

Effectiveness of Irrigation Association

in Irrigation Water Management and O&M of Irrigation Infrastructure, (A case study of Afghani Canal, Shakardara, Kabul, and Khewa, Nangrahar, Afghanistan).



A Research project Submitted to Larenstein University of Professional Education in Partial Fulfilment of the Requirements for the Degree of Master of Agriculture Production Chain Management, specialization in land water management

By

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Dedication

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Acronyms and Terminology

IA	Irrigation Association
WUA	Water Users Association
MAIL	Ministry of Agriculture, Irrigation and Livestock
MEW	Ministry of Energy and Water
RBCs	River Basin Councils
RBA	River Basin Authority
O&M	Operation and Maintenance
RAMP	Rebuilding Agricultural Marketing Program
USAID	United States Assistance for International Development
Mirab	Water Master
AWATT	Afghanistan Water and Agriculture Technology Transfer
OFWM	On Farm Water Management
CPHD	Centre for Policy and Human Development
ARTF	Afghanistan Reconstruction Trust Fund
Hashr	<i>Traditional participatory community based working for cleaning Canal</i>

Water Rights *Entitlement to the use of irrigation water, mutually agreed by all beneficiaries formally or informally.*

Water distribution *The actual delivery of irrigation water to the fields according to the agreed rights or allocation entitlements. In practice, the water distribution varies from the water allocation principles especially in Afghanistan.*

Equity *The term equity may stand for the equity in water distribution, labor contribution and the equity in right for decision making.*

Jerib *Local land measuring unit; one Jerib is equal to 0.2 hectare.*

Abstract

The main objective of this research was to investigate the relative effectiveness of the Irrigation Association System in irrigation water management and O&M of irrigation infrastructure. In Afghanistan, the irrigation water is managed by community based traditional system commonly known as Mirab system. The Mirab system was promoted by Ministry of Agriculture, Irrigation and Livestock to Irrigation Association system. The objective of this promotion was to use irrigation water efficiently, carry out O&M of irrigation infrastructure in a better way and to ensure equity.

The study was carried out in two areas; Khewa district of (Nangrahar Province) and in Shakardara district of (Kabul Province). In both the study areas the irrigation water management was done through a traditional water management system known as Mirab system. The Mirab systems of the above mentioned area were promoted to Irrigation Association system about one year ago by Ministry of Agriculture, Irrigation and Livestock OFWM-Project.

The research investigated the relative effectiveness of Irrigation Association by studying various aspects of the old Mirab system and the new IA system. The research studied the organizational structure, social cohesion, equity issues, transparency, conflict resolution mechanism and resource generation of both the systems.

The data collected from survey of 40 water users (20 water users per study year), group discussion with the Executive Committee and interview with the relative staff of supporting OFWM-Project. The data for Mirab System and Irrigation Association System was collected from the same interviewees in the same area. These interviewees were part of the Mirab system and they converted to Irrigation Association. The data collected from the survey was analyzed in SPSS and Excel, and the relative effectiveness of Irrigation Association was concluded.

The results of the survey indicated that the selection procedure of Mirab (water master) is more democratic in IA system as compared with Mirab system. There was an active involvement of water users in Mirab selection.

The duration of Mirab services varied in Mirab systems of the study areas. The service duration of Mirab in Danishmand village was 1-2 years while in Khewa district (Mian Canal) it was not specific. In the IA system the duration was also not specific and the Mirab could stay in his job as long as the water users are happy with him.

The conflict resolution was carried out by community elders in Mirab system and the water users were quite happy with it and considered it transparent. The Executive Committee was responsible for the conflict resolution in IA system.

The water allocation among the water users especially upstream and downstream in Mirab system was not equitable and the water users often use water illegally raising conflicts among them. While in the IA system the equity was gained to some extent by controlling the illegal water use. The water conflicts were reduced to almost negligible level.

The result of the survey revealed that the labor contribution for maintenance of irrigation infrastructure was equitable among the users in Mirab as well as IA systems. However, in IA system the common fund was raised by the equal contribution of water users.

It can be concluded that the IA system surpasses the Mirab system in certain aspects: the organization structure of IA system is stronger than Mirab system hence many people are involved in management of irrigation water. The IA system is more democratic as compared to Mirab system. The O&M in IA system is much better than Mirab system because of better resource generation of IA. The equity in water allocation is achieved in IA system to some extent. The social cohesion in IA system is more as compared to Mirab system and the IA system is more reliable than Mirab system.

CHAPTER-1INTRODUCTION

1.1 A Brief Description of Afghanistan

Afghanistan is a land locked country, located in the centre of Asia and is neighbored by Turkmenistan, Uzbekistan and Tajikistan in the North, China to the Northeast, Pakistan to the East and South and Iran to the West. Afghanistan is characterized by its rugged mountains with snow-covered peaks of high altitude, up to 7500 meters above sea level, fertile valleys and desert plains. Lowlands include river valleys and desert regions are located in the northern, western, southwestern and southeastern parts while high lands are generally located in the central part of the country. From topographical point of view the country can be divided into three groups. Low lands with 300-500 m; medium land with 500-2000 m and high land between 2000-7500 m above sea level. About half of the country has an altitude of more than 2000 m above sea level. The total land area of Afghanistan is about 65 million ha of which about 80 percent is either mountainous or desert. The total arable land is 12 % (7.9 million ha). The forest cover is only 1.3 million ha or about 2 percent of the total land area (Qureshi 2002).

“The population of Afghanistan is about 29.8 million and the annual growth rate is 2%. Most of the population lives in rural areas (FAO 2011)”.

“Agriculture employs about two-thirds of the population and comprises up to half of Afghanistan’s gross domestic product; however, the contribution varies considerably with yearly climatic conditions (49% in 2002-2003 but only 36% in 2004-2005). The seasonal variability and overall arid climate make irrigation necessary in many areas for reliable agriculture, and irrigated area agriculture accounts for about 80% of crop production. Almost 85% of Afghans live in rural areas and depend either directly or indirectly on agriculture for their livelihoods. Improved access to irrigation is essential for economic growth and enhanced livelihoods (ADB 2008)”.

Irrigation is the mainstay for Agriculture in Afghanistan. Agricultural production without irrigation is not possible in most of the country because of the insufficient rainfall and its unreliability with few exceptional areas where rain-fed agriculture can be practiced. About 85 % of the total crops are grown under irrigation. Canal irrigation is the most common irrigation method which irrigates 75% of the total cultivated land.

❖ Water resources

Naturally, Afghanistan is gifted with good water resources. More than 80% of water comes from the melting of snow over the high peaks of Hindu Kush Mountains which even reach to 7500m above sea level. Unfortunately, the last three decades of war has caused problems of; shortage of efficient institutions, organizational capability of staff, effective rules and regulations with respect to water use and damage of traditional institution. The three decades of war and series of drought years brought negative impacts on water resources of the country (Mahmood 2008).

The way individuals, communities and institutions govern the water resources has direct impact on people's livelihood, human development potential and environmental sustainability. The water problems in Afghanistan are mainly due to poor management and governance issue (Amarkhail and Kakar 2011).

❖ **Importance of water**

"Water is the lifeblood for the people of Afghanistan, not just for living but also for the economy" (FAO 2011).

Access to water, while often viewed as development issue, is increasingly recognized as a security concern. As with any commodity with short supply, water scarcity invites competition among groups that may results in conflicts on multiple levels, from interpersonal to international (Marsden and Arnold-Foster 2007).

"The inequitable and inefficient water distribution has had an adverse impact on agricultural productivity and exacerbated poverty in the region. The implications of decreased agricultural productivity and the large inequities are dire in terms of poverty and food security (ADB 2004)".

Water is now the second major causes of disputes in communities. Sustained access to adequate irrigation water helps deliver multiple human development benefits, including food security, income-generating production and employment and reduced indebtedness and out-migration" (CPHD 2011).

❖ **Current Water Reform and Water Law**

The government of Afghanistan under the current water sector reform is adopting an integrated water resource management, as well as river basin management approach to promote efficient and fair water distribution. The multi-stake holder platforms through the creation of two agencies will be established at basin level. The first agency is the river basin council (RBC) representing water users both upstream and downstream of the river basin and the second is the river basin authority (RBA) consisted of line ministry including MAIL and water management departments. The role of RBA will be the provision of technical advisory services to RBCs while the role of RBC will be the decision making within the framework of water law. At local level Irrigation Association or WUAs will be formed with two objectives; firstly, take participation in decision making about water allocation in river basins and its O&M and secondly, to take the responsibility of water management and O&M of irrigation infrastructure at canal level.

❖ **Promotion of Mirab System to Irrigation Association**

The MAIL has started promoting the Mirab system to Irrigation Association through OFWM project. The area where research was conducted had Mirab system which was promoted to irrigation association about one year ago. Although the IA is based on the foundation of Mirab system yet, the water users do not have much experience with Irrigation association and the system is new for them. The study conducted was about the Mirab system and the IA of same area and same people.

1.2 Problem statement

In Afghanistan, the irrigation water is managed by community based traditional irrigation water management system known as Mirab system. “Typically Mirab is a community based water service provider selected by water users and community elders, responsible for water distribution, O&M and prevention and resolution of conflicts over water” (Thomas and Naeem 2011). In past, the Mirab system used to work efficiently. Currently, this system became weakened and its efficiency in terms of equitable water distribution and proper O&M of irrigation infrastructure is declined. See figure-1 Causal diagram.

Afghanistan is in the process of reforms in the water sector and has introduced changes in water management system. In the new water law the concept of Irrigation Association and Water Users Association is introduced. (Translation of the Water Law published in the Gazette No. (980), 26, April, 2009, of the Ministry of Justice, Afghanistan).

The Ministry of Agriculture, Irrigation and livestock is responsible for the establishment of Irrigation Association and its registration. MAIL has launched the project of OFWM (On Farm Water Management) funded by ARTF (Afghanistan Rehabilitation Trust Fund) with the objective of providing farmers with improved, reliable and equitable distribution of irrigation water to increase agriculture productivity. One of the components of this project is concerned with the establishment and strengthening of irrigation associations (IAs) in order to enable them to assume the role in irrigation water management and operation & maintenance (O&M) in line with new Afghan Water Law (1388).

It is assumed that IA is better enough than the traditional Mirab system in management of irrigation water and O&M of irrigation infrastructure. It is necessary to investigate the effectiveness of the IA in irrigation water management and O&M infrastructure and how the irrigation surpasses the Mirab system.

Causal Diagram of Mriab System

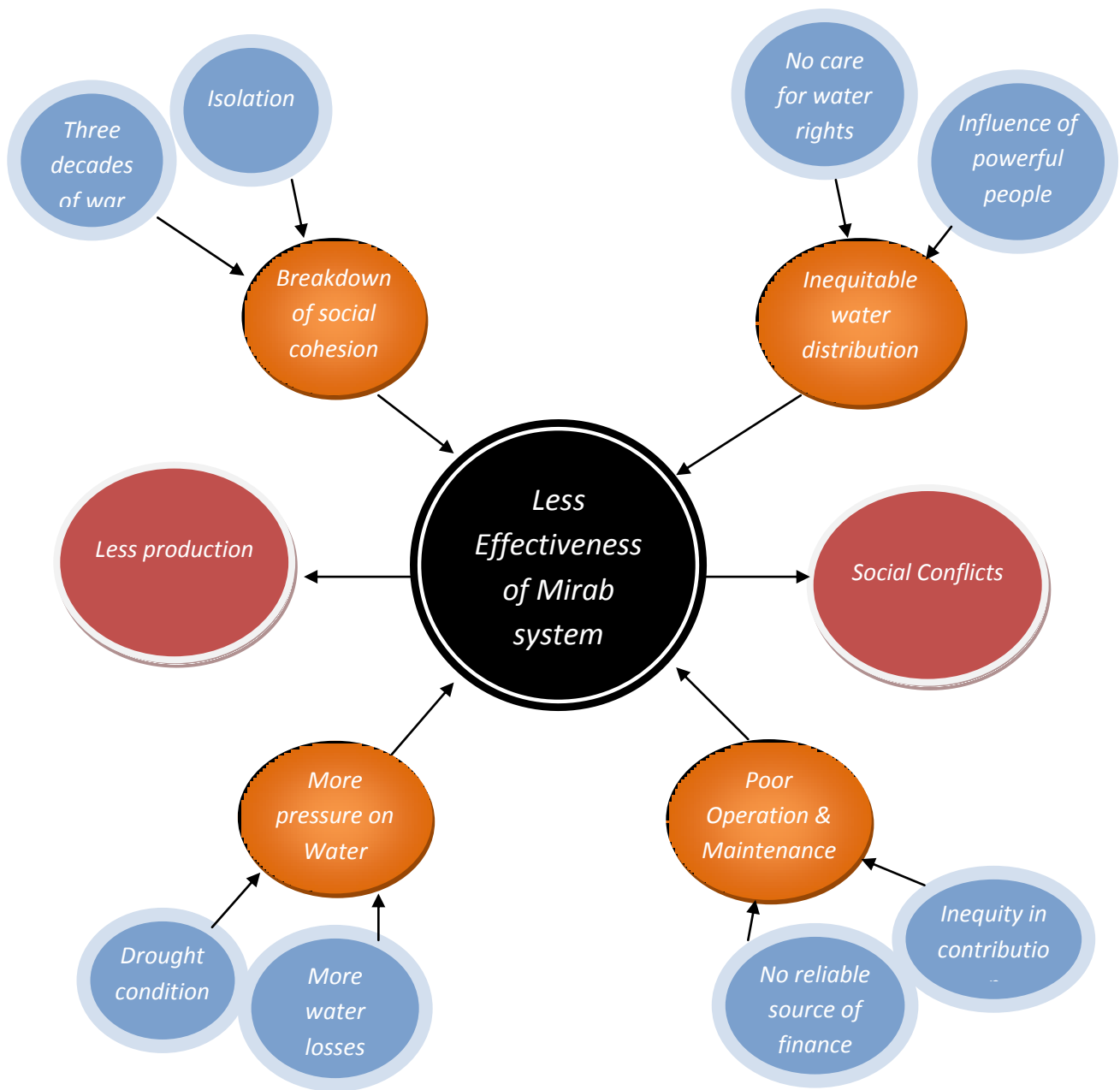


Figure 1 Causal diagram of Mirab System

Mirab system became weakened and its efficiency in terms of equitable water distribution and proper O&M of irrigation infrastructure is declined. The breakdown of social cohesion due to three decades of war, influence of powerful people, less care for water rights, more pressure on water demand, change in cropping pattern, illegal canal off-takes and the increase water scarcity due last few years of drought conditions are the important factors which contributed to the less effectiveness of this system.

1.3 Research objectives

The main objective of this research is to investigate the relative effectiveness of Irrigation Association in irrigation water management and O&M of infrastructure as compared to Mirab System and give recommendations for further improvements of IA.

1.4 Research questions

Q.1 How can IA surpass the Mirab system with respect to Irrigation Water Management and O&M of Irrigation Infrastructure?

1.1 What is Mirab system and how it is organized?

1.2 What is an Irrigation Association and how it is organized?

1.3 How is the transparency in both the systems?

1.4 How is the social cohesion in both the systems?

1.5 What is the resource generation mechanism of both the systems?

1.6 How the irrigation water distribution is done through both systems?

1.7 How the operation and maintenance of irrigation infrastructure is addressed in both systems?

1.8 How the equity issue is addressed in both systems?

1.9 What are the ways in which Irrigation Association surpasses the Mirab System?

2. METHODOLOGY

2.1 Study Area

The research was conducted in the Shakardara district of Kabul Province (See figure-3) and Khewa district of Nangrahar Province (See figure-6).

❖ Study Area-1 Shakardara

The Shakardara district is situated in the central part of the Kabul Province in Afghanistan. It has a population of 63,000 people, with another 10,000 expected to return from abroad (UNHCR 2002). Majority of the people are ethnic Tajiks. Shakardara district borders with Parwan Province to the west, Guldara District to the north, Mir Bacha Kot, DehSabz and Kabul districts to the east, and Paghman District to the south. It's headquarter is the village of Shakardara, which is located in the central part of the district. The agriculture is the main source of income.



Figure 2 Map of Afghanistan

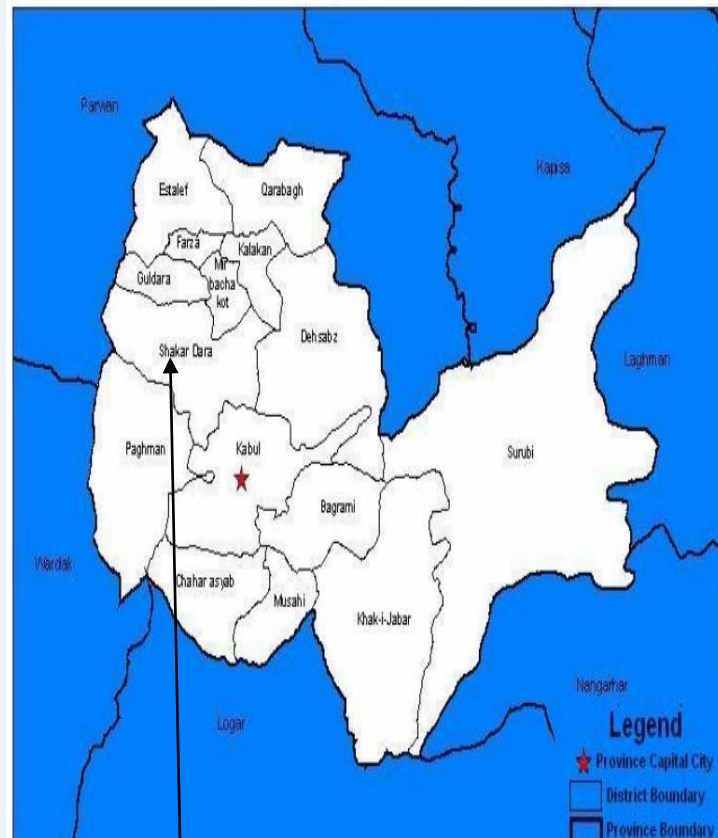


Figure 3-Map of Kabul Province showing Districts

Source Google Maps 2011

Shakardara district of Kabul Province: One of the two study area where study has been conducted

The specific study area is the Danishmand village (Afghanis Canal). The Danishmand village (See figure-3) is situated in Shakardara district of Kabul. There are 200 households living in this village. Majority of the villagers are farmers and rely on farming for their livelihoods. The main fruits grown are grapes (120 ha) and apples (40 ha). Wheat is the only cereal crops grown in the area over 40 ha of land.

Among vegetables, tomatoes is grown over 20 ha of land. The total arable area of this village is 700 ha. Currently, 230 ha of land cultivated and irrigated by canal the remaining 450 ha of land is either remains uncultivated or sometimes cultivated with the mercy of rainfall. Irrigation water is a precious resource for this village because the villagers depend on agriculture. Fortunately, this village has 5 km long irrigation canal which used to provide irrigation water for 700 ha of land. Currently, only 230 ha of land is irrigated by this canal. The un-proper operation and maintenance of the traditional Mirab system led to increased water losses at canal level.

