



# **Water Use Management Plan (WUMP)**

Plan for Sustainable Management and Utilisation of  
Water Resources in Arandu Union Council, District Chitral

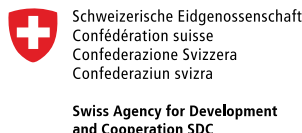


# Water Use Management Plan (WUMP) Plan for Sustainable Management and Utilisation of Water Resources in Arandu Valley District Chitral

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## Contributors:

Asif Iqbal c/o AC Drosh  
Ali Ahmed (SDO Irrigation Division, Chitral)  
Raja Javed (District Officer OFWM)  
Mohammad Asif (Program Assistant OFWM)  
Raqeeb Ullah (Sub Engineer, PHED Chitral), Javed (Social Organizer PHED),  
Mohammad Jehanzeb, Technical Manager AKRSP Chitral  
Mohammad Younis, Engineer SRSP Chitral,  
Syed Hussain Mustafa (Planning & Governance Coordinator W4L),  
Sajid Hussain, Regional Engineer W4L (North)  
Ismat Majeed, Community Development Facilitator W4L (North)

## Peer Review:

Arjumand Nizami, Munawar Khan Khattak, Syed Hussain Mustafa, Khan Mohammad, Towheed Gul  
District Coordinator Committee & GLA Members

## Field survey and other inputs from:

Shujaat Ali (Consultant Analyst), Ameer Ejad (WUMP Team Manager), Nusrat & Kausar (Female Social Organizers), Adnan & Qadeer (Male Social Organizers), Ejaz & Zabiullah (Field Engineers)-Field Team for WUMP engaged by Young Star Development Organisation-YSDO

## Editor:

Fatima Daud Kamal  
Muhammad Abbas Qazi

## Photos:

Ameer Ejad c/o YSDO, Sajid Hussain (W4L), Asfandyar Khan (YSDO), Abdul Qadir (YSDO)

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Salman Beenish

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## Acronyms

AKHSP	Aga Khan Health Services Programme
ADP	Annual Development Plan
AKPBS	Aga Khan Planning & Building Services
AKRSP	Aga Khan Rural Support Programme
BHU	Basic Health Unit
CIADP	Chitral Integrated Area Development Programme
CBOS	Community Based Organisations
CCC	Climate Change Centre
CPI	Community Physical Infrastructure
DDC	District Development Committee
DRR	Disaster Risk Reduction
DWSS	Drinking Water Supply Scheme
FPW	Flood Protection Works
GLAs	Government Line Agencies
ICIMOD	International Center of Integrated Mountainous Development
IDS	Integrated Development Strategy
IWRM	Integrated Water Resource Management
JFMCs	Joint Forest Management Committees
KPK	Khyber Pakhtunkhwa
LP	Livelihood Programme
LPH	Livelihood Programme for Hindukush
MHP	Micro Hydel Power
NFE	Non Formal Education
NGOs	Non-Governmental Organisations
OFWM	On-Farm Water Management
PHED	Public Health Engineering Department
PPAF	Pakistan Poverty Alleviation Fund
RSPs	Rural Support Programmes
SDC	Swiss Agency for Development & Cooperation
SRSP	Sarhad Rural Support Programme
THQ	Tehsil Headquarters Hospital
UC	Union Council
VCs	Village Councils
VO	Village Organisation
W4L	Water for Livelihoods Project
WO	Women Organisation
WUAs	Water User Associations
WUGs	Water Users Groups
WUMP	Water Use Management Plan
YSDO	Young Star Development Organisation

# 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 it this consultation was 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 Tehsil/Valley/UC 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

This Water Use Management Plan (WUMP) for the Arandu Valley of District Chitral was prepared with the help of local communities of Arandu UC and in collaboration with water user associations/groups, concerned technical departments of the Government of Pakistan, and partner organisations in the valley. Intercooperation's project Water for Livelihood, funded by the Swiss Agency for Development and Cooperation (SDC) extended technical and financial facilitation in the entire process of its preparation.

Water Use Management Plan (WUMP) is a modern concept for equitable sharing of water resources among beneficiaries and involvement of all stakeholders working for water sector development. It is a planning tool that focuses on Integrated Water Resources Management (IWRM) approach. IWRM is a process that promotes the coordinated development and management of water, land and related resources, to maximise the resultant economic and social welfare in a fair manner, but without compromising the sustainability of important ecosystems (Global Water Partnership, 2000). The purpose of WUMP is to take inventory of various sources of water available in the valley and identify community priority in order to achieve an effective, equitable and efficient use of water resources at local level.

Assessment of availability and requirements of water, existing use and equity issues, water rights and its balance, climate change and disaster risks, prioritisation and planning for water resource, its development and multiple uses are specific purposes of WUMP. Interactive dialogues between communities and other stakeholders, for the promotion of water resources, prioritisation of water related issues, conservation of water resources and environment friendly planning for preserving water, strengthening of the local institutions' capacities of socially and economically disadvantaged groups are the other purposes of WUMP.

The WUMP for Arandu UC is aligned with Integrated Development Vision (IDS) of 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 incorporated in WUMP implementation. Its preparation process followed 4 phases and 17 sub-steps in close coordination with concerned village communities (WUG/WUA), concerned Government Line Agencies (GLAs) and District authorities to ensure their commitment and ownership.

Arandu valley is located in the extreme south of District Chitral at a distance of 93 km from Chitral town. It is the largest UC of Chitral in terms of population and number of households. The total population of UC Arandu is 26,377 (13522 men and 12855 women) having 3,527 households. The entire valley makes one Union Council that comprises of 5 Village Councils and 28 Revenue Villages.

There are many development issues that need immediate solution in the Arandu UC, but during WUMP process the communities prioritised several issues related to water that are categorically mentioned in this document:

- a. At current only 39% households have access to tap water as out of the total 3,527 households, 30% do not have any water supply arrangement, while 31% households have problems in their pipelines and need rehabilitation and repair works.
- b. There are 42 unlined irrigation channels from 22 perennial streams and natural springs that feed the agricultural lands of the UC, but their infrastructure is exposed to landslides, floods and sediments during rains. During peak agricultural season in the summer, the water flow is often suspended in the irrigation channels due to floods. Seepage is a common factor that restricts the tail users from proper irrigation. Therefore, both water quantity and protection against natural disasters persists regarding irrigation channels.

Natural disasters frequently occur as flash floods after rains and floods in Arandu Gol arise. Due to climate change and lack of watershed management, their impacts are frequent. The floods damage all the infrastructures including water sources and intakes of drinking water supply schemes and irrigation channels also damaging agricultural land and forests in the valley. Arandu Valley is the main source of timber and fuel wood in Chitral, deforestation and over grazing is causing concerns for active watershed management where socio economic sustainability of these people is at stake.

Lack of sanitation facilities including toilets in the households and open defecations have also come up as major health hazards in valley. To solve the issues the community identified the need for sanitation and wastewater disposal as one of water sector issues during the WUMP process. Government and Partner Projects should extend all out support in improving water sector through rehabilitation and improvement of water supply schemes damaged in natural disasters. Proper protective works should be included for safeguarding the water sources and conveyance arrangements.

Improved access to productive use of water by improving and extending irrigation channels was observed during WUMP, these would be reducing wastage of water and farmer's effort through lining of watercourses.

In order to ensure the sustainability and participation of water sector services delivery, promote beneficiary involvement in identification & prioritisation of potentials, sharing of scheme costs and pay for services culture.

Disaster risk reduction through DRM including establishment of Community Based Disaster Risk Management (CBDRM) is needed. Further structural and non-structural measures needs to be adopted to address the respective water related emergencies in Arandu UC.

To improve the health, hygiene and environment in the settlements open defecations needs to be reduced by general awareness to masses and building toilets on cost sharing basis. For multiple and potential use of water Micro and Mini hydro power projects should be initiated in the UC, also for strengthening water management systems through local institutions (WUA/WUG & JFMC) to ensure effective and efficient implementation of WUMP. The local institutions will lobby for their respective villages priorities schemes with local government and other organisations (projects) through building functional linkages.

During the WUMP process, the communities formulated the following recommendations:

- a. The Local Government should use WUMP as guiding document for ADP preparation regarding water sector improvements in Arandu UC.
- b. WUGs and WUAs should be involved in project planning and monitoring of project
- c. For watershed management the local government of Arandu UC should formulate proper plan for forest cutting, grazing, and Invest in Watershed Management with involvement of WUAs and Joint Forest Management Committees (JFMCs).
- d. To legalize the status of WUGs and WUGs, these representative bodies should be registered with government line departments like Social Welfare and Community Development Department, On-Farm Water Management, Soil Conservation and Public Health Engineering Wing of W & S Department.
- e. As primary stakeholder and having the WUMP ownership, the WUAs should be involved in the water sector planning and development process in Arandu UC attracting and convincing Government and Partner Project funds for water sector development.

In order to review the progress and update the WUMP, meeting of stakeholders including WUAs, GLAs, Partner NGOs and Union Council needs to be held annually.

#### Total estimated investment as per WUMP Arandu

S. NO	Head	Estimated cost (Rs. Millions)
1	New drinking water supply schemes	84.87
2	Improve existing DWSS	42.33
3	Improvement in irrigation schemes	124.4
4	On Farm Water Management	46.48
5	Flood protection works	133.23
6	Drainage and sanitation	60.93
Grand total		492.24

#### The key partners

The following key partners were engaged in Water Use Management Plan preparation in Arandu UC of district Chitral:

1. District Administration (AC of concerned Tehsil) as a focal person
2. Public Health Engineering Department
3. Irrigation Division, Chitral
4. On-Farm Water Management Department Chitral
5. Soil Conservation Department Chitral
6. Forest Division, Chitral
7. Aga Khan Rural Support Program Chitral
8. Sarhad Rural Support Program in Chitral
9. FOCUS Humanitarian Organisation in Chitral
10. Young Star Development Organisation (YSDO)
11. Water User Association/ Water User Groups Arandu UC
12. Water for Livelihoods Project





# Chapter 1

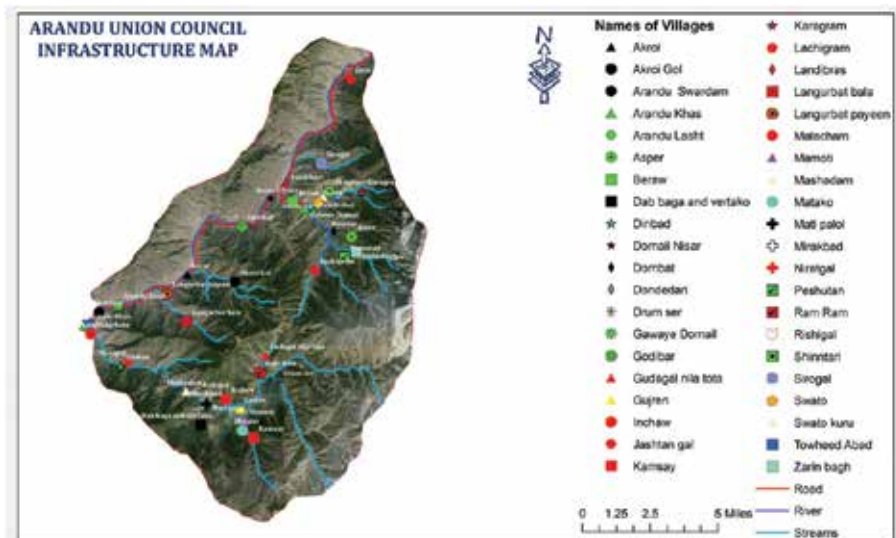
## 1. Area Profile

### 1.1 Location, Elevation & Administration

Arandu Valley is located in the extreme south of District Chitral at a distance of 93 km from Chitral town. The valley lies at about 3,700 feet high from sea level, 13,000 feet being the highest point at Arandu Zome (Khotogoruk) (GIS-WUMP Arandu 2014). The valley shares 36 km border with Kunar Province of Afghanistan. An all-weather road also connects Pakistan and Afghanistan at Arandu Khas settlement. The total area of 82,630 acres of Arandu Valley comprises of about 2.8% fertile agricultural land, 30.67% arid land and 33% arable land, 21% natural jungles and 10% riverbeds (Source data-WUMP 2014 Arandu). The deodar forests spread over the mountains with a height range of 4,000-10,000 feet.

The total population of UC Arandu is 26,377 (13522 men and 12855 women) having 3,527 households. The entire valley makes one Union Council that comprises of 5 village councils and 28 Revenue villages. The cultivable land is being used for traditional subsistence farming with wheat, maize and beans. Rice is cultivated in Arandu. Most of the houses are made of stone, wood and mud while four percent houses are constructed of cement and concrete.

The main tribes living in Arandu Union Council are Kohistani/Gowar, Domeli, Pashtoon, Gujur and Chou (Chitrali). All have their own dialects, while the entire population knows Pushto, Gawar language is spoken by the Kohistani tribe and Domeli is spoken in the Main Domel Valley. The main Arandu valley is accessible through road, but the accessibility is subject to permission by security agencies. Until 2011, the area was open for general traffic. Due to cross border insurgency, the accessibility is now limited through permission at several check points.



Among five village councils, only main Arandu VC has been linked with jeep-able link roads while in Arandu Gol VC, only two settlements out of fourteen are accessible via jeep. It is worth mentioning that it takes 5 hours to walk from main Arandu to the last settlement of Kamsai of Arandu Gol VC. Only 40% of Domel settlements are accessible via jeep and the remaining can only be accessed via rugged tracks along mountains and riverbeds.

## 1.2 Climatic Conditions

The Climate of UC is hot in the summer ranging from warm (at low land) to cool at higher elevations. Spring weather is unpredictable with frequent rains and snow falls. Autumn offers mild and pleasant temperatures. During summer, maximum temperature reaches up to 40°C and falls below freezing point in winter. The valley receives precipitation in the form of rain and snow while later being dominant in winter season. Moreover, occasional rains also occur during the summer because of monsoon influence coming in from Dir. The climatic conditions have remarkable effects on water availability in the UC which is considered a water resourceful area in Chitral district (offering a fair share of vegetative cover).

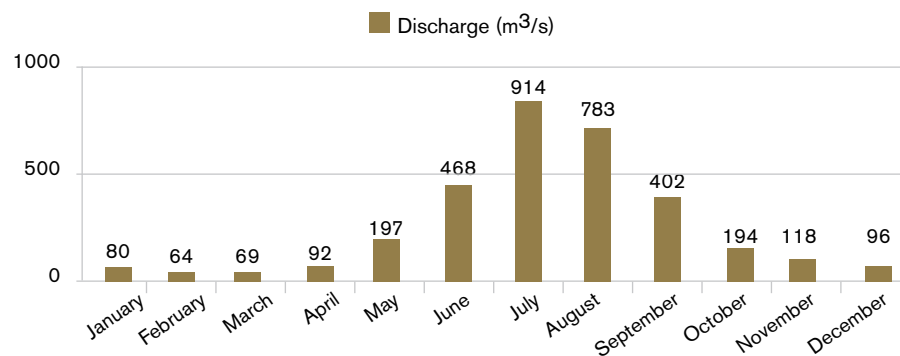
**Table 1: Annual Mean Temperatures**

Mean Maximum Temperature (°C)	40
Mean Minimum Temperature (°C)	5

## 1.3 Hydrology

The drainage of all the streams of Arandu is into River Chitral (known as River Kabul after emerging in Pakistan flowing through Afghanistan). The hydrographs of streams of Arandu is not available, but the main river's hydrographs is given below

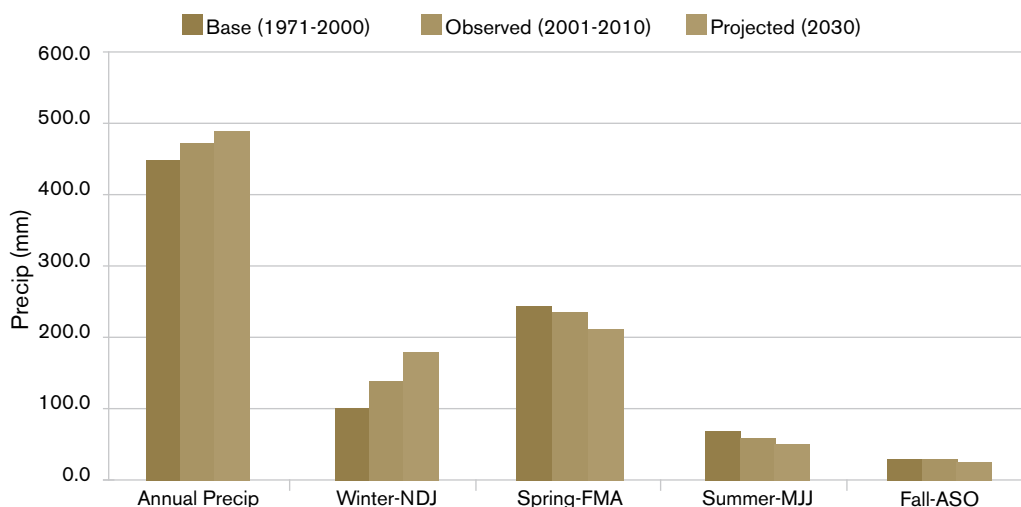
**Figure 1: Mean Monthly Extended Flows in Chitral River - WAPDA Report  
Arandu River Discharge (m<sup>3</sup>/s)**



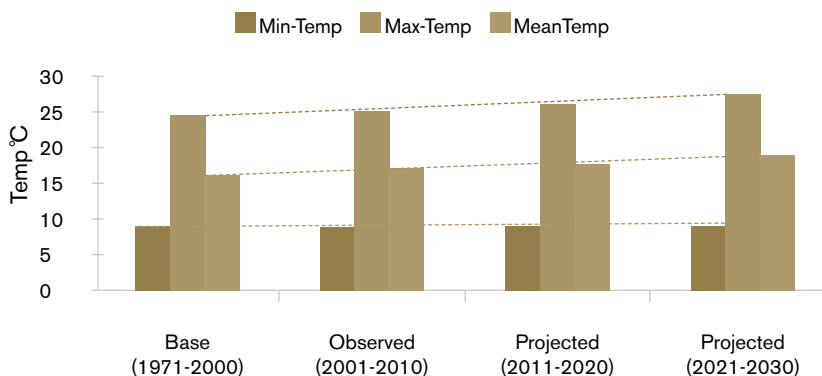
## 1.4 Climate Change Scenario

Variables in climate change are more visible in marginal areas where such events have been observed more frequently. Decadal temperature scenarios for Chitral District revealed that the annual maximum temperatures are at an increasing trend and annual minimum temperatures are at a decreasing trend. On an average, the increase in annual mean temperature is about 0.6°C per decade. Moreover, annual rainfall in Chitral is showing an increasing trend because of an increase in the winter rainfall (IC, 2013). In Chitral, 80% of households have opted for labour migration due to the water hazards induced by climate change (ICIMOD, 2011). In Arandu, events of climate change such as flash flood, heavy rains and flash flood variations have increased both in frequency and scale, according to community perception confirmed through the WUMP exercise. Over the last 20 years, 11 disastrous floods have struck UC Arandu, which was unprecedented in the recent hydrological history. Although, there is no available data on temperature differences in the specific UC but changing scenarios of temperatures, precipitation and cropping zones (as observed by communities), clearly indicate a pattern of change. These changes have negatively influenced local adaptive capacity for natural disasters.

