh-Kohi Irrigation Systems in DI Khan-AUP IC 2004

3.4.1 Irrigation Water Technical Information

Rudh Kohi system, also known as a form of Spate irrigation, is based on flood water from hill-torrents diverted through earthen weir and regulated structures for cultivation of crops. At times there are sudden surges of high volumes of water from steep hills after rain in the catchment area carrying high sediment loads. Spate irrigation systems have head-works for diversion of flood water into canal network and basin storage for regulation. This system combines both perennial and seasonal flows whileit functions through managing water and sedimentation according to the agreed water rights among farmers along the system. The Rudh Kohi irrigation requires a lot of earthen work to be piled up hence a lot of homework must be done throughout the year.

3.4.2 Water Resources Analyses/Location

Sub watershed saad located in Tehsil Daraban, are irrigating the land according to established rules and regulations of Rudh Kohi and perennial system. This channel is divided into Pal north and Pal south.

Table 23: Discharge, Catchment Area and Area with Water Rights in Selected Zams

Name of the Zam	Discharge (Minimum) cms (cfs)	Discharge (Maximum) Cms(cfs)	Catchments Area (km2)	Area with water rights (ha)	Total net work length (km)
Daraban	0.99(35)	1,922(70,000)	1,096	12,543	45
Sheikh Haider Zam	.283(10)	1133.7(40000)	505.75	2231	49
Chodwan Zam	.567(20)	1558.96(55,000)	1014.4	16514	84

Source: PLI-AUP Technical Water Assessment Study Team Survey, 2004

3.4.3 Source by Quality

Quality of irrigation water is good for irrigation purposes because it is not saline. Saline water is hazardous for irrigation. It also brings clay, silt or gravel carried by rushing streams and deposits where the stream slows down making it is much fertile and beneficial in crop production.

Table 24: Water Quality of Daraban Tehsil (Rudh Kohi Flood Water)

Location on the Zams	Kalapani EC_W in ds/m	Flood water EC_W in ds/m	Ground Water EC_W in ds/m	Zn	Fe	K	Na	Mg	Ca	SAR
				mg/L						
Upstream(H)	1.281	1.390	1.833	0.06	0.08	0.90	99.0	71.1	124.9	10.0
Midstream (M)	-	0.819	1.010							
Downstream (T)	-	1.203	1.128							
Average	1.281	1.137	1.174							

Source: PLI-AUP Technical Water Assessment Study Team Survey, 2004

3.4.4 Source by Potential Use

Potential use of the identified irrigation source is analysed by the level in sub watersheds and Gattis. An integraded water resources perspective ensures the quality of life of the communities, environmental conditions,and increased opportunities to improve rural livelihoods through rational, equitable and sustainable use of water at Village Council level. Potential for improvement of irrigation system is 70% because most of the water channels, bands, gattis are damaged due to improper constructions of damaged points, hence flood water is also wasted, to a certain extent.

3.5 Drinking Water Supply Status

Water contamination is the biggest issue and concern of the stakeholders. Water stored in ponds is turbid and is replete with clay, silt and biomasses. Ponds are shared by animals and humans leading to high incidence of morbidity.

3.5.1 Drinking Water Sources

In Daraban, there are 2 main sources for drinking water; one is traditional (earthen) rainwater and second is PHED scheme (pipe line and cemented water tanks). Most of the schemes are non functional.

3.5.2 Service Level Analyses and Hardship Ranking

In the Tehsil's rural area, functional drinking water ponds are located on the village outskirts and not within, therefore more time is consumed for fetching. Women have the main responsibility for water fetching but sometimes men and children are also involved. Time of day for water fetching is usually morning/evening, 20-25 minutes consumed in one trip; 6-7 trips are made in a day, total 3 hours consumed per day. If the water source is closed or damaged they go to the nearest village, and more time is consumed. The collected water quantity is 20 litres/trip. Water storage methodology at HH level is different, some people use pitchers, jerry cans, small plastic tank, mud potsin fact any sizeable container. PHED surface tanks are providing drinking water through distribution pipes but these lines are old and choked with only 20% schemes being functional.

Table 25: Average Water Fetching Particulars

Water Fetching Responsibility			Water Fetching time taken for 1 trip (in mins)	Continuity Hrs/day	Drinking Water Source Available			Methodologies used for water collection/storage at HH level		
M	F	Ch			In Village	Nearest village	Far flung Area	Pitchers/ Mud Pot	Jerry Cans	Small plastic tank
	√	√	20-25	3/h/d	√			√	√	√

3.5.3 Drinking Water Quantity

In villages the water quantity available per capita per day is 3.7 litre with quality being satisfactory. Total capacity of existing water sources (Water Pond/Water Tank) is shown in table 26.

Table 26: Average Water Quality and Quantity

Existing water source	Available per capita	Water Quality	Benefitting HHs
PHED Scheme (with water tank)	3.78 lpcd 1 gpcd	Satisfactory	800
Earthen (rainwater) traditional pond	7.56 lpcd 2 gpcd	Poor	800

3.5.4 Drinking Water Technical Information

Water resources in the context of Pakistan are much essential for proper economic and social development of the nation. The same is true for all Village Councils within Daraban Tehsil, having some resources which are not properly utilised for drinking and irrigation. With the proper use of the water resources for drinking, irrigation, and other environmental enhancement, the socio-economic condition of the village council can be enhanced.

3.5.5 Local Hazards Identification & Ranking

People mainly face two types of hazards - drought and heavy floods. Drought is extremely devastating due to unavailability of irrigation water, while flash floods are sudden with no planning for storage. The seasons or time of flash floods are mostly Feb-March and July-August. Heavy floods usually come in every 10 years. Heavy rains and windstorms occur very rarely in the area, hence low frequency of both.

3.5.6 Water Resource Balance and Demand Analyses

There are limited and insufficient water sources for drinking purposes and quantity is also insufficient for the community viz their demand. If discharge is increased and existing water tanks with pipes or other available structures are repaired, then the water availability ought to increase sufficiently.

3.6 Analysis of General Water Resources

Through technical assessment, details about water sources, water discharge, available quantity, location, quality, existing use and potential use of water have been gathered. Water quality is satisfactory but not good for health due to contamination. In case of scarcity of water, villagers use flood water retained in ditches and natural ponds. Theanalysed and measured total discharge of water, in different villages is shown in table 27.

Table 27: Water Source Discharge (average)

Water Source	Avg. Discharge	Avg. Gallon/p/c/d	Avg. Litres/p/c/d
PHED Scheme	6200 gallons	1 gpcd	3.78 lpcd
Traditional water pond	1362702 gallons	2 gpcd	7.56 lpcd

3.6.1 Source by location

Themain PHED Scheme water source is located upstream in Daraban and Chodwan villages. Water reaches tanks in all VCs through underground cemented pipelines. Rain water harvesting ponds are located within a village, which come in use when water shortage occurs in the PHED scheme.

3.6.2 Source by quality

Assessment of water quality is very important but it is assessed by only spot observation of the sources in terms of its location, surrounding vegetation, cleanliness, source protection, present use practices, settlements in and around the source, possible contamination of defecates, carcasses etc. Analysing the water quality of identified sources indicates physical, biological and chemical contamination.

Table 28: Summary of Water Source by Quality

Source	Good	Moderate	Poor	Very Poor
PHED Scheme			√	
Traditional water pond				√

3.6.3 Source by existing use

The community of Tehsil council Daraban, mostly use PHED scheme water for drinking purposes. Sometimes during days of shortage they retain and use rain water in traditional ponds and flood water in ditches from hill torrent beds. These two sources are used for drinking purposes as well as for livestock.

3.6.4 Source by potential use

Potential use of identified sources are analysed keeping in mind the improvement of water quality, more availability of water to people, better environmental conditions and better health conditions for improving life of local people through repair and initiation of new drinking water schemes. The existing sources have 60% potential use (for drinking purposes of bothhumans and livestock).

3.7 Disaster Risk Reduction

Disaster Risk Management/Reduction include scatastrophes such as floods, flash floods and drought all three of which are evident in an arid, plain area such as Daraban. Reduction in disasterous effects involves two steps: Structural and Non-Structural Measures. To avoid catastrophic effects of water scarcity or its abundance, specific measures have to be taken before the onset of the disaster.

3.7.1 Integrating DRR in development interventions

- Mainstreaming DRR is a strategic decision to safeguard development interventions as well as to ensure that development actions do not cause harm.
- Livelihoods assets cannot be improved until we address vulnerabilities and deploy potentials. Therefore just as developing livelihood assets is a participatory process in development, similarly addressing vulnerabilities goes hand in hand with participation from the same people. This particularly includes protection walls and check dams to protect farming lands.
- Sustainability of development interventions demands mainstreaming DRR (protect livelihood assets). This means that the assets produced as a result of development are not fragile to disasters and are resilient enough to continue to serve communities.

Due to drought and other climatic disasters, migration in Daraban has become a common practice over the last many years. Due to unavailability of drinking water in hot summers accompanied by drought many HHs/ families migrate to DIK, Punjab and other irrigated areas for at least 3-4 months (May-Aug). This is a common practice in all of Rudh Kohi. Otherwise the poor usually migrate in wheat harvesting season for labour and livelihood purposes.

3.8 Sanitation

Similar to majority of the arid rural areas in Pakistan, there is no proper sanitation system available in Tehsil Daraban. The sanitation system being used is mostly open and dry pit while sanitation practices comprise of pit latrines, flush latrines and open defecation. The sanitation waste coming from bathing, kitchen and washing clothes is being discharged out into the open, mostly into streets. The preference of households lies in setting up of flush latrines by and large with no concept of septic tank provision. Furthermore, due to open defecation the sanitation situation is rather unsatisfactory. In the absence of properdrainage system, waste water finds its way into irrigation channels, stream and open fields. This situation is polluting the natural watercourses and channels. The social assessment conducted in the area shows that the personal, domestic and environmental sanitation status seems moderate primarily due to lack of knowledge embedded by cultural practices/taboos and poor housing conditions. The water sources being used for drinking purpose also pose risk of contamination because of the open defecation near to the water sources (in some cases).

Animal waste is used for making dung cake stand foruse as fuel or as manure for crops. The practice is to openly collect animal waste/ dung into a pit near by the house (usually in the yard). Such practices are the root causes of spreading diseases. There is a need for

improvement in the sanitation situation through a program that includes both awareness raising and training as well as support in improving sanitation facilities.

There is a dire need for organising intensive and extensive Water, Sanitation and Hygiene (WASH) sessions simultaneously among male and female communities at Mohallah/Street level to create awareness about importance and significance of cleanliness and water purification methods for domestic use in cooking and drinking purposes. Hygiene Kits containing essential hygiene items should be distributed at household level and regular follow-up should be carried-out for achievement of positive and effective results. Refresher sessions should be organised on a quarterly basis to observe behaviour change vis-à-vis adoption of hygienic lifestyle (WUMP Tank, 2016).

3.9 Health and Hygiene Practices

Pocket hamlets or villages suffer mostly from deplorable health and sanitation. Different hygiene related illnesses and diseases affect the communities such as stomach illnesses, skin diseases and malnutrition. In dry areas such as Rudh Kohi, DI Khan and other districts, the largest source of drinking water is rain water collected in earthen ponds. Ground water is either virtually non-existent or is highly brackish. The “safety” and “quality” of pond water is way below international standards. Conventional water treatment is very expensive and unaffordable for the communities in these areas.

Flood water used for irrigation is also stored in ponds for all the domestic purposes including drinking by humans and livestock, washing clothes, utensils. It brings mud, animal and humans feces and other foreign materials to the storage ponds. Mud transported to the ponds causes dense turbidity. The higher the turbidity, the higher is the risk for the drinkers to develop diseases because contaminants like viruses, bacteria can easily attach themselves with the suspended solids. Only a very few water supply tanks are available in the area which are quite insufficient.

There is no proper solid waste management system in the Tehsil. Households throw their garbage either into open plots or in the streets. Moreover, some even dispose-off their solid waste in the nearby water channels. All these methods of disposal are the main cause of land and water pollution which threatens the local environment, the ecosystem and also causes unhygienic conditions. Local communities are not in a position to improve or introduce the existing level of solid waste collection and disposal (as in urban areas) without guidance.There is a need to create a greater awareness on environmental sanitation.The most painful reality is that water is polluted by humans themselves, which is a great threat to all living creatures.