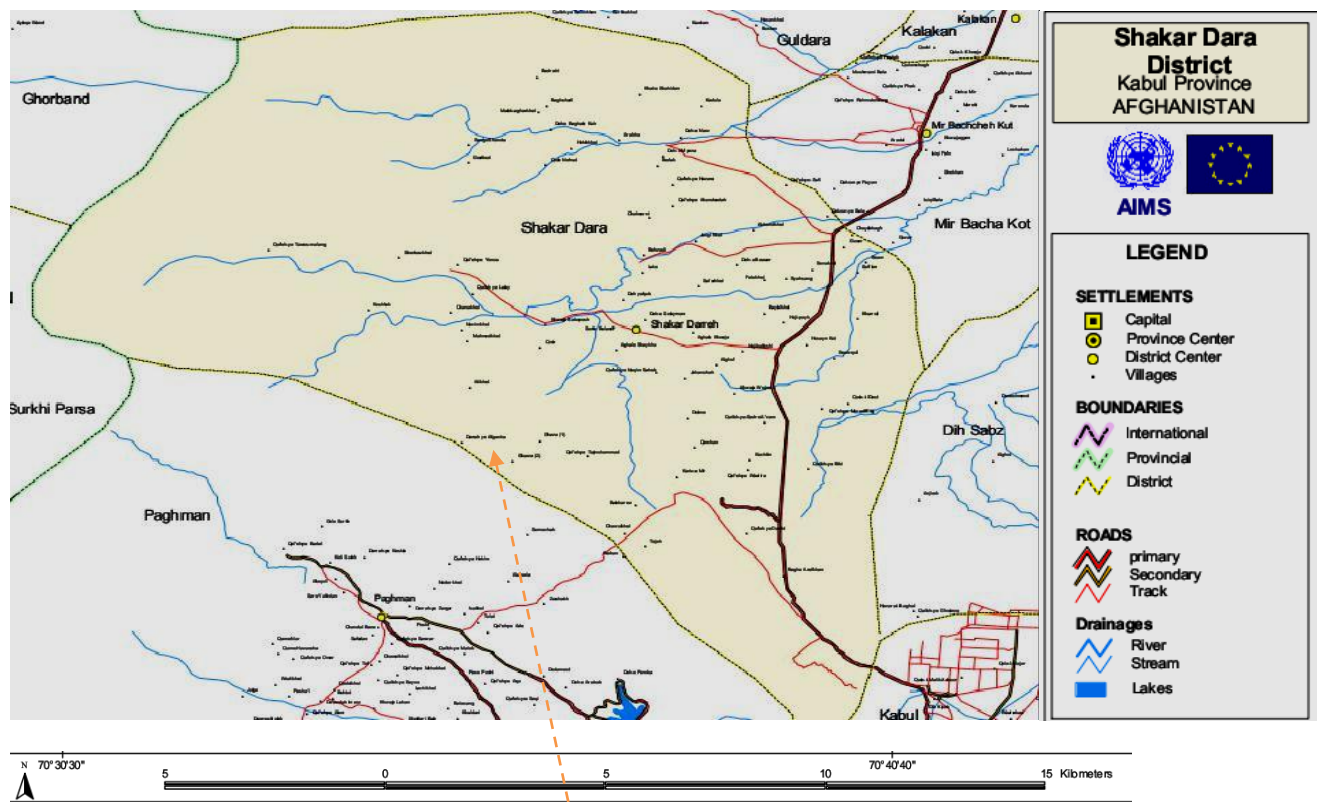


Figure 4 Map of the Shakardara District Showing the specific Village where research was conducted

Source: Afghanistan Information Management Services (AIMS)

❖ Study Area-2 Kuz Kunar (Khewa) District

Kuz Kunar is one of the secure districts of Nangrahar province. (See figure 4). It is situated 22 Km away from Jalalabad city (provincial centre of Nangrahar province) in the north part of Nangrahar Province, on the Kunar River. Some of the main villages of the districts are Khewa, Shaga, Budyalay, Kalatuk and Kashkot. The district is commonly famous by the name of Khewa. The total population of the district is estimated 167,640 in 2002. Majority of the people are Pashtun (75 %) with remaining 25 % Pashayee and others. Most of the population is engaged in agriculture. The main crops sown in the district are wheat, rice, sugarcane, maize and vegetables. The sources of irrigation water are Kariz, river and rainfall.



Figure 5 Map of Afghanistan

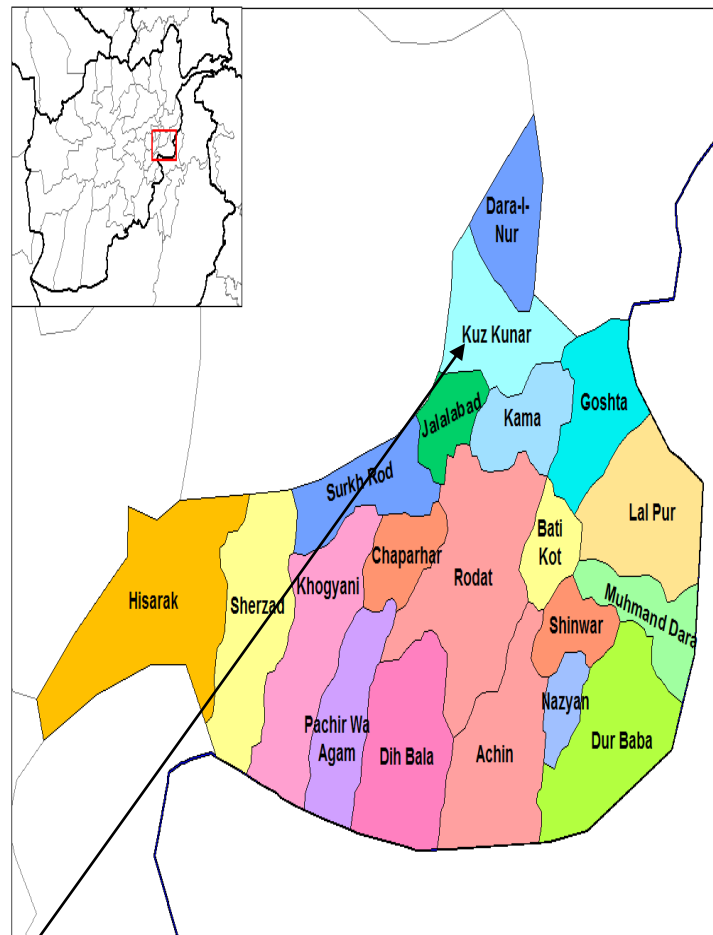
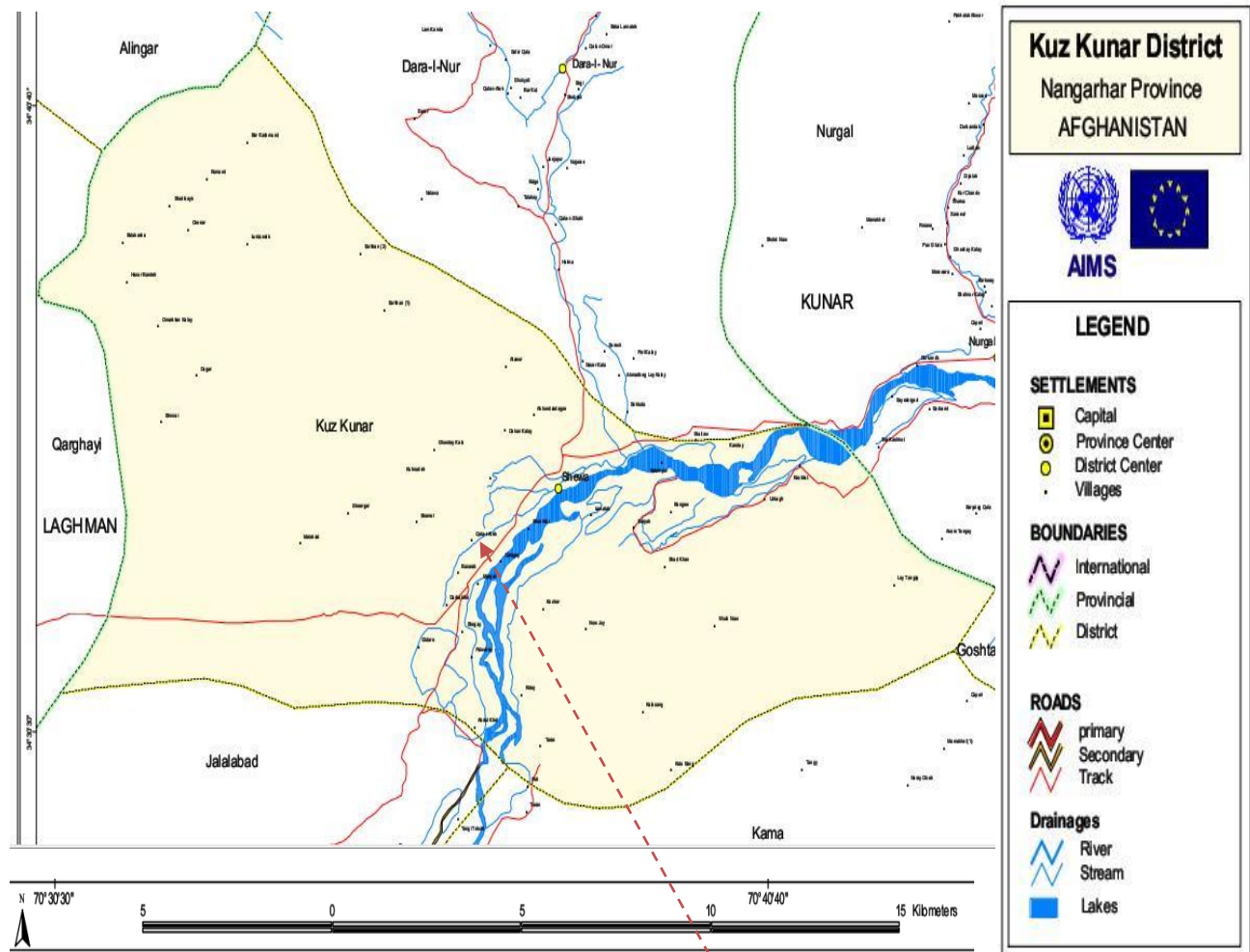


Figure 6 Map of Nangrahar Province with its districts

Kuz Kunar (Khewa) district of Nangrahar Province: One of the two study area where study has been conducted

The specific study area was the Shaga village (See figure 5) which is one of the main villages of Khewa district. The total population of the village is 3600 which makes a total number of 450 households. The canal studied was the Mian canal which was 2.5 Km long had a total command area of 1584 Jeribs. The source of irrigation water of this canal was Kunar River. The people of this village were farmers who were growing wheat, rice, maize, wheat, cotton and vegetables. There were two season crops summer and winter season.

Figure7 Map of Kuz Kunar (Khewa) District



Source: Afghanistan Information Management Services (AIMS)



2.2 Research Strategy

The research had both quantitative and qualitative approaches. The research strategy for data collection was based on the following:

❖ Literature review

Review of relevant literature including reports and publications inside the country and outside the country was done. The literature review was done for the support and validation of my research findings.



Figure8 Discussion with executive committee of IA of Danishmand village

Source: Field data

❖ Focus group discussion

A group discussion with the executive committee of the Irrigation association was held. The executive committee of water user association was selected for the group discussion because it represented all the water users and was involved in making important decisions. The executive committee is also responsible for the water distribution and O&M of irrigation infrastructure. The main focus in the group discussion was on the previous Mirab system and Irrigation Association. The various aspects of both the system were discussed. These aspects include organizational structure, social cohesion, equity and transparency and resource generation. Mirab was also included in the discussion with the Managing committee because he used to be an important person of the old traditional water distribution system and will remain also active in the IA and will provide useful information.

A discussion with the relevant staff of the supporting project (OFWM; On Farm Water Management Project) was also done to get their support during field work and collect relevant information about the IAs and technical data about the Afghani canal.

❖ Conducting Survey

A survey of the 40 water users was conducted in two different study areas. From each study areas 20 water users were selected through executive committee. The interviewees were divided into two clusters of 10 water users per cluster per study area. One cluster represented the upstream area of the canal and the other represented the downstream area of the canal. The survey addressed the issues of social cohesion (perception, feelings, and conflicts) and transparency and equity issues (labor contribution, elections, water allocation). The questionnaire for the survey had pre-structure questions, semi-structured and open ended questions.

2.3 Data Analysis

The research was based both on the qualitative and quantitative data. Two types of data was collected from the field. The data about the previous traditional irrigation water management system (Mirab) and data of new system of Irrigation Association (IA). The data for Mirab System and Irrigation Association System was collected from the same interviewees in the same area. These interviewees were part of the Mirab system and they converted to Irrigation Association about one year ago.

The data collected was arranged according to questions and then coded and analyzed using SPSS (Statistical Package for Social Sciences) and Microsoft Excel. The data was then presented in the graphs and tables.

2. 4 Time Schedule

Activity	June-10				July-10				Aug-10				Sep-10			
Preparation of Research Proposal				X	X	X										
Field Work/Data Collection							X	X	X							
Data Processing/Analysis								X		X	X					
Preparation of Draft Report										X	X	X	X			
Submission of Final Report														X		

Table 1 Time Schedule for Research

2.5 Conceptual Frame Work

The research was based on studying various aspects of both the systems (Mirab and IA). These aspects included organizational structure, social cohesion, equity, transparency, conflicts resolution and resource generation. See figure-9 Conceptual Frame Work. The data collected for both systems was analyzed, compared and the relative effectiveness of IA was concluded.

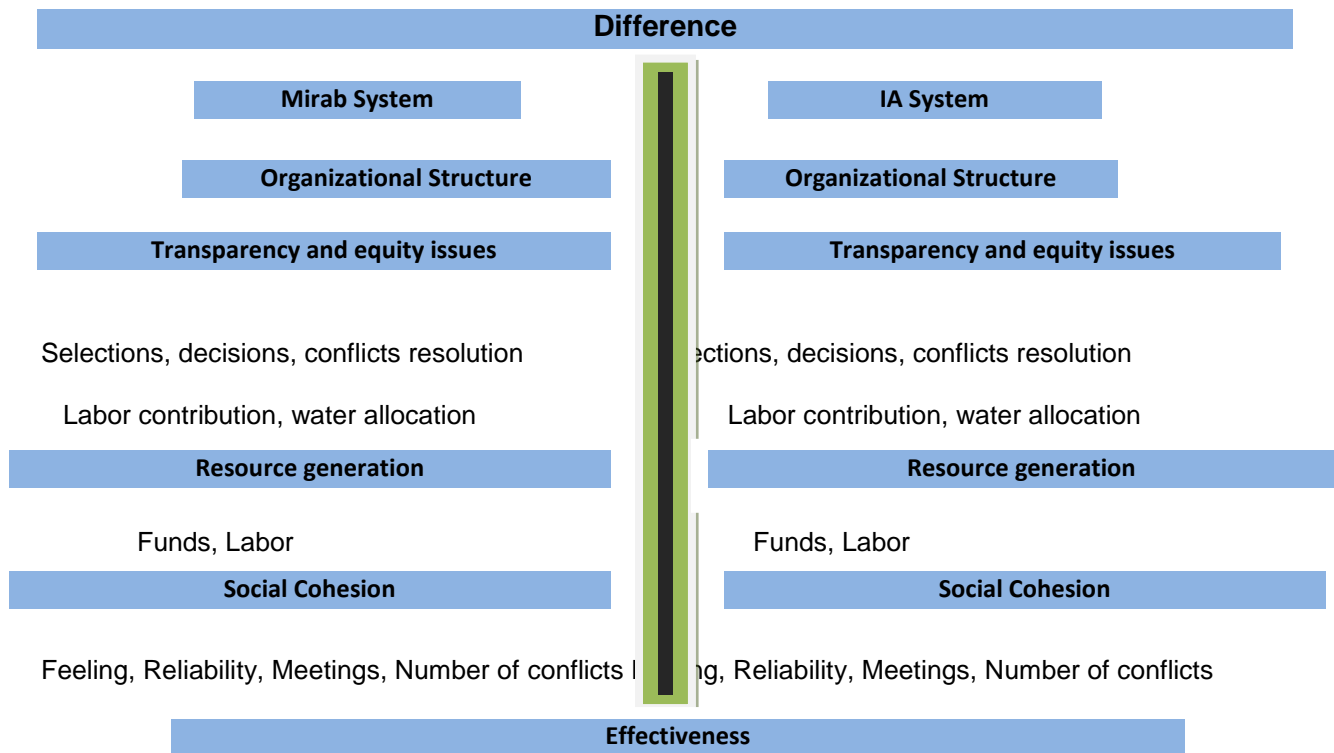


Figure9 Conceptual Frame Work

2.6 Research Limitations

The research conducted had some limitations which are described as follow:

Security

The security situation of various parts of Afghanistan is not good. The security situation of the area where the research was conducted was comparatively good but still had problems.

Technical Data and Maps:

The area where the research was conducted had very little technical data about the water discharge, water flow at intake and water losses. The irrigation associations were newly established so the technical data about change in cropping pattern and yields was not available. The specific maps of the canal were also not available.

3. LITERATURE REVIEW

3.1 Introduction

Despite of being resource sufficient, Afghanistan is still facing the problem of water shortage with the declination of total cultivated land from 3.3 million ha in 1980s to 1.8 million ha recently. The main reasons of this declination in the cultivated land are three decades of war and the drought conditions over the last five years. The prolonged war has caused the problems of shortage of efficient institutions, organizational capability of staff, effective rules and regulations with respect to water use and damage of traditional institution (Mahmood 2008).

The current water shortage is primarily driven by inefficient services rather than insufficient resources. The way individuals, communities and institutions govern the water resources has direct impact on people's livelihood, human development potential and environmental sustainability. The water problems in Afghanistan are mainly due to poor management and governance issue (Amarkhail and Kakar 2011).

Irrigation water management in Afghanistan is divided into two categories; the formal irrigation management system (10%) and the informal system (90%). The informal irrigation system is a community based traditional irrigation water management system known as Mirab system (Qureshi 2002).

3.2 Traditional Mirab System

Several researchers have dealt with Mirab system definition. Some researchers (Thomas and Naeem 2011) suggested a clear definition of Mirab as is a community based water service provider selected by water users and community elders responsible for water distribution, operation & maintenances and prevention and resolution of conflicts over water. Others, (Lee 2007 and Roe 2008) talked about the variation of the Mirab system region wise depending upon the culture of the region but still there are certain common features. Thomas 2009, has expressed the same opinion about the Mirab system. It can be said that Mirab as a community systems depends on the culture of particular community at certain area but with certain common features and it is not easy to come with one Mirab system with a clear cut characteristics.

❖ Mirab Selection

Pain 2004, in his case studies in various villages of Saripul and Faryab provinces reports that the process of Mirab selection in the villages is opaque. Although the local Shura and other informant referred to it as consensual process yet the process through which a person is identified and put forward is not clear. The Mirab could be replaced after one year if local Shura is interested.

❖ Mirab Payment

In majority of cases the Mirab is paid with crops usually wheat however the amount of wheat varies in different areas. In some cases the Mirabs were paid 7 Kgs of wheat per house. Pain 2009, Huntziger and Delesgues, 2009 came up with same conclusion about the Mirab payment.

Mirab is paid in the form of crops. Physical work required for regular maintenance and cleaning as well as emergency repairs of the canal is shared by the farmers, who respond to the Mirab's call for Hashr-voluntary communal work-and their participation is formally recorded. Farmers who do not participate are faced with financial penalties (AWATT 2010).

❖ **Water Distribution and O&M**

The Mirabs are managing the water distribution within the village by ensuring the rotation of the agreed schedule between the sub-canal and water distribution within the sub-canal. There is variation in water distribution procedure in the Mirab system. Basically, water distribution is based on agriculture land. Water from the canal is distributed according to traditional units and vary in different region. Example of traditional units are; Kalam (1 kalam is equal to 12 hours of water), Khord/Jerib (1 Khord is equal to 45 minutes), number of plants (1000 grapes plants are allowed 3 hours water per day), time (day or night) and turn (5-7 water turns for the lower reaches and 4-7 for the upper reaches). In some areas where there is sufficient water there is no specific systems and every farmer takes water when and how much he needs (Pain 2009 and AWAAT 2010).

The operation of canal (opening main gates,) is done by Mirab while the regular maintenance and cleaning (usually once a year) is shared by water users. The Mirab asks water users for Hashr (voluntary communal work) for the purpose of cleaning and maintenance of canal. In case of emergency repair the same strategy is used (DAI 2010).

3.3 Less Effectiveness of Mirab System

Several Scholars and Organizations have studied the Mirab system and expressed their opinions about the efficiency of the Mirab system. Roe 2009, in his study on WOL (Water, Opium and Livestock) mentioned that the community water management system (Mirab system) is effective whenever there is sufficient water which meets the needs of all the irrigators (upstream and downstream). In this case, Mirab system is effective in distribution of water among the users but in the case of water shortage and scarcity it is beyond the capacity of community water management system to address the issue properly.

DAI 2006, has studied the organizational structure and capability of the Mirab institutions and tradition of collective action in irrigation development and management. The study concludes that the Mirab institutions are not well organized and not sufficient in order to face the new irrigation and economic challenges. It has suggested that the Mirab systems need changes and it should be transformed into formal institutions with greater efficiency, better organizational structure and should have a legal status.

CPHD 2011, has stated in its report that irrigation water and schemes are managed by local communities of water users through Mirab system but no single model exists across the country for Mirab system. Although the Mirab system has survived during the three decades of war and rapid change in the political environment but it has not adapted successfully to the new challenges. It further has added that there is a great difference in water rights and water distribution in Afghanistan.

Several other Scholars have studied the issue of equity in the Mirab system. For example, Roe 2009, has reported that there are inequities in the management of irrigation water. The farmers irrigating on the upstream of the canal receive more water than those downstream, while the downstream farmers must take relatively more burden of canal infrastructure maintenance to ensure that the water reaches their lands. Pain 2004, concluded that although the village institutions are better enough in regulating the management of common pool resources but still these institutions (including Mirab) are always not fair in equitable distribution of the resources due to the presence of powerful people who frustrate the distribution of common pool resources both between the village and within the villages.

In their study, Huntziger and Delesgues 2009, have reported that the Mirab cannot often manage conflicts beyond tow villages. The selection and designation of Mirab is not 100% transparent and Mirabs sometimes also favor large land lords over the minor land owners in water access.

3.4 Irrigation Association IA

FOA has dealt in detail with Irrigation Association and has described in detailed its types and purposes. There are different kinds of irrigation associations depending upon the degree of control of management by government or farmers. The organization mainly controlled by the farmers referred as Association of Irrigation Water Users or Irrigation Associations (IAs). The Irrigation Associations (IA) is the organization of the people for the benefit of the people. However, without the support and encouragement of the government these organizations cannot exist and survive. Most of the irrigation concern with irrigation water management and maintenance of irrigation infrastructure however, some association also deal with generation of power and use of water for industry.