**Figure 2: Chitral Precipitation Scenarios**



**Figure 3: Chitral- Decadal Temperature Scenarios (Annual)**



## 1.5 Institutional Arrangement and Capacity Building

### 1.5.1 VO /CBOs, Water Users Group, Water Users Association

In District Chitral, the Aga Khan Rural Support Program (AKRSP) started the local Institutional Development process in the late eighties, with the basic aim of forming organisations, promotion of savings and skills enhancement. Moreover, the Sarhad Rural Support Program (SRSP) also supported community development process, which has also helped the formation of village-based organisations in the whole Union Council. According to data, there are 41 village/women (V/WOs) organisations in the UC. Under Water for livelihood (W4L) project, three Water User Associations are formed in Arandu comprising representatives from 34 male and 35 female Water Users Groups (WUGs). These WUGs are representing 2192 households. WUGs/WUAs work around one common interest - water - and hence they ensure that other development potentials also come up with interventions on water. The WUMP field teams and WUGs/WUAs jointly contributed in carrying out an assessment, for prioritisation and preparation of WUMP.

### 1.5.2 District Coordination Committee (DCC)

Along with WUMP preparation in the field, an advisory committee, i.e. a DCC was formed and notified by the Deputy Commissioner (DC) of Chitral. The purpose of the DCC is to steer the WUMP process and its implementation at district level. The coordination committee is to hold bi-annual meetings or when specifically required. The project keeps close interaction with DCC to keep them updated about project interventions in the district and seeks support for timely provision of services by the concerned actors (PHED, Irrigation Division, OFWM, SCD and Forest Department). The DCC will also ensure ownership for the WUMP at a District / Tehsil level.

### 1.5.3 Capacity Building of WUG/WUA and GLAs

At the beginning of Phase II, before initiating the process of WUMP preparation, training was conducted of all stakeholders in the district along with partner organisations to conceptualise the IWRM concept and understanding the WUMP preparation in the field. This inspires the easy flow of information and previous experiences.



## Chapter 2

### 2. Socio Economic Factors

#### 2.1 Demography

The Arandu UC comprises of 3,527 Households. The population of an area is one of the decisive factors in deciding the extent of facilities available and what facilities ought to be planned for the future. The total population of the area is 26,377 souls having 13,522 men (51.26%) and 12,855 women (48.73%). Out of the total population, there are 7054 children and 163 people of above 80 years of age.

**Table 2: Population Distribution**

Village Council	Population	Men	Women	Children	Above 80
Asper Domel	5145	2895	2250	1470	21
Domel	4835	2401	2434	1350	36
Arandu	5536	2931	2605	1520	58
Akroi	3640	1940	1700	910	13
Arandu Gol	7221	3355	3866	1804	35
<b>Total</b>	<b>26377</b>	<b>13522</b>	<b>12855</b>	<b>7054</b>	<b>163</b>

Source: Arandu WUMP Database 2014

#### 2.2 Housing Pattern

As per the database of the Union Council, in 2014 the total houses (in the UC) were 3,527. Out of the total, 98.44% are katcha<sup>1</sup> while about 1.56% are katcha/pucca<sup>2</sup> housing. Mud, stone and wood are important materials used in the construction of houses. The number and quality of housing conditions is shown in table 3.

**Table 3: Housing Quality**

Village Council	Katcha	Katcha/Pucca
Asper Domel	718	17
Domel	650	25
Arandu	747	13
Akroi	455	0
Arandu Gol	902	0
<b>Total</b>	<b>3472</b>	<b>55</b>

Source: Arandu WUMP Database 2014

<sup>1</sup>Made from mud (or mud plastered onto bricks), straw, stones or other natural building materials

<sup>2</sup>Made from using baked bricks, cement and concrete

Arandu has an immense ethnic diversity having Domeli, Chou, Gujur, Pathan and Nuristani as different ethnic groups with Kohistani being the largest ethnic group. Major spoken languages are Pushto, Domeli War, Gujurwar, Khowar and Kohistani. Almost all the inhabitants follow the Sunni sect of Islam. Distribution of population because of ethnic diversity is shown in table 4.

**Table 4: Ethnic Distribution HHs wise**

Village Council	Alamshadari	Arabdari	Gujur	Kohistani	Malibackdari	Manzadari	Muladari	Pathan	Quraish	Sonadari	Sultandari	Wardad	Other (small groups)
Asper	132	95			95	20					110	20	197
Domel			30					20	295			129	261
Arandu				105		90	130			110	60		263
Akroi			70	170				55		110			50
Arandu Gol			300	215				100	100			150	45
Sub Total	132	95	400	490	95	110	130	175	395	220	170	299	816
Total	3527 HH												

Source: Arandu WUMP Database 2014

## 2.3 Educational Facilities

Education is an important determinant of development and there are 28 government schools, 1 private school and 2 non-formal education systems (NFEs). Distribution of educational institutions is shown in table 5.

**Table 5: Number of Educational Institutions**

Village Council	Primary		Middle		High		Madrassah		NFE	
	Girls	Boys	Girls	Boys	Girls	Boys	Boys	Girls	Boys	Girls
Asper Domel	1	4								
Domel	2	4				1				
Arandu		3								2
Akroi	1	2	1			1				
Arandu Gol		8								
Sub Total	4	21	1			2				2

Source: Arandu WUMP Database 2014+ EDO Offices 2014

Total number of enrolled students in Government educational institutions is 3,688 which accounts for 13.98% of the total population. Moreover, 65% of total enrolled students in Government schools are boys and 35% are girls. The overall distribution of students in different educational institutions is as follows in table 6.

**Table 6: Number of Enrolled Students**

Village Council	Government		Private		Madrassah		NFE	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Asper Domel	414	93	56	13			29	57
Domel	788	120						
Arandu	1044	415						
Akroi	265	15						
Arandu Gol	379							
Total	2890	643	56	13			29	57

Source: Arandu WUMP Database 2014+ EDO Office Chitral 2014

The literacy rate in Arandu is 39.78% is comparatively lesser than that of the overall district (65%); only 24.55% women and 55.01% men are literate in the area. The distribution of educated men and women according to the village councils is tabulated in table 7.

**Table 7: Number of Educated Men and Women**

Village Council	Women				Men			
	Primary	Middle	Matriculation	Above Matriculation	Primary	Middle	Matriculation	Above Metric
Asper Domel	75	0	0	0	100	4	2	0
Domel	453	72	35	7	1740	710	120	32
Arandu	406	285	105	28	1275	775	465	255
Akroi	660	150	60	15	1058	47	24	0
Arandu Gol	801	2	2	0	649	104	62	17
<b>Total</b>	<b>2395</b>	<b>509</b>	<b>202</b>	<b>50</b>	<b>4822</b>	<b>1640</b>	<b>673</b>	<b>304</b>
%age	75.9%	16.1%	6.4%	1.58%	64.8%	22%	9.05%	4.09%

Source: Arandu WUMP Database 2014

## 2.4 Access to other Infrastructures

The level of prosperity of any area can be judged from the utility services available. Arandu is devoid of important services like bank, agricultural services and electricity. Available services are health facilities in three VCs (Domel, Akroi and Arandu), post office, and police station in main Arandu UC. Telephone wireless loop is available in the main settlements except Arandu Gol VC. Access roads are not available in most of the villages that are unpaved and in dilapidated condition, including 32 km main road passing through UC. This situation further casts its effects on communities to access these services, a major limiting factor to improve living conditions in the UC.

**Table 8: Availability of Key Services**

Village Council	Agricultural Service Centers	Animal Service Centers	Telephone (wireless )	Electricity Office	Post office	Bank	Police Station	Health Facilities
Aspar								
Domel								
Akroi								
Arandu								
Arandu Gol								
	For Non-availability				For Availability			

Source: WUMP Arandu Database 2014

## 2.5 Off-Farm Income Sources

Local people are using multiple strategies, including both farm and off farm sources, to generate household income. Moreover, the rural economy is mostly based on natural resources, but communities are adopting more off-sources of income because of decreasing natural resource base. Total number of people engaged in off-sources of income are shown in table 9.

**Table 9: Off-Sources of Income**

Village Council	Services	Skills	Business	Remittances (Abroad)	Labour
Asper Domel	173	399	21	0	625
Domel	144	331	18	1	518
Arandu	176	404	21	23	633
Akroi	115	266	14	3	417
Arandu Gol	36	463	24	9	725
<b>Total</b>	<b>644</b>	<b>1863</b>	<b>98</b>	<b>36</b>	<b>2918</b>

Source: Arandu WUMP Database 2014

UC Database shows that carpentry, masonry and working as transport drivers are major employable skills for men in the Arandu; total number of skillful men are shown in table 10.

**Table 10: Number of Skilful Men**

Village Council	Drivers	Carpenters	Masons	Tailors
Asper Domel	2			2
Domel	32	12	0	1
Arandu	9	3	1	3
Akroi	6	4		1
Arandu Gol	12	12	13	1
<b>Total</b>	<b>61</b>	<b>31</b>	<b>13</b>	<b>8</b>

Source: Arandu WUMP Database 2014

**Table 11: Number of Skilful Women**

Village Council	Seamstresses	Embroidery Work
Asper Domel	1	13
Domel	3	92
Arandu	4	21
Akroi	3	
Arandu Gol	2	150
<b>Total</b>	<b>13</b>	<b>150</b>

Source: Arandu WUMP Database 2014

For women, stitching and embroidering are major skills, used for income generation; total number of skillful women working in Arandu are shown in table 11.

## 2.6 Land Use

Land use in Arandu is mainly classified into four major types, i.e. rangeland and pasture land, forests, glaciers, agricultural and residential area. There is a 27647.125 acre land in the possession of the villagers, out of which 2305.625 acres are cultivable and under irrigation channels. Out of 2305.625 acre of the total cultivable area, 1026.5 acres of land is located in a single cropping zone of Asper Domel and Arandu Gol. The Basmati rice of Arandu is famous all over the district for its particular fragrance and taste. In double cropping areas, wheat, maize, beans and rice are major crops. Fodder crops are cultivated on limited land and fodder is mostly collected from forests as winter food for animals. 95% of the housing and land is owner occupied while 5% land is under tenancy farming on product sharing basis. Total land, under cultivation, in the UC is appended in table 12.

**Table 12: Irrigated Land Distribution**

Village Council	Total Land in Village (Acres)	Land under Cultivation (acre)	Arid land (acre)
Aspar Domel	5016.4	463.3	4553.1
Domel	6349.5	875.9	5472.4
Akroi	3509.3	190.3	3319.0
Arandu	2437.5	213	2224.5
Arandu Gol	10334.5	563.25	9771.25
<b>Total</b>	<b>27647.2</b>	<b>2305.75</b>	<b>25340.25</b>

Source: Arandu WUMP Database 2014

## 2.7 Agriculture & Livestock Status

### 2.7.1 Landholding Pattern

Rugged mountains and low temperature limits agriculture practices in the Arandu area, which is an impediment in the extension of arable land. It also limits 44.52% of land for the production of a single crop in a year with Arandu Gol and Asper Domel VCs. Average land holding size in the Union Council is 7.83 acres, but the actual land holding under the command of irrigation channel is 0.66 acres. Out of the total population, 557 households do not hold any land for farming and 84% of households manage their own farmland. The ownership of land is transferred mainly to the male members of a family. Landowner distribution in the UC is given in table 13.

Database shows that 84% of the households are owners of their land who neither rent out nor rent land from others. Mostly landless people practice agriculture on sharing basis where owners provide land, and another party contributes labour and inputs. The crop produce is equally distributed between the owner and landless farmer.

**Table 13: Land Owners Distribution**

Village Council	Owners (HH)	Shared (HH)
Aspar Domel	732	3
Domel	669	6
Akroi	451	4
Arandu	737	23
Arandu Gol	885	17
Total	3474	53

Source: Arandu WUMP Database 2014

### 2.7.2 Farming Practices

Most of the communities in the UC, practice agro-pastoralist lifestyle which includes subsistence arable cropping, fruit production, and livestock production. Owing to small landholding size, local communities utilise the agricultural production for their own household consumption. Rice, Wheat, maize, pulses and barley are food while grasses are fodder grown in the UC. Major vegetables are potatoes, turnips, onions, tomatoes, okra, and pumpkin grown in kitchen gardens for domestic consumption. In addition, fruits are also grown in the area which includes walnuts, grapes and apricots. Moreover, local people collect different kind of medicinal and aromatic plants such as mushrooms, mint, and barberries (chowenj). Different kinds of diseases such as root rot, rust, leaf curl, pest attack, powdery mildew, dieback, scabs etc. infect agricultural crops in the area.

The Arandu Gol and Asper VC fall in single cropping zones where farming activities take place between April and September and VC Akroi, Domel and Arandu fall in double cropping zone. Seasonal activities of major food crops in the Arandu area are given in Table 15.

**Table 14: Seasonal calendar**

Crops	Sowing Month	Harvesting Month
Wheat	October– November	June- July
Maize	May –July	October
Bean	May –July	September–October
Potato	May	October
Barley	October– November	May- June

Source: Arandu WUMP Database 2014

Both men and women share farmland labour but women are mostly engaged in culturing, hoeing, weeding and thinning whereas men are engaged in watering, harvesting and ploughing. Women are solely responsible for the labourious uprooting, bundling and carrying of fresh weeds and forages from fields to shed as feed for their cattle. Their contribution is greater than men in the execution of agricultural activities. Local farmers use both mechanised (tractor) and traditional methods of farming depending on the availability and access road.

### 2.7.3 Livestock Holding

Every household keeps livestock in UC Arandu. Currently a household (on an average) keeps one sheep, two cows, fourteen goats and nine poultry birds.

In Arandu, livestock resources are an important component of rural economy and largely comprise of cattle, goat, sheep, and some donkeys as pack animals. Domestic poultry is also kept for their own consumption. These animals are reared for meat, milk, wool, manure and transportation of wood. For many people, livestock is also a source of cash income at the time of urgent need. Local communities revealed that cattle and goat are the most favoured animals. Gujars (nomads) communities live a pastoral economy with only goats. Overall distribution of livestock in the UC area is as given in table 16.



**Table 15: Number of Livestock**

Village Council	No. sheep	No. cows	No. goats	No. poultry	No. donkeys
Domel	600	1078	4043	11060	530
Aspar Domel	0	2325	14360	11645	665
Arandu Gol	1953	1743	11088	5268	567
Akroi	710	910	17500	2440	285
Arandu	105	1273	2460	4213	0
<b>Total</b>	<b>3368</b>	<b>7329</b>	<b>49451</b>	<b>34626</b>	<b>2047</b>

Source: Arandu WUMP Database 2014

Diseases like black quarter, foot and mouth disease, Foul Pox etc. are common in the area and for the treatment they rely both on veterinary and traditional methods. Women and children are responsible for livestock rearing with exception in Gujurs where men are tasked for tending livestock animals. Streams and water channels are mostly used as drinking water source for animals.