Major sources of water pollution include municipal sewage, industrial wastes, contamination from agriculture and landfills. Adverse human health effects from water can be divided into four main categories:

1. **Water-borne diseases:** Water-borne diseases are caused by water that has been contaminated by humans, animals, or chemical wastes. Water-borne diseases like Cholera, Typhoid, Dysentery, Polio, Hepatitis A and E, Diarrhea, Anemia, are the most fatal diseases among many others.
2. **Water-based diseases:** Those caused by aquatic organisms that spend part of their life cycle in the water and another part as parasite within animals. Water-based diseases are caused by a variety of tapeworms, roundworms and tissue nematodes that infect humans. Although these diseases are not usually fatal, but they prevent people from living normal lives and impair their ability to work.
3. **Water-related vector diseases:** Those transmitted by vectors, such as mosquitoes and some flies that breed or live in or near water. Malaria, yellow fever, dengue fever, sleeping sicknessare some of the common diseases.
4. **Water-scarce diseases:** Diseases found in conditions where water is scarce and sanitation is poor, such as trachoma, and tuberculosis etc.

Water- related diseases are a growing tragedy, killing more than 5 million people each year- 10 times the number of people killed in wars (WWDR, 2003).

3.10 Other (Forestry, Wildlife, Soil Conservation, O&M)

Rudh Kohi area is a classic example of a dry, arid environment. The tree species are mostly Acacia nilotica (kikar), Tamarix sp., Zizyphus sp. (Ber), Prosopis sp.(mesquite), Capparis aphylla (Kirir), Salvadora oleoides (Peelu) and Acacia jacquimontii which are growing naturally on agricultural fields, roadsides and banks of water channels (Rudhs). Haloxylon recurvum (laana) is a common bush used for fuel. Kikar is a good fodder and fuel, sometimes used as timber. Tamarix wood is used for making handles of farm implements and ploughs. It is a fodder tree for camels. Zizyphus is a dual purpose fodder cum fuel wood tree. Prosopis is found everywhere, which is not a palatable fodder even for goats except for its pods, which they prefer to eat. Although very thorny, it is used as fuel wood.

Capparis aphylla (Kirir) is common in the area and is eaten by goats. Its fruit is pickled for human consumption. Salvadora oleoides (Peelu) wood is used for fuel and its bark and leaves for medicinal purposes. All the agricultural land is privately owned and the woody trees are the property of the owner. After the crop harvest, free grazing of livestock is practiced by the whole community. Tenants can obtain fuel wood with a prior permission of the owner. Forest Department has recently taken up foresting activities on the private lands in the Rudh Kohi area, mostly at down-stream villages (under the Billion Trees Project of Khyber Pukhtunkhwa).

3.10.1 Wildlife

Markhor and mountain deer are statistically diminishing but still found in the western hill tracts of Shiranis area. The migratory birds for example quail and houbarabustards, sucks, cranes, pigeons also pass through the area. Amongst other birds are partridges and marine birds of different types in riverine area and Chashma Reservoir. Rabbits, porcupines, wolf and jackals are also found in the district.

3.10.2 Soil and Water Testing Facilities

There is only one soil testing laboratory at the Agricultural Research Station, Ratta Kulachi in DI. Khan, for provision of services to the farmers. It is a well equipped laboratory. A sum of Rs. 5/- is charged for analysing one soil sample. Farmers are also provided guidance as to how to draw soil samples from a field. Usually farmers have to bring soil samples to the laboratory. If a farmer provides transportation then one of the staff members visits the field and draws samples himself. There is no soil testing laboratory in the Rudh Kohi area. Similarly, water testing facility in the past was provided by the Agricultural Engineering Wing of the Agricultural Extension Department having its office in DI Khan city. Unfortunately, this Engineering Wing has recently been abolished by the provincial government under the down-sizing / right-sizing policy.

3.10.3 Operation & Maintenance

Village Council in Tehsil Daraban have no regular operation and maintenance mechanisms like collection of O&M fund or Saving System for drinking water however for irrigation schemes they collect funds on need basis. The ownership feelings for the existing schemes were only little evident, as the community's participation in the planning and implementation process was found to be minimum except for few newly constructed schemes.

Involving the community from initial planning stages to the final handing over, helps in the long term sustainability of such schemes. Through this mechanism, the community takes over the O&M responsibility on a regular basis, eventually forming a true ownership in the coming years.

Chapter 4
4. Planning and Development

4.1 Integrated Planning and Development Strategy

For the sake of forming a cohesive grasp over the recommendations evolving from the locals to the WUAs's prioritisation exercises, including the participating partner organisations to the advice from and for the local government of Tehsil Daraban, the following categorical discourse is meant to be multi-purpose. It elaborates on what the water user associations say they want, what the government thinks they want and ideas which they can also look into. It also chalks out a few recommendations for the WUAs (or the locals) the local organisations and the local government personnel. All in all, the recommendations are only the surface of a sea of possibilities, the only way to explore would be to take every involved party into confidence and work with a genuine goodness of heart.

4.2 IWRM Approaches

- The formulation of IWRM Plan follows a distinct four phase approach:
- Identify the range of water resource issues that occur across a Tehsil and assess their severity, mutual dependence and frequency of occurrence. A "user requirement issue" results from an inadequate matching of user requirements (demand) and water resources availability and quantity (supply) while an "impact issue" results from human activities (which negatively affects the quantity or quality of the water resource) or from natural causes in the case of floods and droughts. National and International issues should also be taken into account, for instance upstream-downstream issues.
- Identify measures and management interventions at all levels–national, basin/valley, local–which are necessary to address the issues identified. From the interventions required identify the management functions at each level. Management functions include such items as policy development, planning and coordination, water allocation, discharge regulation, monitoring, enforcement and information dissemination. Trans-boundary problemsmay require concerted international cooperation and joint efforts.
- Analyse the present institutional capacities at all levels–national, basin/valley, local–and examine the potentials and constraints relating to the issues to be dealt with and functions to be undertaken. The capacities relate to factors such as the efficiency of institutional structures and the adequacy of human and financial resources as well as the adequacy of policies and legislation.
- Prepare strategies in consultation with different water related stakeholders for removal of any deficiency in the framework of national policies, legislation and regulations for IWRM, for the development of institutional roles that allow a coordinated implementation of IWRM with required management instruments and associated skills. International strategies have to be developed in collaboration with other riparian nations.

4.3 Conservation and Protection of Water Resources

Water Resource Base desperately needs to be improved in Tehsil Daraban. As it identifies and minimises factors responsible for degradation of water resources, it also promotes activities for optimisation of water resources.

4.4 Multiple Use of Water

This plan recognises and strategises to diversify water utilisation pattern. Tehsil Daraban suffers from lack of water at certain times of the year yet at other it has sufficient. Still being an arid district, water resources need to be used for fostering social and economic development activities through using new and improved technologies.

4.5 Balanced Use of Water

It identifies overall water situation and ensures distribution of water according to needs of the communities to minimise water wastage issues. It also emphasises on equitable allocation of water resources among all user groups.

4.6 Productive Use of Water

To harness productive use of water as a resource, it should multiply livelihood opportunities for poor and marginalized communities in Tehsil Daraban.

4.7 Efficient Use of Water

To reduce water wastage, it adopts methods and prescribes improvement in the existing water utilisation systems.

4.8 Water Resource Use Disputes

During the social & technical assessment careful attention was given to identify the disputes for any past, present utilisation of water sources also the future plan. In assessment process, major disputes exist in different VCs among the different tribes for irrigation water utilisation and water rights. In relation to water management, the following specific challenges and constraints have been identified in the Rudh Kohi area:

1. Weaknesses and problems of the traditional Rudh Kohi water distribution system

- Upstream landowners do not respect the Kuliyat& Riwajat-e-Abpashi (Irrigation laws), which ultimately adversely affects the traditional water distribution system.
- The recognised management structure (Pathi Dari, WUA) has weakened and no longer plays an effective role in water regulation and distribution.
- Political interference by the local influential that influence the Rudh Kohi department for both not respecting the Kuliyat & Riwajat, also getting funds (bulldozers hours etc) either for their own bund construction or giving to their affiliated peoples.
- Uneven distribution of expenses/investment among farmers & landowners for the construction of infrastructure (bunds etc.) causing problems.
- Lack of appropriate technologies for water harvesting and moisture conservation at farm level.
- Unawareness about efficient water usage techniques, e.g. irrigation scheduling.
- Sometimes Rudh Kohi system itself becomes a source of conflicts as major disputes occur due to disrespect to Rudh Kohi irrigation rules and principles.

2. Weakness/Problems ofGovernment Line Agencies (GLAs)

- Rudh Kohi Irrigation Department is not effective due to interference from the local influentials and the administration, as well as the limited financial resources available due to the abolishment of the Agriculture Engineering Department.
- Rudh Kohi Irrigation Department is not effective in application of rules in case of violation.
- Rudh Kohi Irrigation Department has no control over upstream landowners, who often cause disparity in water allocation for downstream land owners.
- Non-availability of machinery (bulldozers) during peak season causes delay in bund construction.

3. Lack of infrastructure & access to market

- Remote villages have no proper metalled access road and people cross agriculture fields for travelling. When these fields are filled with water from floods for irrigation, access to markets is made more difficult.
- Lack of infrastructure for irrigation and drinking water.
- Lack of infrastructure or rehabilitation/de-siltation. Most of the Rudh Kohi irrigation water diverges into the irrigated land of nullas which have either no water rights or water rights of which come after the land from it has been diverged due to siltation.

4. Lack of access to safe drinking water

- In most of the villages people are using rainwater, which they store in open unprotected ponds and use without further treatment. This leads to a high incidence of waterborne diseases.
- Some villages have piped water supply provided by the Public Health Engineering Department (PHED). However, most of these systems are in disrepair, pipes are old or damaged.
- People of downstream villages have no access to drinking water. This is the main reason for the migration of local people to CRBC command area villages.

4.9 Gender and Social Inclusion

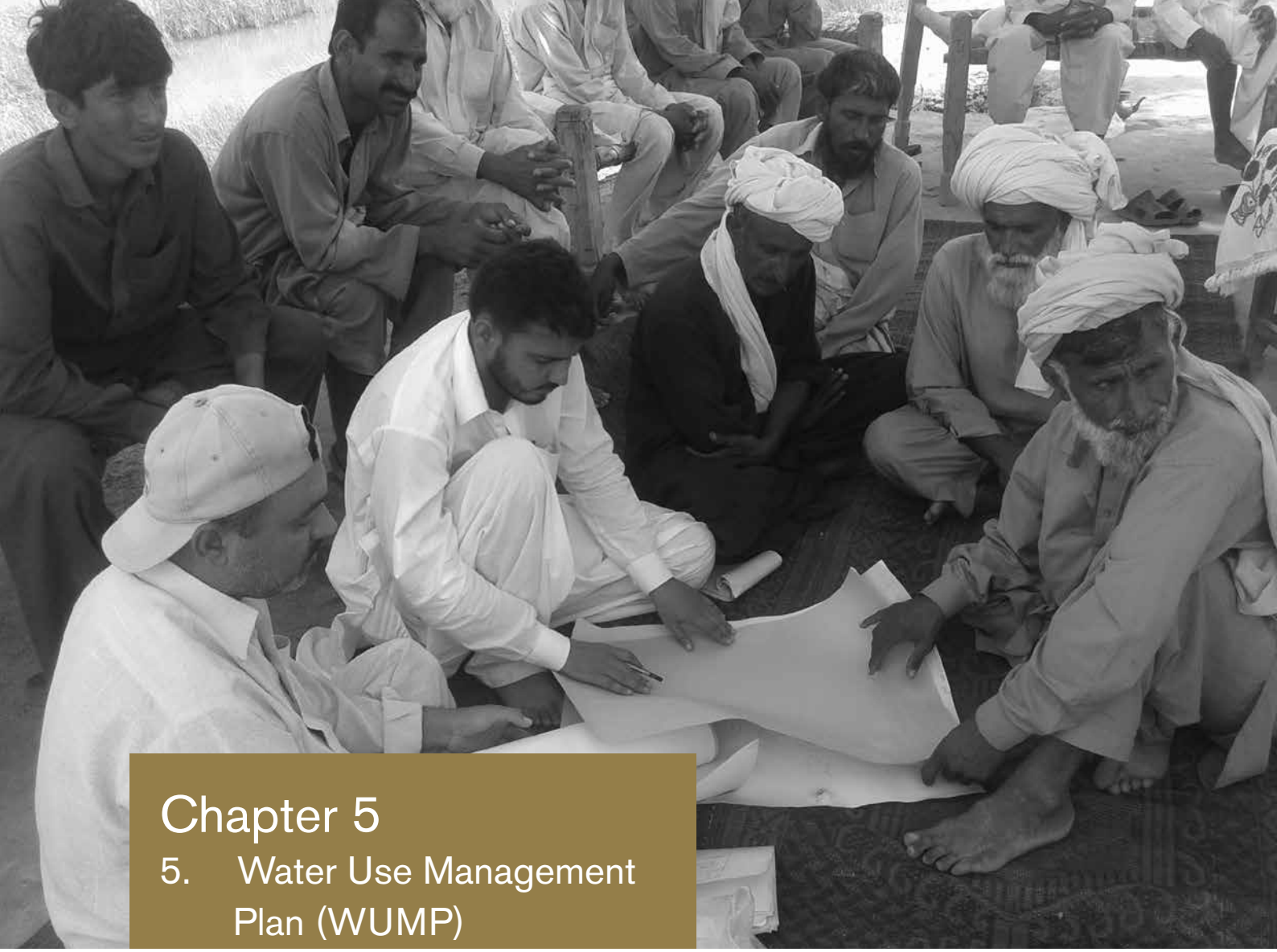
Women constitute 52% of the population of Dera Ismail Khan. The condition is as deplorable as is the condition of the women in other poorest parts of the country. In Daraban, the concept of "feminisation of poverty" is very evident and prominent. Women are poor, undernourished, weak and over worked. Alongside being malnourished, they are much less (or not at all) educated with a very restricted access to health facilities - which are generally limited as well. The population is highly deprived of basic necessities of life. A clear contrast can be seen in areas observed under Chashma Right Bank Canal and in urban parts of District DI Khan.