A water user association is a non-profit organization that is initiated and managed by the group of water users along one or more hydrological sub-system (distributor canals which are the higher level than a watercourse) regardless of the type of farms involved (IWMI, 2003).

Burgers 1998, has defined a water user association as voluntary, self-governed, organized group of irrigators who, although maintaining individuals control of their land, crop choices and marketing, work cooperatively to manage and maintain the local irrigation systems that serve their farms. The size of the association ranges from few to several hundred farms and from few to several thousand hectares of land.

It can be concluded that an Irrigation associations organizations of water users who wish to undertake water-related activities for their mutual benefits. These organizations are established according to the aspirations of its member. These organizations are termed as irrigation associations or water users associations.

❖ Organizational Structure of IA

Several Scholars have dealt with the organizational structure of the IA and its importance. They have emphasized on establishing the irrigation association according to the needs of the water users and local conditions.

There is variation in the organizational structure of irrigation associations. Scheuman and Hasan 2001, in their study in two provinces of Turkey have reported variation in the organizational setup of the irrigation associations. However, all the Irrigation Associations were membership organization joined by farmers voluntarily. The IA was consisted of a General Assembly, a Chairman and a Board of Directors. Elected farmers, community elders and delegates from municipalities were involved in the setup of the IA.

DAI 2006, presented an organizational structure for a water user association in Afghanistan. It has suggested that the association should consist of a General Assembly elected by water users, Management Board, Executive Committee consisting of a General Manager, Deputy/O&M Engineer, Accountant, Secretary, System operator and Mirabs. An Internal Audit Committee will be optional. See Annex-2 for detail information. This is model structure of WUAs but the structure and the internal rules and regulation of the WUAs might vary in different areas.

3.5 Effectiveness of IA

Several Scholars have dealt with the effectiveness of Irrigation Associations and have studied various aspect of IA which contributes to the effectiveness of the Irrigation Association. For example, Amarkhail and Kakar 2011, have reported that the performance of water users association is positive over the last five years. The water users associations have been effective in reducing the inequities in water access between upstream and downstream water users of a canal and have also reduced the water conflicts. Fipps 2006, have also reported that the local people in the Herat provinces were quite happy with organizational structure of water users association and the election process. They were positive and optimistic about the future benefits and effectiveness of the association.

Scheuman and Hasan 2001, in their study in two provinces of Turkey has reported that the IA are self-reliant and recover costs from local resources. They manage their common water sources and the infrastructures.

Nelson 2004, in his study on PIM reported that Participatory water management has several advantages and is for that reason widely promoted by authorities, development agencies and NGOs. Sometimes, the formation of a WUA is made a precondition for construction of a new irrigation scheme or rehabilitation of an existing one. There are several advantages of participatory irrigation management and the potential ones could be functional water allocation, better water utilization including good demand management, better cost recovery and better enforce of various restrictions.

According to Belsare, participatory irrigation management by Water Users Association in the Waghad irrigation scheme in Nashik district of Maharashtra State of India resulted in saving of 13 million cubic meter of water in the irrigation year 2008-2009. The saving of water has been achieved by the use of sustainable irrigation management through water users association. The average irrigated area increased from 3,212 ha to 10,750 ha after the formation of the association.

Ghosh and Kumar 2009, concluded in their study that there is a correlation of socio-personal, economic, communication and psychological characteristics of group members with group dynamics effectiveness. According to Moustafa 2004, education, caste, farm size, income, social participation, scientific orientation and attitude of group members are significantly related to group dynamics effectiveness.

3.6 Expected Improvements with IA

DAI 2006, considers the WUAs better enough as compared to Mirabs system in bringing the equity in water distribution, providing proper O&M of irrigation infrastructure by generating resources, having good accountability mechanism, and being a legal and formal representative of water users. The WUA association will represent the water users to government and civil society, improve water management, bring in equity, capture and use outside resources, reduce government expenditure, participate in land water planning and management, resolve water-conflicts.

Radosevich 1975, believes that developing local irrigation association will provide better institutional frame work and will have several advantages; more farmers will involve in decision making process, timing and conveyance will improve, better dispute resolution mechanism, Irrigation Association will act as a contact point between water users and government and the most important is that there will be exchange and dissemination of information and assistance on improved water use and agriculture practices.

According to Hussain 2007, there are various facilitating factors and conditions contributing to the success of WUAs; the WUAs have legislative backing because of having strong and clear legal status, the WUAs have the support from government agencies and NGOs by having effective partnerships and interactions with them, there is always leadership, the WUAs have financial strength by generating resources, there are long term capacity building and support services, there is clear water use rights, there is efficient system of accountability and transparency, the conflict resolution, the cost of being member is low as compared to its benefits and through WUAs the O&M of irrigation infrastructure is well done.

Irrigation Associations are better in improving the irrigation performance. Irrigation Performance is expressed in ratio and is the ratio of actually irrigated area to the total command area under an IA. Study by Yazar N/D, reveals that irrigation performance of IA improved significantly.

Burger 1998, claims that the WUAs are effective in conflicts resolution. The WUAs could organize activities of farmers within one irrigation area. These activities could be agreeing on crop rotation for efficient use of limited water supply, sharing farm equipments, marketing the harvest and obtaining the credits. The WUAs could also be a focal point for meetings and negotiations with government's water management authorities and welfare NGOs interesting to implement the project.

3.7 Important Points for IA

Various scholars have drawn the attention to an important point which needed to be considered carefully prior to the establishment of IA. The scholars have given emphasis on keeping in mind the local conditions and requirements of people while establishing Irrigation Association. Thomas 2009, suggests that any new system should balance positive & accepted elements of the past Mirab systems with elements which challenge the currently contested status quo. He further adds that while facilitating a process of change in collective water management one must study the current system instead of imposing a one fits all blue print /model of WUA formation.

Radosevich 1975, has emphasized on the minimum disruption of already existing local institutions. The new system should be according to the needs of the people and local conditions. In his study he cited an example of Ceylor (Sri Lanka) where two changes were brought by the British that modified local practices in the use and maintenance of irrigation systems. The custom forced services were abolished and the British system of minor courts was introduced. It does not work and the things went wrong because the local leaders did not get assistance for maintenance of water courses and new dispute resolution mechanism was not understood by people.

IEG 2011, study in Pakistan revealed that the IA worked actively at the beginning of the project implementation. The farmers were united in IA till the lining of the canal. Very few IA were left functioning after the completion of the project. The establishment of IA was imposed by the project which resulted in the breakdown of the IA soon after the completion of the lining of the canal.

Hamdy 2004, emphasizes on the identification of clear cut managing responsibilities and authorities, clear water rights and supportive incentives for the managing persons for the success of WUAs. He also adds that the irrigation infrastructure should be compatible with water rights and local management capacities.

KAI 2009, in his study on PMIs (participatory management irrigation system) suggested and emphasized on conducting research before rehabilitating a canal or forming a water user association WUA because water management arrangements differ in each canal in the PMIs project. Even though some lessons can be transferred to other canals, overall it is important to understand local complexities. He further has added that if local complexities are not studied establishing a water users association will trigger water conflicts.

CHAPTER-4 RESULT

This chapter has dealt with the outcome of the field work. The chapter summarizes the result of group discussion with executive committee of Irrigation Association including Mirab and the staff member of OFWM-project, and the result of the survey conducted.

4.1 Group Discussion: Executive Committee and Mirab (Afghani Canal)

The group discussion with the executive committee and Mirab of the Afghani Canal has provided the following results:

4.1.1 Mirab System in Danishmand Village (Afghani Canal)

Irrigation water is an important and precious resource of Danishmand village. Unfortunately, the irrigation water is scarce and the great portion of the arable land remains uncultivated or cultivated after 2-3 three years. The irrigation water is managed by a water master (Mirab). The Mirab system is consisted of Mirab, community elders and water users. The responsibilities of the Mirab in the Mirab system are to distribute water according to the pre-determined water allocation by opening the gates, he has to let the farmers know their respective turns, play active role in solving water conflicts and maintain irrigation infrastructure. The role of the community elders is to play active role in the water conflict resolution, Mirab selection and coordinate with NGOs or government. The water users play role in the selection of Mirab. They have to contribute labor whenever needed for maintenance of irrigation infrastructure. The government has little influence in the Mirab system of Danishmand village. Its role is limited to resolution of the conflict if not solved by community elders.

Mirab is appointed by the elders of the area with the general agreement of the water users. The duration of the Mirab is usually not specific. The duration of a Mirab depends upon his performance. The Mirab could stay as long as he performs well. He could be changed if not performed well usually at the end of the cropping year with general agreement of the water users. Various Mirabs were replaced one after another but the current Mirab of the Afghani canal worked for 13 years. Mirab is usually paid with crops (wheat). The minimum quantity of crops he receives is 21Kgs of wheat per house. He could be awarded with more crops depending upon the generosity of the water user. Currently, the Mirab of the Danishmand village is paid with water for his services. He receives 4 hours of water at his turn for his services.

There are certain criteria for selection of Mirab in the Mirab system which is always considered during the selection Mirab. The Mirab should be active, honest and hardworking. He should have to know the water rights and the water users.

a. Water distribution

Water is distributed according to a local and traditional measuring unit system known as Qulba (pair of oxen for plowing). One Qulba is equal to twelve hours of water. In past, the landholding size was large but with the continuous division of land among heirs due to heritage law, the landholding is decreasing and becoming small. The Qulba (12 hours of water and is also equal to 150-200 Jeribs of land) is then distributed among the heirs. The farmers receive water

according to predetermined turn system. The Mirab is responsible to ensure that the farmers receive water according to their correct turn.

b. Water rights

The water right is the allocation of entitlements to the use of irrigation water formally or informally mutually agreed by all water users or beneficiaries. The water rights are determined according to old Qulba system. Whenever, a farmer wants to sell his land, he only sells the land and the water rights remain with the seller. He then can give his water right on rent basis. The cost of one hour of water is equal to 800Afs on average basis. The farmers who has surplus of water could give water to his neighbors for free or charge him money per unit time.

c. Equity and transparency in Danishmand Mirab System

The water allocation in the Mirab system of Afghani canal is not equitable. The upstream water users receive more water because the discharge at the upstream is high as compared to the downstream. The discharge at downstream is very low as compared to the upstream. The time allocated per unit of land for water remains the same in upstream and downstream while the discharge varies significantly between them. A great portion of water is lost in canal while reaching the downstream area. (See table 2 for water losses).

d. Illegal Water Use and Water Conflicts

Illegal water use or water theft often occurs in Mirab system. The water users open the turn-out diverting water to their fields illegally. The water user having legal turn closes the turnout back. The closing and opening of turnout sometimes continue several times. The water user having legal turn either forgives the users diverting water illegally or have exchange hard words for using water illegally. In some cases conflict occurs between them.

e. Conflict resolution

Water is a precious resource for the farmers of Afghani canal. Sometimes, water is used illegally by farmers which give rise to conflicts over water. These conflicts are not too much serious and are usually, just restricted to mere exchange of words among two users. Whenever, water conflict get serious then community elders are approached.

Community elders try to solve these conflicts in un-biased way and usually the conflict resolution process is done in a transparent way.

f. Operation and Maintenance of Canal

The water users of Afghani canal clean and de-silt their canal once per year. Mirab call upon the water users to participate in canal cleaning or de-silting. The water users clean part of the canal passing along their fields. Those water users who do not participate get fined by Mirab for their absence. There was no fund for O&M of irrigation infrastructure but water users contribute labor for canal cleaning.

4.1.2 Irrigation Association in Danishmand Village (Afghani Canal)

In the discussion the executive committee and Mirab reflected that the irrigation association is made with general agreement and interest of the water users with the help of the OFWM project. The IA is consisted of the executive committee, Mirab and water users. The executive committee has a chairman, vice chairman and treasure man. The executive committee is selected by a democratic electoral process. The role of the executive committee is to support the Mirab in water management and O&M of irrigation infrastructure. It has to contribute in the implementation of water rights and the execution of project work properly. It has also to resolve conflicts over water among the users.

The water distribution is done according to the pre-determined water rights through the same local units as was before in the Mirab system. There has been some improvement in the equity of water distribution. The downstream water users receive more water because of the reduction and control of water theft. With the lining of the canal the water the downstream people will receive more water. The operation and maintenance of the canal is improved as we have fund specific for maintenance and the canal is cleaned at least twice a year.

Some improvements have occurred with the establishment of irrigation association. The water users contributed money to raise a common fund for the maintenance of the canal. The canal will be lined by the OFWM project which will prevent water losses.

4.2 Group Discussion: Executive Committee and Mirab (Mian Canal)

The discussion with executive committee and Mirab has resulted in the following outcomes:

4.2.1 Mirab System in Khewa (Mian Canal)

Mirab system of Mian canal is consisted of one Mirab, community elders (Malik) and water users. Community elders and farmers are involved the selection of Mirab. The community elders are play important role in conflict resolution. The role of Mirab is to monitor the canal and maintain it properly. He has to ensure that the water distribution is done according to water rights. The duration of the Mirab is not specific and Mirab can stay working as long as water users are happy with him. The current Mirab of the Mian canal has been working for 13 years and the people were quite happy with him. The Mirab is paid with crops (21 Kgs of wheat per water user) for his services.

The water users and community elders select Mirab, based on certain criteria. Honesty and trustworthiness were the most important conditions for Mirab selection. Moreover, Mirab was supposed to be active and not lazy. He was supposed to be young and not too much old, have sufficient knowledge about the water rights and has to be a well known person and has to know local people. One of the responses of the interviewees about Mirab selection criteria was: "Mirab should be able to work in cold water in winter season with half of his body drown in the water".

The source of irrigation water is the Kunar River which passes near the Khewa district. There is no permanent water scarcity and the irrigation water is distributed without any turn system. However, when there is water scarcity then the water is distributed according to the turn system. The irrigation water is distributed according to size of the land. Normally one Jerib of land (0.2 ha) receives 30 minutes of water per turn per water user.

In the water scarcity time the irrigation water is used illegally. The illegal water use sometimes causes serious conflicts among the water users. Mirab tries to mitigate the conflicts over water however; if the conflict is serious then community elders (Malik) are approached for the resolution of the conflicts.

The maintenance of the irrigation infrastructure is the responsibility of the Mirab with cooperation of the water users. The canal is usually cleaned and de-silted once a year. Mirab calls upon the water users to contribute labor for the cleaning and maintenance of the canal. Usually, the water users clean the part of canal which is passing along their land.

There is no common fund available for the O&O of irrigation infrastructure. The canal is poorly maintained and there are a lot of conveyance losses. The canal is also damaged by occasional floods.

The Mian Canal Mirab system was not transparent especially in water distribution. The downstream people receive less water as compared to the upstream water users. The selection procedure is not always clear and is opaque. There are no elections but the water users and community elders appoint Mirab. Sometimes the decision made by community elders is imposed by the people appointed for certain tasks. Although it is said that all the water users are involved in the selection process but still the systems are dominated by the upstream people. The participation of the downstream people is less as compared to upstream. The conflict resolution is transparent and the water users were happy with it. Labor contribution was also reported transparent. The water users reported that they usually clean part of the canal passing along their land.

The social cohesion in the Mirab system of Mian Canal was not satisfactory. The conflicts over water were existed in the system. At least 2-3 conflicts per year were reported in the Mirab system. There were limited meetings of the water users among themselves. They usually meet whenever a communal work was carried out usually once per year. The perception of the water users about the Mirab system was good however; they considered the system not too much reliable in terms of water availability.

4.2.2 Difference between Afghani and Mian Canal Mirab System

The Mirab System in Khewa district of Nangrahar province (Mian Canal) does not vary much from the Shakardara district of Kabul province (Afghani Canal) Mirab system. However, there are still certain differences among both the systems. The Mirab is paid with water in Afghani canal while in Mian canal with crops. The water distribution is done with turn system in Afghani canal while in Mian canal there is no turn system in normal situation. When the water gets scarce then the water distribution is done according to turn system.

4.2.3 Irrigation Association in Khewa (Afghani Canal)

In the discussion, the executive committee and Mirab reflected that the irrigation association is made with general agreement and interest of the water users with the help of the OFWM project. The IA is consisted of the executive committee, Mirab and water users. The executive committee has a chairman, vice chairman and treasure man. The executive committee is selected by a democratic electoral process. The role of the executive committee is to support the Mirab in water management and O&M of irrigation infrastructure. It has to contribute in the implementation of water rights and the execution of project work properly. It has also to resolve conflicts over water among the users.

The water distribution is done according to the pre-determined water rights through the same local units as was before in the Mirab system. There has been some improvement in the equity of water distribution. The downstream water users receive more water because of the reduction and control of water theft. With the lining of the canal the water the downstream people will receive more water. The operation and maintenance of the canal is improved as we have fund specific for maintenance and the canal is cleaned at least twice a year.

Some improvements have occurred with the establishment of irrigation association. The water users contributed money to raise a common fund for the maintenance of the canal. The canal will be lined by the OFWM project which will prevent water losses.

4.2.4 Difference between Irrigation Association of Afghani and Mian Canal

There were no obvious differences in the organizational structure of the irrigation association in Danishmand village (Afghani canal) and Khewa district (Mian canal). Both of the systems had similar structure with same objectives and responsibilities.

4.3 Group Discussion: With OFWM Project Staff

The group discussion with the on farm water management project staff was done to get information about current government strategy about Mirab system, shortcomings of Mirab system, description of irrigation association, its responsibilities and the possible benefits of the irrigation association. The result of the discussion is summarized below:

4.3.1 Government (MAIL) Strategy

The current strategy of the government (MAIL) is to promote the Mirab system to a formalized and strong institutional structure based on the foundation of Mirab system. Its current strategy is to promote the Mirab system into Irrigation Association system. The MAIL is working hard to develop a model charter for the irrigation association. The irrigation association will make its own bylaws but within the frame work of MAIL's charter.

4.3.2 Mirab System and its Shortcomings

The Mirab system is a traditional and community based system through which irrigation water is managed and O&M irrigation infrastructure is carried out. The organizational structure of the Mirab system in both the study areas was consisted of Mirab, community elders and water users. The community elders select a person among the water users for the water distribution and O&M of irrigation infrastructure who is called as Mirab. The community called the water management system as Mirab system. There are some shortcomings of the Mirab system. The Mirab system is not able to ensure the equity of water distribution among the water users. The operation and maintenance of the infrastructure is very poor. There are a lot of water losses due to poor maintenance. (See table-2 as example of water losses).The system is influenced by powerful people in some areas. The Mirab system is not able to solve the water conflicts and tackle the new water challenges.

Table 2 Technical Information of Afghani Canal, Danishmand Village (Source: OFWM-Project)

Discharge and losses of Afghani Canal	
Head at U/S (ft)	0.617
Head at D/S (ft)	0.554
Discharge upto U/S (lit/sec)	21.54226666
Distance Covered upto D/S (meter)	1000
Discharge at D/S (lit/sec)	16.50233752
Water losses (lit/sec)	5.039929139
Conveyance Efficiency %	76.6044622
losses %	23.3955378

Source OFWM-Project

4.3.3 Irrigation Association

The Irrigation Association is established with the common interest of water users. It is consisted of an Executive Committee and at least 3 to 5 members depending upon the water course command area. It is also connected with the government authorities (MAIL). The Executive Committee is consisted of a Chairman, Vice Chairman and a Treasurer. The Executive committee is elected by water users either with general agreement of all users or through election process. There is no written ToR of the person belongs to the Executive Committee. However, the committee of IA is legally registered with government and is representing the community. It is in close contact with government authorities. The committee will also supervise the Mirab and will help him in water distribution and O&M of irrigation infrastructure. The government will assist the Irrigation Association financially and technically whenever required.

❖ **Responsibilities of Irrigation Association**

The irrigation association is responsible for the distribution of irrigation water and O&M of irrigation infrastructure. It is also responsible for the resolution of conflicts over water and any other problem arising from the lining of the canal. IA has to ensure equity among the users. It has to facilitate government staff, consultants and other stakeholders in information documentation/data base development about water rights, allocation and distribution. The IA has to assist any government or NGOs staff while undertaking social or engineering surveys for scheme preparation and design.

❖ **Water Distribution in IA**

The water distribution in the IA association is being done according to the pre-determined water rights. However, with canal lining the water losses will be reduced and water will be saved to reach at a good discharge rate to the downstream area. The illegal water use is also reduced and the downstream people receive more water as compared before.

❖ **Conflict Resolution in IA**

The conflict resolution mechanism in IA system of is carried out with the help of community elders, Mirab and Executive Committee. Mirab and Executive committee will solve water conflicts. The executive committee will be easily available and will have more time for resolution of conflicts. Community elders could also play role whenever necessary.