## 2.8 Mapping of Stakeholders, Local NGOs & Government Line Departments

YSDO, SRSP, AKRSP, CIADP and FOCUS Humanitarian Assistance are the major Non-Governmental Organisations (NGOs) working in the UC. These organisations have implemented a range of development activities to improve living conditions of people. In total 80 projects have been executed in irrigation, Flood Protection Wall (FPW), Drinking Water, Communication, sanitation and micro hydropower (MHP). AKRSP is the pioneer organisation that initiated community based projects in the UC. YSDO completed 11 community infrastructure projects through the support of Intercooperation (IC) financed by Swiss Agency for Development and Cooperation. Currently SRSP is working on CPI projects i.e. irrigation channels and protection walls. FOCUS has been providing trainings in disaster risk mitigation and preparedness. Among Government Line Agencies, Public Health Engineering Department (PHED) and On Farm Water Management completed 7 DWSS, 7 water course improvement schemes respectively have been implemented in the whole UC. Key development organisations in the UC are shown in table 17.

**Table16: Key Development Organisations in the UC**

Name of Organisation	Type of Organisation	Number of projects Implemented	Key Areas of Interventions
W4L/IC	INGO	11	Irrigation, FPW, DWSS
AKRSP	NGO	49	Irrigation, MHP, DWSS, Link road FPW
SRSP	NGO	7	FPW, Irrigation, MHP, DWSS
CIADP	NGO	7	DWSS, Sanitation and Irrigation channel
PHED	Government	7	DWSS
On Farm Water Management	Government	7	Improvement in Irrigation Schemes/ water courses

Source: Arandu WUMP Database 2014

## 2.9 Water Sector Interventions

Most of the development interventions were made for improvement of water related infrastructures such as DWSS, Irrigation and FPW in the Union Council. In total 6 drinking water supply schemes and 6 irrigation channels/ watercourses were improved/developed by Government agencies in Arandu whereas remaining were developed by NGOs and communities themselves.

**Table 17: Water Sector Interventions**

Village Council	DWSS					FPW			Improvement of Irrigation Channel/Water reservoirs					MHPs	
	PHED	W4L-IC	CIADP	SRSP	AKRSP	W4L	SRSP	AKRSP	OFWM	W4L	CIADP	SRSP	AKRSP	AKRSP	SRSP
Domel	1	2	1	2	1		1		1	0	2		1	3	
Aspar Domel	1	0		1				1		0	1		2	1	
Arandu Gol	1	0							1	0			11	1	
Akroi	1	2				1	2			2			9		1
Arandu	3	1				1			5	2		1	2	1	
<b>Total</b>	<b>17</b>					<b>6</b>			<b>32</b>					<b>7</b>	

Source: Arandu WUMP Database 2014





## Chapter 3

### 3. Socio Economic Factors

#### 3.1 Existing Water Resources Scenario

God has blessed Arandu with abundant water, but due to lack of awareness and managerial skills, it could not be utilised according to the needs of the local people. Being a mountainous area there is abundance of streams, springs and glaciers, which are a permanent source of water in the Union Council. All the water sources are perennial and comprise of springs and glacial waters. The snow and glaciers also charge aquifers and water tables. Moreover, Arandu also receives occasional spells of rainfall from summer monsoon disturbances during the month of July and August, which also results in an increase flow of water, causing floods and dislocates springs. River Chitral is the major tributary passing through the valley. There are 22 small streams which contribute to main streams of Domel, Akroi Gol and Arandu before falling into River Chitral. Stream water can be and is drained into channels for irrigation, drinking, water mills and Micro Hydro power generation purposes.

#### 3.2 Water Sources and Classification

The main source of water in the UC is surface bound, i.e. streams and watercourses from melting snow and glaciers. Sub-surface resources are, however limited to natural springs. Moreover, spring waters are used for drinking purposes as well as for irrigation in some settlements. Water in the irrigation channels is used for dual purposes in six settlements of the UC i.e. irrigation and drinking purposes. The sources are mostly located in the dry and perennial streams that are vulnerable to flooding. Every year flash floods damage, erode and bury the water sources and thus render the investment on drinking water supply, go waste. Sometimes, landslides also affect the water sources and change the elevation of intake and design of the pipeline system.

Arandu Union council is rich in water resources except VC Arandu. 22 sub-watersheds produce 22 streams that feed the agricultural lands of Arandu UC through 42 irrigation channels and 42 springs in the Union council.

**Table 18: Water Classification**

VC	Spring	Stream
Akroi	5	3
Arandu	0	1
Arandu Gol	17	12
Aspar Domel	8	2
Domel	12	4
Total	42	22

Source: Arandu WUMP Database 2014

### 3.3 Existing Water Management Systems

The water governance systems in the Arandu are centuries old, which over the years has evolved into present system of water governance. Until 1969, the district of Chitral was an independent state with its own system of governance. Under the system all the ex-rulers and their representatives made the decisions (including water resource management). The community had no say in the system and every citizen was bound to obey the orders of the rulers. Under this system, irrigation channels were constructed and managed by governors and their appointees in the respective areas by using forced labour.

Later, their ancestors equally divided the lands and water among their descendents and thus this provided the basis for the emergence of local water governance in the area. Customary laws regarding management, distribution, utilisation and maintenance of irrigation infrastructures emerged which are strictly practiced by the communities since the history of Chitral known to the writer since 1300 AD.

### 3.4 Management of Water Resources

During the Chitral State (1300 to 1969), the penalty given for water theft was in the form of confiscation of cattle that would be slaughtered and distributed between the communities. The water conflicts were also heard out in the Qazi courts<sup>3</sup>, most of the cases were heard, and verdicts were based on the traditional laws and were supposed to be accepted by both petitioners.

#### 3.4.1 Distribution of Water

During the rule of state, the ex-rulers divided water among different clans. These clans were given water user rights keeping in view the quantity of land. Under the system, the person with more land was given more water and vice versa. In addition to this, social status and the associations of clans/tribes with the royal family were other reasons for receiving more water rights. The division of water was based on the one in Gologh whereby each household was assigned a fixed quantity of water, which was available regularly throughout the season. This became the basis of water division in the area (Nadeem et al. 2009).

There are two local water governance systems, namely Khakhai / Mir-xoye and Sorough System (water tank) and open system in UC Arandu. In Arandu valley nearly 56% channels are governed by a Khakhai system while 44% channels of search system.

#### 3.4.2 Khakhai or Mir-Xoye System

This system ensures equitable distribution and access of water in and around water channels from head to tail-end, based on the size of the land to be irrigated. In this local water governance system, the community appoints a person by consensus called Mir-Xoye who ensures that all landholders get their judicious share of water. The compensation for the services of Mir-Xoye is paid either monthly in cash or through the crop produce at each harvest.

Mir-Xoye is paid with 14-15 kg of producing crop per 0.07 acres under the command of irrigation channels.

- **Gram**

The community, within a specific number of neighbouring households who share their joys and sorrows, is called Gram. The households sharing an irrigation channel often form a gram. They govern the system of irrigation channels on mutual consensus based upon an old system and un-written agreements. Gram is not a governance system of just water, but it is the overall governance system of a village which includes water.

- **Mone**

The commonly shared duties of a Gram are called Mone. This is a common practice all over Chitral, to run the traditional systems on an equitable basis and mutually share profit and loss. Mone system is also practiced in irrigation; DWSS, livestock rearing and arrangement of burial rituals in case of death in the community. Through this system, all the beneficiary households are responsible to carry out some duties and in case of failure; they are penalized according to the intensity of non-compliance to Mone. Through it, the community which receives water from the irrigation channel, appoints a person on a rotation-basis from each beneficiary house for specific time to ensure proper distribution of water to all landowners in the Gram. This system is observed mostly in large irrigation channel systems. In this system, persons appointed by the Gram members carry out minor repair, whereas the community does the major repair work collectively. For repair of the channel, the following rules are observed.

- The landowner under whose ownership the channel passes through, is responsible for cleaning the channel.

<sup>3</sup>A qadi (Arabic: قاضي; also cadi, kadi or **qādi**) is the magistrate or judge of the Shari'a court, who also exercised extra-judicial functions, such as mediation, guardianship over orphans and minors, and supervision and auditing of public works.[1] The word "qadi" comes from a verb meaning to "judge" or to "decide". (Wikipedia, Aug 6 2016).

- Whenever the channel is passing through communal land, it becomes the collective responsibility of the beneficiaries to clean the irrigation channels and carry out minor and major repair works as well.
- If the channel is benefiting more than one gram, then certain parts of the channel passing through a village become the responsibility of the respective village.

### 3.4.3 Sorough

Sorough refers to use of irrigation water by the turn. This system comes into practice under special conditions when there is acute water scarcity in the area. In this system, predefined water user rights become the basis of distribution of water as per availability. So this rudimentary system is observed only in the Domel VC of the valley.

## 3.5 Irrigation Systems & Water Rights

### 3.5.1 Irrigation Channel System

Arandu is divided into two watersheds of Arandu Gol and Domel having 22 streams. Most of the streams are feeding the irrigation channels. The total land under cultivation is 2,305 acres, while there is additional land of 25,340 acres that needs pumping and siphon irrigation systems for lifting the water. In addition, seven micro-hydro units were established on these irrigation channels and six of them are functional, being operated by the local community.

In Arandu Valley, 1-cusec water is available for 30 acres, which is much higher than standard requirement. Owing to lack of proper lining, a large proportion of water is lost as leakage before reaching the fields. This is phenomenal due to the reason that maintaining water conveyance systems in difficult terrains is cumbersome and expensive; therefore, farmers practice flood irrigation, which uses much more than the required amount of water. Civil irrigation channels are mostly unlined and prone to sliding at critical points.

If agriculture is promoted in Arandu UC, it will be a major source of cash income. Arandu has a competitive advantage of having many vegetables and fruits than other UCs of Chitral because of lower elevation and weather condition.

All the irrigation channels are gravity based and developed by local communities on trial and error basis. The resources, equipment and knowledge are obsolete and therefore were not sustainable. Now with the increase in population, more land has also come under cultivation and thus the capacity of channels is further limited.

If modern technologies for pumping siphon, ramp pump, mechanised pumping system and drip irrigation are developed, more than 25,340 acres of land can be added in the cultivable area. There is plenty of water in most of the streams, especially when snow is melting down. During the summer season when the weather becomes dry, the threat of flash floods lingers, which hit the off-takes of irrigation channels and cut the supply off. The vulnerability of channel heads is the main problem so far for irrigation channels in the valley.

Some channels are not wide enough and cross through difficult terrain and considerable amount of water goes waste before reaching the tail-end of the irrigation channel. Such channels need to be widened and cement-lined to stop wastage of water.

Some channels pass above households and due to seepage, the households underneath get damp. Those households normally do not allow the continuous flow of water. Especially at night time, people stop the flow of water in channels. After proper lining and increasing the height of the channel, the excess of water will increase the productivity of channel and improve the dampening conditions beneath houses.

Channels crossing through soft rocky lands, can destroy the crops and property underneath. These channels need slabs over crossings of mud-sliding and stone rolling. There are 31 known sources of irrigation canals in Arandu Valley. Among these channel sources, 9 are emerging from springs while remaining 22 are coming from perennial streams. The traditional irrigation system is gravity-based and designed by the local communities with local knowledge through trial and error. Most of the channels were developed in the ancient days with wooden and stone equipment. Now blasting and use of modern equipment has made it easy and people have considerably developed their irrigation channels. Majority of the irrigation canals in the valley were constructed by the communities on self-help basis, except seven which were constructed by AKRSP. In the whole Union Council there are 39 main irrigation channels that discharge 66 cusecs water to 2305.8 acres of farmland.

The overall situation of irrigation channels benefiting different community (HHs) including landholding is shown in table 20.

**Table 19: Situation of Irrigation Channels**

Village Council	No of Irrigation Channels	Total Discharge (Cusecs)	Command Area (Acres)	Beneficiary HH
Akori	6	13.13	191	455
Arandu	2	23.8	213	760
Arandu Gol	14	12.88	563	902
Asper Domel	5	5	463	735
Domel Gol	15	29.62	875	675
<b>Total</b>	<b>42</b>	<b>84.43</b>	<b>2305</b>	<b>3527</b>

Source: WUMP Arandu 2014 and Revenue Record

There are no water right conflicts regarding streams in the valley. Most of the settlements use water according to ancient practices. The streams are considered communal property. The source points of some streams are still occupied by the royal family, but the ownership of the streams belongs to the communities. Conflicts only arise during the drought periods when streams get short of water. Overall, in Arandu valley, there are no disputes on water resources especially for irrigation. However, small/ minor disputes arise between individual farmers which are resolved through negotiation (Jirga) by the village elders. Owing to lack of proper allocation and management systems, small conflicts arise among communities over water distribution. Sometimes, lack of participation in maintenance and repair works creates conflicts. Although there is no formal mechanism to resolve such conflicts, however village elders take initiatives to address conflicts and in serious cases seek police and court support. Table 21 shows that the main reason of conflicts among communities is on forest and is followed by water.

The community arranges the labour or cash contribution in case of any channel damaged by flash floods or landslide. However, there is no proper system of maintenance and governance of the irrigation channel. The active labour force migrates to other areas of livelihood therefore the traditional governance system has been disturbed. The local community needs proper system and operational training for the maintenance of their channels and to mitigate the conflict regarding water issues

**Table 20: Conflicts data**

Conflicts	Number	Name of Villages
Political	2	Arandu Khas and Malacham
Forest-related	5	Landi Braz, Birow, Gowai, Domel Nisar Payeen and Pishotan  Nlsar Pya
Water-related	3	Swato, Dondidari and Arandu Lasht

### 3.6 Drinking Water Supply

Arandu has relatively abundant water resources than other areas in Chitral to which both spring and streams contribute. Water is available round the year however, during floods, the water resources are destroyed, which affects water supply to channels (coming in from streams).

Almost all water supply schemes are based on the gravity flow due to the sloping topography. In most cases, the source is located in the mountain and water is brought down through pipeline to lower areas. There are 17 water supply schemes which are implemented by PHED, AKRSP, CIADP, W4L IC, SRSP. Out of these 17 schemes, only six schemes are functional and six are partially functioning while the remaining need full rehabilitation. 53% of the total households of UC yet to be connected with clean drinking water. VC wise existing status of drinking water schemes is as shown in table 22.

**Table 21: DWSS Situation**

Village Council	DWSS Exists		DWSS Functional			DWSS Need		Household		
	Yes	No	Functional	Partially Functional	Not Functional	Repair/ Rehab	New	Repair	New	Functional
Akroi	3	1	2		1	1	1	120	170	165
Arandu	4	2	2	1	1	2	2	245	215	300
Arandu Gol		14					14		902	
Asper Domel	1	4		1		1	4	295	440	
Domel	9	2	2	4	3	7	2	455	155	65
<b>Total</b>	<b>17</b>	<b>23</b>	<b>6</b>	<b>6</b>	<b>5</b>	<b>11</b>	<b>23</b>	<b>1115</b>	<b>1882</b>	<b>530</b>
%	43.59	58.97	15.38	15.38	12.82	28.21	58.97	31.61	53.36	15.03

### 3.7 Drinking Water Sources

Both spring and stream contribute to water resources of Arandu Union Council for drinking purpose. From water resource analysis, it has been observed that an average of 2.33 gallons of spring drinking water is available per head per day<sup>4</sup>, which is much lesser than standard requirement equivalent to 10 gallon per head per day. However, not all these springs have been tapped yet and spring water is mixed up with stream water. Owing to poor and dilapidated condition of water infrastructures, a considerable quantity is wasted before reaching end users. However, the situation is different in different villages due to source proximity and conveyance system.

**Table 22: Water Sources**

Village Council	Spring Available	Spring connected with DWSS	Stream connected with Pipe for drinking	Stream as a source for drinking purpose	Remarks
Akroi	5	3	0	2	Use spring water mixed with stream via irrigation channels
Arandu	0	1	3	2	
Arandu Gol	17	1	0	2	
Asper Domel	8	2	0	2	
Domel	12	7	0	4	
<b>Total</b>	<b>42</b>	<b>14</b>	<b>3</b>	<b>12</b>	

Source: Arandu WUMP Data base 2014

**Table 23: Drinking Water Discharge**

Village Council	Existing discharge of spring (lit/sec)	Daily Discharge per capita (lit/day)	Alternate potential sources (lit/sec)	Daily discharge of alternative sources(lit/day)
Akroi	2.66	63.1	6.4	151.9
Arandu Gol	17.972	215.0	5.8	69.2
Asper	3.668	65.5	9.2	165.0
Domel	8.95	159.9	9.6	171.0
Arandu	0	0.0	0.0	0.0
<b>Total /Average</b>	<b>33.25</b>	<b>110.2</b>	<b>30.984</b>	<b>102.7</b>

Source: Arandu WUMP Data base 2014

The only water schemes being run by/under community-owned management system for operation and maintenance were developed by W4L. With the exception of government-implemented schemes, local people contributed 10-20% of the total cost as their community share. Only W4L has developed maintenance system for its project, the other implementing agencies have failed to develop any system therefore the schemes are not functional. The communities need proper systems for O&M of their projects. Government agencies hire technical 'Valve men' for each scheme, but the maintenance of DWSS is not possible without proper help from the communities and financial resources. In the rest of Chitral, after a project completes, the community carries out repair and maintenance on self-help basis, which may either be in cash or in kind.

<sup>4</sup>Standards adopted from UN Water Decade Program on Advocacy and Communication UNW-DPAC.

In the entire valley, workload of women is higher than in men. Women and children are the ones who fetch water which affects their time, health and resources. The terrain is also difficult and every year many women and children receive injuries while undertaking this responsibility. On an average they make seven trips per day which takes 27 minutes one way.