In the study area women are generally married off, soon after puberty. They work up to 16 hours a day, doing household chores, fetching water and fuel, looking after farm animals and working in the fields. Customs and social norms restrict her access to services and laws that openly discriminate against her, providing little protection of basic human rights. Custom and culture dictates her mobility, which is generally limited, within and outside the village.

Table 29: Gender Division of Rural Every Day Activities

	Activities	Female	Male	Children
Agricultural	Ploughing		X	
	Sowing of crop	X	X	
	Weeding of crop	X		
	Irrigation		X	
	Harvesting of crop	X	X	
	Planting, weeding and picking vegetables	X		
	Tree plantation	X	X	X
	Fodder cutting	X		
	Fuel wood collection	X		
Livestock	Milking of the animal	X		
	Grazing of the animals	X		
	Water to animals	X		
	Cleaning animal shed	X		
Poultry	Poultry Management	X		
Domestic	Preparation of meal	X		
	Serving of meal	X		
	Collecting drinking water	X		X
	Cleaning house	X		
	Washing dishes & clothes	X		
	Stitching& Sewing	X		
Employment	Service/Employment	X		

In Tehsil Daraban, both women and men are involved in carrying out agricultural activities, firewood collection and fetching of drinking water. Management of irrigation channels is however carried out by the male population only. Women have a lot of contribution in maintaining drinking water posts, maintaining water conveyance to farms, and sometimes irrigating agriculture fields etc. However, this contribution is often invisible and unrecorded. Based on this premise, it is important to ensure implementation of women specific priorities (e.g. drinking water), and building their skills in maintaining water schemes close to their houses and farms as well as record keeping. Another strategy to mainstream women's priorities is multi-use of water e.g. constructing water collection ponds in every village with a proper protection from animals and unsafe water-borne diseases.



Chapter 5

5. Water Use Management Plan (WUMP)

Community participation is the most important step for the sustainability of any project, scheme or even a government run initiative. Schemes also need to be community managed to be able to survive at all.

In the case of developing a WUMP and its future in our present scenario, the up-coming Local Government Act is an opportunity for direct referencing, incorporating and researching on water. It has to be kept in mind that the ownership for Water Use Management Plans rests with the districts.

- Water User Associations are recognised as direct implementation partners with incremental responsibility and duty bearing for water users living in the basin / district.
- Though technical departments have also earlier implemented project activities with project funds, this particular set-up obliges them to place their technical advisory and other services at the disposal of a joint decision making at district level – which they are also a part of.
- Role of local NGOs will shift largely to support Water User Associations (organisation, mediating representation issues, capacity building and ability to advocate their needs at district level). NGOs will in turn need a lot of training and support on gaining advocacy skills and orientation on this paradigm shift.

Water Use Management Plans are in line with the new thinking of the Government to possibly prepare district development plans.

Access to (improved) drinking water: This includes access to clean drinking water and water for food production. In case of drinking water, generally classical water supply schemes will be implemented after thorough analyses of feasibility and collective access by all social sections in the community (particularly the poor). In specific areas, where the water may be brackish and / or very turbid, in addition to water supply, options for water treatment (through filtration and chlorination) can also be explored and – if found appropriate – promoted. Another area to be explored in the provision of safer drinking water is to line the traditional water ponds to avoid contamination by foreign material.

Access to water for food production: For low cost irrigation, case to case interventions will be designed according to the feasibility, need and a simple cost / benefit analysis. The idea is to make larger area cultivable for staple foods, where the cost per acre remains modest. Areas already receiving water and where farmers are keen to promote non-food commercial crops with increased irrigation,

might not be within the short-term capacity and focus of WUMP. First priority, is the food production and to enhance nutrition of farm families.

5.1 Village level WUMP

Local (and unique) indigenous irrigation systems such as Rudh Kohi irrigation water management is specific to DI Khan and Tank districts where flood run off (spate) is intercepted in large bands and then water is released for the lower areas. The nature and size of basins vary from area to area according to the system – and hence the scale and mandates of Water User Association may also vary in different districts. As the area is generally water scarce therefore it is very important to adhere to efficient means of irrigation. For the preparation of village level WUMP, multiple aspects have to be kept in mind. The locals are generally receptive to any developmental idea coming their way, mostly asking for more water: to irrigate as much and as many fields as possible as well as to have a constant, unchecked supply of running water in taps.

Table 30: Breakup of Tehsil Daraban into Wards, Village Councils and Villages

Ward, Village Councils and Villages	Total Households	Population
Ward Daraban		
VC Daraban 1	2000	20000
VC Daraban 2	3700	31000
VC Zarkani		
Kot Lalu	400	3200
Madha	250	3500
Zarkani	250	1200
Ward Gara Essa Khan		
VC Gandi Ashiq	820	6200
VC Gandi Essab		
Dholka Jadid	130	975
Gandi Essab	170	1040
Mochi Wal	121	915
VC Gandi Umer Khan		
Gandi Umer Khan	815	5750
Gara Mureed Shah	65	455
Khiyara Basharat	95	665
VC Gara Essa Khan		
Kot Essa Khan	400	7800
Gara Khan	280	2430
Gara Mastan	194	1000
Gara Mehmood	200	1600
VC Saggu		
Hayat Leel	40	280
Kohawar	350	2450
Saggu	600	5890
Ward Musazai Sharif		
VC Kikri		
Gara Mir Alam	720	3100
Kikri	100	450
Kot Shahnawaz	306	1425
VC Musazai	1800	15000
Ward Chodwan		
VC Chodwan		

Chodwan	3600	30000
Shah Alam	400	2000
VC Gara Nehar		
Gara Mumraiz	250	1500
Gara Nehar	375	5500
VC Kot Taga		
Basti Moliyan	50	350
Kot Taga	830	5810
Ward Bukkhi		
VC Bukkhi		
Gara Akhunzada	360	3500
Bhukhi	450	3300
Kot Musa	500	2500
Thalian	300	1500
VC Gara Matt		
Gara Abdullah	520	2800
Gara Matt	750	6200
VC Jandi Babur		
Gara Maru	350	2500
Jandi Babur	350	2450
Moga	110	750
Talai Budha Shah	165	750
VC Kori Hoot		
Kori Hoot	500	2300
Kori Jamal	400	3000

5.2 Proposed Water Supply Initiatives (New & Rehabilitation)

5.2.1 Drinking Water Prioritisation

Table 31: Data for Drinking Water Schemes

S.No	DWSS Namelist	Schemes	Total Schemes	Total VC	Total Villages	Total Beneficiary HH/Farmer
1	Hand pumps	Hand Pumps	06	In 17 VC	In 45 Villages	19225
2	Tube wells and perennial water	Tube Well	14			
3	Repair damaged distribution pipes	Pipeline	19			
4	Desiltation of water storage tanks	Water storage tank	03			
5	Rehab of pacca water pond	Pacca pond	04			
6	Rain water kacha pond	Kacha pond	04			
7	Submersible Pump	Submersible Pump	14			

5.2.2 Proposed Irrigation Initiatives

Table 32: Data for Irrigation Schemes

S.No	Irrigation Schemes Name list	Total VC	Total Villages	Total Beneficiary HH/Farmer
1	De-siltation: Gang channel, channel near Gatti Pal Wali, Pal Mazar, Gudh Channel from Chodwan Zam, Tarkhoba, Tal, Rahwal, south side of Kot Tagga, Paal Watli, big Korra Janobi	In 17 VC	In 45 Villages	19225
2	Rudhs: Welari, Rahwal, Torzoye, Gajistan, Gajistan, Lohra, Rudh Kori			
3	Construction of gateson: Gatti Abdul sattar, Jaffar, Abdul Hai, Gati ALLAH Baksh, Gandi Qadardad, Gati Warri, Gata Shera, 2 separate gated structures on Pal Naleen, Gati Siyal, Saad Gandi Ashiq, Gathi Khadu, Gandi Watli (and pacca bund), Gatti kadu, Karu, Shehzad			
4	Construct inlet structures: Gatti Kadu, Karu, Shehzad, 270 inlet structures, 200 inlet structures, 7 inlet, 150 inlet, 50 inlet, 10 inlet, 200, 100			
5	Lining: Thal Rudh Toya, That Gudh			
6	Stone pitching of Gandi Zam			
7	Official hours for Gatties' repair			
8	Construct Wandara at Pal Gara Matt, Gatti Faloos			
9	To construct bund and do pitching just before bridge near Sana Allah land			
10	Gandi Kareta, Gandi Qadardad, Gandi Umar Daraz, Gandi Gara Mad,			
11	Kotha Darkhan			
12	Rehab of Gattis: Sarfraz, Saadarjan, Shakarzai, Sin Khel, Bhukhi, Jhakhar Jat, Kot Musa, Ibraheem, Khadu (North Pal), Siyal, Damsaz, Tumman, Niyaz Muhammad, Sahib dad, Gathi Ranjhu and Gathi Allah Baksh (Palls), Nazo, M.Shafi, Number darwali,			
13	Rehab of Saads: Phirrni, Tanaza, Ghore wall, Dinga, Gand Wala, Phatiyan, Bhaghat, Chotha Wah, Saad Waroki (Diversion channel)			
14	Rehab of Palls: Sin Khel, Chak 27, Chak 80, Gara Meharban			
15	Rehab of GUL Muhammad			
16	Gajistan, Tarkhoba			
17	Toya (Shiekh Haider) + lora (Daraban)+ Gudh(Chodwan)			

5.2.3 Sanitation and Solid Waste Management Schemes

Table 33: Data for Sanitation Schemes

S.No	Sanitation Schemes Name List	Total VC	Total Villages	Total Beneficiary HH/Farmer
1	Sanitation system	In 5 VC	In 5 Villages	6050
2	Drainage system			
4	Street pavements			
5	Toilets/Latrines			

5.2.4 Proposed Livestock Water Supply Scheme

Table 34: Data for Livestock Water Pond Schemes

S.No	Livestock water schemes name list	Total VC	Total Villages	Total Beneficiary HH/Farmer
1	Construction of livestock pond	In 5 VC	In 5 Villages	2330

5.2.5 Proposed Multiple Use System Application

Dera Ismail Khan's Tehsil Daraban lies in that particular arid zone of Pakistan where summers are hottest and winters are mild. Home to the ancient science of Spate irrigation, locally called Rudh Kohi, DI Khan is an irrigated region prone to severe water logging and salinity problems while the rainfed area is prone to wind erosion and droughts. The Rudh Kohi system is currently highly prone to the hazards of flash floods and soil erosion because of increasing population density, raised bunds and water diversions. Sanitation and fresh, clean drinking water forms an integral place in any discussion regarding water in an arid region. People suffer from poverty in DI Khan, which is the major cause of all hardships. Poverty on top of ignorance kills hope and suppresses compassion where God-gifted resources are considered.