❖ **Resource Generation in IA**

In Irrigation Association water users not only contribute in form of labor for the operation and maintenance of the irrigation infrastructure but they also contribute financially. The Association has its own bank account where the money contributed by the user is deposited. The money is withdrawn by the Executive Committee whenever needed.

4.3.4 The Ways in Which Irrigation Association Surpasses Mirab System

There are several ways in which Irrigation Association surpasses the Mirab system which are discussed below in details:

1. Legal Status

Irrigation Association has a legal status and will formally registered with Ministry of Agriculture, Irrigation and Livestock as soon as by-law is established for Irrigation Association. Currently, it is informally registered with the help of the OFWM project. The Mirab system does not have a legal status.

2. Democratic and Transparent System

The Irrigation Association has democratic mechanism for selection of Mirab, Executive Committee and decision making. It is not influenced by powerful people and warlords. The

Mirab system has not 100 % democratic mechanism and is sometimes influenced by powerful people. It is also transparent in labor contribution for O&M of irrigation infrastructure.

3. Better Resource Generation

In Irrigation Association, members contribute an agreed amount of money for the maintenance of irrigation infrastructure and carrying out any improvement intervention. The IA has its own account where the money is deposited. The money is withdrawn for any kind of maintenance. Moreover, water users also contribute in labor whenever needed. In Mirab System although the water users contribute labor for O&M of irrigation infrastructure but no fund was available to do the technical part of the irrigation infrastructure. There were a lot of losses in the canal.

4. Better Management in IA

In Irrigation Association, many people are involved in the water distribution and O&M of irrigation infrastructure. The Mirab is supervised and helped by the executive committee in water distribution, conflict resolution. The management is strong as compared to Mirab system. In Mirab system only Mirab was involved in the management.

5. Better in Equity Issues

The Irrigation Association is better enough in the equity issue. After the lining of canal the water losses will be reduced and the water will reach a good discharge at downstream users. Furthermore, the illegal water use is controlled and more water is available for downstream users. However, there will be no change in the water allocations previously determined. There is equity in the financial contribution of for O&M of irrigation infrastructure as each member users have to pay a fixed amount of money for a common fund raising. This fund will be used for O&M of irrigation infrastructure. Irrigation Association gives equal importance to all water users and gives equal right to decision making.

4.4 Results of the Survey

This section of the report is based on the outcome of the survey carried out among the water users of Afghani and Mian canals. The survey was aimed to get the general perception of the water users about the Mirab system and the new Irrigation association system and what changes have occurred. The survey was based on questions about the people involvement in Mirab selection, equity in water distribution and labor contribution, transparency issues, influence of the powerful people, conflicts resolution, operation and maintenance of infrastructure, social cohesion and so on. The result of the survey is summarized as follow;

4.4.1 Short Summary of the Survey Result

In both, Afghani and Mian canal Mirab system the Mirab was appointed by community elders and water users. Although water users were involved in Mirab selection however, not all waters participated in this selection. The duration of the Mirab was usually not fixed (Mian Canal Mirab System). In some cases, Mirab was appointed for a period of one to two years (Afghani Canal Mirab System). The Mirab remains in his service as long as he performs well and the water users are happy with him.

The duration of Mirab's job was depended upon, the honesty and hardworking of Mirab. He was replaced with other person whenever his performance was not satisfactory and the water users objected on him. He was then changed usually at the beginning of the cropping year. In the Irrigation Association of both the area the Mirab selection was done by the executive committee and water users.

The Mirab systems of Afghani Canal and Mian Canal had similar conflict resolution mechanism. Community Elders were playing main role in conflicts resolution. They were not only resolving the water conflicts but other conflicts as well. The conflict resolution by Community Elders was usually considered transparent and fair. The water users have to accept the decision made by community elders and they usually do so. Mirab was also involved in conflict mitigation and resolution over water. In the irrigation association the conflicts resolution was done by the executive committee and also considered transparent.

The Mirab system of Afghani and Mian canal was not transparent especially in water distribution. The downstream people receive less water as compared to the upstream water users. The selection procedure is not always clear. Although it is said that all the water users are involved in the selection process but still the systems are dominated by the upstream people. The participation of the downstream people is less as compared to upstream. Moreover, community elders have influence in the selection process as well. The decision making is also influenced sometimes by community elders. However, the conflict resolution is transparent and the water users were happy with it. Labor contribution was also reported equitable and transparent. The Irrigation Association of Afghani and Mian canal was comparatively transparent in water distribution as compared to Mirab system. While in labor contribution and decision making the Irrigation associations were more transparent.

The operation and Maintenance of the irrigation infrastructure in the Mirab system of the Afghani and Mian canal was poor. The water users contributed in the form of labor per the annuals cleaning of the canal. While in the Irrigation association of the mentioned areas the operation and maintenance was good because of better resources. The water users were cleaning their canals twice a year.

The social cohesion in the Mirab system of Afghani and Mian canal was not satisfactory. The conflicts over water were existed in both the systems. At least 2-3 conflicts per year were reported in the Mirab systems. However, the nature of the conflicts was not too much serious. There were limited meetings of the water users among themselves. They usually meet whenever a communal work was carried out usually once per year. The perception of the water users about the Mirab system was good however; they considered the system not too much reliable in terms of water availability and O&M of irrigation infrastructure. In contrast, the social cohesion in Irrigation Associations of Afghani and Mian canal was more as compared to Mirab system. The number of conflicts over water reduced to great extent. The water users meet at least twice a year. The water users considered the Irrigation association better than Mirab system.

4.4.2 People involved in Mirab Selection: In Afghani & Mian canal Mirab System and Irrigation Association System

The figure below indicates that in the selection of Mirab, farmers and community elders play great role in Mirab system while in the Irrigation Association the executive committee and farmers are involved in the Mirab selection.

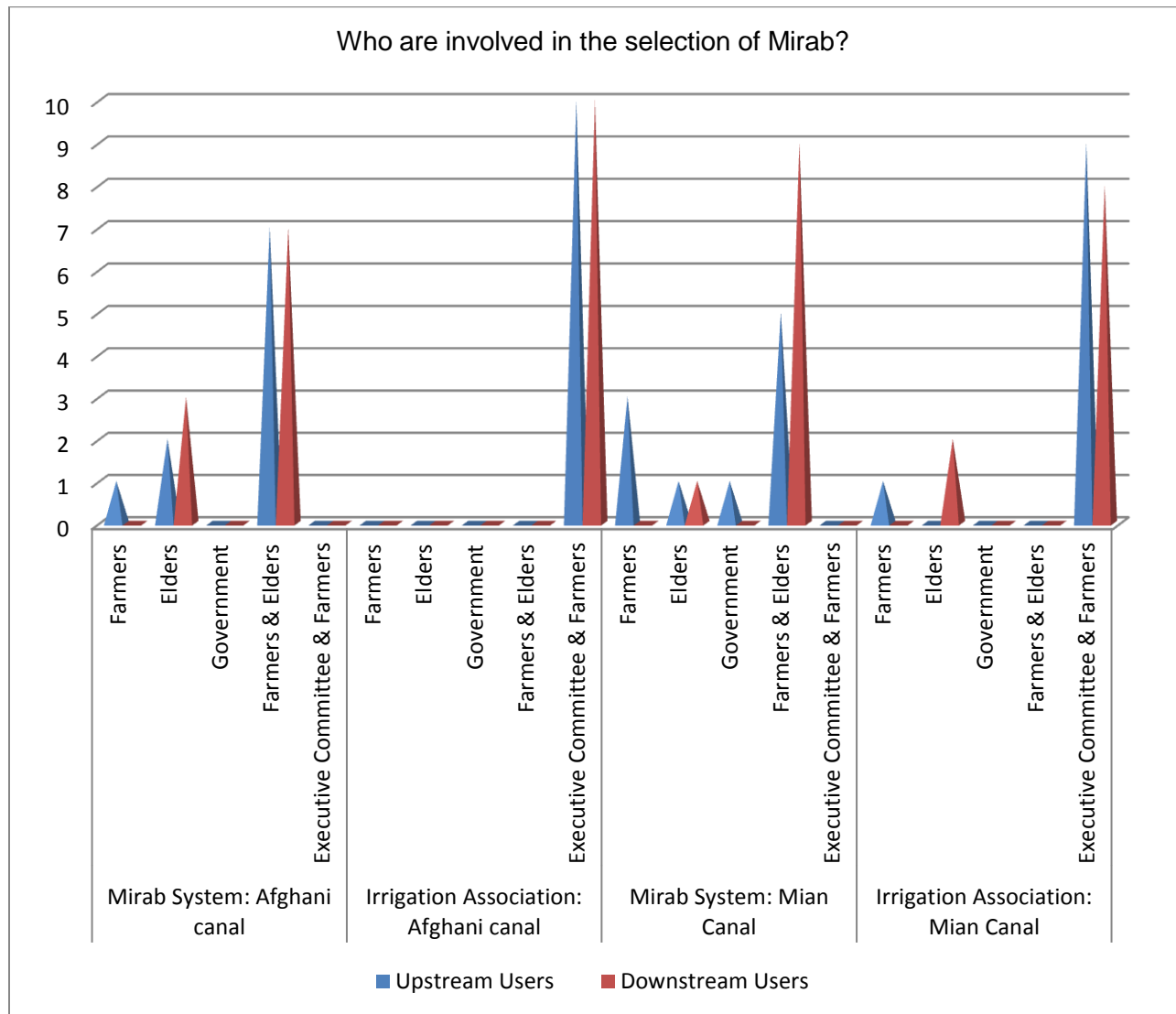


Figure 10 People involved in Mirab Selection in Mirab System and Irrigation Association System

4.4.3 Duration of Mirab Services: In Mirab System and Irrigation System of Afghani Canal and Mian Canal

The figure below reflects that duration of Mirab services in Mira system of Afghani canal is 1-2 years while in Mian canal the duration of Mirab services is not specified. In the new Irrigation Association system in both the study areas the duration of Mirab services is not specified and Mirab can stay in his services as long as water users are happy with him. The duration of the Mirab service depends upon his hardworking and honesty.

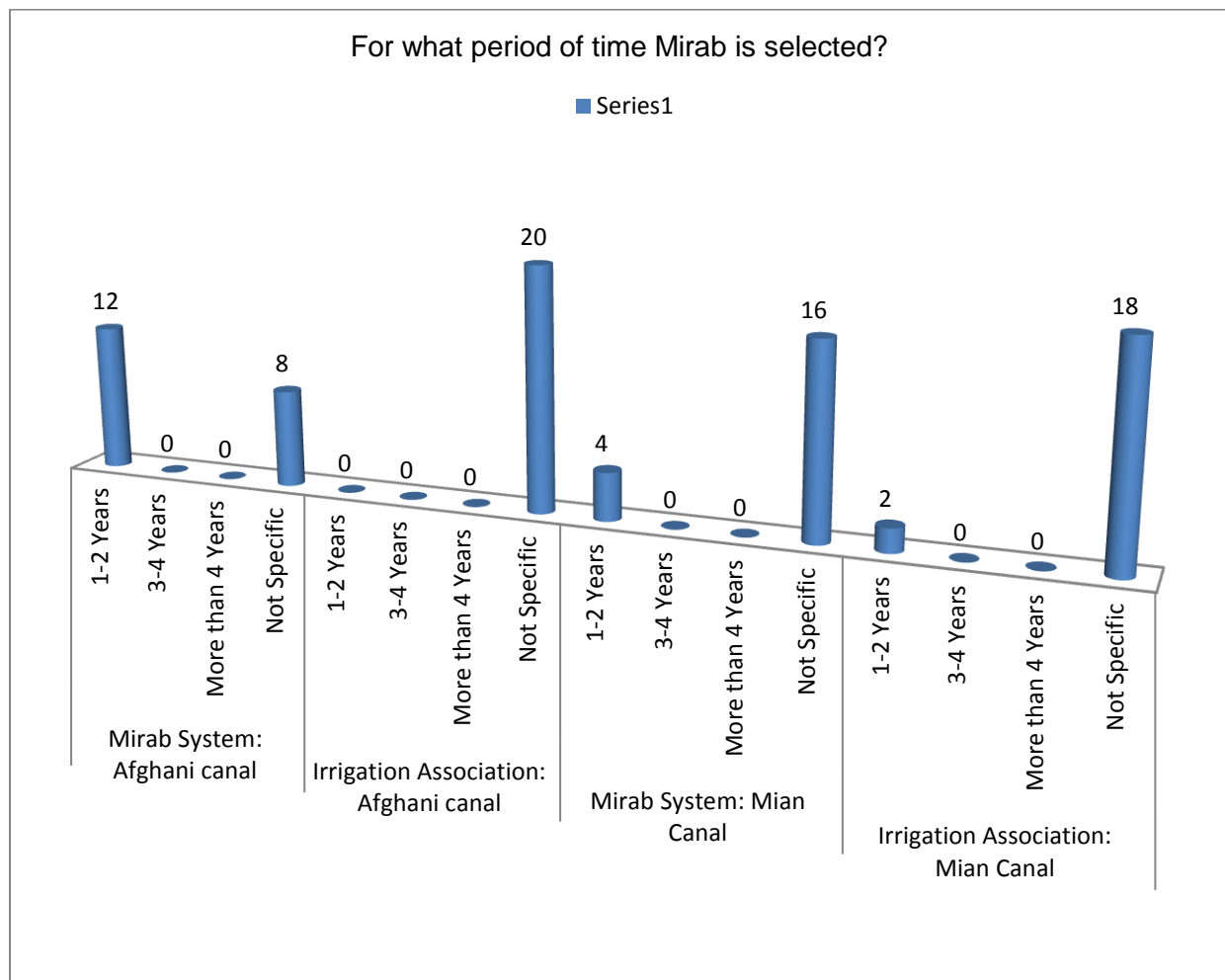


Figure 11 -Duration of Mirab Services: In Mirab System and Irrigation System of Afghani and Mian Canal

4.4.4 Involvement of Water Users in Mirab Selection: In Mirab and Irrigation Association System of Afghani and Mian Canals

It is clear from the figure below that in Mirab system the upstream users are involved more as compared to the downstream users in Mirab selection. In contrast, the involvement of the water users has increased to large extent in the new irrigation association system of Afghani and Mian canals. It is because of the democratic decision process and interest of the water users.

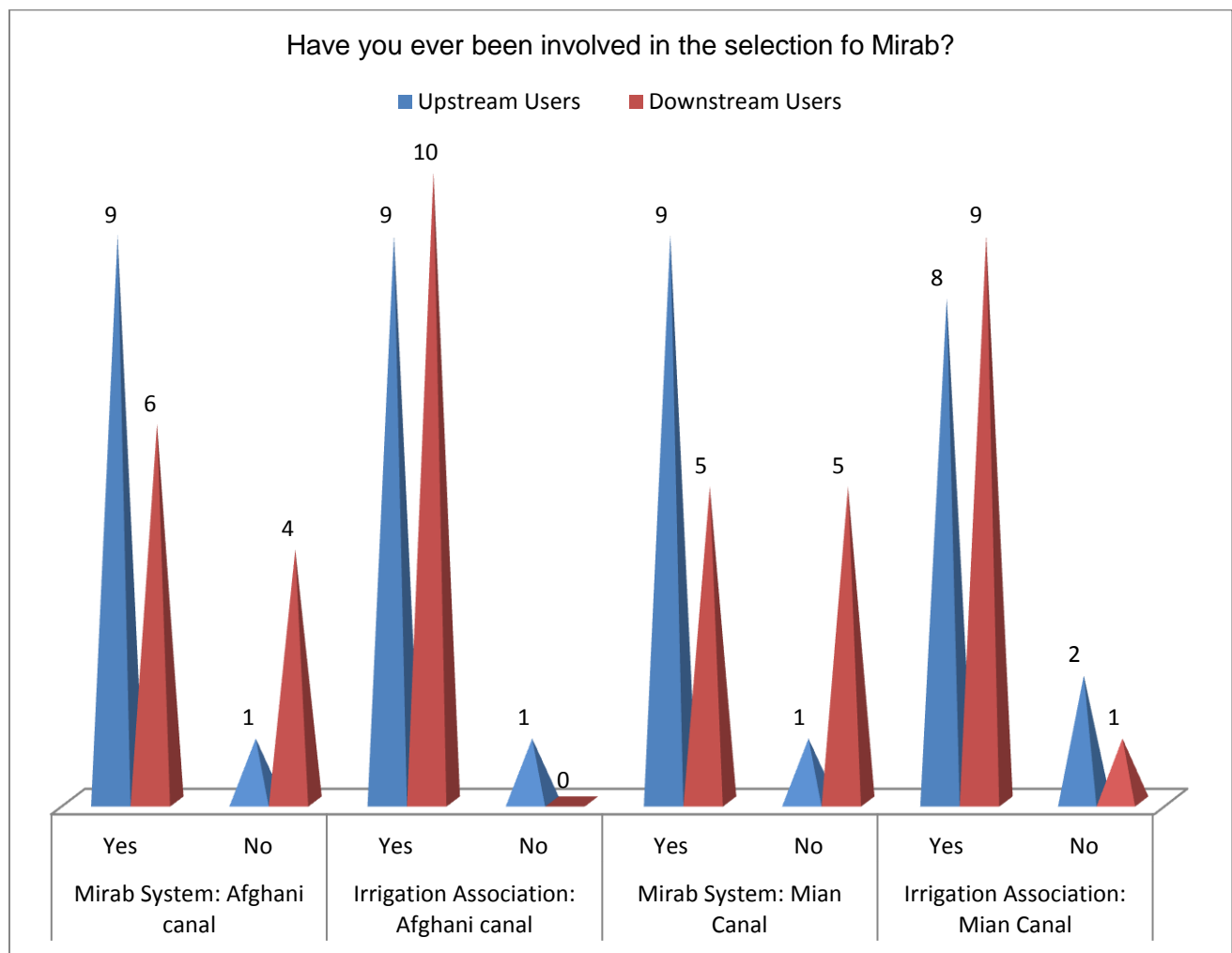


Figure -12 - Involvement of Upstream and Downstream Water Users in Mirab System and Irrigation Association System

4.4.5 Transparency in Mirab selection: In Mirab System and Irrigation Association of Afghani and Mian Canals

From the figure below it is clear that majority of the water users were happy with Mirab selection procedure in Mirab system while they were happier with the selection procedure of Mirab in irrigation association and considered it more democratic and transparent as compared to Mirab system.

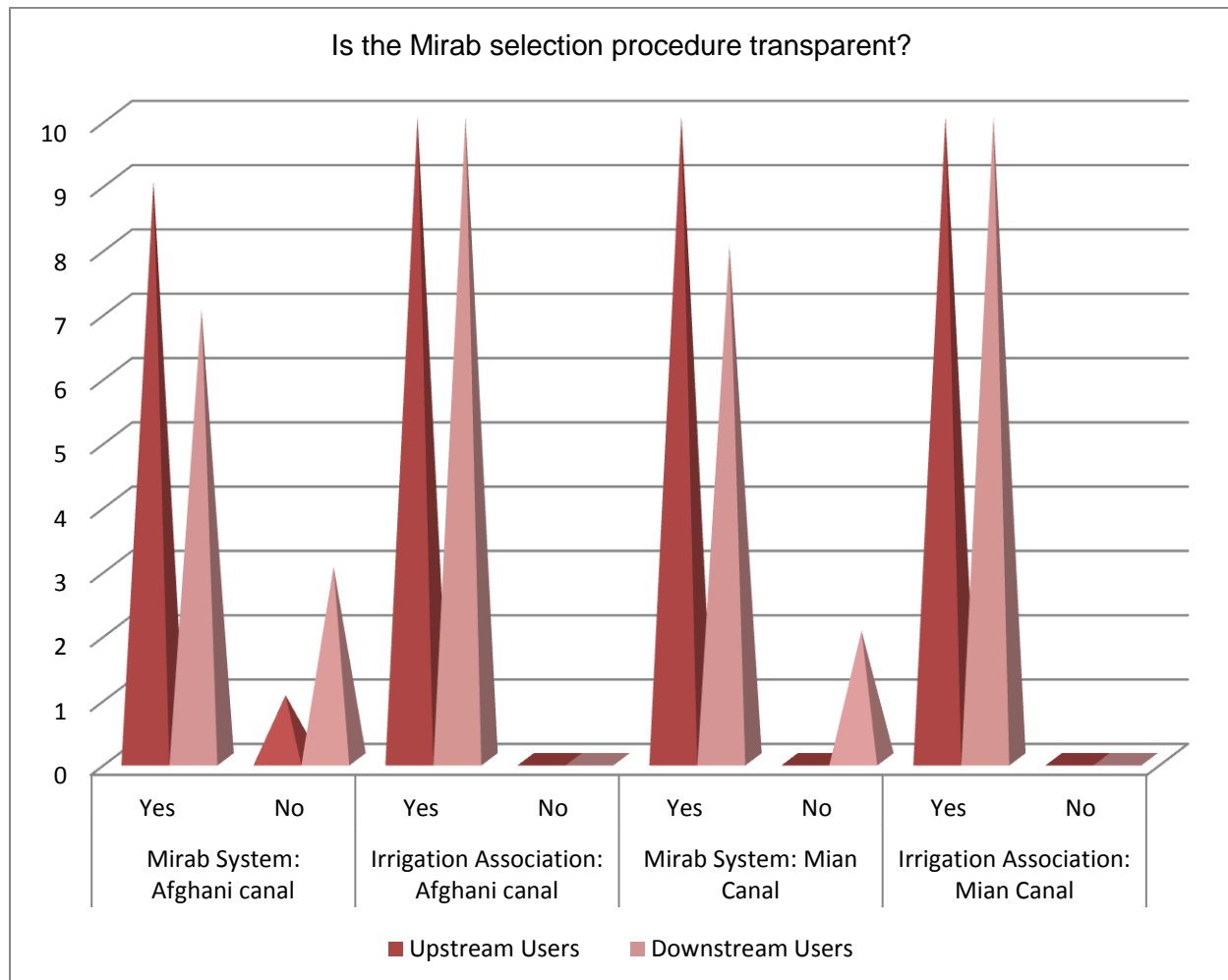


Figure- 13- Transparency in Mirab Selection Procedure in Mirab System and Irrigation Association

4.4.6 Transparency in Conflict Resolution: In Mirab System and Irrigation Association of Afghani and Mian Canals

The figures below show that the conflicts resolution procedure in Mirab system of Afghani and Mian canal is transparent. The conflicts were resolved by the community elders. The conflict resolution in the irrigation association is also transparent and is done by the executive committee. All the water users including upstream and downstream were happy with conflict resolution.