**Table 24: Water Fetching Time**

Water fetching time and analysis of UC Arandu (calculated for one trip a day)				
Village Council	Average Water Fetching Time	Total Man-days (8Hrs /Day)	Opportunity Cost per Day (@450 /Labour)	Per Month
Akroi	21	25	11,156	334,688
Arandu	20	35	15,553	466,594
Arandu Gol	38	65	29,077	872,297
Aspar Domel	33	51	23,016	690,469
Domel	24	35	15,825	474,750
<b>Total</b>	<b>27</b>	<b>210</b>	<b>94,627</b>	<b>2,838,797</b>

Source: WUMP Arandu Data base 2014

Provision of safe drinking water is the responsibility of the government, but in Arandu Valley, the people are compelled to drink contaminated water due to negligence of the authorities. The spring water is considered relatively safe for drinking, but due to lack of protection, the wild and pet animals and livestock use the same source and place and thus pollute water sources.

**Table 25: Water Quality**

Existing Water Quality (as judged by Community)		
Village Council	Good	Not Good
Akroi	2	2
Arandu	2	4
Arandu Gol	0	*14
Aspar Domel	2	3
Domel	5	5
<b>Total</b>	<b>11</b>	<b>28</b>

\* Springs are exist in the settlements but residential areas are far away from spring source and people are using water via open channels

Source: WUMP Arandu Data base 2014

### 3.8 General Water Resources Analysis

Both spring and stream contribute to water resources in Arandu Union Council. Water is available round the year however, during floods, the water resources are destroyed, which affects water supply to channels from streams and disturbs the location of springs as well as intakes of drinking water supply schemes.

In Arandu Union Council, 0.03-cusec water is available for 1 acre of agriculture land, hence 2.4 cusec of water is available for 80 acres of irrigated land, and as per standard of irrigation division, and Chitral 1-cusec water should be available for 80 acres. Owing to lack of proper lining, a large proportion of water is lost as leakage before reaching the fields. This is phenomenal due to the reason that maintaining water conveyance systems in difficult terrains are cumbersome and expensive; therefore, farmers practice flood irrigation that uses much more than the required amount of water. Civil irrigation channels are mostly unlined and prone to sliding at critical points due steep slope terrain of the area.

From the water resource analysis, it has been observed that 2.33 gallons of spring drinking water are available per head, which is much lesser than the standard requirement equivalent to 10 gallons per head per day. However, not all the springs have been tapped yet and water is mixed up with stream water. Owing to the poor and dilapidated condition of water infrastructures, water quantity is considerably wasted before reaching end users. However, the situation is different in different villages due to source proximity and conveyance system.

The majority of water schemes is under community-owned management system for operation and maintenance of water infrastructures



(both DWSS and irrigation water). With the exception of government-implemented schemes, local people contributed 15-25% of the total cost as their community share. After project completion, the community that either may be in cash or in kind does all kinds of repair and maintenance works on self-help basis. Generally, there are two kinds of maintenance and repair works; for daily maintenance and repair works, communities hire local technicians to carry the task and for annual maintenance and large-scale works, all beneficiaries are expected to participate in cash or in kind.

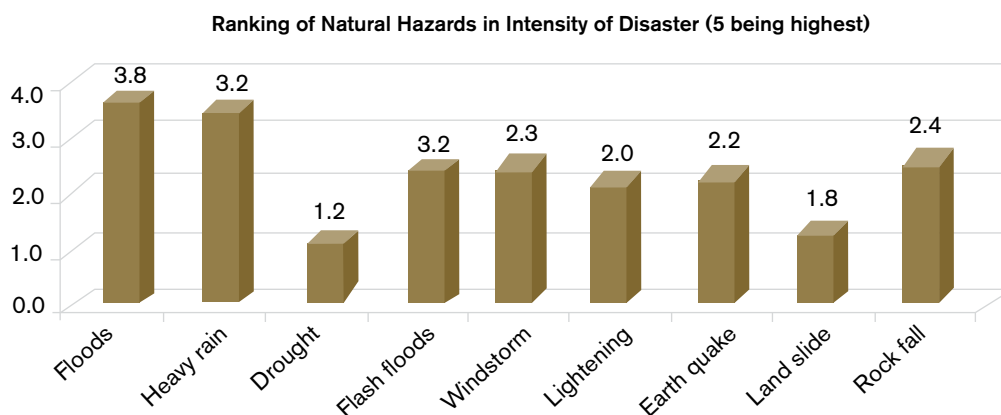
Disputes among communities over water rights, ownership of sources and on crossing of pipeline through lanes are common phenomena often solved at a Jirga at settlement level. When things go beyond the prominent people of the area, the religious leaders try to solve issues. The litigation is the last resort as the people hesitate to at Droshor Chitral town.

Maintenance of drinking water supply schemes is another challenge the local people face. The skill, equipment and availability of fitting in remote villages is difficult for the beneficiaries. Often the community repair with rubber latex instead of proper fitting and continue the flow of water but the leakage remains. For the sustainability of DWSS system, the water users, groups should be empowered financially, socially and legally.

### 3.9 Disaster Risk Management

The entire valley is prone to earthquake, land sliding, flash floods and streams flood. Arandu Valley reported the highest number of disaster events over the last twenty years. As a result, local communities face difficulties to access basic services in a sustainable manner. It has also been observed that key infrastructures have been rendered non-functional in case of floods. Owing to lack of proper preparedness, communities face difficulties to respond to disasters. The Arandu valley is highly prone to various types of natural disasters such as floods, heavy rain, flashfloods, earthquake, landslide, lightening, drought and rock fall. Out of these disasters, floods are ranked as high risk. In order to enhance preparedness against these disasters, organisations such as FOCUS Humanitarian and Intercooperation Pakistan carried out risk assessments as well as training sessions to build capacities of and to organize communities

**Figure 4: History of Hazards in the Valley**



Floods not only destroy agricultural lands, but also disconnect irrigation channels, drinking water supply systems and keep life on-hold. It erodes the forest floor and destroys the valuable trees. Uprooted trees have been carried into and reached neighbouring country Afghanistan by the water, making the local people as well the district government lose millions of rupees in revenue. Humanitarian efforts can mitigate the intensity of the disasters. There should be an awareness program among people on preparedness for and adaptation to disasters as well as rehabilitation afterwards.

Data from FOCUS humanitarian for 1990-2014 shows flashflood hitting UC Arandu in 2010, 2012 and 2013, which caused damages to the agricultural land and irrigation channels.

### 3.10 Sanitation

Sanitation scenario comprises of pit latrines, flush latrines and open defecation. Surface drains are mostly unpaved or stone lined. Furthermore, due to open defecation the sanitation situation is rather unsatisfactory. In the absence of proper drainage system, wastewater finds its way into irrigation channels, streams and open fields. This situation is polluting the natural watercourses and irrigation channels. The social assessment conducted at UC shows that the personal, domestic and environmental sanitation status seems moderate, primarily due to lack of knowledge embedded by cultural practices/taboo and poor housing conditions. The water sources being used for drinking purposes also has the possibility of contamination because of the open defecation near to the water

sources and on the riverside (in some cases). Furthermore, the practice of keeping domestic animals inside residential houses is common. The animal waste / dung is collected openly into a pit near by the house (usually in the yard). This practice is one of the root causes of spreading diseases from such waste and animal dung. It shows that there is a need for improvement of sanitation situation in the valley through a program that should include both awareness raising and training as well as support in improving sanitation facilities. The waste waters from 41% households open in pedestrian streets and crop fields. 44% houses have no drains at all and only 3% households have underground drains.

**Table 26: Sewerage System**

Union Council	Drainage/Sewerage System (percentage)					
	Underground Drains	Covered Drains	Open Drains	No system	Others	Total
Arandu	3.60	0.93	51.39	44.08	0.00	100.00

Source: CIADP Socio-Economic Survey 2011-12

There is no solid waste management system in the UC. The households throw their garbage either into open plots or in the streets. Moreover, some of the households even dispose of their solid waste in the nearby water channels. All these methods of disposal are the main causes of land and water pollution, which is a great threat to the local environment and the ecosystem and causes unhygienic conditions. Local communities are not in a position to improve or introduce the existing level of the solid waste collection and disposal without guidance. There is a need to create a greater awareness on environmental sanitation.

Table 28 shows the diseases recorded in the UC during last two years. It includes stomach problems, diarrhea and other fevers on the high due to physical and biological contamination in the drinking water and poor sanitation system.

**Table 27: Common Diseases - Three Months (Percentages)**

Union Council											
	Fever	Flu	Diabetes	Blood Pressure	Cardiac Disease	Stomach Problem	Gynecological Problem	Cough	Asthma	Diarrhea	Other Diseases
Arandu	72.09	7.21	4.46	29.70	2.71	49.57	0.93	54.89	0.23	20.63	20.67

Source: database Arandu 2014

### 3.11 Health and Hygiene Practices

Health and hygiene are important indicators of community wellbeing. The health facilities are very limited in the Union Council. 86% percent households do not have toilets. The common practice of open defecation causes filthy environment and threatens health and hygiene of the community. The community is using open pits for defecation, which are worse than open defecation. Due to these open defecation communicable diseases are common in the settlements. Lack of awareness is the main obstacle in the construction of toilets. Common diseases reported in the area are fever, flu, diabetes, blood pressure, cardiac disease, kidneys problem, cough and diarrhea. For major ailments, local communities visit the Tehsil Headquarters Hospital (THQ) located in Drosh. Common causes of spread are water contamination, lack of awareness about health and hygiene, malnutrition, open defecation and unavailability of proper sanitation facilities. In the Union Council, vaccination facility for newborn and children is available in the RHC Arandu.

Only 20% households use soap after using toilet. Most women do not know the importance of hand washing before feeding children. The cleaning and washing of babies and children is not given preference in the households. Due to lack of proper bathrooms, women face difficulties regarding personal hygiene. People often throw solid waste into streams and rivers near houses. This creates further degradation of the environment and pollutes the water, causing spread of diseases. In Arandu, 45% people practice open defecation, while 32% have unhygienic dry pits and only 23% have floor squatting (Asiatic) toilets, but most of them are not utilised properly. The kitchen wastes and other disposable household wastes are dumped in the open, in streams and often polythene bags are seen along streams and edges of crop fields. According to the survey, 65% of households knew hand washing is good for health, while 80% did not use soap for hand washing and after using toilets.

**Table 28: Awareness about Hand washing**

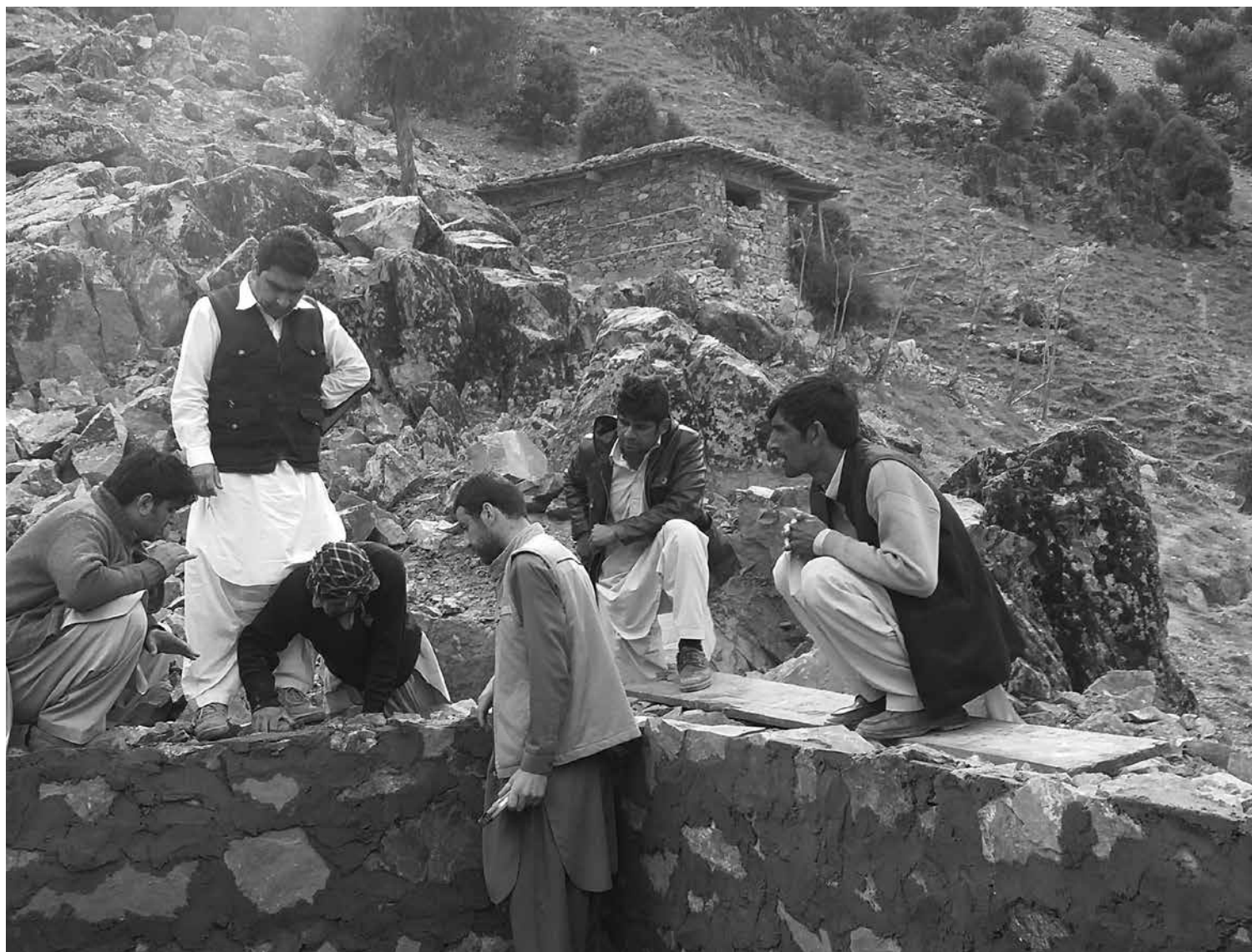
Union Council	Awareness of Households about Hand Wash (Percentages)	
	Households knowing hand-washing is good hygiene	Households using soap for hand-washing after toilet
Arandu	65.32	20.62

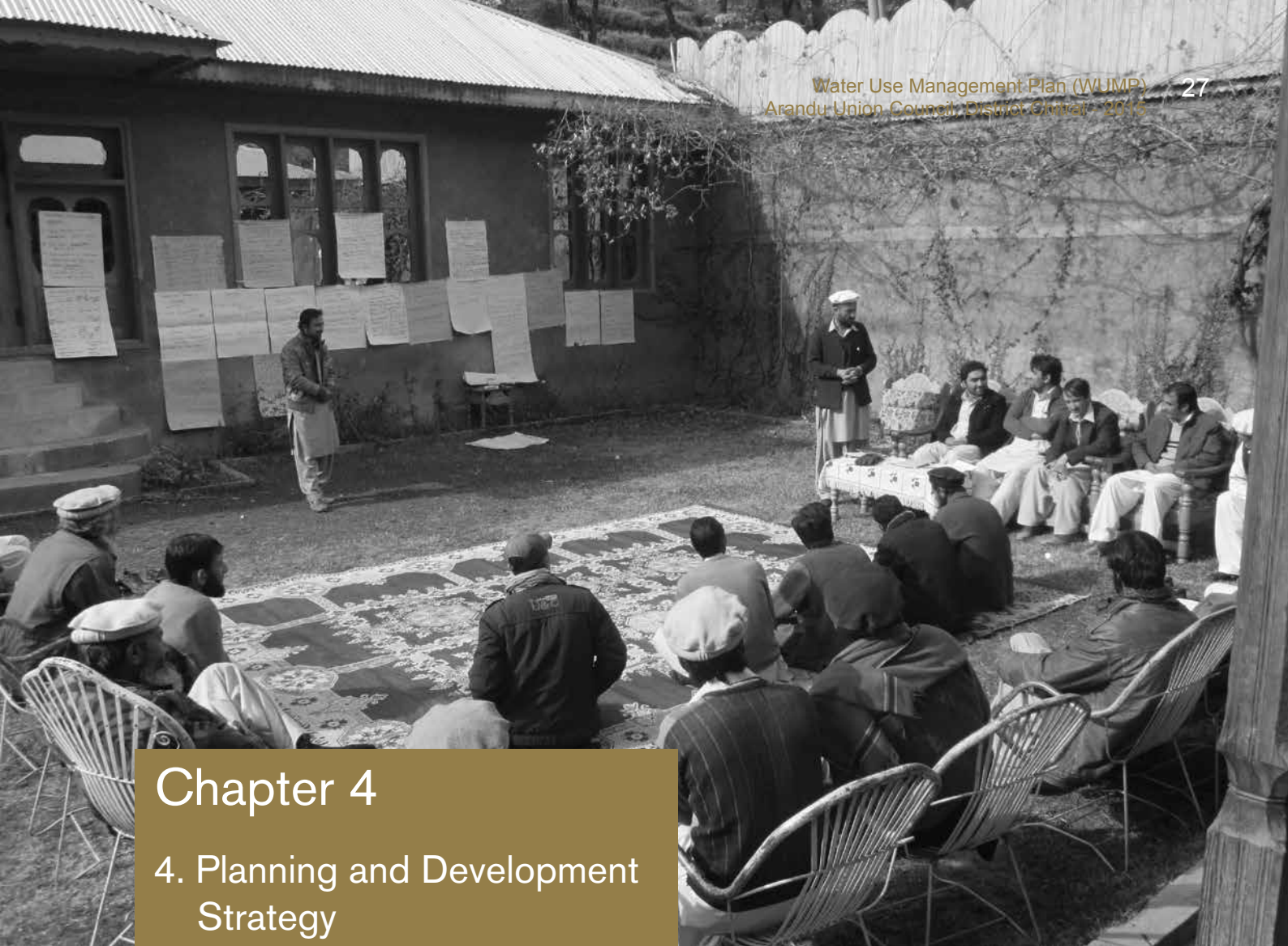
Source: CIADP Socio-Economic Survey 2011-12

### 3.12 Other

The unique climatic conditions and extreme variation in altitude has resulted in diverse ecosystems and vegetation zones in Arandu Valley. Arandu has a green cover of oak, coniferous and alpine forests. According to altitudinal variations, these different kinds of forests are managed under the regular Forest Working Plan. Forestry related activities are undertaken as per working plan prescriptions. In total, these forests are divided into 5 compartments (Domel, Akorai, Koligal, Serigal and Langurbat). Forest department has formed Joint Forest Management Committees (JFMC) to involve the local communities in the conservation of natural resources. These forests provide fuel wood and timber not only to UC but also to the entire District Chitral. Moreover, local communities also rely on these resources for grazing and fodder collection.

