

Afghanistan Research and Evaluation Unit
Case Study Series

Interrogating Irrigation Inequities

Canal Irrigation Systems
in Injil District, Herat



Srinivas Chokkakula



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Acronyms

AIMS	Afghanistan Information Management Systems
AREU	Afghanistan Research and Evaluation Unit
CRS	Catholic Relief Services
CSO	Central Statistics Office, Afghanistan
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
IDP	internally displaced person
MEW	Ministry of Energy and Water
SMEC	Snowy Mountains Engineering Corporation
NSP	National Solidarity Programme
WUAs	water user associations

Glossary

<i>arbab</i>	an elder person elected as leader of the village
<i>arhat</i>	dug well
<i>bola buluk</i>	upstream section
<i>chakbashi</i>	water manager at the community level in Baghlan Province, equivalent to <i>wakil</i> in Herat Province
<i>cumecs</i>	cubic meters per second – a unit for discharge
<i>hashar ab</i>	a community institution to address contingency situations whereby on the demand of a lower-section mirab, the wakil sets out a schedule to close secondary canals on upstream sections to let water flow to downstream sections
<i>jerib</i>	unit of land measurement: 1 jerib equals roughly one fifth of a hectare
<i>karez</i>	a traditional groundwater harvesting structure (also known as qanat in Iran)
<i>khaluse</i>	land distributed free of cost to farmers by government
<i>kulb</i>	circular outlet
<i>mein buluk</i>	middle section
<i>mirab</i>	water master, manages and maintains secondary canal
<i>natre</i>	square weir
<i>naubat</i>	rotational schedule and order in which water is allowed into farm
<i>poen buluk</i>	downstream section
<i>rayati</i>	land independently owned or acquired by farmers
<i>saat</i>	allocated time interval of water flow allowed in proportion to landholding of farmer
<i>Sharia</i>	religious law of Islam
<i>sharsham</i>	rapeseed for oil
<i>shura</i>	village governance committee
<i>Taximot Hakobe Ab</i>	the treatise of Maulana Abdul Rehman Jami (1414-1492), a manual that guides irrigation distribution in Herat Province (translates literally as “distribution of water”)
<i>wakil</i>	water master, manages and maintains primary canal

1. Introduction

This report presents the findings of a case study looking at irrigation system in Injil District, Herat Province, Afghanistan. The purpose of the study was to understand inequities and inequalities in irrigation distribution in a typical canal irrigation system. Two canals of the Hari Rud river system flowing in Injil District, Herat Province, were selected as the focus of the study.

The report describes the range of means by which communities organise equitable irrigation distribution by drawing on indigenous technological solutions and institutional arrangements. It identifies the drivers of inequity and the ways used to mitigate this within the Afghan context. These drivers include: power relations associated with socioeconomic differences; ethnic and cultural relations; and structural and geographic factors. The ways used to mitigate inequities can be divided into two categories: technological solutions and institutional solutions. Technological solutions for mitigating inequities include the traditional design of irrigation distribution devices, while the other major way of mitigating inequities is the institutional spaces within which water masters, the *mirab* and the *wakil*, function, including contingency arrangements invoked during periods of water scarcity.

The report concludes that the nature of the links between the evolving state in Afghanistan and local irrigation management systems are critical in ensuring an equitable irrigation management system. Some key recommendations to those working on water policy in Afghanistan, including the government and external agencies, are made.

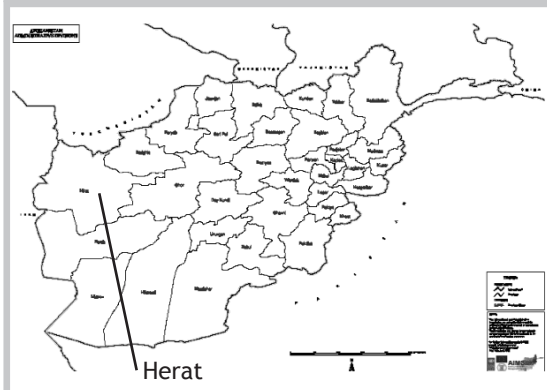
1.1 Study methods

Deteriorating security in Afghanistan restricted access to certain fieldwork locations. For this reason, the relatively secure Injil District in Herat Province was selected for this study, although security issues still prevented fieldwork in the upstream sections of the two canals in Injil.