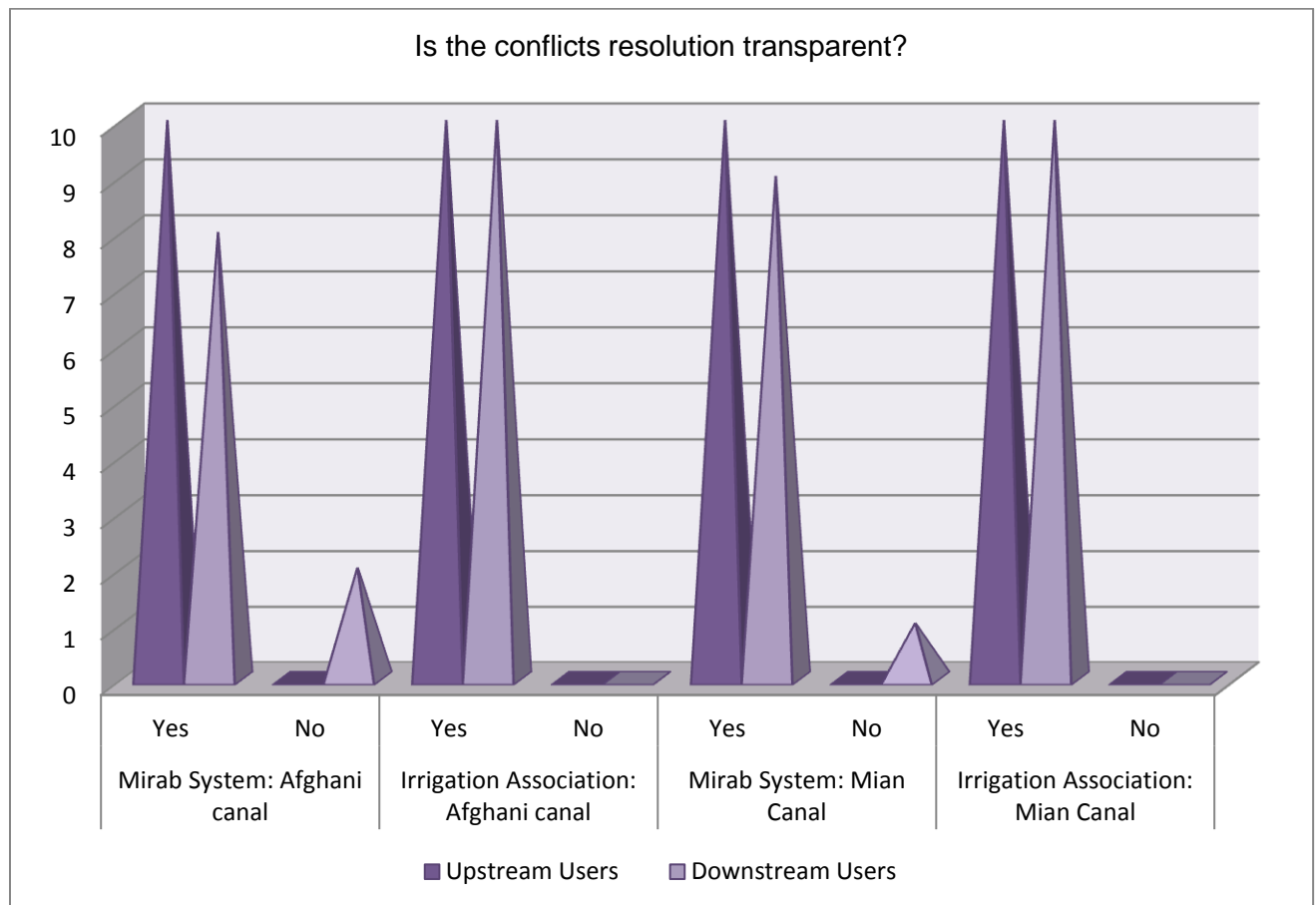


Figure -14 -Transparency in Conflicts Resolution in Mirab System and Irrigation Association

4.4.7 Equity in Water Distribution: In Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below illustrates that the distribution of water among the upstream and downstream water users is not equitable in Mirab system of Afghani and Mian canals while it is relatively equitable in the Irrigation Association system. The upstream and downstream people both recognize that the water distribution is not equitable because the downstream water users receive less water as compare to the upstream water users.

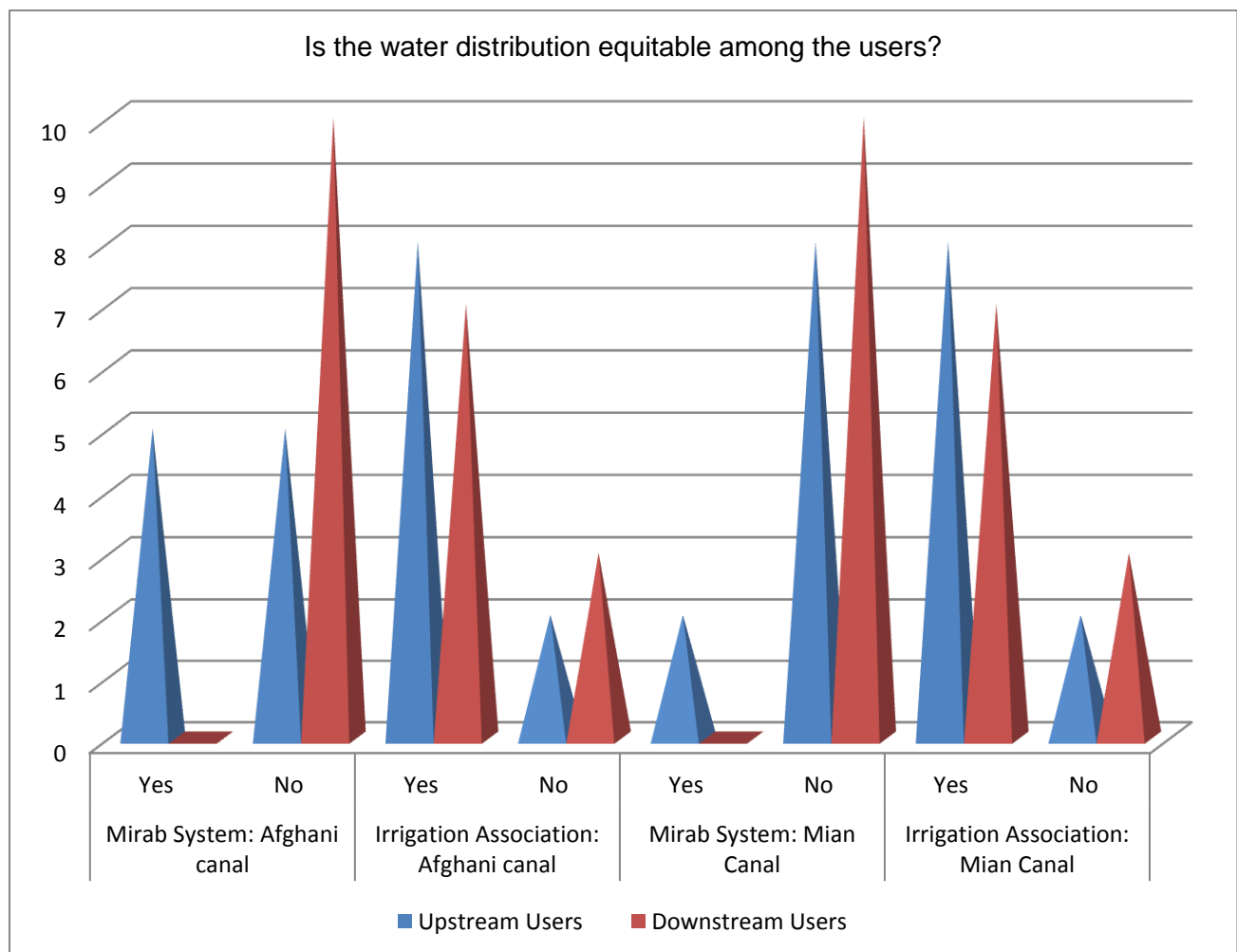


Figure -15 -Equity in Water Distribution among the Users in Mirab System and Irrigation Association

4.4.8 Illegal Water Use: In Mirab System and Irrigation Association of Afghani and Mian Canals.

It is clear from the figure below that the irrigation water is used illegally in the Mirab system of the Afghani and Mian canals. The illegal irrigation water use is a common practice in the Mirab system. The illegal water use was controlled with the establishment of Irrigation Association system. The following figure shows that in the Afghani and Mian canal irrigation association the illegal water use was reduced to a great extent. There is seldom illegal use of water in the irrigation association system.

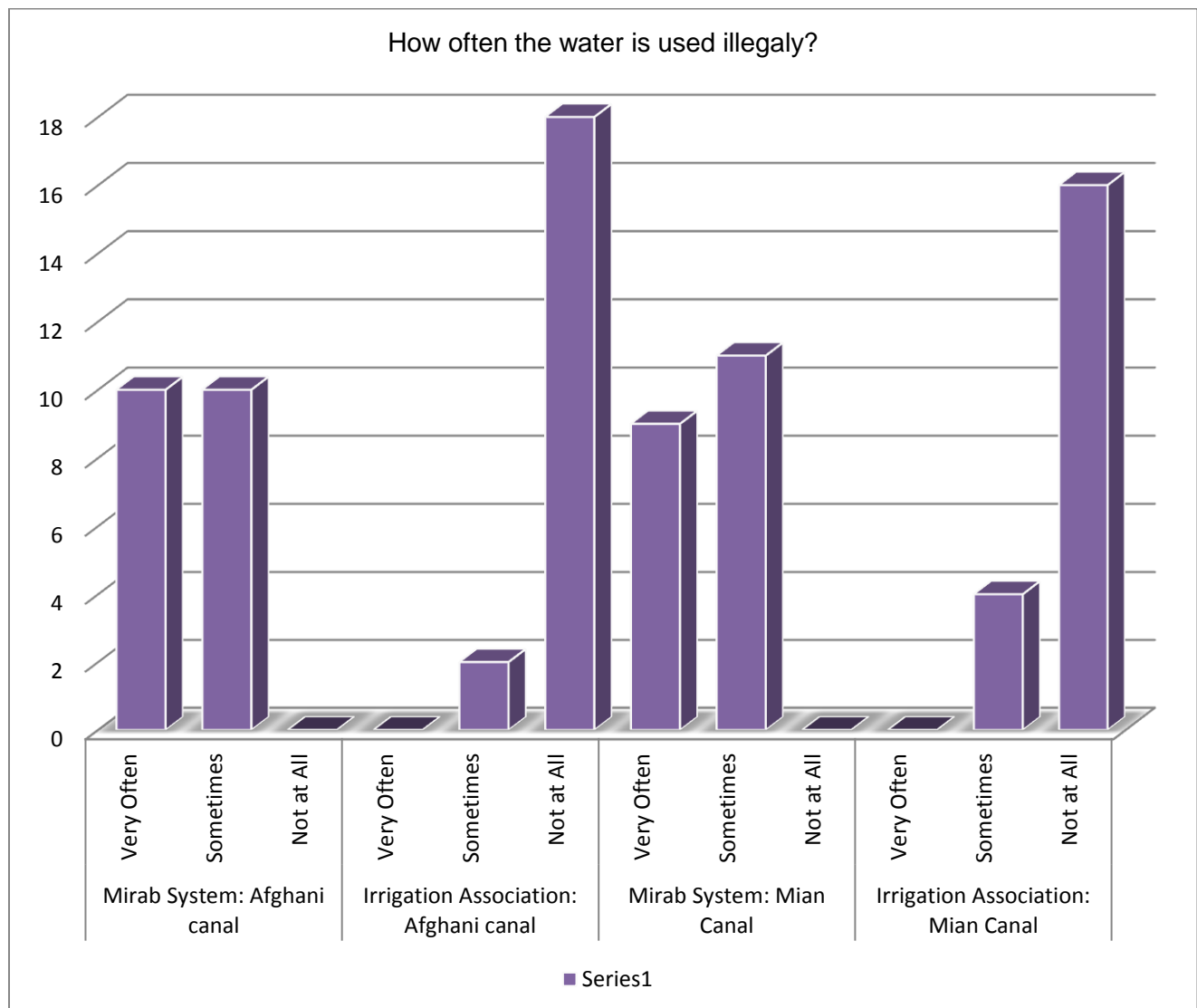


Figure 16 Illegal Water Use in Mirab System and Irrigation Association of Afghani and Mian Canals

4.4.9 Equity in Labor Contribution for Operation and Maintenance of Canal: In Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below illustrates that the labor contribution for O&M of irrigation infrastructure in Mirab system seems to be equitable as most of the interviewees replied that they clean that part of the canal which passes along their fields. However, the labor contribution for O&M of irrigation infrastructure is more equitable in the irrigation association system of Afghani and Mian canals as compared to the Mirab system.

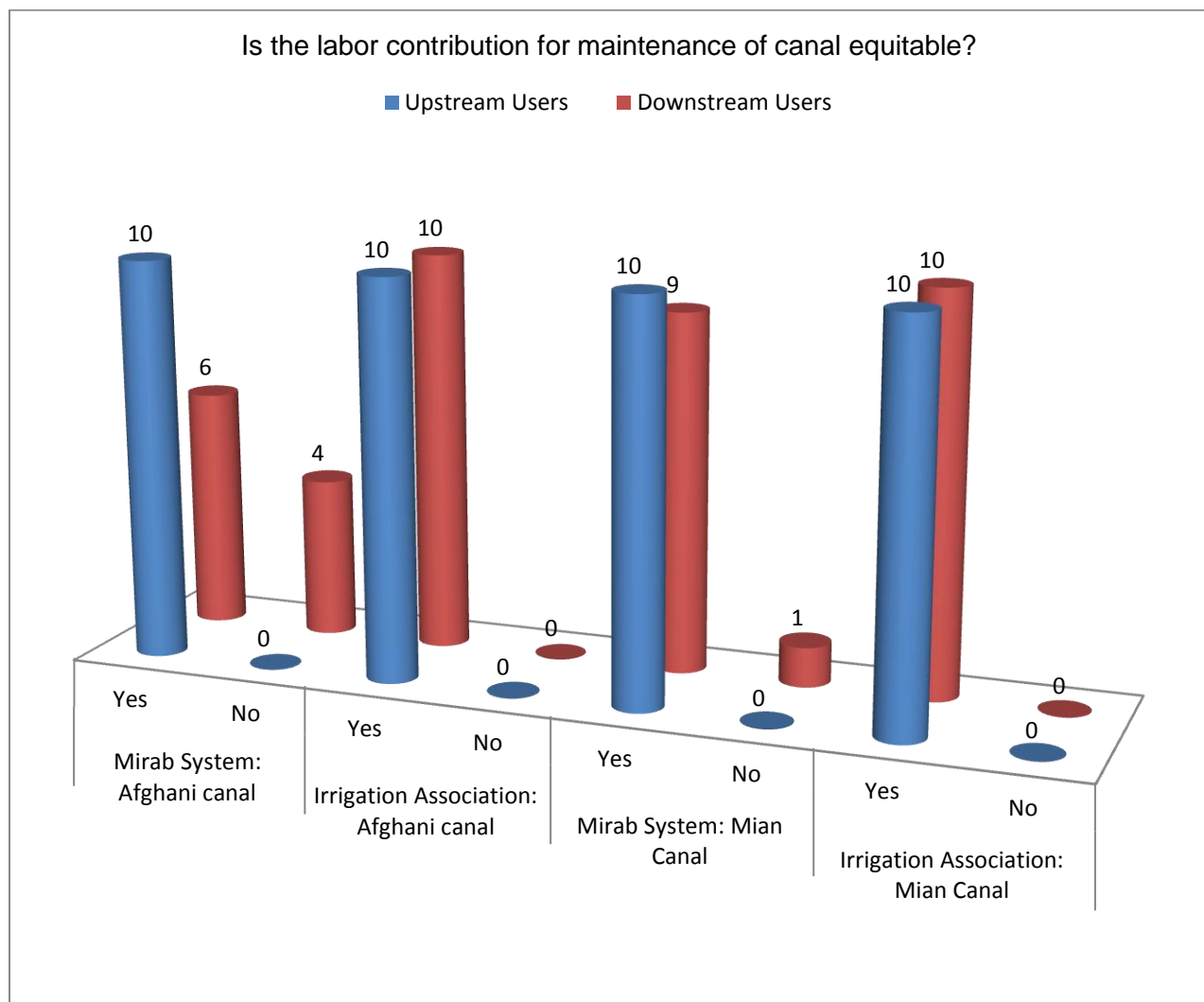


Figure- 17 -Equity in Labor Contribution in Mirab System and Irrigation Association

4.4.10 Personal Feelings Water Users: About Mirab System and Irrigation Association of Afghani and Mian Canals

The table below indicates that in general the majority of water users consider the Mirab System a good system. They are not completely against the system. While comparing the irrigation association with Mirab system the irrigation association is considered better than Mirab system by most of the water users. Looking thoroughly to the table below and comparing the upstream and downstream, the upstream people liked the Mirab system as compared to downstream water users because the upstream people received sufficient water.

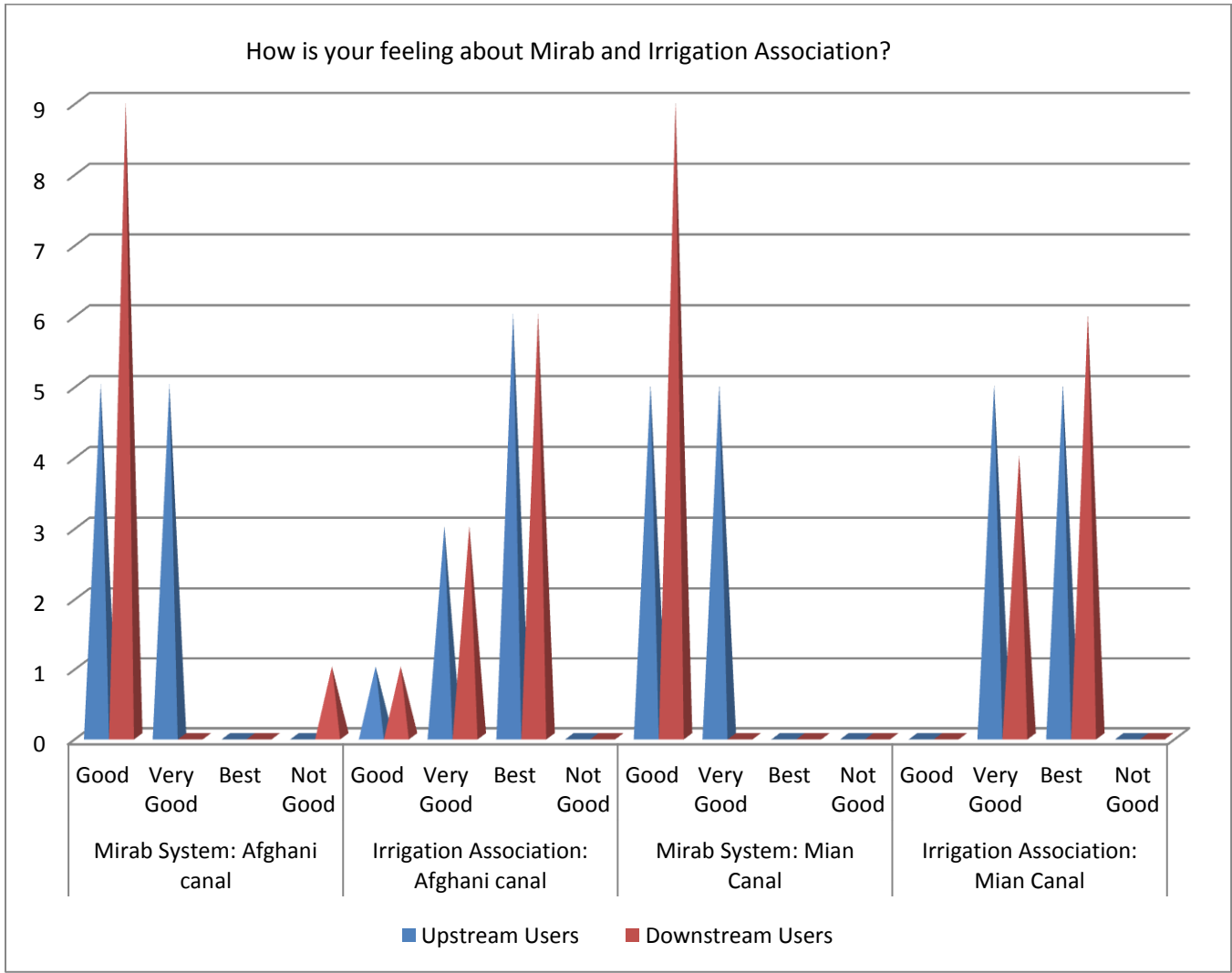


Figure 18 Personal Feelings of Water Users about Mirab and Irrigation Association Systems

4.4.11 Water Users Perception: About Reliability of Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below indicates that in general the majority of water users consider the Mirab system 50% reliable in terms of water availability. Comparing the upstream and downstream water users then upstream users consider the Mirab system 75% reliable while the majority of downstream users consider the Mirab system 50% as the receive less water. In contrast, the irrigation association is considered more reliable than the Mirab system both by upstream and downstream water users.