Owing to continuous harvesting of forests, watersheds are deteriorating which in turn affects the regular flow of water; as a result, flood incidences have significantly increased. The flash floods damage not only the ecology, but also float away the precious trees to Afghanistan thus directly affecting the economy. Owing to continuous conversion of forest land into farmland, marginal lands have become vulnerable to soil erosion that not only affect water quality but also increase land sliding. Therefore, it is important to initiate social forestry activities to reduce pressure on existing resources and improve forest cover. In all degraded watersheds, forest-harvesting activities need strictly banned and plantations should be initiated for restoration of these catchments. Existing community institutions need to be trained in the management and conservation of their natural resources.





## Chapter 4

### 4. Planning and Development Strategy

#### 4.1 Integrated Planning and Development Strategy

WUMP for Arandu UC has been developed keeping in view social, economic and environmental needs of the area and adopt multiple strategies to promote efficient and effective water resource utilisations. In Arandu UC, it is evident that the changing climate situation is giving rise to a complex challenge for the management of water resources. In addition, demographic changes have increased demand for space and resources across mountainous areas. Another important factor is climate change. Because of climate change, the water availability is becoming uncertain and bringing about a vulnerable situation for the increasing demand from local people.

Access and availability of water determines the basis of livelihoods for the mountainous communities who live with subsistence economies, low levels of food security and high vulnerability to climate change. With this background, integrated water resource management carries high justification for optimum and efficient utilisation of water resources. The inclusive and participatory process is to be adopted to develop a multi-sector plan for sustainable development. It is therefore the major highlight of the WUMP strategy in Arandu to include (in the order of priority)

1. Improved access to potable water (drinking water supplies) through new schemes as well as rehabilitation of the existing ones
2. Improved access to productive use of water (water channels and improvement in existing watercourse) through lining and extension to new command area
3. Disaster risk reduction (protection, watershed management) through construction of flood protection structures and building community resilience
4. Strengthening water management systems through local institutions to ensure effective implementation of WUMP under the auspices of the District Authority
5. Develop a watershed management approach through mobilisation of JFMCs which have due stocks in natural forests
6. Sensitise local communities in Arandu regarding health and sanitation through raising awareness and demonstration

This prioritisation was conducted with the representatives coming from all segments of village population (VO/WO) including males and females. During WUMP, the water sector GLAs (Public Health Engineering Dept., On-Farm Water Management, Irrigation Dept.,

Soil Conservation and Forest Dept.) were also involved at the Village Council level prioritisation process. Participants from SRSP and AKRSP also participated in a few meetings. Due importance was given to existing lateral experiences from projects in the water sector in the Arandu Valley (AKRSP, SRSP and FOCUS Humanitarian). At UC/Tehsil level, the WUMP is to be further vetted and owned for long-term assistance and commitment from District Authority.

## 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), availability of water resources and quality (supply) while an “impact issue” derives from human activities (which negatively affect the quantity or quality of the water resource) or from natural causes in the case of floods and droughts. National and International issues should be taken into account, for instance upstream- downstream issues.
- Identify the management interventions at all levels- national, basin/valley, local, which are necessary to address the issues as identified. From the interventions required, identify the management functions of each level. Management functions include such initiatives as policy development, planning and co-ordination, water allocation, discharge regulation, monitoring, enforcement and information dissemination. Transboundary problems may require concerted international cooperation and joint efforts.
- Analyse the present institutional capacities at all levels - national, basin/ valley and 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.

### 4.2.1 Conservation and Protection of Water Resources

Unplanned use of water resources at the community level has resulted in poor delivery of services, contamination and wastage in terms of drinking water. Whereas excessive intake of water in irrigation channels has compromised water conveyance systems, soil nutrient leaching and reduced crop production due to a higher occurrence of crop diseases. In Arandu this problem becomes even more severe at the tail-end of the irrigation channel.

Due to the deforestation and degradation of rangelands in the valley, any investment in water resources and its utilisation increases the risk of landslides and flashfloods. Therefore, WUMP identified initiatives have been considered integrally with suitable environmental concerns such as initiating dialogues for watershed management with the support of Forest Department, Chitral.

As WUMP attempts to improve quality and quantity of water, it lays equal emphasis on promoting awareness on its optimum utilisation by beneficiaries and understanding its inherent environmental concerns. The role of WUAs/WUGs in sensitising users as well as mitigating water conflicts has been mandated as their integral role.

### 4.2.2 Multiple Uses of Water

The water resources are critically important for life, health, food and energy therefore drinking water and sanitation, irrigation and water mills are multiple uses of water in a holistic manner. Under the multiple use of water, it is sought to achieve two or more benefits from a single project. For example in Domel, Akroi and Arandu Gol the beneficiaries accessed (during WUMP) identified irrigation channels with water mills and small hydropower as potential for multiple use of water and adding to their livelihood options.

### 4.2.3 Balanced Use of Water

WUMP assesses the overall water situation and prepares water resources inventory. It recommends measures for distribution of water according to the needs of population and agricultural land available as well as the potential. In terms of drinking water and irrigation, minimum water wastage and trials for high efficiency irrigation systems have been suggested in lower Arandu Areas in WUMP.

Owing to lack of awareness, excessive use of water has led to water induced land sliding and frequent disruption of irrigation channels,

seepage of water from an unlined irrigation channel that sometimes even affects houses and leaching of nutrients in the top soil layers.

#### **4.2.4 Productive Use of Water**

The potential in the Arandu Valley for productive use of water are several. These include options for extending irrigated farmlands spread in 2,305 acres and introduction of efficient irrigation techniques and agriculture extension services for better crop return. In this regard, coordination of Irrigation Division, On-Farm Water Management and Agriculture Department (Extension) and their inputs need to be established.

#### **4.2.5 Efficient Use of Water**

Domestic water supply and irrigation systems often face major water losses, with leakage. These losses can be recovered through improving water conveyance systems, applying use, and reuse options, etc. design, construction, operation and maintenance of systems also contribute to efficient use of water at various stages.

The understanding of water users on economical and efficient use of water is also one of the key elements in enhancing water efficiency through demand management, reduction in use, reuse, and introduction of water-saving measures. (3R principles - Reduce, Reuse and Recharge). Hence, the efficient use of water resources ensures the basic human needs and balance requirements of preserving and restoring the fragile ecosystem.

#### **4.2.6 Water Resources (Use) Conflicts**

Competing interests between communities over resource ownership, its utilisation and management are key reasons where conflict arises. This is usually regarding land, water and forest resources in Arandu Valley.

Over the watershed catchment the level of conflict is also dependent on location (upstream and down-stream effects). One group of people living in the downstream end of the catchment has a dependency on farmlands, whereas the dwelling upstream in the catchment is close to forest and would have more dependency on forest for their livelihoods.

There is a relation of dependency between communities living at the two locations for meaningful utilisation of forest resources as well as of agricultural productiveness for nutritional needs. The conflicts of interest have to be met with pragmatism through promoting dialogue for the achievement of nutritional and livelihood needs and simultaneously addressing floods and disasters arising due to conflict of interest.

Typically, in hydro infrastructures extending over a village, communities living close to source do not participate in the maintenance works, but they consume a major share of water, which creates conflict with users at tail-end who actively contribute in maintenance works but do not get an equivalent share of water.

In addition, conflicts are emerging between communities over the distribution of land after development of new irrigation channel that is one of the critical issues for laying new irrigation infrastructures in the Union Council.

Under this plan, WUAs at Arandu Valley level and WUGs at villages/hamlet level were engaged for contributing towards better provision of services and mitigation of conflicts arising around water.

### **4.3 Gender and Social Inclusion**

In Arandu Valley, both genders are involved in carrying out agricultural activities (harvesting and kitchen gardening), firewood collections and management of irrigation channels is however, carried out by the male population in the valley while fetching of water and cleaning along with cooking is the principal responsibility of women.

Due to cultural constraints, separate meeting for male and female community representatives discussed various water sector aspects during WUMP preparation. Whereas, in some settlements of Arandu Gol the female representatives expressed women's mobility is looked down upon therefore it was very difficult for the team to evidence and list down the suggestions and thoughts of local women. In other areas, the women get together to discuss water sector issues and potentials during WUMP on a separate forum. Community confidence in gender and social inclusion during WUMP process also prevailed due to high acceptance of WUGs/WUAs who have been able to practically connect and developed several water sector initiatives with W4L.

The potential issues identified through WUMP and prioritised from village to village assessment shows drinking water supply is at the

top priority while watershed management as a third priority second followed DRR and Improvement of irrigation channels. All these initiatives cater to the various segments of the population. Further, on as WUMP is implemented in subsequent years the form of Water User Groups (WUGs) and Water User Associations (WUAs) would promote equity and sustainability aspects.

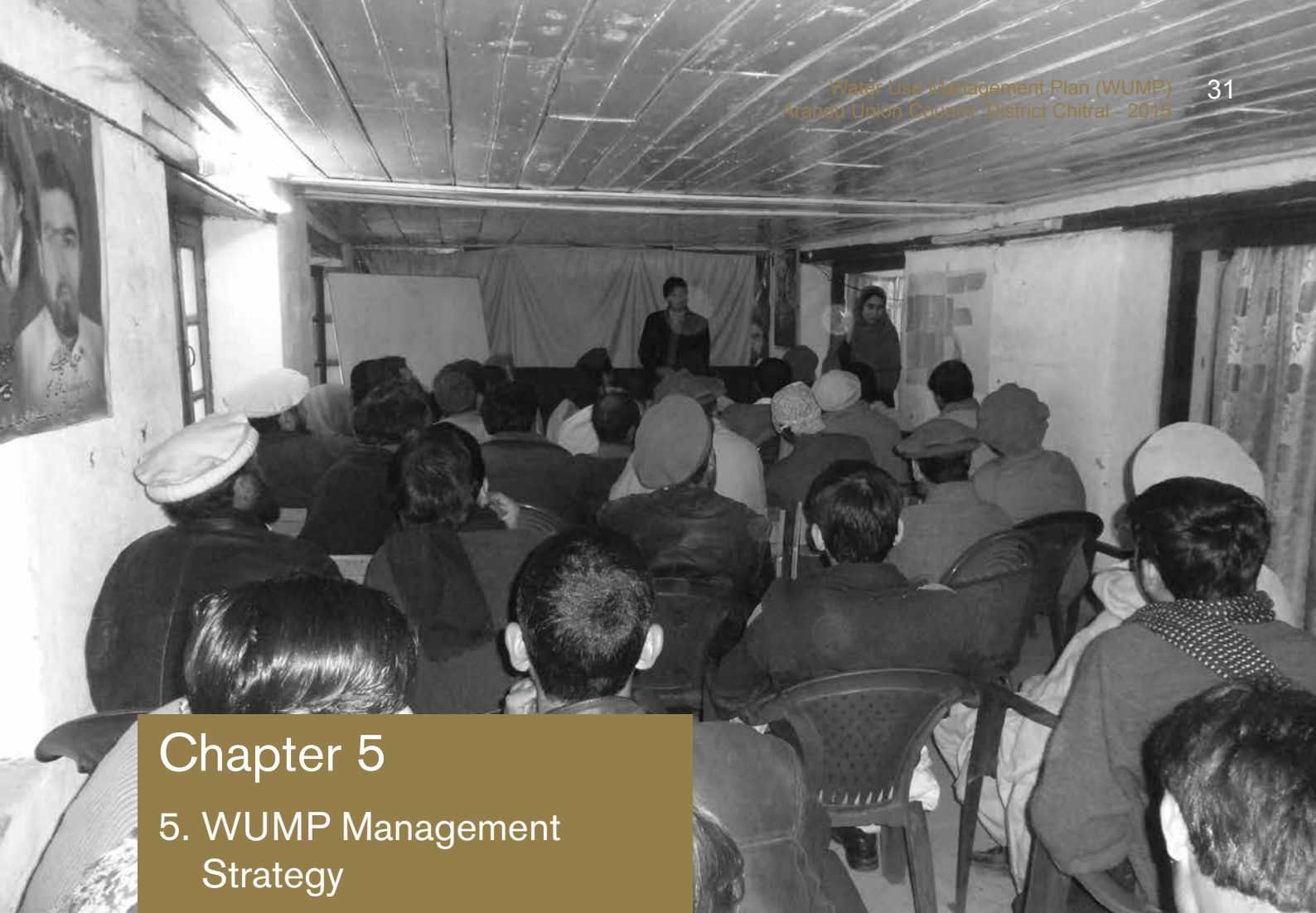
#### 4.4 Prioritisation Process

During the prioritisation process of WUMP, representatives coming from all segments of village population (VO/WO) (including males and females) participated. In the second round representatives from several villages in a village council came together to understand and prioritise the potential water sector issues on the basis of water hardship through a jointly agreed selection criteria e.g. extent of beneficiaries, investment, land, multi-use, capacity to contribute, operate and maintain, access etc.

With discussions at the WUAs / WUGs level, the upstream and downstream connection with water related issues, was better understood. The importance of watershed management in the long-term sustainability also became visible in the prioritisation process, as the valley is prone to land sliding and flash flood occurrences.

During WUMP, the water sector GLAs (Public Health Engineering Department, On-Farm Water Management, Irrigation Division and Revenue Department) and Sarhad Rural Support Program (SRSP) participated in the Village Council level prioritisation. Due importance was given to already existing lateral projects in the water sector in Arandu Valley. At UC/Tehsil level, the WUMP is further vetted and owned for long-term assistance and commitment.





## Chapter 5

### 5. WUMP Management Strategy

#### 5.1 Village level WUMP

The village is defined as Revenue Village, it sometimes has hamlets which in places have grown into sizable population. During WUMP, the team accessed all the revenue villages in Arandu Union Council and collected data on associated hamlets. WUGs are formed at the level of a village/hamlet while WUAs based on common watershed and shared water resources.. Most of the water resources and water related infrastructures are clearly divided between villages and every village has its own rights and management system. Due to this factor, water issues and the exercise to identify potentials were administered in all the 28 Revenue Villages with hamlets in the UC. This gave a holistic picture and direction to the growth of the water sector. In each of the villages, a 'problems analysis' exercise was administered and key issues were discussed, i.e. DWSS issues have emerged as major identified concerns by both male and female populations in the UC.

#### **Ranking key (1 Highest, 5 lowest)**

Top priority was given to the water identified initiative by the community, having pressing needs and discussed with most of the relevant stakeholders; weather hardships, and potable water availability in case of drinking water. Distance from an alternate source; less investment required compared to the number of beneficiaries, extent of command area in case of irrigation, possibilities for beneficiaries to contribute in construction/ O & M. The sub-sector intervention/ schemes which bore maximum scores was ranked at the top, followed by subsequent scores on second, third, fourth and fifth places. The assembly of representatives from different villages in the UC duly agreed to the transparent process where prioritisation was completed in harmony and mutual understanding of preferences within the valley/UC.



**Table 29: Problems Analysis**

Issues	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5	Total
Lack of DWSS	11	6	1	1	4	23
Poor condition of DWSS	3	4	1	1	2	11
Poor condition of irrigation channel	7	12	10	6	3	38
DRR- Flood Risks	7	5	9	10	5	36
On-Farm Water Management	3	7	5	12	10	37
Watershed Management	5	3	10	4	9	31
WASH	3	2	2	2	5	14
Others (Agri/Education)			3	4	2	9
<b>Total</b>	<b>39</b>	<b>39</b>	<b>*42</b>	<b>*40</b>	<b>*40</b>	

\* Some settlements have more than one irrigation channels

Source: Arandu WUMP Database 2014

Based on the problems, projects were identified and prioritised in each of the villages and overall ranking of the projects are as shown in table 31

**Table 30: Project Prioritisation**

Projects	Ranking 1	Ranking 2	Ranking 3	Ranking 4	Ranking 5	Total
DWSS	11	6	1	1	4	23
Improvement of DWSS	3	4	1	1	2	11
Improvement of irrigation channels	7	12	10	6	3	38
Protective works (DRR)	7	5	9	10	5	36
Improvement of OFWM courses	3	7	5	12	10	37
Watershed Management	5	3	10	4	9	31
WASH	3	2	2	2	5	14
Others (MHPs/Agri/Education)			3	4	2	9
<b>Total</b>	<b>39</b>	<b>39</b>	<b>39</b>	<b>39</b>	<b>39</b>	

## 5.2 Proposed Water Supply Schemes (New & Rehabilitation)

The issues identified by the local community (in drinking water supply) are highest in number because of having no drinking water supply scheme in 23 settlements. Out of the total 3527, households 30% household do not have any pipeline while 31% households have problematic pipelines and need rehabilitation of schemes. This un-served population is likely to rise because of an ever increasing population. Most of drinking water supply schemes were designed more than 15 years back; therefore, due to growth in population they need to be updated.