Considerable respect has been given to the formation of a WUMP in the hope for the ultimate achievements it may gain in the future for a deprived land such as DI Khan. Intricate, detailed and extremely viable primary data has been patiently collected from the locals. On the basis of this particular primary data, secondary data in the form of interviews, meetings, talks, discussions and workshops have also been held over a period of 8 years since Intercooperation's entry into Climate Change, DRR and Water Scenarios. Water being a life-force has multiple uses, all of which need to be incorporated efficiently into our work and lives.

Table 35: Proposed multiple use system applications

Govt./Local Government	NGOs/Organisations	Locals
Creating Policies and a Legal Framework • Water Policy • Strategic Water Planning and Restructuring • Improving Water Demand Management • Building an Institutional Framework • Strengthening Enforcement Bodies • Decentralisation • Public-Private Partnerships • Nationalisation • Privatisation • Developing Human Resource • Command and Control: Standards and Restrictions	**Awareness Raising** • Human Disaster Relief • Knowledge Sharing • Influencing the Influential • Health Promotion • Environmental Protection	**Water Conservation and Agricultural Techniques** • Pitcher Irrigation Technique • Roof top water harvesting (water for drinking, household and small-scale irrigation) • Micro catchments water harvesting • Macro catchments water harvesting • Roaded catchments • Mulching • Deep tillage • Addition of Organic matter/FYM • Contour cultivation • Pit planting
Economic Tools • Water Pricing • Water Charges • Tradable Water Rights • Subsidies	**Advocacy Includes** • School campaigns • Media (Local TV channel, radio) • Posters, Flyers • Empowering Young people as promoters • Creating Information Material	**For Irrigation** • Water Rights • Misuse of power and influence • Up-stream vs Down-stream dilemma
Water Distribution Networks • Intermittent Pumping Supply • Leakage Control • Preventing Contamination • Network Design and Dimensioning • Decentralised Supply • Small Scale Hydro Power: Mini Dams and Reservoirs • Gabion Spurs and Gabion Check Dams • Water Storage Tanks, Check Ponds • Groundwater Recharge, Retention, Reuse and Rainwater Storage (3R)	**Social Marketing**	**For Drinking water** • To realise the difference between clean-drinking water and clean-looking water • To consider letting go of the theory that 'water taste buds' cannot be changed • Bottled Water: many do-it-yourself techniques exist for considerably clean drinking water
Environmental and Ecological Vision • Water Sensitive Planning (WaSP) to Harvest Urban Runoff • Natural Water Reservoirs • Watershed Management • Soil Bioengineering Techniques • Recycle Waste Water • Reforestation		**For Sanitation** • Properly construct kacha water drainage channels • Consider Water Tanks for every household
		For Livestock • Need not be drinking from the same pond as humans • Animals ought not be polluting other villages' water ponds either
		• To take appropriate DRR measures and to remember the area is a drought/flood affected region • Take part in all measure, to check and protect their village

5.2.6 Proposed Environment and Ecology Schemes

In almost every village visited, it was obvious that the locals are not aware of any environmental or ecological impact or footprint they might be leaving on their land. Forests especially those which are left for the sake of soil reclamation or even as a cash crop are not considered due to the time involved or simply because of lack of any knowledge. Although people are open to new, improved suggestions but being mostly farmers they have to 'see it to believe it', in case of any sustainable option presented to them.
Many can see and do realise that over irrigation is visibly converting their lands to salinity laden soil yet still they continue excessive watering because 'they can afford to'. For the sake of instant relief many farmers forget their future generations. A dire need exists for awareness raising programmes and similar other measures needed to improve the environment.

5.2.7 Proposed DRR Mitigation Management & Other Initiatives

Table 36: Data for DRR Schemes

S.No	Name list	Total VC	Total Villages	Total Beneficiary HH/Farmer
1	Repair the DRR	In 8 VC	In 8 Villages	3965
2	Protection wall around village			
3	Construction of DRR			

5.2.8 Proposed Supporting Activities, required skills and capacities

There are many possibilities for simultaneously increasing supply and reducing demand that together will bring benefits to arid lands. A major opportunity to save water exists in conventional irrigated agriculture, by far the arid world's largest user of water. This is true for centuries-old, traditional systems as well as for large, capital-intensive modern water-management systems. Still the following points need to be made:

Improved Water Systems: In some arid lands the greatest opportunity for increasing water supplies is to improve existing water systems and thus make more water available without a complete new installation. For example, replacing canals with closed conduits (of plastic, concrete, metal, etc.) will reduce evaporation, or lining canals will reduce seepage losses.

On-farm Water Management: Significant amounts of water can be saved by improving water management on the farm. One deficiency is the design of on-farm distribution and drainage systems between farm fields. Storage, main, and diversion canals and main drains may be well engineered (even down to turnouts serving one or two hundred hectares), but most ditches serving farm fields are inadequate, sometimes even nonexistent. Furthermore, the irrigator often mismanages application of the water.
User Needs Paramount: In designing new systems and rehabilitating old ones, the needs of the user should be paramount. The system must deliver the right amount of water to the user at the right time. Frequently, an irrigation project fails to reach its potential because the use-requirements for the water have not been sufficiently considered. For example, the delivery system in irrigation should be designed to permit changing the water supply as crop demands change with weather and plant maturity. But water is often delivered in an arbitrary and inflexible manner.

Conjunctive Use: Where groundwater is available, surface and groundwater supply and delivery systems should be considered in combination (conjunctive use) for optimal use of the total water resource.

Check on Over-Irrigation: Universally, farmers tend to over-irrigate when water is available. This can lead to problems of water logging, salinity, and leaching of fertility. Frequently, institutional arrangements (systems of delivery, scheduling, water-rights laws, traditions, etc.) encourage over-irrigation. Although over-irrigation may be needed to remove accumulating salts, recent studies indicate that the amount required may be much lower than was formerly believed.

Inadequate Field Leveling: Conventional irrigation is neither cheap nor simple; complexities in the design, construction, and efficient operation of standard irrigation projects are frequently oversimplified or overlooked. Fields are often inadequately leveled, and even small undulations can waste large amounts of water. Precision land-shaping and skilled labour are required. Grading land to a flat surface usually requires high capital costs for equipment, fuel, and maintenance.

Most Important: The scarcer the water, the greater the need for technical and management skills.

U.S. National Academy of Sciences. 1974. More water for arid lands. http://www.ciesin.columbia.edu/docs/006-242/006-242.html

Source: More Water for Arid Lands Promising Technologies and Research Opportunities, National Academy of Sciences, Washington 1974.

Most of the local organisations working in DI Khan district are adamant in their work and objectives. VEER, a local partner, advocated with gathering primary data from the villages, has not only collected comprehensible, practical, technical data on irrigation and drinking water but it has also gathered viable information on social standing of each village. Further more, it has gone ahead with arranging meeting with all Village Councils and prioritised (in an as democratic a style as possible) throughvotingfor the major issues desperately sought within each VC and arrived at a concluding, direly needed answer to the corresponding area's water needs.

Public surveys reveal that NGOs often enjoy a high degree of public trust, which can make them a useful - but not always sufficient - proxy for the concerns of society and stakeholders. Not all NGOs are amenable to collaboration with the private sector. Some will prefer to remain at a distance, by monitoring, publicising, and criticising in cases where companies fail to take seriously their impacts upon the wider community. However, many are showing a willingness to devote their energy and resources to working alongside business, in order to address corporate social responsibility (iisd.org).

But putting aside what local organisations have been significantly contributing to the WUMP's requirements, there are also a few 'bonhomie' practices which ought to be in the local organisations' mantra for Awareness Raising. Not only the government or the NGOs but the corporate sector needs to be lured into helping the water deprived lands such as DI Khan. This needs to be projected as philanthropy as well as a responsibility, especially since DI Khan is home to many industrially, politically and religiously strong families.

5.3 Village Council Level WUMP

Village Councils (VCs) are formed under the Khyber Pakhtunkhwa Local Government Act 2013 to devolve power to grass root level, and issupposed to be a political body that governs a village. However its strength and prowess still needs time and recognition to take root. Tehsil Daraban comprises 5 wards, 17 Village Councils comprising 45 revenue villages and 29 hamlets. Daraban Tehsil comprises of 24066 households, with a total population of 192650. The government shall be allocating 30% of funds to VCs and shall also be involved in monitoring of development activities. Under this plan, village data has been consolidated at village council level and detailed action plan will be developed in coordination with village councils. The village council will be considered as implementing body for plan within the Tehsil and adopted as a development plan for the area.

5.4 Prioritisation of Proposed Schemes and Criteria (Adopted at Village Council Level)

At Village, Village Council and Tehsil Level: After conducting PRA exercises in each village, a scheme was prioritised after which a joint meeting was conducted with all representatives of WUGs, village focal persons and local stakeholders at Village Council level attended. In these meetingsthe prioritised schemes' technical and social feasibility were discussed and with the mutual consensus different schemes were finalised. The schemes prioritised at Village Council level will be part of Daraban Tehsil's WUMP. However, village level schemes will be the priority scheme for that specific village.

For the following indicated prioritisations of schemes, rankings and village/VC names, each village's primary data was individually consulted.

For Social Data – WUMP ANXs - Pairwise Ranking Matrix after conducting PRA Tools
For Technical Data – (village name) data - Prioritised Schemes (Technical Detail) 'Village Name'

5.4.1 DRINKING WATER SUPPLY

Table 37: Overview of Prioritisations for Drinking Water Supply Schemes

	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5 & Above
Drinking Water Supply	**Number and Names of Villages**				
DWSS e.g. lining of pipelines/networks	20 villages: Gandi Essab, Gara Mastan, Mochiwal, Khiyara Basharat, Gara Khan, Gara Mehmood, Kohawar, Gara Mureed Bukhi, Gara Abdullah, Jandi Babar, Korri Hoot, Korri Jamal, Gara Ahmad, Kot Musa, Moga, Kotha Dir Khan, Thalian, Gattar, Chodhwan town, Gandi Umar Khan	6 villages: Daraban 1, Kot Lalu, Gara Khan, Gara Akhunzada, Gara Maro gandi umar khan	2 villages: Mochi Wal, Gara maro	1 villages: Kot Essa Khan	-
Improvement of existing DWSS/repair	6 villages: Mochi Wal, ramzi, Gandi Esab,Chodwan, Jandi Babar, gandi umar khan	3 villages: Gandi Ashiq, kotha Leel, Chodhwan	1 village: Kot Essa Khan	1 village: Madha	-
Tube wells	4 villages: Gara Matt, Gandi Ashiq, Khokher, Mat	5 villages: Gara Mehmood, Gara Mir Alam, Kot Taga, Bukhi, Thalian	3 villages: Daraban1, Daraban2, Gara Mureed Shah	-	-
Hand Pumps	3 Village: Kikri, Tiloker, Ramzi	3 villages: Musazai, Kot Shahnawaz, Jandi Babarr	1 village: Chodwan	-	-
Construction (kacha and pacca ponds, water tanks, Overhead tanks)	5 villages: Hayat Leel, Talai Budha Shah, Saggu, Shah Alam, Gandi Umar Khan	2 villages: Zarkani, Khiyara Basharat	3 villages: Saggu, Kikri, Garah Abdullah	-	-
Submersible Pumps	3 villages: Daraban , Gara Mumraiz, Gara Nehar	2 village: Kot Taga kot esa khan	-	-	-
Lining of Ponds/ Channels	3 village: Tallai Budha Shah, Dasti	1 village: Kikri	2 villages: Gara Abdullah, Gara Matt	2 villages: Zarkani, Gara Mir Alam	
Solar System	3 villages: Basti Moliyan, Gandi Umar khan, Daraban, Gara Khan PHED scheme	1 village: Gara Nehar	-	1 village: Shah Alam	