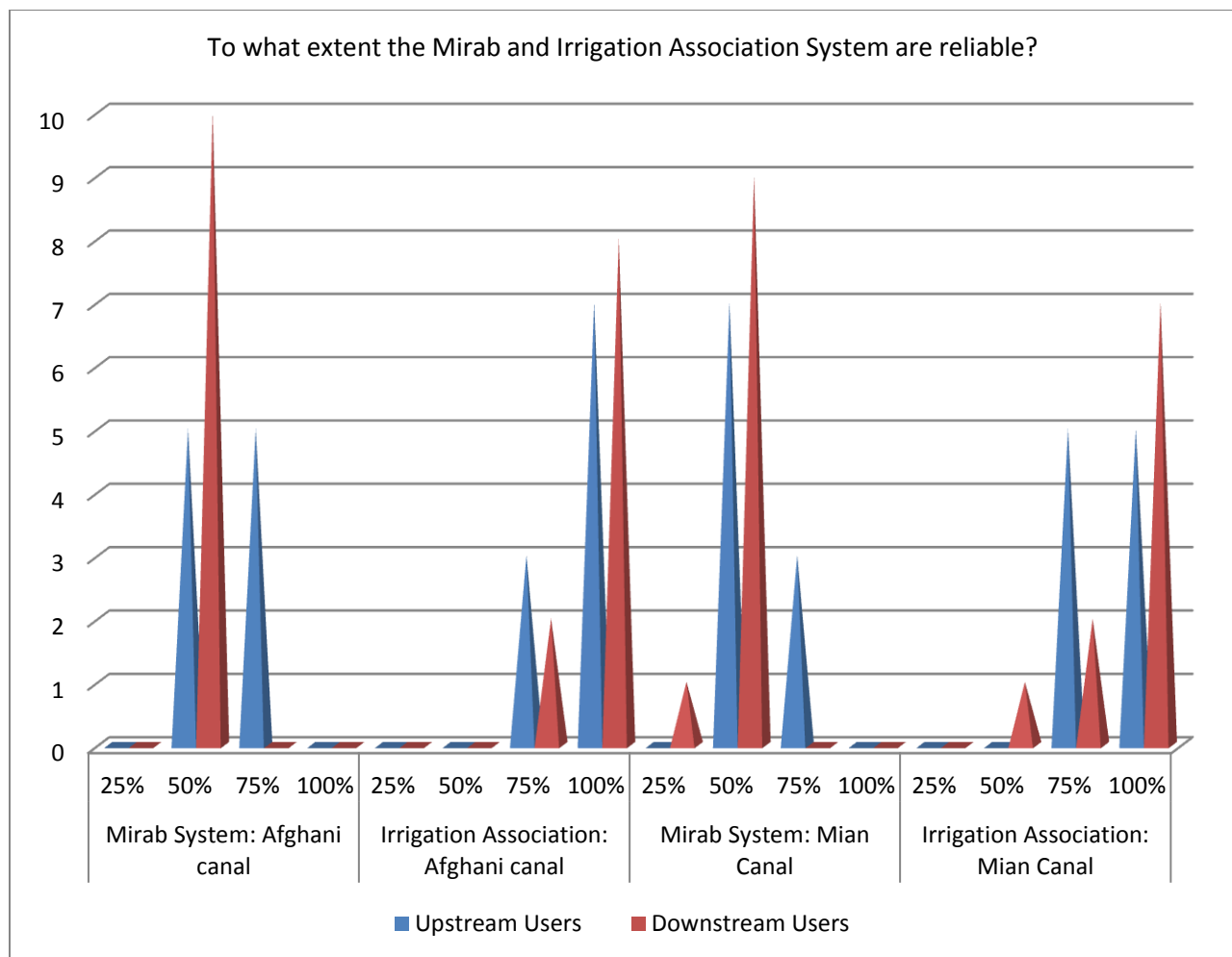


Figure -19- Reliability of Mirab System and Irrigation Association of Afghani and Mian Canals

4.4.12 Frequency of Conflicts over Water: In Mirab System and Irrigation Association of Afghani and Mian Canals

It is clear from the figure below that majority of water users have at least three times conflicts over water per year in the Mirab system of Afghani and Mian canals. On the other hand, the conflicts over water are reduced to great extent with the establishment of irrigation association. The majority of water users have almost no conflicts in the irrigation association of Afghani and Mian canals.

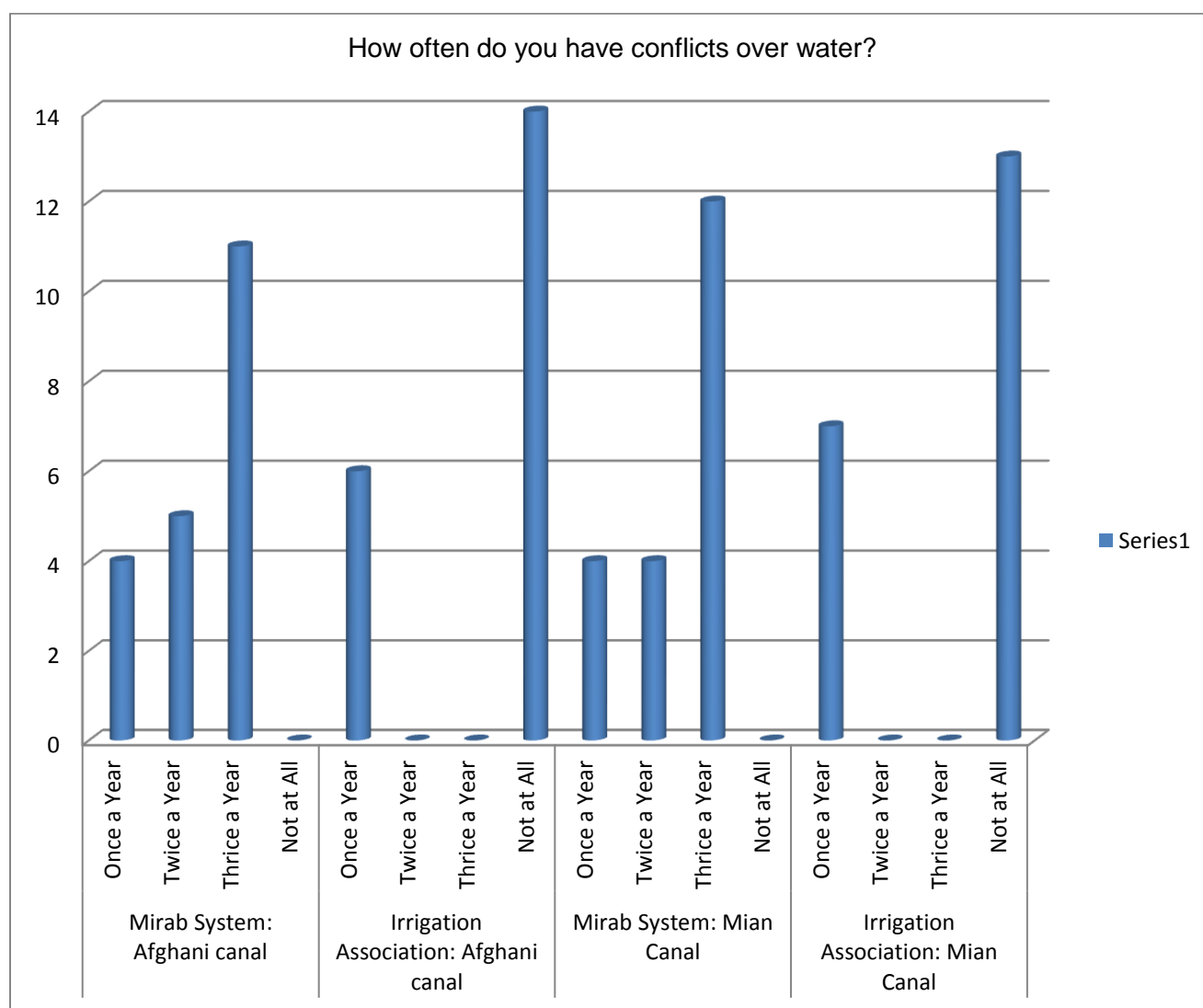


Figure -20 -Frequency of Water Conflicts in Mirab System and Irrigation Association of Afghani and Mian Canals

4.4.13 Meetings of Water Users: In Mirab System and Irrigation Association of Afghani and Mian Canals

It is clear from the figure below that the water users usually meet whenever they feel it necessary in the Mirab system of Afghani and Mian canals. They usually meet at the annual cleaning of canal and whenever the Mirab selection or other important issue is discussed. While in irrigation association the water users meet at least twice a year in addition to other emergency meetings.

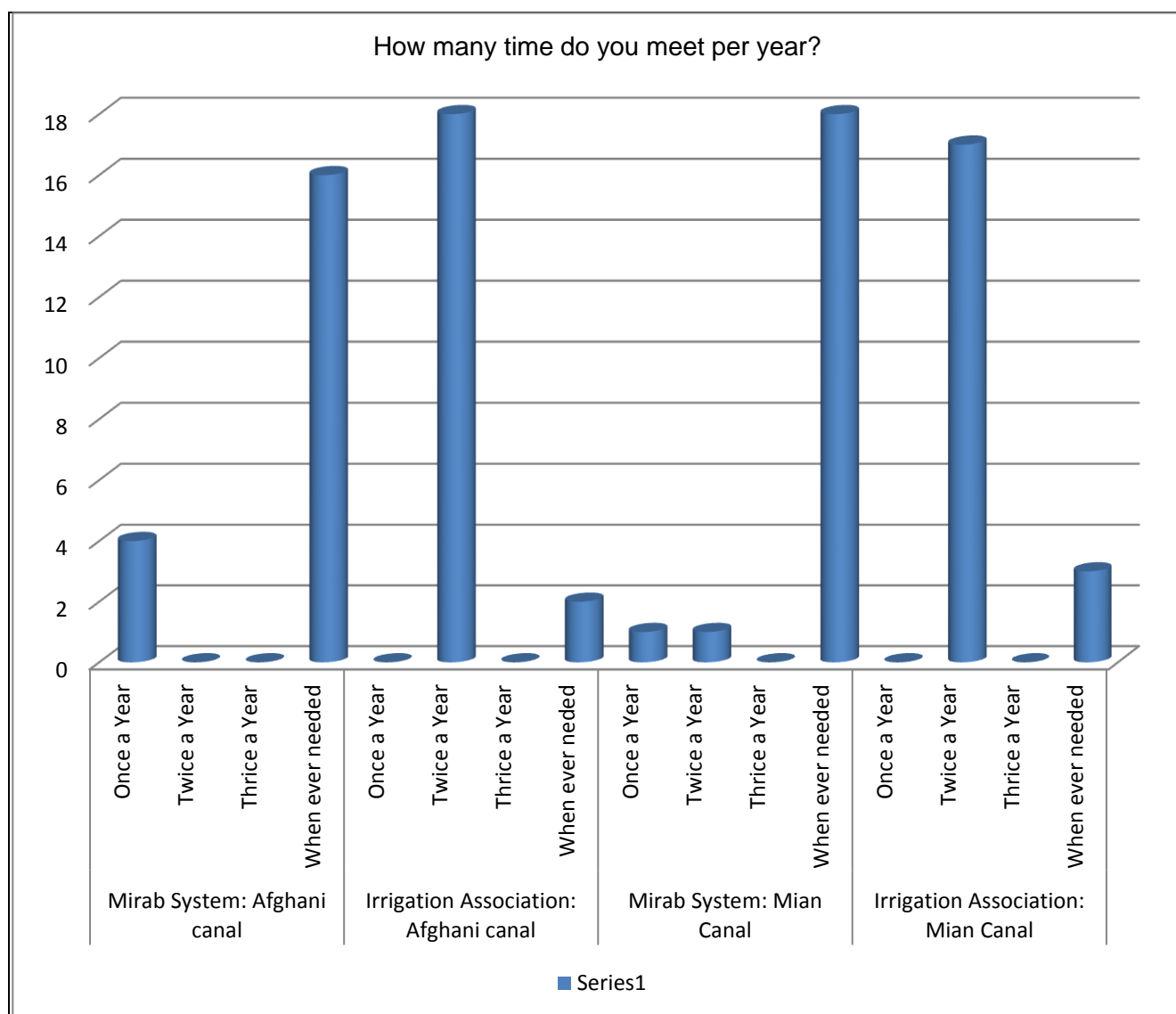


Figure -21- Personal Feelings of Water Users about Mirab and Irrigation Association Systems

4.4.14 Influence of Powerful People: On Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below indicates that the Mirab system of Afghani and Mian canals is not too much influenced by powerful people however it is not 100% free from influence of powerful people. On the other hand, the Irrigation Association is 100% free from the influence of the powerful people in both Afghani and Mian canals.

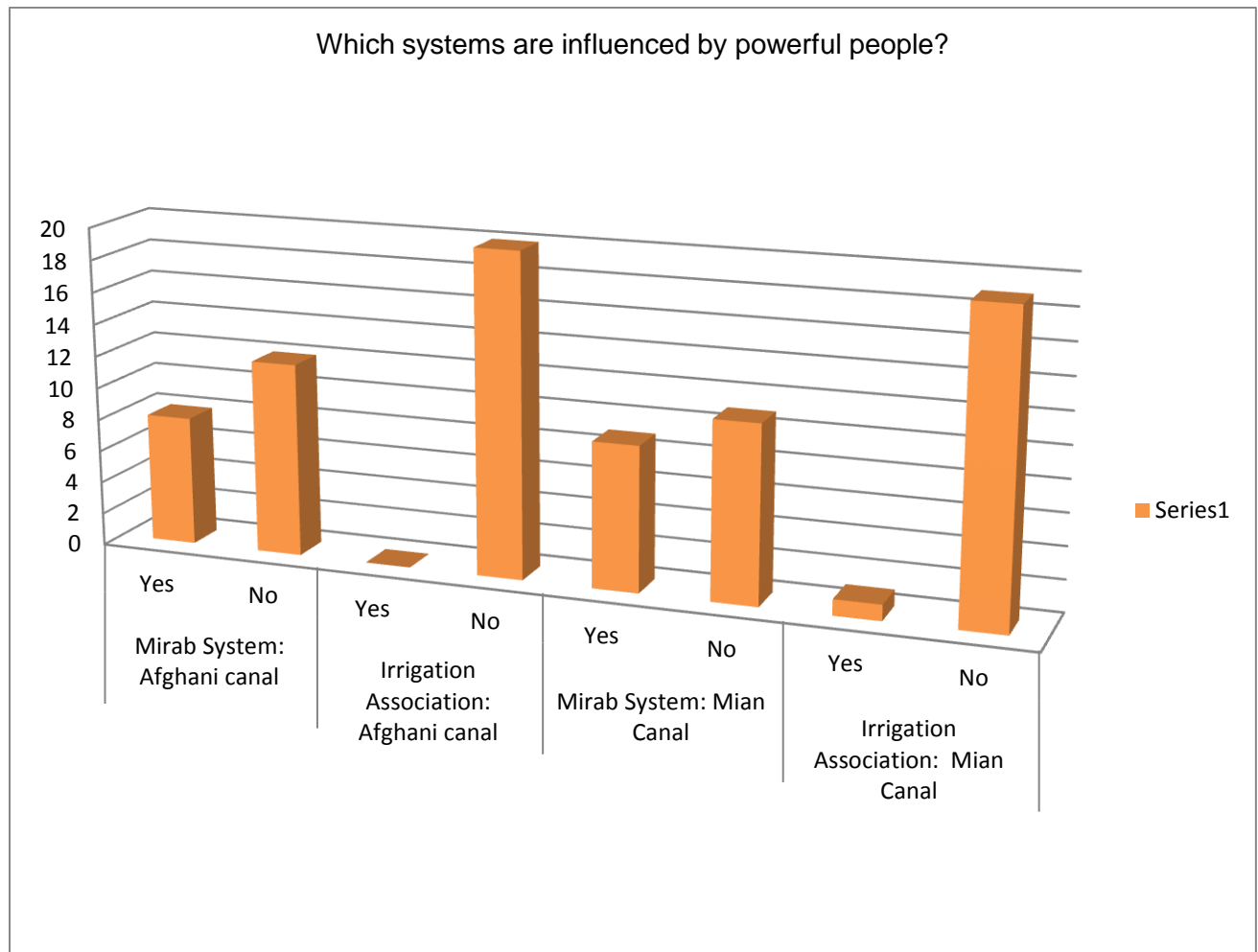


Figure -22- Influence of People on Mirab System and Irrigation Association of Afghani and Mian Canals

4.4.15 Democracy in Decision Making: In Mirab System and Irrigation Association of Afghani and Mian Canals

It is clear from the figure below that the Mirab system of Afghani and Mian canals has not complete democratic decision mechanism. Giving the example of Mirab selection the community elders in the presence of water users appoint a person as Mirab. Some water users raise their fingers showing that they are agreed with this decision. Seeing to other persons with their fingers raised the remaining persons also raise their fingers to show that they are also agreed. Although some people do not like the decision but they pretend of being happy with the decision. In contrast, the Irrigation Association has an electoral process for decision making in both Afghani and Mian canals.