**Table 31: Drinking Water Prioritisation**

Prioritisation	New DWSS			Improvement in DWSS		
	Number of Projects	Beneficiary HHs	Estimated Cost PKR	Number of Projects	Beneficiary HHs	Estimated Cost PKR
Ranking		Numbers	( Million)	Numbers	(Numbers	(Million)
Ranking 1	11	841	44.81	3	570	10.60
Ranking 2	6	396	19.40	4	545	11.88
Ranking 3	1	50	4.42	1	120	8.49
Ranking 4	1	70	3.82	1	175	5.84
Ranking 5 and above	4	265	12.28	2	220	5.52
<b>Total</b>	<b>23</b>	<b>1622</b>	<b>84.72</b>	<b>11</b>	<b>1630</b>	<b>42.33</b>

### 5.3 Proposed Irrigation Initiatives

The irrigation sub-sector has emerged as the second priority in the Arandu Valley, a major portion of livelihoods is dependent on subsistence farming. In Lower Arandu there is a potential to produce vegetable for the local market if agricultural activities are promoted according to market needs. In the UC, 2536 acres land has been reported with potential to be brought under irrigation, land development and agricultural extension. Out of total irrigation channels, only 38 sources have been protected from natural disasters as reported during WUMP. The remaining sources need immediate attention to fend off potential threats during floods and other natural disasters. During WUMP, it has been reported that 1 off-take structure, 15 conveyance channels and 12 supporting structures are fully functional. Further, there are no proper outlet systems on irrigation canals in Arandu Valley. For operation and maintenance, there are 52 irrigation maintenance committees. Overall WUMP has identified 37 improvement schemes for irrigation in the Union Council as appended in table 33.

**Table 32: Irrigation Schemes Prioritisation**

Prioritisation	Number of Projects	Beneficiary HHs	Estimated Cost PKR Million	Farm Land
Ranking 1	7	335	14.90	248
Ranking 2	12	981	36.47	405
Ranking 3	10	1143	33.49	780
Ranking 4	6	360	16.28	259
Ranking 5	3	170	8.73	236
Total	38	2989	109.87	1928.50

### 5.4 Sanitation and Solid Waste Management

At present, there is no proper sanitation as well as a solid waste management system in the Union Council. In order to overcome the existing unhealthy and depleting environmental conditions, a proper wastewater drainage system needs to be laid down to demonstrate and enhance awareness. Open defecation is the main reason of diseases and other environmental degradation. The poorest households should be provided non-local materials for construction of toilets along with health hygiene awareness. The participation of the communities should be ensured in such initiatives so that they take lead responsibility of maintaining afterwards. This could be combined for irrigating farm fields after treatment. In total, the communities have prioritised 13 sanitation related schemes.

**Table 33: Sanitation Schemes Prioritisation**

Prioritisation	Number of Projects	Beneficiary HHs	Estimated Cost
Ranking1	3	280	9.80
Ranking2	2	110	2.02
Ranking3	2	215	7.85
Ranking4	2	170	1.94
Ranking5	4	840	2.93
Total	13	1615	24.54

### 5.5 Proposed Multiple Use System Application

Arandu has plentiful un-utilised water resources in the shape of Arandu River, glaciers, streams and springs. The existing infrastructures should be developed for multiple uses to increase utilisation of water resources. There is repeated demand for reliable power generation in the upper part of Arandu Valley. In the Upper Arandu, the irrigation channels have the potential to produce hydel power that can provide electricity and save expensive forest resources from deforestation.

**Table 34: Multiple Use Application**

Proposed Action	Village council	Settlement	Local Rank	Quantity	Rank
Micro Hydel Power	Akroi	Akroi Gol	11	1	9
Micro Hydel Power	Akroi	Langurbut Bala	9		6
Micro Hydel Power	Domel Gol	Dondidari	10	1	6
Micro Hydel Power	Domel Gol	Domel Nisar	12	1	8
Micro Hydel Power	Domel Gol	Birow	9	1	7
Micro Hydel Power	Asper	Lachigram	4	1	6
Micro Hydel Power	Asper	Asper Domel	6	1	6
Micro Hydel Power	Arandu Gol	Matipalul	1	1	7
Micro Hydel Power	Arandu Gol	Ram	2	1	8
Micro Hydel Power	Arandu Gol	Mashidam	3	1	6
Micro Hydel Power	Arandu Gol	Gugiren	5	1	6
Micro Hydel Power	Arandu Gol	Dinbat	8	1	7
Micro Hydel Power	Arandu Gol	Mirakbat	7	1	6

## 5.6 Other Emerging Issues

**Table 35: Other Related Issues**

Village Council	Settlement	RANKING				
		HHs	Agriculture	Livestock	Road/bridge	Education
Akroi	Akroikhas	170	6	7		
Akroi	Akroi Gol	80	4	8		6
Akroi	Langurbut Payeen	85	7	3		6
Akroi	Langurat Bala	120	6			4
Arandu	Swardam	250	4			
Arandu	Malacham	50	6			
Arandu	Panakot	45	5			
Aspar Domel	Aspar	295	7		8	9
Aspar Domel	ZareenBagh	70	6	9	7	8
Aspar Domel	Lachigram	200	6	9		8
Aspar Domel	Peshutan	120	6	9		8
Aspar Domel	Dombaata	50	7	9		8
Domele	Landibraz	75	7	9		8
Domele	Domelnisar payeen	30	6	7		3
Domele	Domelnisar bala	35	3			
Domele	Biraw	35	5	7	9	
Domele	Guwai	80	6	7	8	

## 5.7 Proposed for Environment and Ecology

Arandu Valley has ample natural forest, which is contributing to livelihoods. This is under extreme human pressure due to extensive harvesting for firewood and lumber both within the Arandu Valley and outside. There is a huge potential to increase forest cover through forestation along riverbeds and other marginal lands. There is also a significant dependency on livestock for which rangelands need to be improved. As part of the WUMP, joint forest management committees (JFMCs) would be strengthened with the coordination

of WUA and Forest Department to promote conservation and management of forest resources in the Valley. In coordination with Forest Division Chitral, a comprehensive assessment of degraded watershed should be undertaken. Rehabilitation process should be started through biological and physical measures to protect the water resources in the catchment under JFMC mandate in the Forest Act.

**Table 36: Environmental and Ecological Activities**

S#	Projects	Number	Expected costs Rs (Million)
1.	Afforestation activities (six sites)	6	6.00
2.	Capacity building of 18 JFMCs	6	1.00
3.	Management supervision and networking	1	1.79

### 5.8 Proposed DRR Mitigation Management & Other

Arandu Valley has reported the highest number of disastrous events, especially floods which partially or completely affected the community, more recently in 2010. Absence of mitigation measures, have rendered key services like the approach road to the valley nonfunctional in times of floods. During the census, communities have placed a greater emphasis on the construction of flood mitigation structures around the key services to ward off the threat. In addition, small gullies and rivulets, formed over lower mountainous tracts and right above communities, dwellings have caused damages to the houses, farmlands and link roads. The watershed component coupled with DRR system would likely check the surge of floodwater and protect households' and other assets. FOCUS Humanitarian organisation has already expressed interest in expanding the emergency preparation to communities. On the hazard risk analysis carried out by FOCUS Humanitarian, the WUAs/WUGs should also be trained in early warning systems in case of flood in Arandu River. Whereas DRM training in forest fire prevention and mitigating landslides are further relevant areas for building community resilience. More than 35 locations require check dams and 39 flood protection walls were identified as appended below in table 38.

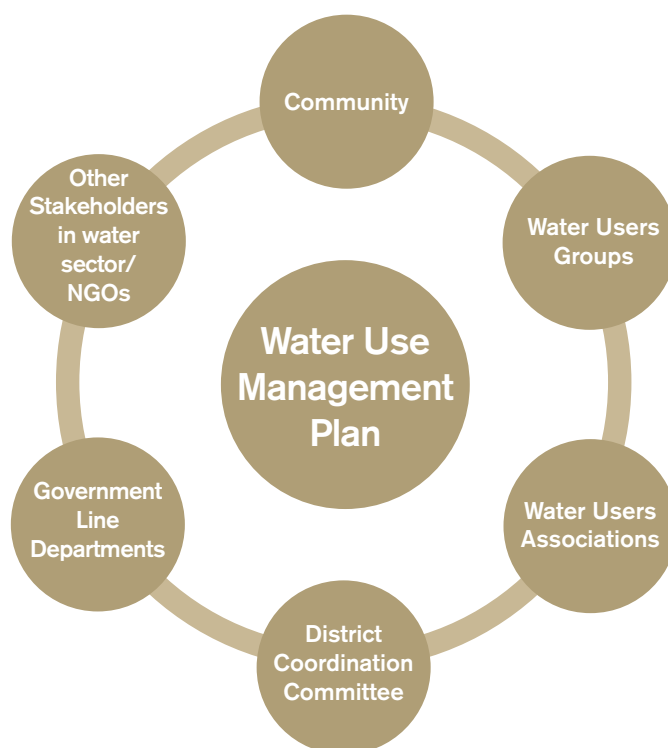
**Table 37: DRR Activities**

Rank	No of Project	Beneficiary Household	Estimated Cost
Rank1	7	835	19.99
Rank2	5	415	33.62
Rank3	10	627	32.63
Rank4	9	820	26.05
Rank5	5	505	16.09

### 5.9 Proposed Supporting Activities

Existing beneficiary groups have been organised to form WUGs and WUAs. Currently in Arandu Valley, 3 Water User Associations have been formed based upon mutual water interest and location. There are a total of 63 WUGs (39 male, 324 female). In the WUMP implementation, these WUGs would come in closer interaction with WUAs. Furthermore bridging up with GLAs and related water sector projects is necessary in venturing (in taking up different activities) the broader range of water sector potentials identified in WUMP through capacity building events.

**Figure 5: Institutional framework for WUMP Implementation Mechanism for Arandu UC**



In order to facilitate implementation of WUMP, the SDC funded Water for Livelihoods Project (W4L) has committed to perform the following supporting activities in coming years.

WUAs/WUGs would be supported in organisational management, including record keeping, financial management, implementation of infrastructure schemes, O&M, training in conflict management and advocacy of water rights. Improvement in water governance is likely through strengthening dialogue between WUA and GLAs, yielding into GLA notifications and measures for promotion of service delivery. The WUMP lays a roadmap for WUAs on the water sector in the Valley. In order to materialise this roadmap the recommendations identified in WUMP have to be understood, owned and propagated through WUAs, access to GLAs and other water sector organisations/donors. W4L would bridge these actors through WUMP implementation as a tool for knowledge and experience sharing.

WUAs and WUGs gain strength through internal dialogue and communication, in which gender balance and inclusivity of deprived segment is to be represented in an executive body. The W4L would keep a close coordination with WUAs for continuous dialogue within WUGs (male and female) through collective water sector services' improvement and management, O&M, health and hygiene awareness sessions, knowledge management and dissemination of success stories. The awareness in WUGs and WUAs through the mentioned activities is likely to increase manifolds, which would be encouraged towards community savings base for promoting self-sustaining systems.

The local implementing partners, including grassroots NGOs, water sector GLAs and other water sector projects in the Tehsil/Valley would be connected through training and knowledge sharing events e.g. techniques on efficient utilisation of water for increasing crop production, analyse customary water management in the districts/valley - particularly on the rights, inclusion and decision-making. These measures would promote standardisation of approach among various partners in the water sector.

**Table 38: Supporting Activities**

S No.	Description	Total Cost Rs.(Million)
1.	Orientation workshop on WUMP to District Authorities, Village Council members and representatives of WUG, WUA based on learning from 2014	0.062
2.	Capacity Building of WUAs/WUGs in Organisational Management, Record keeping, Finance Management, Implementation, O&M and advocacy etc.	0.25
3.	Development of Functional linkages for WUA with GLAs for WUMP Implementation in the respective areas through workshops/interactions	0.375
4.	Educating on hygiene and safe handling of drinking water at domestic level	0.1
5.	TNA and Training plan of WUA/WUG in water related social (lobbying, conflict management & technical skill) in water resource management, efficiency etc.	0.125
6.	WUAs linkages development with concerned authorities/ Departments for identification and implementation of community based infrastructure and inclusion in Annual Development Plan (ADP)	0.3
7.	Organise experience sharing events of WUA on six monthly basis (WUAs Assembly)	0.06
8.	Analyse customary water management in the UC – particularly on rights, inclusion and decision-making.	0.162
9.	Training of Trainers (TOT) on WUMP following field/resource manual for District Authorities including GLAs, partner NGOs and other stakeholders	0.2
10.	Thematic Training on Orientation & sensitisation of concerned govt. line department on disaster management due to flash floods and monitoring system at district and provincial level	0.15
11.	Orientation of WUGs/WUAs on various techniques regarding efficient on-farm utilisation of water for crop production, Sloping Agriculture and Land Techniques (SALT), tunnel farming	1.3
12.	Training of WUGs/WUAs on optimal use of water e.g. Improved Irrigation Techniques	
13.	Capacity/Skills on management system and O&M	
	<b>Total</b>	<b>2.586</b>

### 5.10 Village Council Level WUMP

Village Councils (VCs) were notified under the Khyber Pakhtunkhwa Local Government Act 2013 to devolve constitutional powers to grassroots level. As a result, the Arandu UC has been divided into five village councils, namely Arandu Gol, Arandu, Accra, Domel and Aspar Domel. Arandu is the largest VC it has 902 households and Akroi is the smallest having 455 households. The YSDO team conducted WUMP visits to all the settlements of Arandu Valley and collected the data accordingly. According to the villagers table 39 shows their prioritised projects.

Local Government Act 2013 will allocate 30% of the funds at the discretion of Village Council. The VC will also be made responsible for monitoring of development activities. WUMP is likely to feed into Village Council plans once the devolution of power commences through local body election in mid of 2015.

### 5.11 Prioritisation of Proposed Water Sector Initiatives and Criteria

Under the prioritisation process for water sector initiatives, participatory criteria has been adopted on water hardship. The jointly agreed selection criteria were prepared in consultation with WUGs and Village representatives, local NGOs and field staff of GLAs. The criteria includes the extent of beneficiaries, economical investment, benefiting land, capacity of beneficiary to contribute, operate and maintain, access, multi-use potential etc. Overall ranking of projects is as shown in table 39

**Table 39: Village Council Level WUMP**

Village Council	Projects	Rankings				
		1	2	3	4	5 & Above
Aspar	DWSS		1	1	1	
	Improvement of DWSS	1		1		
	Improvement of irrigation channels	1	1	1	1	1
	Protective works (DRR)	1	1	1	1	1
	Improvement of water courses	1	1	1	1	
	Watershed Management	1			1	
	WASH	1		1	1	
	MHPs					2
	Others (Agri/Education)				1	15
Domel	DWSS	1		1		2
	Improvement of DWSS		1			1
	Improvement of irrigation channels	1	1	1	2	7
	Protective works (DRR)	1	1	1	1	6
	Improvement of water courses	1	1	1	1	6
	Watershed Management		1	1	2	2
	WASH	1		1		1
	MHPs					3
	Others (Agri/Education)		2	1	3	19
Akruai	DWSS	1			4	
	Improvement of DWSS		1			
	Improvement of irrigation channels			1		
	Protective works (DRR)	1			1	
	Improvement of water courses	1	1	1		
	Watershed Management		1	1		1
	WASH	1	1	1		1
	MHPs					1
	Others (Agri/Education)			1	2	8
Arandu Gol	DWSS	1	1	1	1	9
	Improvement of DWSS	1				
	Improvement of irrigation channels	1	1	1	1	10
	Protective works (DRR)	1	1	1	1	10
	Improvement of water courses	1	1	1		9
	Watershed Management			7	1	5
	WASH					
	MHPs					0
	Others (Agri/Education)					7
Arandu	DWSS				1	
	Improvement of DWSS	1	1		1	2
	Improvement of irrigation channels	1	1	1	1	2
	Protective works (DRR)	1	1	1	1	2
	Improvement of water courses	1	1	1	1	1
	Watershed Management	1		1	1	
	WASH			1	1	2
	MHPs					5
	Others (Agri/Education)				1	3
	<b>Total</b>	<b>25</b>	<b>23</b>	<b>34</b>	<b>35</b>	<b>144</b>

## 5.12 Investment Plan

An investment plan has been developed dividing the prioritised project implementations into short-term, medium term and long term given the importance of community ranking and their urgent needs. Priority #1 projects have been considered in the short-term investment plan. The priority #2 and #3 projects are to be implemented in the medium term while the four & five ranked projects are to be implemented in the long term.