Figure 19: Prioritisations of Drinking Water Supply Schemes

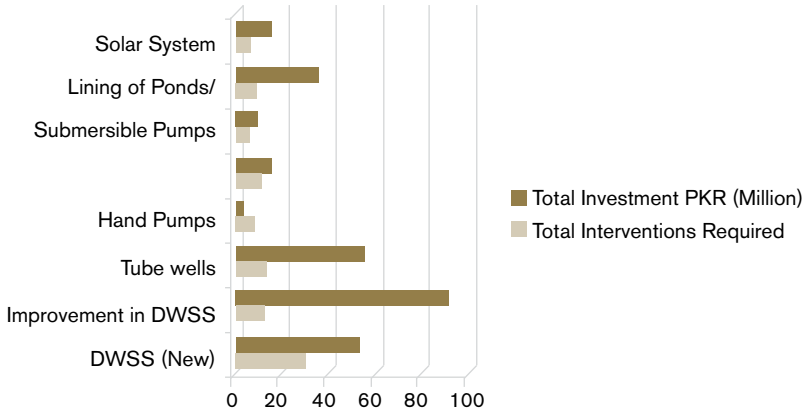


Table 38: Detailed Prioritisations of Drinking Water Supply Schemes

S.No	Type	Village Name	VC Name	Ranking	Beneficiary Households	Estimated Cost in millions (PKR)
1.	DWSS	Daraban 2	Daraban 2	1	3700	17.0
2.	DWSS	Gandi Essab	Gandi Essab	1	130	0.80
3.	DWSS	Gara Mastan	Gara Essa Khan	1	194	0.7
4.	DWSS	Gandi Umar khan	Gandi Umer Khan	1	800	2.5
5.	DWSS	Khiyara Basharat	Gandi Umer Khan	1	225	2.0
6.	DWSS	Gara Khan	Gara Essa Khan	1	380	2.7
7.	DWSS	Gara Mehmood	Gandi umar Khan	1	200	0.5
8.	DWSS	Kohawar	Saggu	1	350	0.1
9.	DWSS	Bukhi	Bukhi	1	450	2.5
10.	DWSS	Gara Abdullah	Gara Matt	1	500	7.0
11.	DWSS	Gara Maro	Jandi Babar	1	275	1.0
12.	DWSS	Jandi Babar	Jandi Babar	1	350	2.0
13.	DWSS	Korri Hoot	Korri Hoot	1	500	2.0
14.	Improvement of existing DWSS/repair	Korri jamal	Kori Hot	1	400	2.0
15.	Improvement of existing DWSS/repair	Moga	Jandi Babar	1	120	2.0
16.	Improvement of existing DWSS/repair	Gara Ahmad	Bukhi	1	60	2.0
17.	Improvement of existing DWSS/repair	Kot Musa	Chodwan	1	500	2.0
18.	Improvement of existing DWSS/repair	Issa Gattar	Bukhi	1	245	2.0
19.	Improvement of existing DWSS/repair	Thalian	Bukhi	1	300	2.0
20.	Improvement of existing DWSS/repair	Kotha Dirkhan	Kori Hot	1	55	2.0
21.	Improvement of existing DWSS/repair	Mochi Wal	Gandi Essab	1	121	0.15
22.	Improvement of existing DWSS/repair	Chodwan town	Chodwan	1	3000	0.15

23.	Improvement of existing DWSS/repair	Jandi Babar	Jandi Babar	1	350	2.5
24.	Improvement of existing DWSS/repair	Gara Ramzi	Gandi Essab	1	130	2.0
25.	Tube well	Gandi Ashiq	Gandi Ashiq	1	800	6.0
26.	Tube well	Gara Matt	Gara Matt	1	750	6.0
27.	Tube well	Kokhar	Gandi Umer Khan	1	210	6.0
28.	Tube well	Khiyara Basharat	Gandi Umer Khan	1	225	6.0
29.	Hand Pump	Kikri	Kikri	1	110	0.2
30.	Hand Pump	Tilokar	Gandi Essab	1	125	0.2
31.	Hand Pump	Gara Ramzi	Gandi Essab	1	130	0.2
32.	Construction of Overhead Tank / tank	Saggu	Saggu	1	600	3.5
33.	Construction	Talai Budha Shah	Jandi Babar	1	750	0.5
34.	Construction	Shah Alam	Chodwan	1	375	0.18
35.	Construction	Gandi Umer Khan	Gandi Umer Khan	1	800	3.5
36.	Construction	Hayat Leel	Saggu	1	60	0.7
37.	Submersible Pumps (10)	Daraban 1	Daraban 1	1	3500	2.2
38.	Submersible Pumps	Gara Mumraiz	Gara Nehar	1	250	0.4
39.	Submersible Pumps	Gara Nehar	Gara Nehar	1	375	3.0
40.	Lining of Ponds/Channels	Talai Budha Shah	Jandi Babar	1	750	0.5
41.	Solar System	Basti Moliyan	Kot Taga	1	50	2.5
42.	Solar System	Gandi umar khan	Gandi umar khan	1	800	2.7
43.	Solar System	Kot Taga	Kot Taga	1	815	2.5
44.	DWSS (New)	Daraban 1	Daraban 1	2	3500	1.4
45.	DWSS (New)	Kot Lalu	Zarkani	2	400	1.0
46.	DWSS (New)	Gandi Umer Khan		2	815	0.25
47.	DWSS (New)	Gara Khan	Gara Essa Khan	2	380	1.2
48.	DWSS (New)	Gara Akhunzada	Bukhi	2	400	2.5
49.	DWSS (New)	Gara Maro	Jandi Babar	2	275	1.0
50.	Improvement in DWSS	Gandi Ashiq	Gandi Ashiq	2	800	7.5
51.	Improvement in DWSS	Hayat Leel	Saggu	2	60	0.9
52.	Improvement in DWSS	Chodwan	Chodwan	2	3600	5.0
53.	Tube well	Gara Mehmood	Gara Essa Khan	2	200	0.3
54.	Tube well	G. Mir Alam	Kikkri	2	710	7.0
55.	Tube well	Kot Taga	Kot Taga	2	815	2.5
56.	Tube well (generator)	Bukhi	Bukhi	2	450	0.09
57.	Tube well	Thalian	Bukhi	2	300	2.5
58.	Hand Pumps (6)	Musazai	Musazai	2	1800	0.8
59.	Hand Pumps	Kot Shahnawaz	Kikkri	2	35	0.2
60.	Hand Pumps	Jandi Babar	Jandi Babar	2	350	0.13
61.	Construction	Zarkani	Zarkani	2	400	0.4
62.	Construction	Khiyara Basharat	Gandi Umer Khan	2	225	1.5
63.	Submersible Pumps	Kot Taga	Kot Taga	2	815	2.5

64.	Lining of Ponds/Channels (8 km)	Kikri	Kikri	2	110	30.73
65.	Solar System	Gara Nehar	Gara Nehar	2	375	4.0
66.	DWSS	Mochi Wal	Gandi Essab	3	121	0.7
67.	DWSS	Gara Maro	Jandi Babar	3	275	1.7
68.	DWSS	Korri Jamal	Korri Hoot	3	400	0.7
69.	Improvement of existing DWSS/repair	Kot Essa Khan	Gara Essa Khan	3	400	50.0
70.	Tube well	Daraban 1	Daraban 1	3	3500	7.0
71.	Tube well	Daraban2	Daraban 2	3	3700	7.5
72.	Tube well	G. Mureed Shah	Gandi Umer Khan	3	85	2.5
73.	Hand Pump	Chodwan	Chodwan	3	3600	0.15
74.	Construction	Saggu	Saggu	3	600	1.5
75.	Construction	Kikri	Kikri	3	60	1.0
76.	Construction	Garah Abdullah	Gara Matt	3	500	0.5
77.	Lining of Ponds/Channels	Gara Abdullah	Gara Matt	3	500	0.5
78.	Lining of Ponds/Channels	Gara Matt	Gara Matt	3	750	0.5
79.	DWSS	Kot Essa Khan	Gara Essa Khan	4	400	0.15
80.	Improvement of existing DWSS/repair	Madha	Zarkani	4	250	7.5
81.	Lining of Ponds/Channels	Gara Mir Alam	Kikkri	4	710	0.37
82.	Lining of Ponds/Channels	Zarkani	Zarkani	4	400	1.5
83.	Solar System	Shah Alam	Chodwan	4	375	1.8
	Total		**58251**	**265.35**		

5.4.2 IRRIGATION SYSTEMS

Table 39: Overview of Prioritisations for Rudh Kohi Irrigation Systems Schemes

	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5& Above
Rudh Kohi Irrigation Systems	**Number and Names of Villages**				
De-siltation	6 villages: Gara Meharban gara mir Alam (keenda Alif) (lane wala Kus) Gara Mehmood, Gandi Esab (saad farooq)	4 villages: Daraban 2, Kot Lalu, Shah Alam, Korri Hoot	3 villages: Gara Mehmood, Gara Mir Alam, Bukhi	1 village: Gara Nehar	2 villages: Daraban 1, Thalian
Rehabilitation/Repair	4 villages: Madha, Gara Umer Khan, Kot Essa Khan, Gara Mastan	3 villages: Khiyara Basharat, Gara Khan, Gara Mehmood	7 villages: Madha, Gara Umer Khan, Kot Essa Khan, Gara Mastan, Chodwan, Gara Mir Alam, Shah Alam,	4 villages: Gara Mureed Shah, Jandi Babarr, Gara Mureed Shah, Thalian	2 villages: Daraban 1, Gandi Ashiq

Constructions (gates, saads, walls, roads, inlet structures, lining, etc)	2 villages: Chodwan, Bukhi	9 villages: Zarkani, Dholka Jadid, Gandi Essab, Kot Essa Khan, Gara Mastan, Gara Mehmood, Korri Jamal, Tallai Budha Shah, Gara Matt	8 villages: Gandi Ashiq, Kot Shahnawaz, Gara Nehar, Gara Akhunzada, Kot Musa, Gara Matt, Moga, Korri Hoot	6 villages: Daraban 2, Gandi Ashiq, Kohawar, Gara Akhunzada, Gara Abdullah, Gara Maro	3 villages: Gara Maro, Gara Mumraiz, Gandi Ashiq
Stone Pitching	-	1 village: Chodwan	-	-	-
Electricity/Transformer	1 village: Kot Musa	2 villages: Talai Budha Shah, Basti Moliyan	-	2 villages: Gara Mehmood, Moga	1 village: Gara Mumraiz

Figure 20: Prioritisations of Rudh Kohi Irrigation Systems Schemes

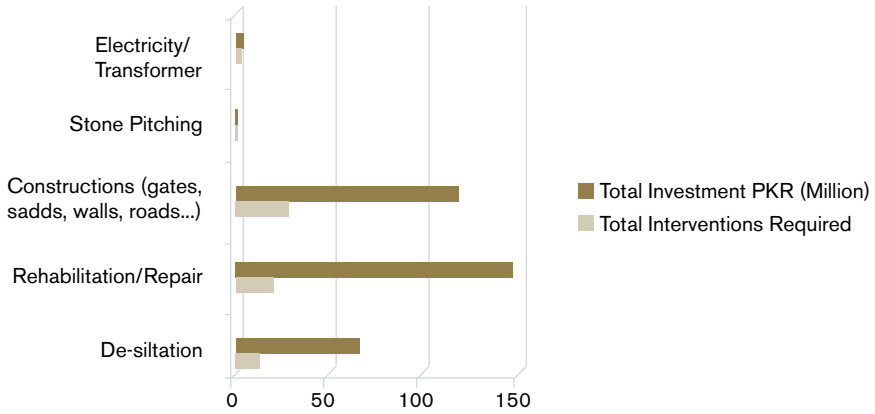


Table 40: Rudh Kohi Irrigation Systems Prioritisations

S.No	Type	Village Name	VC Name	Ranking	Beneficiary Households	Estimated Cost in millions (PKR)
1.	De-siltation	Zarkani	Zarkani	1	400	0.7
2.	De-siltation	Dholka Jadid	Gandi Essab	1	130	0.3
3.	De-siltation	Gara Mehmood	Gara Essa Khan	1	200	1.0
4.	De-siltation	Gara Mir Alam	Kikkri	1	50	0.72
5.	De-siltation	Kot Shahnawaz	Kikkri	1	306	0.45
6.	De-siltation	Musazai	Musazai	1	1800	3.0
7.	Rehabilitation/Repair	Madha	Zarkani	1	250	2.8
8.	Rehabilitation/Repair	Gandi Umer Khan	Gandi Umer Khan	1	815	0.25
9.	Rehabilitation/Repair	Kot Essa Khan	Gara Essa Khan	1	400	0.5
10.	Rehabilitation/Repair	Gara Mastan	Gara Essa Khan	1	194	1.75
11.	Constructions	Saggu	Saggu	1	600	1.0
12.	Constructions (200 inlets)	Chodwan	Chodwan	1	3600	60.0
13.	Constructions	Bukhi	Bukhi	1	450	0.6
14.	Electricity/Transformer	Kot Musa	Bukhi	1	500	0.6
15.	De-siltation	Daraban 2	Daraban 2	2	3700	3.0
16.	De-siltation	Kot Lalu	Zarkani	2	400	1.2