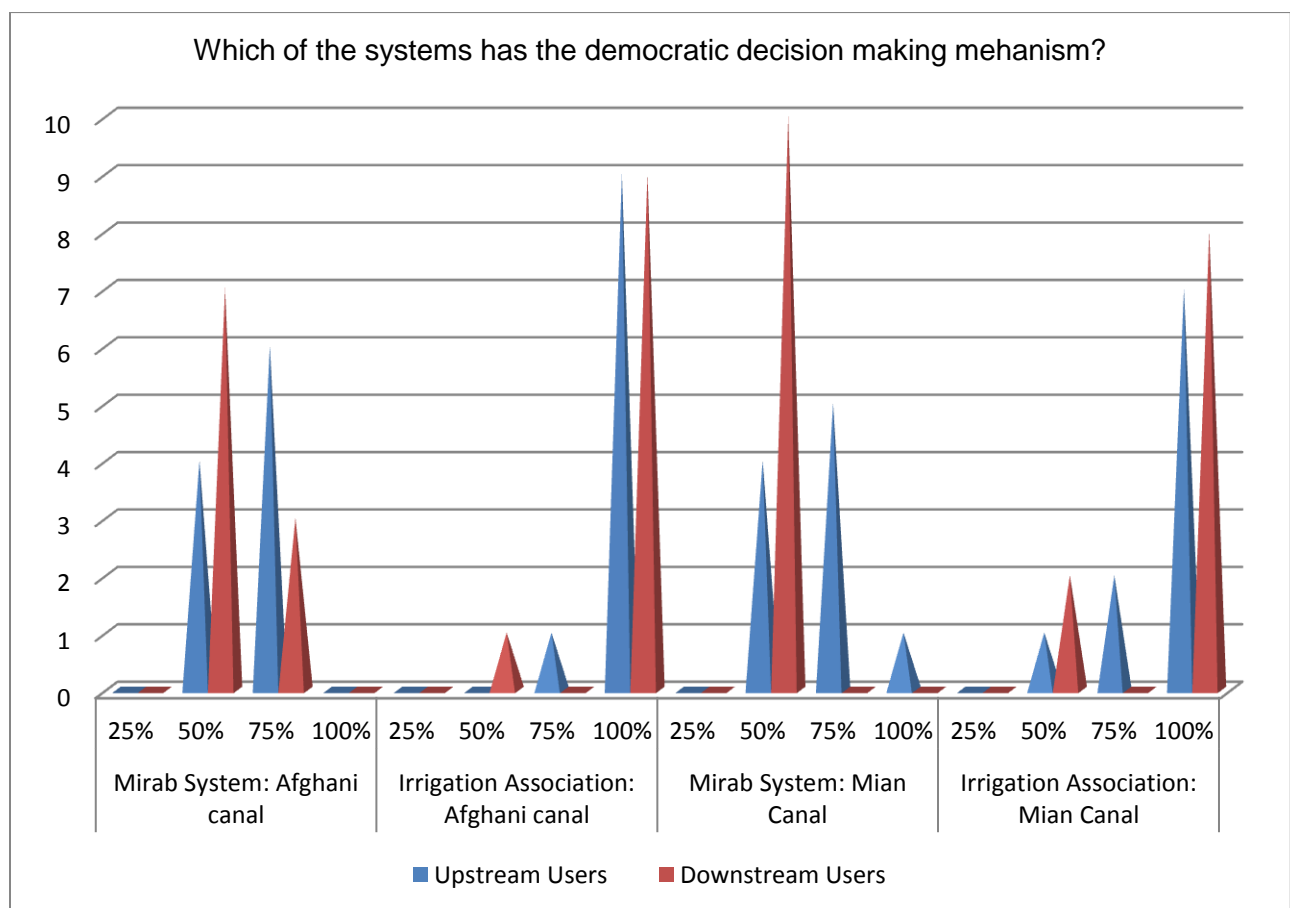


Figure -23 -Democracy in Decision Making Mechanism in Mirab System and Irrigation Association of Afghani and Mian canals

4.4.16 Availability of Fund: In Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below indicates that in Mirab System of both Afghani canal and Mian canal there was specific fund for operation and maintenance of irrigation infrastructure. The farmers only contributed in form of labor for the annual cleaning of their canal. In contrast, the irrigation association of both Afghani and Mian canals there is a common fund available which is raised by the equal contribution of farmers for the maintenance of the irrigation infrastructure.

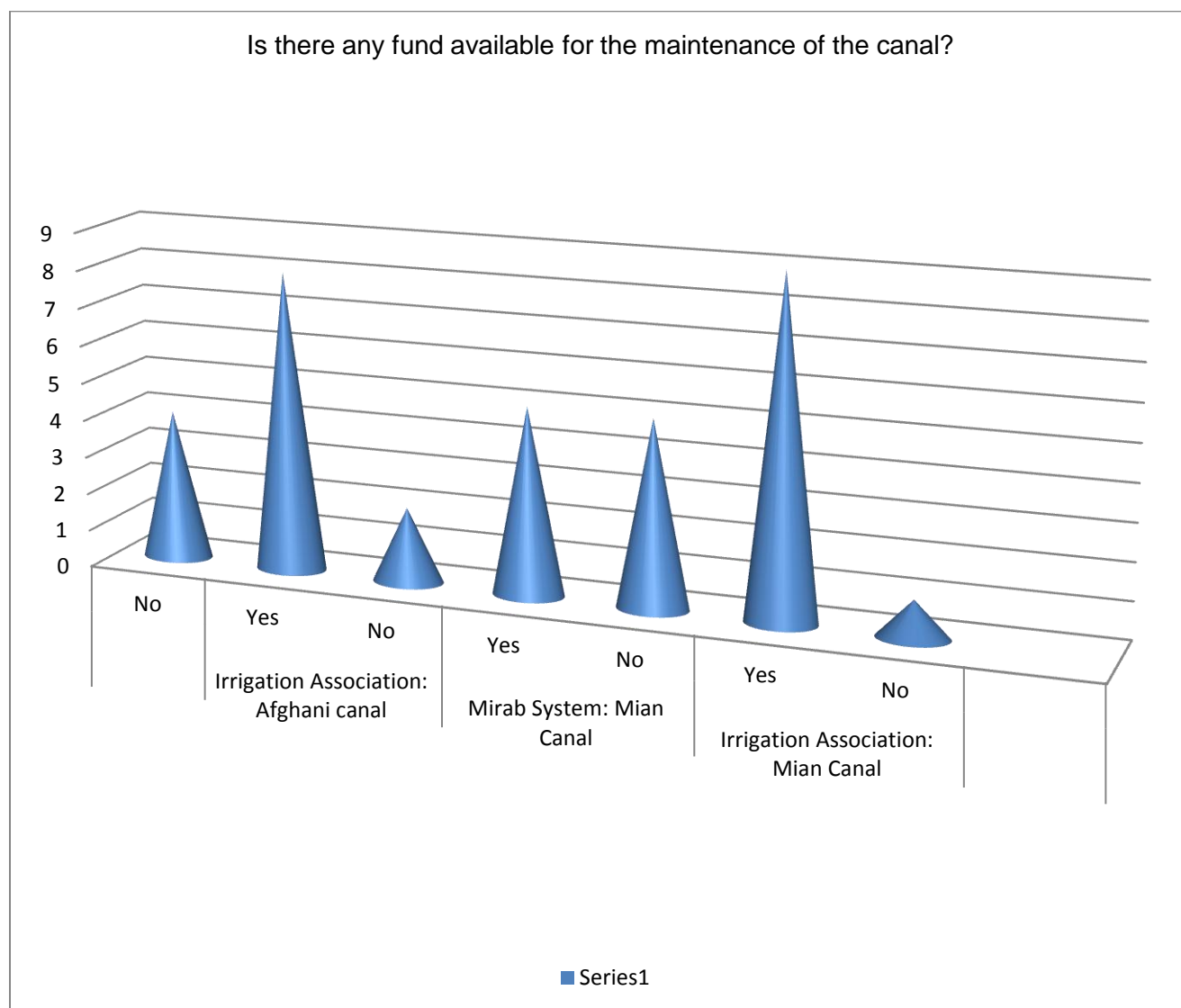


Figure -24 - Availability of Fund in Mirab System and Irrigation Association of Afghani and Mian Canals

4.4.17 Mirab Payment for his Services: In Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below indicates that Mirab is paid with crops for his services in Mirab system of Afghani and Mian canals. The payment of Mirab remains the same i.e. with crops in the irrigation association of Mian canal. Mirab is paid with water for his services in the irrigation association of Afghani canal. He receives 4 hours of water in his turn for his services.

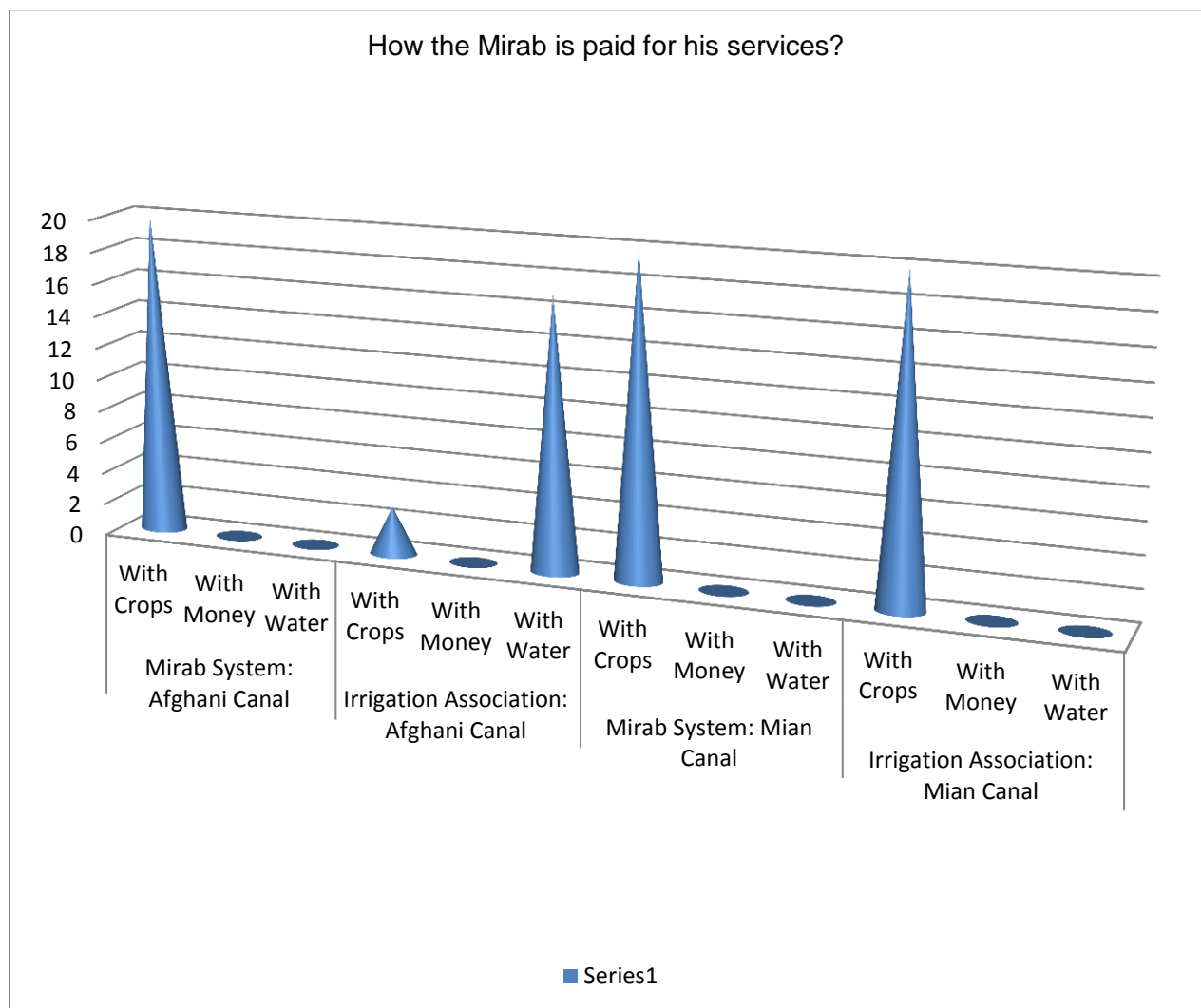


Figure- 25 -Mirab Payment in Mirab System and Irrigation Association of Afghani and Mian Canals

4.4.18 Canal Cleaning: In Mirab System and Irrigation Association of Afghani and Mian Canals

The figure below shows that canal cleaning is done once per year in Mirab system of Afghani and Mian canals. The reason is that the Mirab system has poor resources. On the other hand, canal cleaning is done at least twice a year in irrigation association of both Afghani and Mian canals because the irrigation association has more resources for canal cleaning as compared to Mirab system.

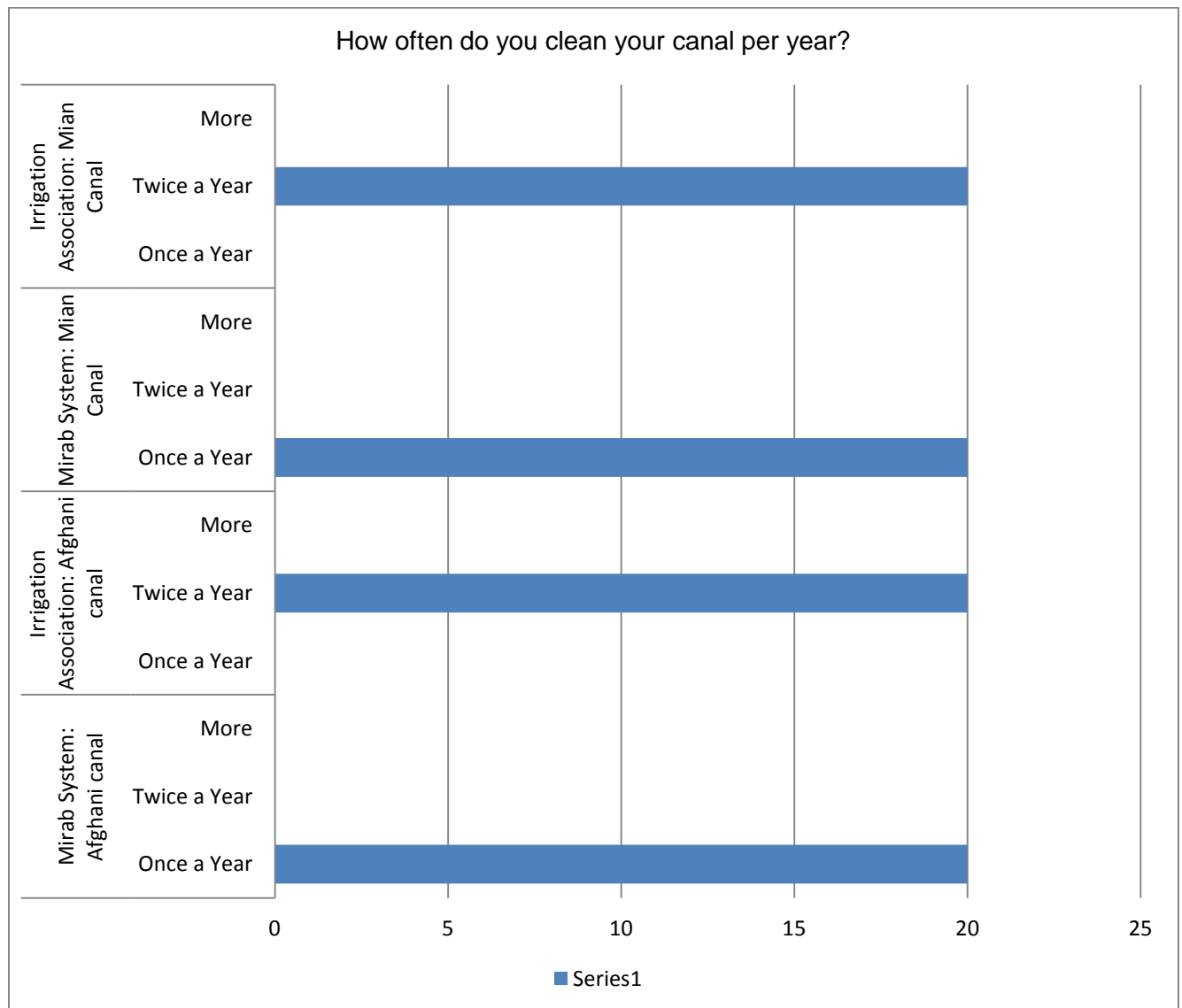


Figure 26 Canal Cleaning in Mirab System and Irrigation Association of Afghani and Mian canals

CHAPTER-5 DISCUSSION

5.1 Mirab System

The Mirab system is a community based and traditional system made by farmer's community for the irrigation water distribution and O&M of irrigation infrastructure. Although there are a lot of similarities in Mirab system still the system vary in different part of the country depending upon the community. From the field survey and group discussions it was confirmed that there is some variation in Mirab system in different parts of the country. For example in Shakardara district, of Kabul province the Mirab system varied from that of the Khewa district of Nangrahar province in terms of duration of Mirab services, payment of Mirab and water distribution system. Scholars like Lee 2007 and Roe 2008 have the similar opinion about variation of Mirab system depending upon the area.

5.2 Organizational Structure

The Mirab systems studied in Shakardara and Khewa district were not well organized. The Mirab system consisted of Mirab, water users and community elders. Mirab plays major role in water distribution and O&M of irrigation infrastructure while the role of water users was to contribute the labor for a common work and participate in Mirab selection. However, not all water users participate in the selection process. The community elders were involved in the conflict resolution and Mirab selection. The community elders were too much busy persons and were involved in the other activities. It was sole Mirab who distribute operate and maintain the irrigation infrastructure. Over all, the organizational structure of the Mirab system was not capable to face irrigation challenges. DAI 2006, has withdrawn the same conclusion and has focus on transforming the system into a well-organized and legal entity. Roe 2009, reported in his study that it is beyond the capacity of Mirab system to redress water scarcity.

5.3 Mirab Selection

From the field survey and group discussion it was discovered that the Mirab selection is done by community elders and water users. The selection process is not always clear. It is a traditional and not 100% democratic process. Community elders appoint a person with the agreement of water users. Although the water users consider it a transparent process but the survey result shows that most of the upstream water users are involved in the selection process. Pain 2004, has also reported that the Mirab selection procedure in villages is not clear and is opaque.

5.4 Mirab Payment

Generally, Mirab is paid with crops for the services he delivers but still there is variation in the Mirab payment. From the survey and discussion with Mirab it was revealed that in the Mirab system of Danishmand village Mirab was paid with water while in the Khewa district he was paid with crops. The amount of crops Mirab receives also varies in different areas. Some people pay the Mirab with more crops depending upon their generosity. The rich and large land holders usually pay the Mirab more than the normal quantity of crops. Sometimes these rich farmers are favored by the Mirab in water distribution. Pain 2009, Huntziger and Delesgues 2009 came up with the same results about the Mirab payment.

5.5 Water distribution

Basically water allocation and distribution is done according to the land size. The water users use their traditional units for water distribution.

Figure-27- Water distribution in Afghani Canal

These traditional units vary in different part of the country depending upon the type of the water user's community. From the group discussion with the executive committee and Mirab of Danishmand village (Afghani canal) it was discovered that the water distribution was done according to local unit known as Qulba (pair of oxen used for the plowing of land). One Qulba is equal to 12 hours of water and covers 150-200 Jeribs of land.

Source: Field data



There was a turn system and each farmer was supposed to get water in his turn. While from the discussion with executive committee and Mirab of Khewa district (Mian canal) it was cleared that in the Mirab system the water distribution was done according to the land size. For each 24 Jeribs of land 12 hours of water was allocated.

There was no turn system and each farmer could get water when and how much he wanted however; when there was water scarcity then the turn system was followed. The canal in both study area was cleaned once a year through the contribution of labor by each water user. Pain 2009, AWATT 2010 and DAI 2010 have the same conclusion about the water distribution and O&M of irrigation infrastructure.

5.6 Equity in Mirab System

According to the result of the survey the Mirab system is not good in equity issues especially in irrigation water distribution. There is always great difference in the water rights and actual water distribution among the users. The upstream water users are favored and receive more water. According to the response of one of the interviewees from upstream area; *"I am from upstream' Sara-e-Aab' and it is my right to use more water"*. The downstream people receive less water. It was revealed from the group discussions with executive committee and Mirab that the time allocated for one Jerib of land for upstream and downstream people is the same but the flow at the downstream area is very low. The data collected from OFWM project staff for Afghani canal, it clear that there is great difference in water discharge within one Km distance of canal. The discharge at upstream of canal is 21.5422666 liter/sec which decreases to 16.523 liters/sec after covering a distance of one Km at the downstream. If the upstream water user irrigates 24 Jeribs of land in 12 hours then the downstream water user could hardly irrigated 12 Jeribs of land with the same amount of land. According to the CPHD report 2011, there is a great gap between water rights and water distribution in Afghanistan. Roe 2009, also has reported inequities in the water distribution in traditional irrigation water management system.

According to the result of the survey the labor contribution in the Mirab system studied seems to be equitable to some extent. The interviewees in the Khewa district, Mian canal replied that each water users clean the part of the canal passing along their land when asked about the labor contribution and canal cleaning. However, the labor contribution may vary at primary canal level. Roe 2009, reported in his study that the downstream people take relatively more burden of canal infrastructure maintenance to ensure the water reaches their land.

5.7 Water Conflicts and its Resolution

The discussion with Mirab and the result of the survey showed that there is always conflict over water in Mirab system among the water users. The water users violate the water rights especially in the time of water scarcity raising conflicts over water. The survey results reveal that the conflict resolution among water users in Mirab system is transparent and the water users are happy with it. Initially, Mirab tries his best to mitigate and resolve conflicts over water. If he fails to do so then community elders are approached. It seems that the water users have great respect to the community elders and accept the decision made by them in conflicts resolution. However, the conflict resolution between two canals or village is difficult and sometimes Mirab fails to solve it. Huntziger and Delesgurs 2009, reported that Mirab cannot manage the conflicts beyond two villages.

5.8 Influence of Powerful People

In discussion with the executive committee, it was mentioned that the Mirab system is not influenced by powerful people. However, the survey result shows that the Mirab system is not influenced by the powerful people to large extent but still the powerful people have some influence on the system. The degree of influence of the powerful people depends upon the type of community. Pain 2004, reported that the village institutions are not always fair in equity of resource generation because of the presence of powerful people.