**Table 40: Investment Plan**

S No.	Project Description	Short Term Investment PKR (Million)	Medium Term Investment PKR (Million)	Long Term Investment PKR (Million)
<b>1</b>	<b>Drinking Water Supply</b>			
1.1	DWSS	24.42	26.10	34.21
1.2	Improvement of DWSS	17.299	13.402	11.63
<b>2</b>	<b>Irrigation Systems</b>			
2.1	Improvement of Irrigation Channel	50.1	51	23.3
2.2	Piloting Water Efficient Technologies	0	2	3
2.3	On-Farm Water Management training	21.1575	13.94	11.392
<b>3</b>	<b>Disaster Risk Reduction</b>			
3.1	Flood Protection wall	63.92	38.86	30.45
3.2	Formation and Training of DRR committees		1	0
3.3	Provision of Stock piles	1		
<b>4</b>	<b>Ecology and Natural Resource Management</b>			
4.1	Watershed Management	2.5	6	6.5
4.2	Afforestation Activities	1.2	0.8	
4.3	Training and Capacity of JFMCs	0.45		
<b>5</b>	<b>Drainage and Sanitation system</b>			
5.1	Drainage and Sanitation Schemes	12.61	27.84	20.48
5.2	Training on Health and Hygiene	0.15	0.3	0.3
<b>6</b>	<b>Productive Utilisation of Water Resources</b>			
6.1	Micro Hydel Power Station Establishment	21.7	31.5	23.1
6.2	Promote Cultivation of improved Varieties of Fruit and Cash Crops		1	1.5
6.3	Capacity Building/training of farmers	1	1	0.5
<b>7</b>	<b>Supporting Activities</b>			
7.1	Orientation workshop on WUMP to District Authorities, Village council members and representatives of WUG, WUA based on learning from 2014	0.06		
7.2	Capacity Building of WUAs/WUGs in Organisational Management, Record keeping, Finance Management, Implementation, O&M and advocacy etc.	0.25		
7.3	Development of Functional Linkages for WUA with GLAs for WUMP implementation in the respective areas through workshops/interactions	0.38		
7.4	Educating on hygiene and safe handling of drinking water at domestic level	0.1		
7.5	TNA and Training plan of WUA/WUG in water related social (lobbying, conflict management & technical) skill in water resource management, efficiency etc.	0.13		



8	Development of WUAs linkages with concerned authorities/ Departments for identification and implementation of community based infrastructure and inclusion in Annual Development Plan (ADP)	0.3		
8.1	Organise experience sharing events of WUA on six monthly basis (WUAs Assembly)	0.06		
8.2	Analyse customary water management in the districts – particularly on rights, inclusion and decision-making.	0.16		
8.3	Training of Trainers (TOT) on WUMP following field/resource manual for District Authorities including GLAs, partner NGOs and other stakeholders	0.2		
8.4	Thematic Training on Orientation & sensitisation of concerned government line departments on disaster management due to flash floods and monitoring system at district and provincial level	0.15		
8.5	Orientation of WUGs/WUAs on various techniques regarding efficient on-farm utilisation of water for crop production, Sloping Agriculture and Land Techniques (SALT), tunnel farming	1		
8.6	Training of WUGs/WUAs on optimal use of water e.g. Improved Irrigation Techniques	0.5		
8.7	Capacity/Skills on management systems and O&M	1		
	<b>Total</b>	<b>221.79746</b>	<b>227.737</b>	<b>135.58</b>

### 5.13 Detailed Action Plan (year wise) with beneficiaries

**Table 41: Action Plan**

SNo.	Project Description	No. of Projects	Expected Beneficiaries	Implementation Years			Estimated Cost
				1	2&3	4&5	
<b>1</b>	<b>Drinking Water Supply</b>						
1.1	DWSS	23	1377	6	7	10	84.72
1.2	Improvement of DWSS	11	1630	6	3	2	127.05
<b>2</b>	<b>Irrigation Systems</b>						
2.1	Improvement of Irrigation Channel	40	3104	15	16	9	124.4
2.2	Piloting Water Efficient Technologies	5	3257	0	2	3	5
2.3	On-farm Water Management training	5	120	5			0.75
<b>3</b>	<b>Disaster Risk Reduction</b>						
3.1	Flood Protection wall	37	3322	13	14	10	133.23
3.2	Formation and Training of DRR committees	5	3257		5		1
3.3	Provision of Stock piles	5		5			1
<b>4</b>	<b>Ecology and Natural Resource Management</b>						
4.1	Watershed Management	30	2572	5	12	13	15
4.2	Afforestation Activities	5	3257	3	2		2
4.3	Training and Capacity of JFMCs	3	325	3			0.45
<b>5</b>	<b>Drainage and Sanitation System</b>						
5.1	Drainage and Sanitation Schemes	14	1740	4	6	4	60.93
5.2	Training on Health and Hygiene	5	3257	1	2	2	0.75
<b>6</b>	<b>Productive Utilisation of Water Resources</b>						
6.1	Establishment of Micro Hydro Power Station	11	3257	2	4	5	76
6.2	Promote cultivation of improved varieties of Fruit and Cash Crops	5	5		2	3	2.5
6.3	Capacity Building/training of farmers	5	3572	2	2	1	2.5
<b>7</b>	<b>Supporting Activities</b>						

7.1	Orientation workshop on WUMP to District Authorities, Village council members and representatives of WUG, WUA based on learning from 2014	1		1			0.06
7.2	Capacity Building of WUAs/WUGs in Organisational Management, Record keeping, Finance Management, Implementation, O&M and advocacy etc.	1		1			0.25
7.3	Development of Functional Linkages for WUA with GLAs for WUMP implementation in the respective areas through workshops/interactions	1		1			0.38
7.4	Education on hygiene and safe handling of drinking water at domestic level	1		1			0.1
7.5	TNA and Training plan of WUA/WUG in water related social (lobbying, conflict management & technical) skills in water resource management, efficiency etc.	1		1			0.13
8	Development of WUAs linkages with concerned authorities/Departments for identification and implementation of community based infrastructure and inclusion in Annual Development Plan (ADP)	1		1			0.3
8.1	Organise experience sharing events of WUA on six monthly basis (WUAs Assembly)	1		1			0.06
8.2	Analyse customary water management in the districts – particularly on the rights, of inclusion and decision-making.	1		1			0.16
8.3	Training of Trainers (TOT) on WUMP following field/ resource manual for District Authorities including GLAs, partner NGOs and other stakeholders	1		1			0.2
8.4	Thematic Training on Orientation & sensitisation of concerned government line departments on disaster management due to flash floods and monitoring system at district and provincial level	1		1			0.15
8.5	Orientation of WUGs/WUAs on various techniques regarding efficient on-farm utilisation of water for crop production, Sloping Agriculture and Land Techniques (SALT), tunnel farming with HEIS .	1		1			1
8.6	Training of WUGs/WUAs on optimal use of water e.g. Improved Irrigation Techniques	1		1			0.5
8.7	Capacity/Skills on management system and O&M	1		1			1
	<b>Total</b>	<b>222.00</b>	<b>34,052</b>	<b>83.00</b>	<b>77.00</b>	<b>62.00</b>	<b>641.58</b>

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

- Local Government Body (Village, VC/UC and Tehsil Council)
- Government line Department (PHED, OFWM, Irrigation Division, Forest Department)
- RSPs (AKRSP and SRSP) and FOCUS Humanitarian
- Other Community Based Organisations (VO/WOs, WUAs, JFMCs)

For the purpose of monitoring, a separate committee will be formed having representatives from community organisations, partner organisations, representatives from local bodies and other line departments to assist the District Coordination Committee (DC).



## Chapter 6

### 6. WUMP Implementation, Mobilisation and Updating

WUMP will be implemented through engaging WUGs/WUAs with the technical support from GLAs for detailed design, preparation of cost estimates, economic viability, justification and supervision during implementation. Subsequently for operation and maintenance of community-based schemes, the GLAs extend technical knowledge and experience to the WUAs. Village Councils, Tehsil Councils and District Development Committees would be kept aware of the process and progress. Government line agencies will support the WUAs to develop and strengthen collaborative mechanisms with potential technical support and supervision during implementation and operation of community based schemes. For long-term realisation of water related projects, the District/Tehsil is also expected to connect with organisations having the resources and interest to offer assistance in water related initiatives in WUMP.

#### 6.1 WUMP Implementation Advocacy

Key parties involved in mobilisation for WUMP are WUA, CBO, Local NGOs and government line departments at District & Tehsil level including Local Government bodies.

**Table 42: Parties Involved for WUMP Mobilisation**

Organisa- tion	Responsibility
WUA /WUG	Stay connected with the WUG and keep them motivated for realisation of Water Sector improvement Ensure that village priorities and information is collected through WUG Maintain regular contact with WUG forum, especially post-WUMP During or post-WUMP phases, any conflict mediation support should be given to WUG
Local NGOs	Build capacity of WUG and WUA through organisational management Guide the process of priority identification and bring up real social dimensions and deserving beneficiaries up front Ensure that the WUAs are inclusive and gender concerns are duly represented in the WUGs Support WUAs in their advocacy effort to mobilise resources for WUMP Link technical departments and Water Users' Associations for their smooth functioning together Liaise for proper representation of WUA /WUG

District Authorities	<p>Provide legal and administrative acceptance and support to WUMP implementation</p> <p>Allocate resources for the implementation of WUMP in the district development plan</p> <p>Provide timely technical services to WUAs/WUGs in WUMP implementation</p> <p>Remain involved in participatory monitoring and provide feedback to the district government for improvement in water sector services delivery</p> <p>Take issue for larger policy change/ improvement (if required) with higher authorities through initiating dialogue</p>
SDC funded W4L project and WUAs	<p>Ensure timely coaching and guidance at all levels</p> <p>Steer WUMP process in collaboration with the district government</p> <p>Organise timely trainings as scheduled in WUMP.</p> <p>Ensure support through timely flow of funds and assistance in water governance</p>

## 6.2 WUMP Updating and Procedure for Changes

WUMP will be implemented after vetting by the DCC. On a yearly basis, members of Water User Association will review priorities and necessary adjustments will be made according to emerging needs and removal of redundant activities. For any kind of amendment, 70% of WUG/WUA members will agree and vet necessary amendments in WUMP. These changes will be further verified at Village and Tehsil Councils before approval of District Development Committee.

## 6.3 WUMP Reporting, Coordination and Ownership

Village level reporting will be the responsibility of WUGs/WUAs for which local NGOs will be the focal organisation. This would be reviewed on an annual basis through WUAs/WUGs assembly.



## 7 Annexure

### 7.1 DWSS new projects

S No.	Project Type	Location	VC Name	Project Prioritisation			Beneficiary HHs	Project Cost Estimated Cost in millions
		Village Name		Village level	Village Council level	Ranking		
1	DWSS	Akroi khas	Akroi	1	1	1	170	2.44
2	DWSS	Dap (Baga & Wartako)	Arandu Gol	1	14	2	80	4.04
3	DWSS	Durumser	Arandu Gol	1	10	2	90	1.97
4	DWSS	Gujren	Arandu Gol	1	4	1	50	5.33
5	DWSS	Inchao	Arandu Gol	1	5	1	51	3.51
6	DWSS	Mamuti	Arandu Gol	1	3	1	80	2.32
7	DWSS	Matipalol	Arandu Gol	1	2	1	50	7.83
8	DWSS	Mirakbaat	Arandu Gol	1	6	1	75	3.79
9	DWSS	Ramram	Arandu Gol	1	7	1	40	4.60
10	DWSS	Rishigal	Arandu Gol	1	8	1	35	6.74
11	DWSS	Karagram	Domel	1	1	1	120	2.23
12	DWSS	Panakot	Arandu	2	4	2	45	2.72
13	DWSS	Dinbaat	Arandu Gol	2	11	2	90	5.08
14	DWSS	Godagal Nilatota	Arandu Gol	2	9	1	75	2.58
15	DWSS	Mashadam	Arandu Gol	2	12	2	40	2.48
16	DWSS	Matako	Arandu Gol	2	13	2	26	1.95
17	DWSS	Peshutan	Asper Domel	2	5	1	120	4.59
18	DWSS	Dombaant	Asper Domel	3	2	1	50	4.42
19	DWSS	Zareen Bagh	Asper Domel	4	4	1	70	3.82
21	DWSS	Guwai	Domel	5	3	1	80	5.18
22	DWSS	Akroi Gol	Akroi	5	4	4	80	2.34
23	DWSS	Birow	Domel	6	9	3	35	1.62
24	DWSS	Swato kuru	Domel	4	7	1	70	3.15

## 7.2 Improvement of DWSS

S No.	Project Type	Location Village Name	VC Name	Project Prioritisation			Beneficiary HHs	Project Cost Estimated Cost in millions
				Village level	Village Council level	Ranking		
25	DWSS	Swardam	Arandu	1	1	1	250	3.17
26	DWSS	Kamsai	Arandu Gol	1	1	1	120	2.35
27	DWSS	Lachigram	Asper Domel	1	1	1	200	5.08
28	DWSS	Langurat Bala	Akroi	2	2	2	120	2.74
29	DWSS	Arandulasht	Arandu	2	2	1	70	1.731
30	DWSS	Aspar	Asper Domel	2	3	1	295	5.182
31	DWSS	Dondidari	Domel	2	2	1	60	2.228
32	DWSS	Shenteri	Domel	3	10	2	120	8.49
33	DWSS	Towheedabad	Arandu	4	3	1	175	5.84
34	DWSS	Malacham	Arandu	5	6	0	50	3.14
35	DWSS	Arandu khas	Arandu	6	5	1	170	2.38

## 7.3 New Sanitation Schemes

S No.	Project Type	Location Village Name	VC Name	Project Prioritisation			Beneficiary HHs	Project Cost Estimated Cost in millions
				Village level	Village Council level	Ranking		
36	Sanitation	Langurbat Payeen	Akroi	1	1	3	85	2.98
37	Sanitation	Akroi Gol	Akroi	2	2	4	80	2.8
38	Sanitation	Akroi khas	Akroi	3	3	2	170	5.95
39	Sanitation	Langurat Bala	Akroi	5	5	3	120	4.2
40	Sanitation	Panakot	Arandu	3	3	5	45	1.58
41	Sanitation	Malacham	Arandu	4	4	6	50	1.75
42	Sanitation	Arandu khas	Arandu	5	6	7	170	5.95
43	Sanitation	Towheedabad	Arandu	5	7	6	175	6.13
44	Sanitation	Peshutan	Asper Domel	1	1	5	120	4.2
45	Sanitation	Aspar	Asper Domel	5	3	4	295	10.33
46	Sanitation	Lachigram	Asper Domel	5	4	7	200	7
47	Sanitation	Landibraz	Domel	1	1	3	75	2.63
48	Sanitation	Domail nisar bala	Domel	2	3	5	35	1.23
49	Sanitation	Shenteri	Domel	4	5	6	120	4.2

## 7.4 Improvement in Irrigation Channels

S No.	Project Type	Location Village Name	VC Name	Project Prioritisation			Beneficiary HHs	Project Cost Estimated Cost in millions	Land under command
				Village level	Village Council level	Ranking			
50	Water Channel	Malacham	Arandu	1	1	1	50	4.3	25
51	Water Channel	Dinbaat	Arandu Gol	1	2	1	90	0.2	21.875
52	Water Channel	Godagal Nilatota	Arandu Gol	1	3	1	75	3.4	78.75
53	Water Channel	Mashadam	Arandu Gol	1	1	1	40	2.4	12.5
54	Water Channel	Matako	Arandu Gol	1	4	1	30	0.3	10
55	Water Channel	Dombaath	Asper Domel	1	2	2	20	2.3	69
56	Water Channel	Biraw	Domel	1	2	2	30	2.1	31.25
57	Water Channel	Arandu khas	Arandu	2	2	1	170	4.3	25
58	Water Channel	Towheedabad	Arandu	2	4	2	175	4.3	25
59	Water Channel	Dap (Baga & Wartako)	Arandu Gol	2	10	2	50	2.6	12.5
60	Water Channel	Durumser	Arandu Gol	2	11	3	90	0.6	37.5
61	Water Channel	Gujren	Arandu Gol	2	5	1	50	3.9	65
62	Water Channel	Inchao	Arandu Gol	2	6	1	51	2.3	27.5
63	Water Channel	Kamsai	Arandu Gol	2	14	3	120	5.2	21.875
64	Water Channel	Mamuti	Arandu Gol	2	12	3	80	2.3	34.875
65	Water Channel	Matipalol	Arandu Gol	2	7	1	50	3.8	39.75
66	Water Channel	Mirakbaat	Arandu Gol	2	8	2	75	2.6	12.5
67	Water Channel	Ramram	Arandu Gol	2	9	2	40	2.6	90.5
68	Water Channel	Rishigal	Arandu Gol	2	13	3	30	2	12.5
69	Water Channel	Akroi Gol	Akroi	3	3	1	80	2.4	37.5
70	Water Channel	Swardam	Arandu	3	5	2	250	4.3	50
71	Water Channel	Aspar	Asper Domel	3	1	2	195	4.5	75
72	Water Channel	Lachigram	Asper Domel	3	3	2	140	1.9	75