17.	De-siltation	Shah Alam	Chodwan	2	375	0.1
18.	De-siltation	Korri Hoot	Korri Hoot	2	500	1.0
19.	Rehabilitation/Repair	Khiyara Basharat	Gandi Umer Khan	2	255	2.2
20.	Rehabilitation/Repair (Saad Tanaaza)	Gara Khan	Gara Essa Khan	2	380	1.0
21.	Rehabilitation/Repair (Saad Phirrni)	Gara Khan	Gara Essa Khan	2	380	5.3
22.	Rehabilitation/Repair	Gara Mehmood	Gara Essa Khan	2	200	10.0
23.	Constructions (gate & inlets)	Zarkani	Zarkani	2	400	2.5
24.	Constructions	Dholka Jadid	Gandi Essab	2	130	1.0
25.	Constructions (gate + inlets)	Gandi Essab	Gandi Essab	2	130	2.30
26.	Constructions	Kot Essa Khan	Gara Essa Khan	2	400	0.7
27.	Constructions	Gara Mastan	Gara Essa Khan	2	194	1.0
28.	Constructions	Gara Mehmood	Gara Essa Khan	2	60	1.0
29.	Constructions	Korri Jamal	Korri Hoot	2	100	3.0
30.	Constructions	Tallai Budha Shah	Jandi Babar	2	750	1.0
31.	Constructions	Gara Matt	Gara Matt	2	750	1.0
32.	Stone Pitching	Chodwan	Chodwan	2	3600	0.4
33.	Electricity/Transformer	Talai Budha Shah	Jandi Babar	2	750	1.6
34.	Electricity/Transformer	Basti Moliyan	Kot Taga	2	50	0.6
35.	De-siltation (2 ghattis)	Gara Mehmood	Gara Essa Khan	3	170	0.8
36.	De-siltation	Gara Mir Alam	Kikkri	3	710	38.41
37.	De-siltation	Bukhi	Bukhi	3	500	0.3
38.	Rehabilitation/Repair	Madha	Zarkani	3	250	3.5
39.	Rehabilitation/Repair	Gandi Umer Khan	Gandi Umer Khan	3	800	4.5
40.	Rehabilitation/Repair	Kot Essa Khan	Gara Essa Khan	3	400	50.0
41.	Rehabilitation/Repair	Gara Mastan	Gara Essa Khan	3	194	0.4
42.	Rehabilitation/Repair	Gara Mir Alam	Kikri	3	710	38.41
43.	Rehabilitation/Repair	Chodwan	Chodwan	3	2500	3.0
44.	Rehabilitation/Repair	Shah Alam	Chodwan	3	375	0.18
45.	Constructions	Gandi Ashiq	Gandi Ashiq	3	800	6.0
46.	Constructions	Kot Shahnawaz	Kikkri	3	306	18.20
47.	Constructions	Gara Akhunzada	Bukhi	3	400	1.0
48.	Constructions	Kot Musa	Bukhi	3	500	0.1
49.	Constructions	Gara Matt	Gata Matt	3	750	1.2
50.	Constructions	Korri Hoot	Korri Hoot	3	500	0.2
51.	Constructions (100 inlets)	Gara Nehar	Gara Nehar	3	375	3.0
52.	Constructions	Moga	Jandi Babar	3	50	0.35
53.	De-siltation	Gara Nehar	Gara Nehar	4	375	0.5
54.	Rehabilitation/Repair	Gara Mureed Shah	Gandi Umer Khan	4	455	3.5
55.	Rehabilitation/Repair	Jandi Babar	Jandi Babar	4	350	0.07
56.	Rehabilitation/Repair	Gara Mureed Shah	Gandi Umer Khan	4	455	3.5
57.	Rehabilitation/Repair	Thalian	Bukkhi	4	450	4.5
58.	Constructions (100 inlets)	Daraban 2	Daraban 2	4	3700	3.0
59.	Constructions	Gandi Ashiq	Gandi Ashiq	4	60	1.4
60.	Constructions	Kohawar	Saggu	4	350	1.5

61.	Constructions (50 inlets)	Gara Akhunzada	Bukhi	4	400	1.5
62.	Constructions (road)	Gara Abdullah	Gara Matt	4	500	3.0
63.	Constructions	Gara Maro	Jandi Babar	4	275	0.8
64.	Electricity/Transformer	Gara Mehmood	Gara Essa Khan	4	200	1.0
65.	Electricity/Transformer	Moga	Jandi Babar	4	150	1.0
66.	De-siltation	Daraban 1	Daraban 1	5	2500	10.0
67.	De-siltation	Thalain	Bukkhi	5	300	3.0
68.	Rehabilitation/Repair	Daraban 1	Daraban 1	5	2500	10.0
69.	Rehabilitation/Repair	Gandi Ashiq	Gandi Ashiq	5	800	0.5
70.	Constructions	Gara Maro	Jandi Babar	5	275	0.9
71.	Constructions (road)	Gara Mumraiz	Gara Nehar	5	250	4.0
72.	Constructions	Gandi Ashiq	Gandi Ashiq	5	150	1.0
73.	Electricity/Transformer	Gara Mumraiz	Gara Nehar	5	250	2.0
	Total		**48234**	**339.79**		

5.4.3 DISASTER RISK REDUCTION

Table 41: Overview of DRR Schemes

	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5
Disaster Risk Reduction	**Number and Names of Villages**				
Constructions (Village Protection Walls, other structures)	1 village: Kot Lalu	-	4 villages: Dholka Jadid, Basti Moliyan, Kot Taga, Tallai Budha Shah	-	-
Repair of Flood Protection wall	1 village: Kot Musa	1 village: Gara Abdullah	3 villages: Gara Mehmood Khan, Gara Mumraiz, Jandi Babarr	-	1 village: Moga

Figure 21: Prioritisations of Disaster Risk Reduction Schemes

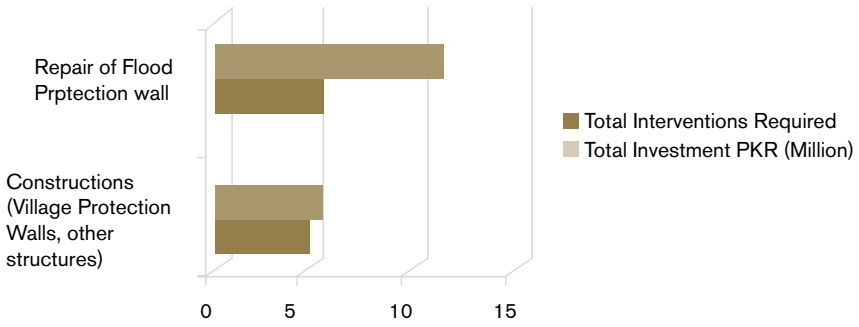


Table 42: Detailed Prioritisations for Disaster Risk Reduction

S.No	Type	Village Name	VC Name	Ranking	Beneficiary Households	Estimated Cost in millions (PKR)
1.	Constructions (Village Protection Walls, other structures)	Kot Lalu	Zarkani	1	400	0.2
2.	Repair of Flood Protection wall	Kot Musa	Bukhi	1	500	2.5
3.	Repair of Flood Protection wall	Gara Abdullah	Gara Matt	2	500	0.12
4.	Constructions (Village Protection Walls, other structures)	Dholka Jadid	Gandi Essab	3	130	3.0
5.	Constructions (Village Protection Walls, other structures)	Basti Moliyan	Kot Taga	3	50	2.5
6.	Constructions (Village Protection Walls, other structures)	Kot Taga	Kot Taga	3	815	0.17
7.	Repair of Flood Protection wall	Gara Mehmood	Gara Essa Khan	3	200	0.8
8.	Repair of Flood Protection wall	Gara Mumraiz	Gara Nehar	3	250	0.12
9.	Repair of Flood Protection wall	Jandi Babar	Jandi Babar	3	350	0.4
10.	Repair of Flood Protection wall	Moga	Jandi Babar	4	150	10.0
	Total		**3345**	**19.81**		

5.4.4 WATER FOR LIVESTOCK

Table 43: Overview of Water for Livestock Schemes

	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5
Livestock Water Pond	**Number and Names of Villages**				
Construction/Lining or Repair	1 village: Korri Jamal	2 villages: Khiyara Basharat, Gara Khan	-	-	2 villages: Gara Nehar, Moga

Figure 22: Prioritisations of Water for Livestock Schemes

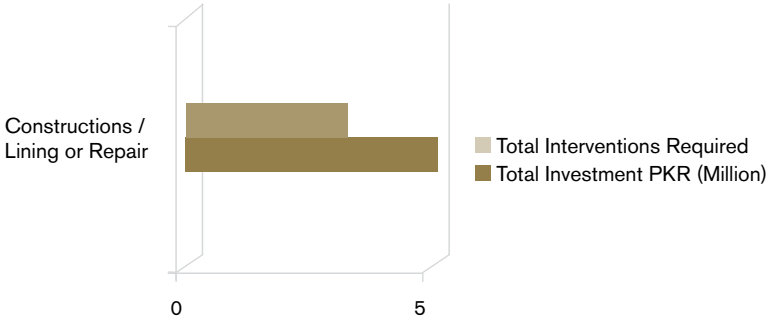


Table 44: Detailed Prioritisations for Water Ponds for Livestock

S.No	Type	Village Name	VC Name	Ranking	Beneficiary Households	Estimated Cost in millions (PKR)
1	Construction/Lining or repair	Korri Jamal	Korri Hoot	1	400	0.3
2	Construction/Lining or repair	Khiyara Basharat	Gandi Umer Khan	2	225	0.5
3	Construction/Lining or repair	Gara Khan	Gara Essa Khan	2	380	0.1
4	Construction/Lining or repair	Tallai Budha Shah	Jandi Babar	3	750	2.0

5	Construction/ Lining or repair	Gara Nehar	Gara Nehar	5	375	0.4
6	Construction/ Lining or repair	Moga	Jandi Babar	5	150	0.15
	Total		**2280**	**3.45**		

5.4.5 DRAINAGE AND SANITATION

Table 45: Overview of Drainage and Sanitation Scheme

	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5
Drainage and Sanitation Systems	**Number and Names of Villages**				
Drainage& Sanitation Schemes	-	1 village: Zarkani	1 village: Gara Umer Khan	1 village: Gara Abdullah	-
Toilets/Latrines	-	-	-	-	1 village: Gandi Ashiq

Figure 23: Prioritisations of Drainage and Sanitation Schemes

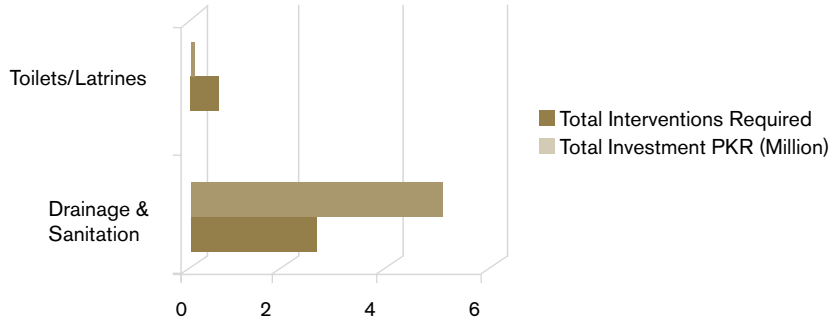


Table 46: Detailed Prioritisations for Drainage and Sanitation Systems

S.No	Type	Village Name	VC Name	Ranking	Beneficiary Households	Estimated Cost in millions (PKR)
1.	Drainage & Sanitation Schemes	Zarkani	Zarkani	2	400	0.4
2.	Drainage & Sanitation Schemes	Gara Umer Khan	Gara Umer Khan	3	800	4.5
3.	Drainage & Sanitation Schemes	Gara Abdullah	Gara Matt	4	500	0.4
4.	Toilets/Latrines	Gandi Ashiq	Gandi Ashiq	5	800	0.02
	Total		**2500**	**5.32**		