5.9 Organizational Structure of IA

According to the information obtained from the OFWM staff, the Irrigation Association is consisted of member water users and executive committee. The executive committee is made of three persons; a Chair man, Vice Chairman and Treasurer. The current setup of the IA is not according to the government charter for the IA which is the process of development. However, there is complete full support of the government with the current IA. MAIL and its supporting organizations are working to develop by-laws for the IA. After the finalization of the by-laws the IA will then be re-organized according to the proposed setup. However, the organization set-up of Irrigation Association might vary in different parts depending upon the interest and need of the people.

From the field survey and discussion with executive committee it was confirmed that the organizational structure of the irrigation association was the same as mentioned by the OFWM project. In both the study areas the organizational structure of irrigation association was the same.

Scheuman and Hasan 2001, in their study in two provinces of Turkey reported the variation in the organizational set-up of the Irrigation Associations. However, all the irrigation associations

were membership organization joined by farmers voluntarily. The IA was consisted of a general assembly, a chairman and a board of directors. elected farmers, community elders and delegates from municipalities were involved in the setup of the IA.

5.10 Volunteer Executive Committee

From the group discussion with OFWM project staff, it was discovered that the executive committee of irrigation association is consisted of three persons a Chair man, Vice Chairman and Treasurer. These persons are appointed by 50+1 members of the IA either by election or general agreement. It is tried to appoint those persons for the executive committee who are not too busy and remain most of the time in the village because they are the people who will be contacted most by government and other developing NGOs. The executive committee is working voluntarily without receiving any kind of reward. Free working concept is not always sustainable. These people can always change their mind and can leave their jobs because the job they are performing is not an easy one and they are not rewarded for it. Moreover, performing a job without any reward is not always well executed. Although the executive committee did not requested for salary but it would have been much better if the persons working in the executive committee were given incentives. Hamdy 2004 also emphasizes on provision of supportive incentives for the managing persons for the success of the association.

5.11 By-LAW

The by-law for Irrigation Association is not yet developed. MAIL is still working to develop a model for by-laws. The Irrigation Associations studied (Afghani and Mian canal associations) still have not any written by-laws. They are waiting for the general by-law which is in the process of development. The irrigation association is responsible to develop their own by-laws but within the frame work of the government model by-law and the government of Afghanistan water law. The rules and regulations governing water distribution and O&M may vary in different irrigation association depending upon the type of community but will not violate the water law.

5.12 Water Users Association and Irrigation Association

In the new law the formation of water users associations is encouraged. However, there are two kinds of water users associations; the irrigation association and the water user association. These two kinds of associations work for water management but at different levels. The WUA is responsible for water distribution and O&M of irrigation water at river basin and main canal level. Water users association is registered with the Ministry of Energy and Water. There other stakeholders involved in WUA like Ministry of Rural Rehabilitation and Development, Ministry of Mines. The Irrigation Association is a part of WUA which is responsible for irrigation water management and O&M of irrigation infrastructure at secondary and tertiary canal level. The IA is registered with Ministry of Agriculture, Irrigation and Livestock. Recently, there is no WUA in the study area and it is not clear when it will be established.

5.13 People Perception of IA

According to the survey result of the two study areas the people were quite happy with the new system of Irrigation Association. They considered it more reliable in terms of water distribution and O&M of irrigation infrastructure.

They were also quite happy with the organizational structure and considered the IA as a democratic system. In the group discussion with Mirab and executive committees the irrigation association was also admired. The Mirab was quite happy with the new system. He added that the burden over his shoulders is now shared with the irrigation association. Fipps 2006, in his study in Heart province also reported that the people were quite happy with the water user association and its democratic election process.

5.14 Water Rights and Water Allocation

The current water rights are predetermined by the ancestors of the water users. The water allocation was done according to the size of land and the tax taken by the government. In some areas land owners have registered less land in order to avoid government tax on land but the allocation of water was done according to land registered. In irrigation association the water rights needs to be re-determined. Hamday 2004, also give more emphasis on identification of clear cut managing responsibilities, clear water rights and incentives for managing persons for the success of water association.

5.15 Equity Issues in Irrigation Association

According to Wegerich, the term equity has two main components; the proportionality and the egalitarianism. According to the proportionality principle the resources should be distributed according to the effort made and the egalitarianism suggest that everyone should be treated equally. The equity covers various aspects. It addresses the equity in water distribution, labor contribution and equity in right to decision making. The equity in terms of labor contribution in irrigation Association was achieved to some extent while the equity in water distribution was not satisfactory. Although more water will be made available for downstream water users by reducing water losses and controlling illegal water use but still the water distribution will not be 100% equitable. During the survey of the water users from the upstream replied that “The upstream water users deserve to have more water as compared to the downstream because they belong to the upstream area and have more water”. The water allocation is done according to the community based rules and regulations.

Equity in terms of decision making is also achieved with the establishment of Irrigation Association as all the water users are equally important in this system and are involved directly or indirectly in the decision making. The result of the survey showed that in the Mirab system the involvement of the upstream water users were more in decision making as compared to the downstream users. The involvement of the downstream users has increased to great extent in the irrigation association in both of the study areas. DAI 2006, has considered Irrigation Association better enough in equity issues.

5.16 Resource generation and O&M

The result of the survey and group discussion showed that the irrigation associations have better resource generation mechanism and O&M of irrigation infrastructure is carried well as compared to the Mirab system. There is a common fund available for the IA which is raised by the mutual contribution of the water users. The association also has a bank account where this fund is deposited.

The canal is cleaned two times per year while it was cleaned only once in the Mirab system. The water users also contribute labor whenever required. Hussain 2007, has also considered the water users association better enough in resource generation. Scheuman and Hasan 2001, in their study in two provinces of Turkey has reported that the IA are self-reliant and recover costs from local resources. They manage their common water source and the infrastructure

Figure28 Control Structures in Mian canal



Source: Field data

Figure29 poorly maintained Afghani Canal



Source: Field data

These two pictures show the poor maintenance of the irrigation infrastructure in Mirab systems in both the study area due to poor resource generation. The control structures are made of local materials which are stopping or diverting waters properly. One of the main reasons of the water theft in Mirab system is the poor control structures and turnout.

5.17 SWOT analysis of Mirab and IA

The Irrigation Association and the traditional Mirab systems are briefly analyzed below through SWOT.

Table- 3- SWOT Analysis of Mirab and IA systems

	Mirab System	Irrigation Association
Strengths	<ul style="list-style-type: none"> • Strong Traditional System survived even after three decades of war • Self dependent • Based on community rules and regulations 	<ul style="list-style-type: none"> • Strong Management • More Reliable in terms of water access • Innovative and productive • Has Legal status • Democratic system • No or less influence of powerful people • Better resource generation • Good in equity issue
Weaknesses	<ul style="list-style-type: none"> • Not innovative and not productive • Poor management • Have No legal status • Poor resource generation • Poor O&M of infrastructure • In-Equity • Illegal Water Use 	<ul style="list-style-type: none"> • Poor capacity of IA • Lack of technical persons • No written by-laws so far • Volunteer Executive committee • No written water rights
Opportunities	<ul style="list-style-type: none"> • Mirab system basic concept could be used in IA • Mirab could act as important part of Irrigation Association 	<ul style="list-style-type: none"> • Support of government • NGOs are interesting in IA • Good Social cohesion
Threats	<ul style="list-style-type: none"> • Influence of powerful people • Social breakdown • New water Challenges • Water conflicts 	<ul style="list-style-type: none"> • Climate change and Water scarcity • No clear water rights • Change in cropping pattern

CHAPTER-6 CONCLUSION AND RECOMENDATIONS

6.1 Conclusion

Afghanistan has a long history of traditions and is famous for it. The traditional irrigation water management (Mirab system) has been working for centuries and is totally based on the traditional rules and regulations. Unfortunately, the Mirab System remained traditional and has not adapted to the new challenges of the irrigation water and hence its effectiveness has declined. The government of Afghanistan felt it necessary to adapt the system and thus in the new water law the formation of Irrigation Association has been introduced with the assumption in mind that Irrigation Association will perform better in managing the irrigation water and carrying out better O&M of irrigation infrastructure.

The Irrigation Association is a new concept and is in the process of development. From the recent field study no concrete conclusion could be drawn about the effectiveness of Irrigation Association in term of equitable water distribution and O&M infrastructure. However, the irrigation association has relative advantages over Mirab system through which it surpasses the Mirab system. These relative advantages are;

The Irrigation Association has better management system because of good organizational structure. The IA is better in transparency and is more democratic system. The decisions are made through a democratic decision mechanism. Conflicts resolution is much better in IA as compared to Mirab system.

It is better in resource generation and have common fund. It is also better in operation and maintenance of irrigation infrastructure by having more resources for O&M. The social cohesion is more in IA system as compared to Mirab system. The water users meet twice a year at least to discuss water related issues. The water users had good feelings about IA. The conflicts over water have been reduced to great extent..

Although some improvements have occurred in the equitable water distribution among the users with the establishment of IA but still the problem existed and was not solved totally. The downstream water users received more water with the control of illegal water use. The downstream water users will receive even more water after the lining of the canal which will prevent water losses.

It is worth mentioning that the effectiveness and success of the IA depend upon various factors which must be considered. These factors include; clear water rights, enforcement of the water rights, by-laws with clear objectives, full government support in term of supportive policy, incentives and enforcement of water rights, strong financial and administrative capabilities of IA and strong linkage between the irrigation department and IA. Extension services on efficient water use, irrigation scheduling and irrigation methods, and the provision of credit for the purchase of machinery for O&M of irrigation infrastructure are also from the important factors influencing the success and effectiveness of the IA.

Further studies are needed to evaluate the performance of the IA associations and its effectiveness after the completion of the project.

6.2 Recommendations

- The objective of IA should be clear and the water users must know the purpose of the IA. It must not be based upon the thinking of mere receiving of financial support from the supporting organization or government. OFWM-Project should make the water users aware of the importance and objectives of the IA through trainings, seminars and workshops prior to establishment of the IA.
- The MAIL through its project of OFWM should help IA in developing the by-laws. The by-laws should have clear water rights, rules and regulations governing water distribution, O&M of irrigation Infrastructure and change in cropping pattern. These rules and regulations should be acceptable for all water users and must be signed by them. There must be certain penalties for the violators of the rules and regulations.
- The secret of success of Irrigation Association lies in strong government support in implementing water rights and to avoid violence of the water right. The government authorities at the district level should provide full support to irrigation Association for implementation of water rights.
- The Executive Committee of Irrigation Association is consisted of volunteers who working without receiving any kind of reward or salary. The interest of the people working voluntarily might be more in the beginning but with the passage of time it could be declined so the sustainability of such kind of committee is always doubted. Moreover, the working performance of volunteers is not always satisfactory. It is recommended that the executive committee must be given certain incentives. Water users have to contribute to pay the executive committee.
- The National Bank of Afghanistan and the organizations engaged in the provision of credit should be persuaded to provide credit to IAs in order to enable them to buy machinery required for O&M of irrigation infrastructure and precision land leveling. Provision of credit for purchasing precision land leveling and other machinery will not only optimize the use of water but will also make people together. Generally, people remain together if they have something in common.
- The poor financial and administrative capabilities of the IA results in low-performance and even failure. The capacity of the IA should be improved by providing financial and management trainings by the on-going OFWM-Project. These trainings may include book keeping, irrigation scheduling and proper maintenance of O&M of irrigation infrastructure.
- There is no link between the directorates/sub-directorates of MAIL and water users at province and district level respectively. There is a need for establishing a strong link between the DAIR department of irrigation and the Irrigation Associations. This link will help farmers to get advice on technical issue related to irrigation water management.

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ANNEXES

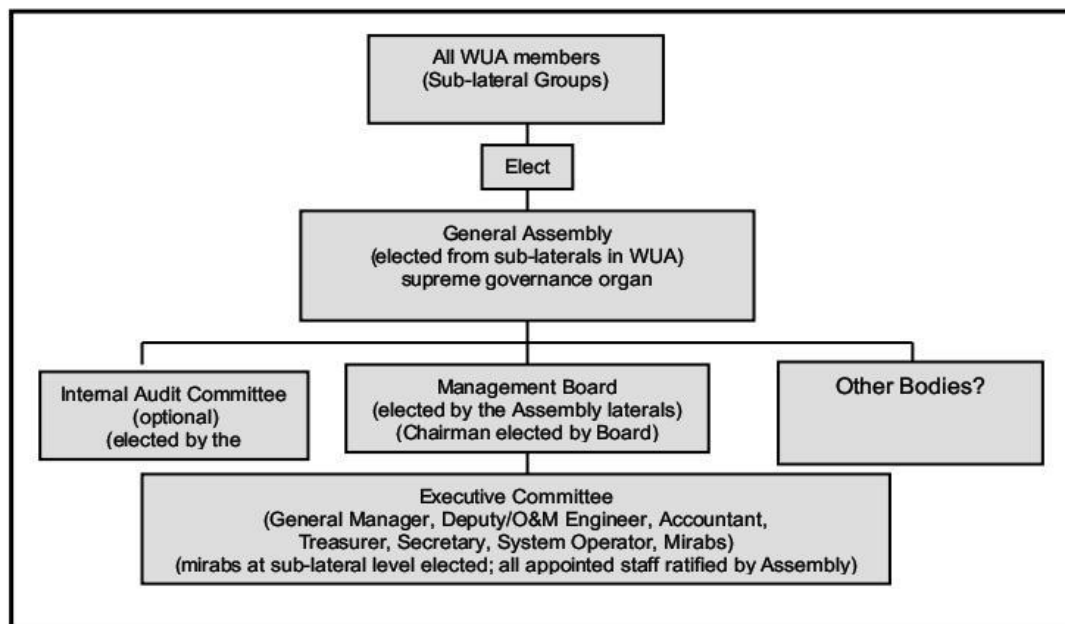
Annex-1 Organizational Structure of WUAs recommended by DAI

Governing and Management Bodies

The structure of a WUA according to the Charter and Internal Regulations is presented below in Figure 1. The internal bodies of the WUA have distinct governance and management functions. These are as follows:

- General Assembly: representation of members of sub-laterals in order to supervise and establish mandates for the Management Board and Executive Committee.
- Management Board: representation of the General Assembly in order to supervise the Executive Committee and ensure that it executes the mandates of the General Assembly.
- Executive Committee: execution of the mandates of the General Assembly through day-to-day management and decision-making.
- Internal Audit Committee: representation of the members in auditing the WUA's finances, independent of the Management Board and Executive Committee.

**Figure 1: Organizational Structure of a WUA
According to the Proposed Model Charter and Internal Regulations**



Management Board

The Management Board directly supervises the Executive Committee and is the key interface between the representatives of the sub-lateral membership in the Assembly and the Executive Committee. Article 33 indicates that the Management Board should be elected by an absolute majority of Assembly members among the sub-lateral units. The same is true of Article 27, which covers the removal of the Management Board. Article 32 concerns the appointment of Chairman of the Management Board. The article specifies that the Chairman of the Management Board is the Chairman of the WUA, who acts on behalf of the WUA in its dealings with outside agencies.

Internal Regulations

The DAI team has also prepared an Internal Regulations. The Regulations outlines and describes the following and other specific guidelines and tasks of the WUA. In the following we are providing an outline summary of the some of the chapters and will enclose a copy of the full text of the Internal Regulations to this report.

Employees

The General Assembly possesses the right to review and approve or reject staff appointments or dismissals of the Management Board or General Manager. This is also true concerning the salaries of WUA staff, which are paid by the members. Additional provisions specify these rights of the General Assembly.

Operations and Maintenance

The Internal Regulations contain procedures for operations and procedures for maintenance of the irrigation system. Also, it contains the definitions of routine, preventive (rather than periodic), and emergency maintenance. The Internal Regulations should be modified to include simple procedures for walk-thru inspections, keeping a Maintenance Register, and implementation or routine, periodic, and emergency maintenance.

Financial Management

The list of financial management activities of the Association among others, include the calculation of service fees. The Executive Committee prepares the Annual Budget and proposes it to the Management Board and the General Assembly for approval. The Executive Committee consults with the Management Board throughout budget formation and submits the Annual Budget for approval to the Management Board, which then presents it to the General Assembly for approval. Similarly, the Management Board is specified as a recipient of Monthly Financial Statements and reports. Final approval of financial reports is made by the Management Board. The General Manager's competencies include only provisional approval.

Dispute Resolution

The chapter provides a series of instances which is sufficient for the purpose of dispute resolution. The Internal Regulations also offer a range of methods of for dispute resolution. Methods in the present regulations include binding arbitration by the Management Board or General Assembly. In addition to these methods, the Internal regulations offer Management Boards and General Managers the options of conciliation and third-party mediation in an attempt to build consensus and achieve a "win-win" solution before resorting to binding arbitration in which one or both disputants is more likely to remain dissatisfied.

Annex-2 Survey Questionnaire and Checklist

Survey Questionnaire

Irrigation Association

Name of Water users:.....Contact No.....

Village:.....location.....upstream/downstream

Education level: a. Primary b. Secondary c. High School/University d. Illiterate

SECTION-A Transparency and Equity Issues

Q1. Who are involved in the selection of Mirab?

	a. Users	b. Elders	c. Government	d. (a & b)	e. (a, b, c)
Mirab System					
IA					

Q2. For what period of time Mirab is selected?

	1-2 Years	3-4 Years	More than 4	Not specific	
Mirab System					
IA					

Q3. Have you ever been involved in the selection of Mirab?

Mirab System	Yes	No	IA System	Yes	No
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Q4. Is the Procedure of selection of Mirab transparent?

Mirab System	Yes	No	IA System	Yes	No
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Q5. Is the procedure of conflict resolution transparent?

Mirab System	Yes	No	IA System	Yes	No
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Q6. Is the allocation of water among the users equitable?

Mirab System	Yes	No	IA System	Yes	No
--------------	-----	----	-----------	-----	----

Q7. How often the water users use the water illegally?

	Very often	Sometimes	Not at all	
Mirab System				
IA				

Q8. Is the contribution of labor for the maintenance of canal is equitable and fair?

Mirab System	Yes	No	IA System	Yes	No
--------------	-----	----	-----------	-----	----

Section-B Social Cohesion

Q9. What is your feeling about?

	Good	Very good	Best	Not good
Mirab System				
IA				

Q10. To what extend the system is reliable?

	25 %	50%	75%	100%
Mirab System				
IA				

Q11. How many times per year you had conflict over water?

	Once a year	Twice a year	Thrice	Not at all
Mirab System				
IA				

Q12. How many times you have met per year?

	Once a year	Twice a year	Thrice	When needed
Mirab System				
IA				

Q13. Which of the systems is influenced by powerful people?

Mirab System	Yes	No	IA System	Yes	No
--------------	-----	----	-----------	-----	----

Q14. Which of the system has more democratic decision making mechanism?

	25%	50%	75%	100%	
Mirab System					
IA					

Section-C Resource Generation

Q15. Is there any fund available for maintenance of irrigation infrastructure?

Mirab System	Yes	No	IA System	Yes	No
--------------	-----	----	-----------	-----	----

Q16. How the Mirab is paid?

	Crops	Money	Water	
Mirab System				
IA				

Q17. How often the canal is cleaned per year?

	Once a year	Twice a year	More	
Mirab System				
IA				

Section- D Long Questions

Q18. What is the criteria for Mirab selection?

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Q19. What do you know about Irrigation Association?

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.....

.....

Q20. Which system do you prefer and Why?

.....

.....

.....

.....

.....

Q21. What improvements have occurred with the establishment of IA?

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....

Comment

.....

.....

.....

Check list for group discussion with Managing committee of IA

Q1. How the Mirab system works in your village?

Q2. Who are involved in Mirab system and what are their responsibilities?

Q3. How Mirab is appointed and how long he stays in his job?

Q4. What are the criteria for the selection of Mirab?

Q5. How irrigation water is distributed among users?

Q6. How O&M is carried out in the Mirab system?

- Q7. How water conflicts are resolved in Mirab system?
- Q8. What is IA and how it works in your village?
- Q9. Who are involved in IA and what are their responsibilities?
- Q10. How the Executive committee and Mirab are selected in IA system?
- Q11. How the irrigation water is distributed among the users?
- Q12. How is the operation and maintenance of the irrigation infrastructure carried out through IA?
- Q13. What is the conflict resolution mechanism in IA system?
- Q14. What improvements have been occurred with the establishment of IA?

Checklist for group discussion with supporting organization (OFWM project staff)

- Q1. What is the current strategy of government about Mirab System?
- Q2. What are the shortcomings of the Mirab system?
- Q3. How IA organized and how does it work?
- Q4. What are the responsibilities of IA?
- Q5. Who are involved in making by-laws for IA?
- Q6. In which way IA is better than Mirab system from organizational structure point of view?
- Q7. To what extent the IA will be able to ensure equity?
- Q8. What are the feelings of water users about IA system?
- Q9. In which ways IA is superior to Mirab system with respect to the following issues?
- a. Resource generation
 - c. O&M of irrigation
 - d. Transparency (Conflict Resolution and Selection procedures)
- Q.10 To what extent the IA is influenced by powerful people?