73	Water Channel	Zareen Bagh	Asper Domel	3	5	2	70	4.2	175
74	Water Channel	Dondidari	Domel	3	5	2	60	2.3	21.875
75	Water Channel	Dondidari	Domel	3	5	2	60	2.7	21.875
76	Water Channel	Guwai	Domel	3	3	2	48	4.5	266
77	Water Channel	Karagram	Domel	3	4	2	120	3.2	29
78	Water Channel	Karagram	Domel	3	4	2	120	3.4	29
79	Water Channel	Langurbat Payeen	Akroi	4	2	1	10	6.7	9
80	Water Channel	Langurbat Bala	Akroi	2	1	1	75	3.9	34
81	Water Channel	Peshutan	Asper Domel	4	4	2	100	3.2	70
82	Water Channel	Landibraz	Domel	4	6	2	75	4.6	112
83	Water Channel	Swato	Domel	4	7	2	50	1.5	22.1875
84	Water Channel	Swato	Domel	4	7	2	50	3.1	22.1875
85	Water Channel	Domail nisar payeen	Domel	5	1	1	30	3.3	187.5
86	Water Channel	Swato kuru	Domel	5	8	2	70	2.2	24.375
87	Water Channel	Swato kuru	Domel	5	8	2	70	3.2	24.375
88	Water Channel	Arandu Lasht	Arandu	3	3	2	70	3.9	75.5
89	Water Channel	Panakot	Arandu	4	6	3	45	3.9	12.5

## 7.5 Disaster Risk Reduction

S No.	Project	Location	Project Prioritisation				Beneficiary HHs	Project Cost
			VC Name	Village level	Village Council level	Ranking		
Type	Village Name	VC Name	Village level	Village Council level	Ranking	Beneficiary HHs	Estimated Cost in millions	
90	Protective Works	Akroi Gol	Akroi	1	1	3	80	3.41
91	Protective Works	Arandulasht	Arandu	1	2	3	70	3.32
92	Protective Works	Panakot	Arandu	1	1	1	45	2.79
93	Protective Works	Towheedabad	Arandu	1	6	3	175	1.13
94	Protective Works	Aspar	Asper Domel	1	1	3	295	2.26
95	Protective Works	Shenteri	Domel	1	1	1	120	4.05
96	Protective Works	Swato	Domel	1	10	3	50	3.02
97	Protective Works	Lachigram	Asper Domel	2	2	3	200	3.55



98	Protective Works	Domail nisar payeen	Domel	2	5	3	30	0.79
99	Protective Works	Biraw	Domel	2	4	3	35	4.89
100	Protective Works	Guwai	Domel	2	3	3	80	21.26
101	Protective Works	Swato kuru	Domel	2	8	3	70	3.13
102	Protective Works	Malacham	Arandu	3	4	3	50	1.39
103	Protective Works	Durumser	Arandu Gol	3	1	1	90	2.67
104	Protective Works	Gujren	Arandu Gol	3	2	1	50	4.07
105	Protective Works	Inchao	Arandu Gol	3	3	1	51	1.75
106	Protective Works	Matako	Arandu Gol	3	4	2	26	2.6
107	Protective Works	Mirakbaat	Arandu Gol	3	5	2	75	4.81
108	Protective Works	Ramram	Arandu Gol	3	6	2	40	3.61
109	Protective Works	Dombaata	Asper Domel	3	4	3	50	2.91
110	Protective Works	Peshutan	Asper Domel	3	3	3	120	7.91
111	Protective Works	Landibraz	Domel	3	7	3	75	0.92
112	Protective Works	Akroi khas	Akroi	4	4	4	170	2.09
113	Protective Works	Dap (Baga & Wartako)	Arandu Gol	4	13	4	80	3.54
114	Protective Works	Godagal Nilatota	Arandu Gol	4	7	2	75	3.35
115	Protective Works	Kamsai	Arandu Gol	4	10	3	120	4.78
116	Protective Works	Mamuti	Arandu Gol	4	9	3	80	2.99
117	Protective Works	Mashadam	Arandu Gol	4	8	3	40	2.28
118	Protective Works	Matipalol	Arandu Gol	4	11	4	50	1.57
119	Protective Works	Domail nisar bala	Domel	4	2	2	35	2.04
120	Protective Works	Karagram	Domel	4	9	3	120	3.42
121	Protective Works	Swardam	Arandu	5	5	3	250	4.84
122	Protective Works	Dinbaat	Arandu Gol	5	12	4	90	2.91
123	Protective Works	Rishigal	Arandu Gol	5	14	4	35	2.81
124	Protective Works	Zareen Bagh	Asper Domel	5	5	3	70	2.51
125	Protective Works	Dondidari	Domel	5	6	3	60	3.02
126	Protective Works	Arandu khas	Arandu	3	3	3	170	4.84

## 7.6 On-Farm Water Management

S No.	Project	Location	VC Name	Project Prioritisation			Beneficiary HHs	Project Cost	Land under command
	Type	Village Name		Village level	Village Council level	Ranking	Estimated Cost in millions		
127	OFWM	Akroi khas	Akroi	2	3	3	170	1.755	58.5
128	OFWM	Akroi Gol	Akroi	5	4	4	80	0.75	37.5
129	OFWM	Langurat Bala	Akroi	1	1	2	120	1.22	61
130	OFWM	Langurbat Payeen	Akroi	5	2	4	10	0.18	9
131	OFWM	Arandu khas	Arandu	3	2	4	170	0.9	25
132	OFWM	Arandulasht	Arandu	3	4	4	70	1.51	75.5
133	OFWM	Malacham	Arandu	2	1	4	50	0.8	25
134	OFWM	Panakot	Arandu	4	5	2	45	0.82	12.5
135	OFWM	Swardam	Arandu	2	3	4	250	1	50
136	OFWM	Dap (Baga & Wartako)	Arandu Gol	5	14	4	50	0.78	12.5
137	OFWM	Dinbaat	Arandu Gol	4	6	3	90	0.77	21.875
138	OFWM	Durumser	Arandu Gol	4	5	3	90	0.75	37.5
139	OFWM	Godagal Nilatota	Arandu Gol	5	9	4	75	1.575	78.75
140	OFWM	Gujren	Arandu Gol	4	3	2	50	1.3	65
141	OFWM	Inchao	Arandu Gol	4	4	2	51	0.81	27.5
142	OFWM	Kamsai	Arandu Gol	5	11	4	120	0.73	21.875
143	OFWM	Mamuti	Arandu Gol	3	1	1	80	0.6975	34.875
144	OFWM	Mashadam	Arandu Gol	5	10	4	40	0.79	12.5
145	OFWM	Matako	Arandu Gol	4	2	1	30	0.84	10
146	OFWM	Matipalol	Arandu Gol	5	12	4	50	0.795	39.75
147	OFWM	Mirakbaat	Arandu Gol	4	8	4	75	0.87	12.5
148	OFWM	Ramram	Arandu Gol	5	13	4	40	1.81	90.5
149	OFWM	Rishigal	Arandu Gol	4	7	3	30	0.81	12.5
150	OFWM	Dombaas	Asper Domel	2	2	4	20	1.38	69
151	OFWM	Lachigram	Asper Domel	4	3	4	140	1.5	75
152	OFWM	Asper	Asper Domel	1	1	1	100	1.4	70
153	OFWM	Zareen Bagh	Asper Domel	2	4	4	70	3.5	175
154	OFWM	Biraw	Domel	4	3	4	30	0.625	31.25
155	OFWM	Domelnisar bala	Domel	1	4	4	17	0.5	25
156	OFWM	Domelnisar payeen	Domel	4	5	4	30	3.75	187.5
157	OFWM	Dondidari	Domel	1	7	5	60	0.79	21.875
158	OFWM	Guwai	Domel	4	1	4	48	5.32	266
159	OFWM	Karagram	Domel	2	8	5	120	0.81	29
160	OFWM	Landibraz	Domel	5	2	4	75	2.24	112
161	OFWM	Shenteri	Domel	2	9	5	120	0.82	29.375

162	OFWM	Swato	Domel	3	6	4	50	0.78	22.1875
163	OFWM	Swato kuru	Domel	3	10	5	70	0.812	24.375

### Settlements for New DWSS as Priority Rank 1

VC Name	Village Name	Tot. HHs	1st Priority	Estimated cost of the scheme (RS)
Akroi	Akroi khas	170	DWSS	2,444,487
Arandu Gol	Dap (Baga & Wartako)	80	DWSS	4,038,469
Arandu Gol	Durumser	90	DWSS	1,973,312
Arandu Gol	Gujren	50	DWSS	5,330,962
Arandu Gol	Inchao	51	DWSS	3,514,675
Arandu Gol	Mamuti	80	DWSS	2,315,252
Arandu Gol	Matipalol	50	DWSS	7,832,124
Arandu Gol	Mirakbaat	75	DWSS	3,785,011
Arandu Gol	Ramram	40	DWSS	4,600,587
Arandu Gol	Rishigal	35	DWSS	6,740,579
Domel	Karagram	120	DWSS	2,231,512
<b>Grand Total</b>		<b>841</b>		<b>44,806,970</b>

### Settlements for New DWSS as Priority Rank 2

VC Name	Village Name	Tot. HHs	2nd Priority	Estimated cost of the scheme (RS)
Arandu	Panakot	45	DWSS,	2,716,936
Arandu Gol	Dinbaat	90	DWSS	5,079,050
Arandu Gol	Godagal Nilatota	75	DWSS	2,581,887
Arandu Gol	Mashadam	40	DWSS	2,475,703
Arandu Gol	Matako	26	DWSS	1,952,989
Aspar Domel	Peshutan	120	DWSS	4,592,129
<b>Total</b>		<b>396</b>		<b>19,398,694</b>

### Settlements for New DWSS as Priority Rank 3

VC Name	Village Name	Tot. HHs	3rd Priority	Estimated cost of the scheme (RS)
Aspar Domel	Dombaath	50	DWSS	4,416,422
<b>Total</b>		<b>50</b>		<b>4,416,422</b>

### Settlements for New DWSS as Priority Rank 4

VC Name	Village Name	Tot. HHs	4th Priority	Estimated cost of the scheme (RS)
Aspar Domel	Zareen Bagh	70	DWSS	3819377
<b>Total</b>		<b>70</b>		<b>3819377</b>

### Settlements for New DWSS as Priority Rank 5

VC Name	Village Name	Tot. HHs	5th and above Priority	Estimated cost of the scheme (RS)
Domel	Guwai	80	DWSS	5181167
Akroi	Akroi Gol	80	DWSS	2335958
Domel	Birow	35	DWSS	1619250
Domel	Swato kuru	70	DWSS	3145010
<b>Total</b>		<b>265</b>		<b>12,281,385</b>

### Improvement of DWSS as Priority 1

VC	Settlement	HH	Rank	Estimates in Million
Arandu	Swardam	250	1	3.17
Arandu Gol	Kamsai	120	1	2.35
Asper Domel	Lachigram	200	1	5.08

### Improvement of DWSS as Priority 2

VC	Settlement	HH	Rank	Estimates in Million
Akroi	Langurat Bala	120	2	2.740
Arandu	Arandulasht	70	2	1.731
Aspar Domel	Aspar	295	2	5.182
Aspar Domel	Dondidari	60	2	2.228

### Improvement of DWSS as Priority 3

VC	Settlement	HH	Rank	Estimates in Million
Domel gol	Shenteri	120	3	8.49

### Improvement of DWSS as Priority 4

VC	Settlement	HH	Rank	Estimates in Million
Arandu	Towheedabad	175	4	5.84

### Improvement of DWSS as Priority 5

VC	Settlement	HH	Rank	Estimates in Million
Arandu	Malacham	50	5	3.14
Arandu	Arandu khas	170	6	2.38

### Irrigation Channel Priority 1

VC	Village Name	Priority	Beneficiary HH	Irrigated land	Estimated Million
Arandu	Malacham	1	50	25	4.3
Arandu Gol	Dinbaat	1	90	21.875	0.2
Arandu Gol	Godagal Nilatota	1	75	78.75	3.4
Arandu Gol	Mashadam	1	40	12.5	2.4
Arandu Gol	Matako	1	30	10	0.3
ASPAR DOMEL	Dombaas	1	20	69	2.3
DOMEL	Biraw	1	30	31.25	2.1
<b>Total</b>		<b>7</b>	<b>335</b>	<b>248.375</b>	<b>15</b>

### Irrigation Channel Priority 2

Arandu	Arandu khas	2	170	25	4.3
Arandu	Towheedabad	2	175	25	4.3
Arandu Gol	Dap (Baga & Wartako)	2	50	12.5	2.6
Arandu Gol	Durumser	2	90	37.5	0.6
Arandu Gol	Gujren	2	50	65	3.9
Arandu Gol	Inchao	2	51	27.5	2.3
Arandu Gol	Kamsai	2	120	21.875	5.2
Arandu Gol	Mamuti	2	80	34.875	2.3
Arandu Gol	Matipalol	2	50	39.75	3.8
Arandu Gol	Mirakbaat	2	75	12.5	2.6
Arandu Gol	Ramram	2	40	90.5	2.6
Arandu Gol	Rishigal	2	30	12.5	2
<b>Total</b>		<b>12</b>	<b>981</b>	<b>404.5</b>	<b>36.5</b>

### Irrigation Channel Priority 3

Akori	Akroi Gol	3	80	37.5	2.4
Arandu	Swardam	3	250	50	4.3
ASPAR DOMEL	Aspar	3	195	75	4.5
ASPAR DOMEL	Lachigram	3	140	75	1.9
ASPAR DOMEL	Zareen Bagh	3	70	175	4.2
DOMEL	Dondidari	3	60	21.875	2.3
DOMEL	Dondidari	3	60	21.875	2.7
DOMEL	Guwai	3	48	266	4.5
DOMEL	Karagram	3	120	29	3.2
DOMEL	Karagram	3	120	29	3.4
<b>Total</b>		<b>10</b>	<b>1143</b>	<b>780.25</b>	<b>33.4</b>

### Irrigation Channel Priority 4

Akori	Langurbat Payeen	4	10	9	6.7
Akori	Langurbat Bala	4	75	34	3.9
ASPAR DOMEL	Peshutan	4	100	70	3.2
DOMEL	Landibraz	4	75	112	4.6
DOMEL	Swato	4	50	22.1875	1.5
DOMEL	Swato	4	50	22.1875	3.1
<b>Total</b>		<b>6</b>	<b>360</b>	<b>269.375</b>	<b>23</b>

### Irrigation Channel Priority 5

DOMEL	Domelnisar payeen	5	30	187.5	3.3
DOMEL	Swato kuru	5	70	24.375	2.2
DOMEL	Swato kuru	5	70	24.375	3.2
<b>Total</b>	<b>0</b>	<b>15</b>	<b>170</b>	<b>236.25</b>	<b>8.7</b>

**WASH Projects Priority 1**

VC	Village Name	Priority	Beneficiary HH	Estimated Cost In Million
Akori	Langurbat Payeen	1	85	2.98
Asper Domel	Peshutan	1	120	4.20
Domel	Landibraz	1	75	2.63

**WASH Projects Priority 2**

Akori	Akroi Gol	2	80	2.80
Domel	Domelnisar bala	2	35	1.23

**WASH Projects Priority 3**

Akori	Akroi khas	3	170	5.95
Arandu	Panakot	3	45	1.58

**WASH Projects Priority 4**

Arandu	Malacham	4	50	1.75
Domel	Shenteri	4	120	4.20

**WASH Projects Priority 5**

Akori	Langurat Bala	5	120	4.20
Arandu	Arandu khas	5	170	5.95
Arandu	Towheedabad	5	175	6.13
Asper Domel	Aspar	5	295	10.33
Asper Domel	Lachigram	5	200	7.00



#### DRR Priority 1

VC Name	Village Name	Tot. HHs	Ranking	Total cost In Million
Akroi	Akroi Gol	80	1	3.41
Arandu	Arandulasht	70	1	3.32
Arandu	Panakot	45	1	2.79
Arandu	Towheedabad	175	1	1.13
Aspar Domel	Aspar	295	1	2.26
Domel	Shenteri	120	1	4.05
Domel	Swato	50	1	3.02

#### DRR Priority 2

Aspar Domel	Lachigram	200	2	3.55
Domel	Domelnisar payeen	30	2	0.79
Domel	Biraw	35	2	4.89
Domel	Guwai	80	2	21.26
Domel	Swato kuru	70	2	3.13

#### DRR Priority 3

Arandu	Malacham	50	3	1.39
Arandu Gol	Durumser	90	3	2.67
Arandu Gol	Gujren	50	3	4.07
Arandu Gol	Inchao	51	3	1.75
Arandu Gol	Matako	26	3	2.60
Arandu Gol	Mirakbaat	75	3	4.81
Arandu Gol	Ramram	40	3	3.61
Aspar Domel	Dombaath	50	3	2.91
Aspar Domel	Peshutan	120	3	7.91
Domel	Landibraz	75	3	0.92

#### DRR Priority 4

Akroi	Akroi khas	170	4	2.09
Arandu Gol	Dap (Baga & Wartako)	80	4	3.54
Arandu Gol	Godagal Nilatota	75	4	3.35
Arandu Gol	Kamsai	120	4	4.78
Arandu Gol	Mamuti	80	4	2.99
Arandu Gol	Mashadam	40	4	2.28
Arandu Gol	Matipalol	50	4	1.57
Domel	Domelnisar bala	35	4	2.04
Domel	Karagram	120	4	3.42

#### DRR Priority 5

Arandu	Swardam	250	5	4.84
Arandu Gol	Dinbaat	90	5	2.91
Arandu Gol	Rishigal	35	5	2.81
Aspar Domel	Zareen Bagh	70	5	2.51
Domel	Dondidari	60	5	3.02

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