5.5 Overview of All Schemes & Their Prioritisation

Table 47: Overview of Number of Schemes and Prioritisations

Schemes	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5
DRINKING WATER SCHEMES and NUMBER OF VILLAGES					
DWSS (New)	20	6	2	1	-
Improvement in DWSS	6	3	1	1	-
Tube wells	4	5	3	-	-
Hand Pumps	3	3	1	-	-
Construction (kacha and pacca ponds, water tanks, Overhead tanks)	5	2	3	-	-
Submersible Pumps	3	2	-	-	-
Lining of Ponds/Channels	3	1	2	2	-
Solar System	3	1	-	1	-

IRRIGATION SCHEMES and NUMBER OF VILLAGES					
De-siltation	6	4	3	1	2
Rehabilitation/Repair	4	3	7	4	2
Constructions (gates, saads, walls, roads, inlet structures, lining, etc)	2	9	8	6	3
Stone Pitching	-	1	-	-	-
Electricity/Transformer	1	2	-	2	1
DISASTER RISK REDUCTION and NUMBER OF VILLAGES					
Constructions (Village Protection Walls, other structures)	1	-	4	-	-
Repair of Flood Protection wall	1	1	3	-	1
LIVESTOCK WATER POND and NUMBER OF VILLAGES					
Construction/Lining or Repair	1	2	-	-	2
DRAINAGE and SANITATION and NUMBER OF VILLAGES					
Drainage& Sanitation Schemes	-	1	1	1	-
Toilets/Latrines	-	-	-	-	1
Total	**63**	**46**	**38**	**19**	**12**

5.6 Investment Plan (Short –Medium – Long) Term

Short term investment has been procured through evaluating Ranking 1, medium term investment through Ranking 2 & 3 while long term investment is generated through Rankings 4 &above. A grand total of 178 interventions have been identified and prioritised with total required investment worth PKR 633.72 (Million) ranging over the short, medium and long term time span. It is estimated that a total of 114,610 households shall directly benefit from these interventions.

Figure 24: Overview of Total Investment, Interventions and Benefitting Households

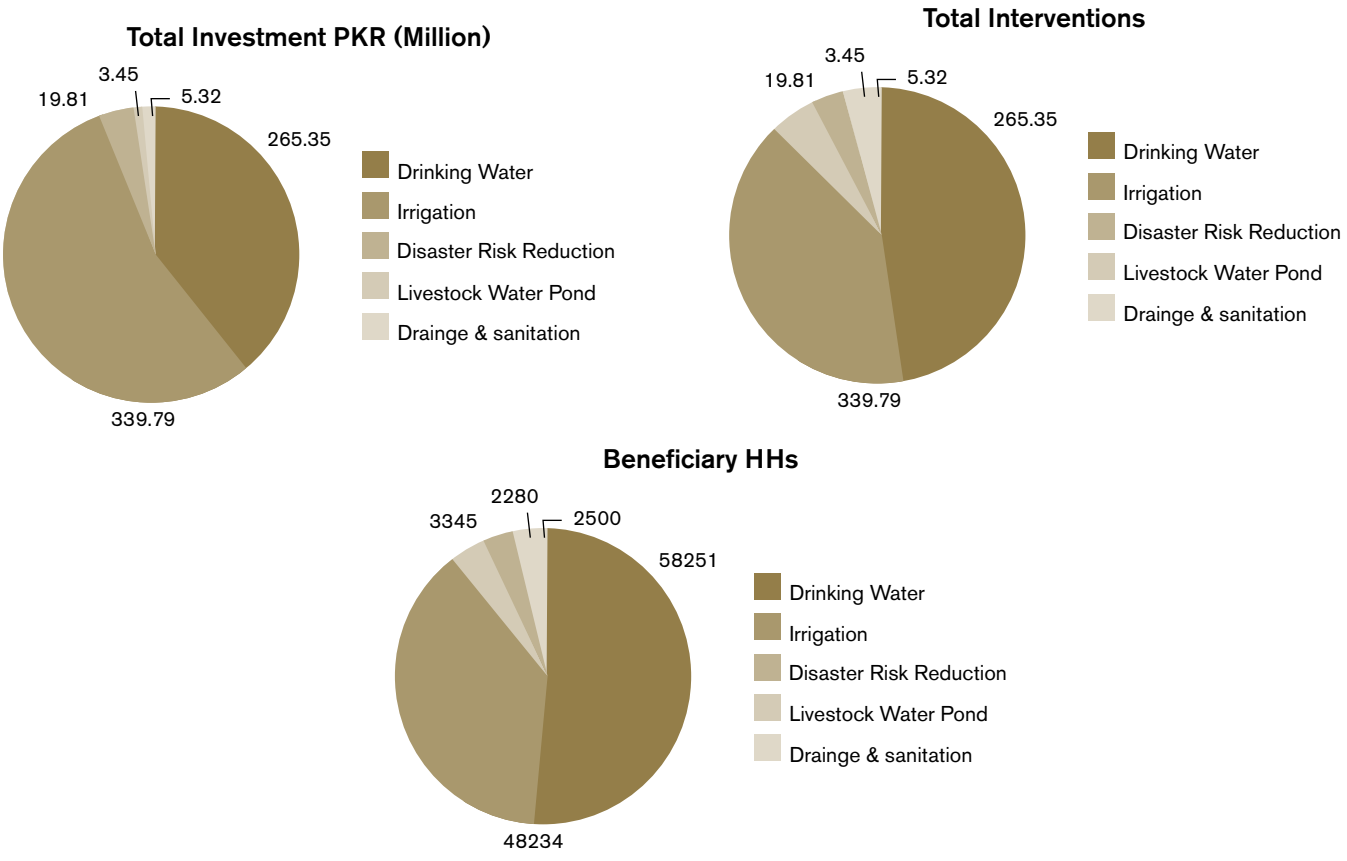


Table 48: Investment Plan (Short – Medium – Long) Term

S.No	Project Description	Total Interventions Required	Short Term Investment PKR (Million)	Medium Term Investment PKR (Million)	Long Term Investment PKR (Million)	Total Investment PKR (Million)
1	DRINKING WATER SCHEMES To benefit 58251 Households					
1.1	DWSS (New)	29	40.8	10.45	0.15	51.4
1.2	Improvement in DWSS	11	18.8	63.4	7.5	89.7
1.3	Tube wells	12	24.0	29.39	-	53.39
1.4	Hand Pumps	7	0.6	1.28	-	1.88
1.5	Construction (kacha and pacca ponds, water tanks, Overhead tanks)	10	8.38	4.9	-	13.28
1.6	Submersible Pumps	5	5.6	2.5	-	8.1
1.7	Lining of Ponds/Channels	8	0.5	31.73	1.87	34.1
1.8	Solar System	5	7.7	4	1.8	13.5
2	IRRIGATION SCHEMES To benefit 48,234 Households					
2.1	De-siltation	16	6.17	44.81	13.5	64.48
2.2	Rehabilitation/Repair	20	5.3	118.49	22.07	145.86
2.3	Constructions (gates, saads, walls, roads, inlet structures, lining, etc)	28	61.6	43.55	17.1	122.25
2.4	Stone Pitching	1	-	0.4	-	0.4
2.5	Electricity / Transformer	6	0.6	2.2	4.0	6.8
3	DISASTER RISK REDUCTION To benefit 3345 Households					
3.1	Constructions (Village Protection Walls, other structures)	5	0.2	5.67	-	5.87
3.2	Repair of Flood Protection wall	6	2.5	1.44	10	13.94
4	LIVESTOCK WATER POND To benefit 2280 Households					
4.1	Construction/Lining or Repair	5	0.3	2.6	0.55	3.45
5	DRAINAGE & SANITATION To benefit 2500 Households					
5.1	Drainage& Sanitation Schemes	3	-	4.9	0.4	5.3
5.2	Toilets/Latrines	1	-	-	0.02	.02
	Grand Total	**178**	**183.05**	**371.71**	**78.96**	**633.72**

5.7 Formulation of Detailed Action Plan (year wise)

Water for Livelihoods goal is to "contribute to improving and securing livelihoods and increasing food security of communities in Khyber Pakhtunkhwa and FATA areas of Pakistan through sustainable, secure and equitable access to water". In lieu of which table 49 shows the phase progress reviewcompiled against the LFA targets.

Table 49: Formulation of Detailed Action Plan (year wise)

S.No	Project Description	# of Projects	Implementation Years		
			1	2&3	4&5
1	**DRINKING WATER SCHEMES**				
1.1	DWSS (New)	23	13	9	1
1.2	Improvement in DWSS	16	11	4	1
1.3	Tube wells	12	4	8	-
1.4	Hand Pumps	7	3	4	-
1.5	Construction (kacha and pacca ponds, water tanks, Overhead tanks)	10	5	5	-
1.6	Submersible Pumps	4	3	1	-
1.7	Lining of Ponds/Channels	6	1	3	2
1.8	Solar System	5	3	1	1
2	**IRRIGATION SCHEMES**				
2.1	De-siltation	16	6	7	3
2.2	Rehabilitation/Repair	21	4	11	6
2.3	Constructions (gates, saads, walls, roads, inlet structures, lining, etc)	29	3	17	9
2.4	Stone Pitching	1	-	1	-
2.5	Electricity/Transformer	6	1	2	3
3	**DISASTER RISK REDUCTION**				
3.1	Constructions (Village Protection Walls, other structures)	4	1	3	-
3.2	Repair of Flood Protection wall	6	1	4	1
4	**LIVESTOCK WATER POND**				
4.1	Construction/Lining or Repair	6	1	3	2
5	**DRAINAGE & SANITATION**				
5.1	Drainage& Sanitation Schemes	3	-	2	1
5.2	Toilets/Latrines	1	-	-	1

5.7.1 Implementation Modalities of Action Plan

- The implementing organisation needs to be composed of all relevant representatives from the government (local & district included), involved organisations (NGOs, WUA, WUGs, etc), academia, scientists, concerned and involved locals and other agencies.
- Capacities of the above mentioned need to be built up further, through multiple methods (trainings, discussions, workshops etc).
- Resources need to be mobilised for further linkage development.
- Strengthening and developing, where appropriate, of policy frameworks and relevant legislation for implementation.

5.7.2 Potential Collaborators for Capacity Building and Resource Identification

Efforts need to be initiated in Rudh Kohi area regarding drinking and irrigation water use. Through WUMP a more prominent role needs to be played to address these issues by facilitating the dialogue between different stakeholders such as the line departments, WUAs, civil society organisations, public and private sectors. Through WUMP a first step in this direction has been taken.
As the next step, a platform to all stakeholders needs to be provided to address the water issues of Rudh Kohi area and to create synergies between different stakeholders in order to tackle drinking and irrigation water issues.

Linkages need to be facilitated among different organisations (like Agricultural Research, Forest, Animal Husbandry, Extension, Arid

zone of PARC, Soil conservation, RWSS, Spate irrigation, TVO, Rudh Kohi department etc.) leading to joint interventions aiming at a more equitable access to water and improving the water use efficiency for drinking and irrigation purposes.

The joint interventions with the active participation of the communities are expected to resolve some pressing problems related to water. The role of the NGOs will be to raise awareness and mobilise the communities for the construction, rehabilitation, operation and maintenance of the water infrastructure.

5.7.3 Monitoring of Action Plan

For monitoring purpose a separate committee will be formed having representatives of community organisations, partner organisations, local bodies' representatives and other line departments. At different levels, the committee will be formed having representatives of government and other agencies in the district.

Water Conservation Methods for Agriculture, Farming, and Gardening

- Drip or Micro Irrigation
- Bottle or Pitcher Irrigation
- Pit Irrigation
- Drought Tolerant Crops or Seeds
- Furrow Irrigation
- Acequias
- Subsurface Drip Irrigation
- Black Plastic or Organic Mulch
- Gravity Drip Bucket Irrigation Systems for Vegetable Gardens
- Sand Dams
- Organic Farm Soils Require less Water to Grow Crops
- Drought Tolerant Livestock Breeds
- Change our Diets – More land Friendly!
- Qanats
- Rain Water Harvesting and Rain Gardens
- Half-Moons, Bunds or Terraces
- Motorized and Non-Motorized Water Pumps
- Collecting Fog or Mist
- Deficit Irrigation
- Mycorrhizal Soil Fungus
- Investing in a Soil Moisture Sensor
- Good Drainage
- Agroforestry
- Solid Rain

From: Big Picture Agriculture

Chapter 6
6- WUMP Implementation, Mobilisation and Updating

6.1 WUMP Implementation Agreement and Contents

The WUA and Rudh Kohi department are found to be the main stakeholders, both representing farmers and communities of the area. After registration of WUA, it is planned that WUMP will be displayed at Rudh Kohi department, along with Kuliyat and Riwajat, itwill be an equally important document for GLAs,donors, community, Farmers, and WUA. The WUA and Rudh Kohi department/ collector will be the main custodians of WUMP and it will be implemented by Rudh Kohi dept.Similar to Kuliyat and Riwajat, theWUMP will be followed and respected by the community especially the farmers. In other words WUMP will be based on existing rules and regulations for easily understanding and guidance for GLAs, Farmers, custodians, donors and Local Government.

6.2 WUMP Mobilisation Procedure and Parties Involved

The water use management plan is the directory of water sector issues and potentials in Tehsil Daraban, identified and prioritised by WUAs/WUGs and other relevant stakeholders. The WUMP provides overall guidance to District Authorities for attention to water related issues. The WUAs will collaborate with different stakeholders such as:

1. **Rural communities:** These include simply the users and their collectives such as Water User Groups and Associations (collective inputs, cost sharing – both cash and kind – and providing local support in all steps from identification till post project operation and maintenance).
2. **Government set ups:** At provincial as well as Local Governments at district and Tehsil levels. There are relevant partner departments with whom the project has built strong relationship during Phase I. The district set-up of various line agencies organised under the administration of the Deputy Commissioner, will receive changes after the promulgation of Local Government Act in the Province.
3. **Research institutions** such as Pakistan Council of Research in Water Resources (PCRWR), universities, Pakistan Agricultural Research Council, International Water Management Institute (IWMI).
4. **Government line departments / service providers** such as On-Farm Water Management wing, Agriculture Department of KP, Office of the Assistant Commissioner Rudh Kohi system D.I. Khan, Soil Conservation Department.
5. **Other projects** such as Spate Irrigation Project (funded by several donors such as UNDP-GEF, WSP, PPAF-LACIP, USAID, World Bank projects and others.
6. **Private sector organisations** such as specialised engineering companies, especially for small dams (through tendering).
7. **Local NGOs** especially those which have been an integral part of gathering primary data from the field.
8. **Advocacy Fora** such as Spate Irrigation Network.

Along the way new partnerships will be explored when necessary, based on their comparative advantage of local presence, technical competence, quality of delivery, etc.

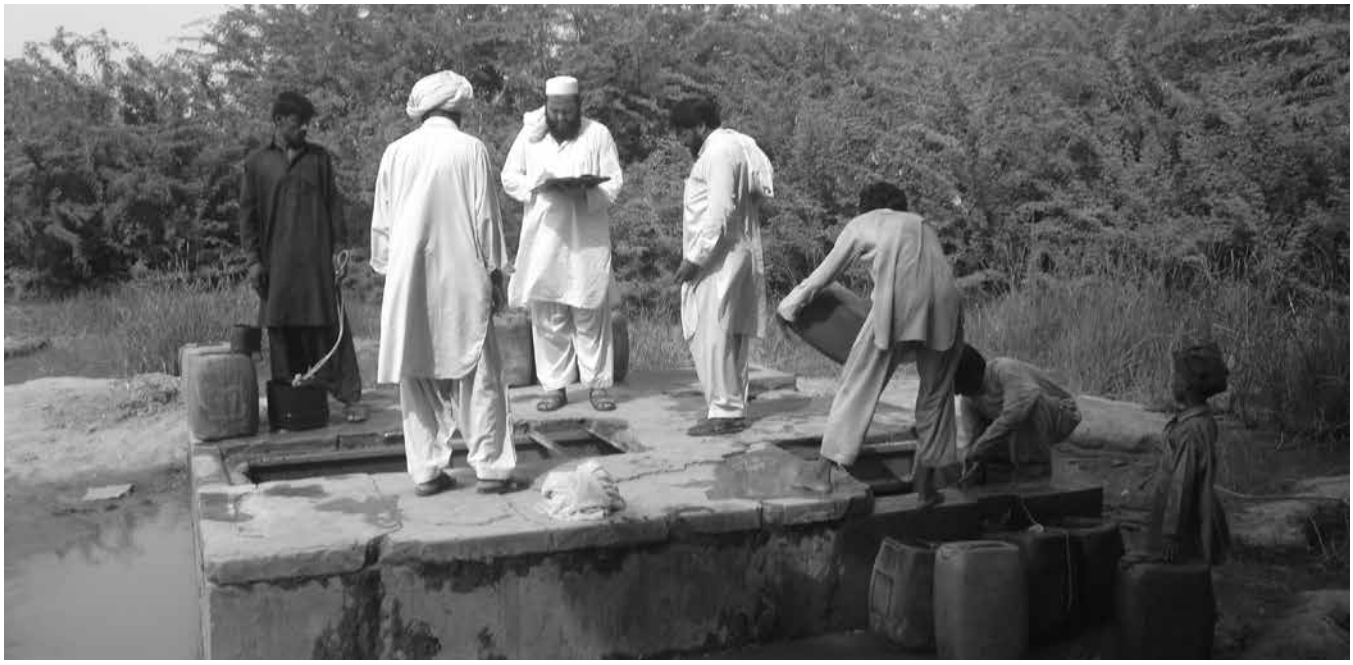
6.3 WUMP Updating and Procedure for Changes as Needed

WUMP needs to be considered an 'alive' strategy. It is evolving, accommodating, conserving and thoroughly sustainable. It is imbedded in the 3Rs and climate change scenarios. It cannot and should not be considered the final word! On the other hand, it should neither be taken forgranted nor be changed as and when needed without counsel and thorough research. The human factor- be itthelocal, official or the affected, need to chip in with their honest opinion. An agreed mode or procedure for changes and updating need to be formulated and adopted.

6.4 WUMP Reporting, Coordination and Ownership between Stakeholders

The idea behind the development of WUMP is that all the involved parties need to coordinate for inputs, report, acknowledge, review and ultimately own the Plan. The ultimate plan is that the district administration and line departments should adopt the WUMP and replicate it in other districts. For this, it should live upto Intercooperation's vision by being open for interpretation, by being in harmony with the surroundings.

The water use management plan is the directory of water sector issues and potentials in Daraban Tehsil identified and prioritised by WUAs/WUGs and other relevant stakeholders together. The WUMP provides overall guidance to District Authorities for attention to water related issues. The WUAs will collaborate with different stakeholders such as the ones mentioned above.



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WUMP is

"A concept to equitably share water resources within and amongst rural communities"

DI Khan: 8-year-old girl, 10 labourers drown in contaminated water

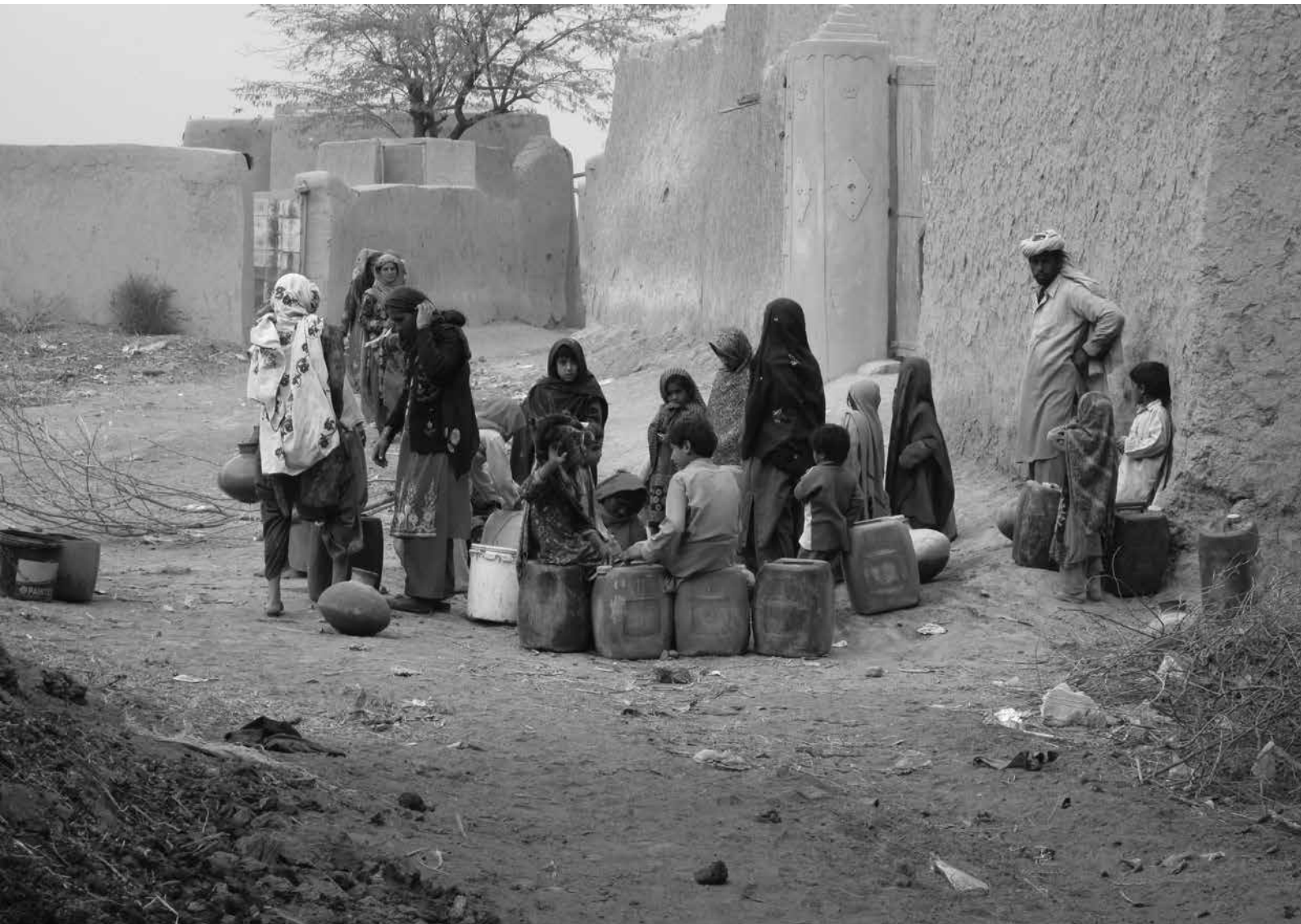
DERA ISMAIL KHAN – As many as ten labourers drowned in contaminated water here on Friday while another fifteen were rushed to the hospital in unconscious state, Dunya News reported. An eight-year-old girl fell into contaminated water discharged from a local factory. At least 10 labourers jumped in to save her life but could not survive the contamination. Those deceased include women and children. Police and rescue teams rushed to the site. 15 persons were rushed to the hospital in an unconscious state.

Published in Dunya News, 2nd May 2014.

All tapped out: Water shortage at DI Khan prison

DI KHAN: Inmates at Central Prison DI Khan suffered a shortage of water as Ramazan kicked off, due to a malfunctioning tube well. The issue has caused great inconvenience to the prisoners, particularly at the time of Sehr and Iftar. It is reported that the DI Khan Grid Station is supplying electricity to all feeders at 80 volts instead of 220 volts. The low voltage has caused the water well in the prison to stop working. Prisoners are not just deprived of drinking water but also water to maintain hygiene. The prison staff and prisoners have protested against the inconvenience and demanded an adequate supply of electricity as well as water.

Published in The Express Tribune, July 2nd, 2014



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