Preliminary discussions with local NGOs and government offices suggested that traditional irrigation management systems are mostly organised around three distinct sections of any canal system: *bola buluk* (upper section), *mein buluk* (middle section), and *poen buluk* (lower section). Field visits, which took place over two weeks, were conducted accordingly. Two canals on the Hari Rud river system in Injil District were visited: the Injil canal and the Jui Nau canal. Attempts were made to visit at least one village in each of the three sections of the two canals.

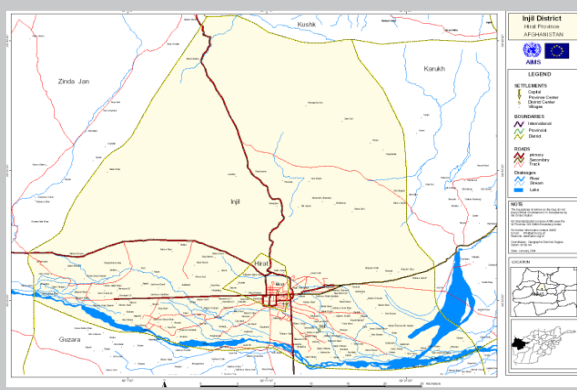
Figure 1 shows the two canals studied and the locations of the villages visited. Security concerns prevented the research team from visiting two sections of the Jui Nau canal; instead, visits to additional villages were made in other sections of the Injil canal. Details of the field visits and informant profiles are included in Table 1.

Figure 1.1: Case study locations



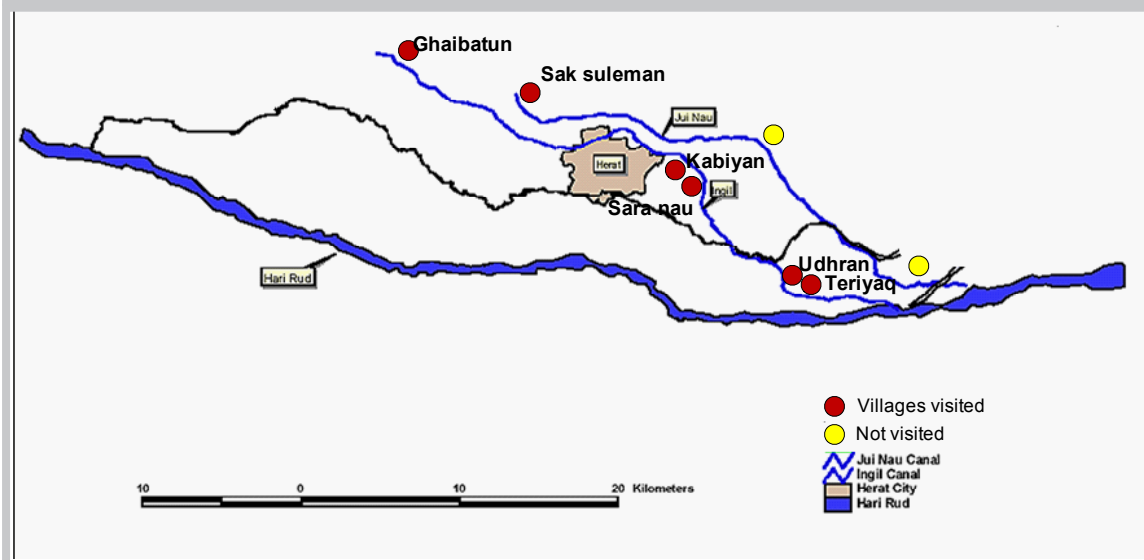
Source: AIMS, Kabul

Figure 1.2: Case study locations



Source: AIMS, Kabul

Figure 1.3: Case study locations



Source: Adapted from SMEC International and Agrisystems Ltd¹

Methods used for gathering data and information included key informant interviews and focus group discussions in the field as well as in workshop settings. Interviews were conducted with staff from the irrigation department and NGOs active in irrigation issues in Herat, such as Catholic Relief Services (CRS). In the field, farmers were interviewed individually as well as in groups. Focus group discussions were organised with the help of CRS and the irrigation department, which targeted specific groups of water masters or managers—*mirabs* and *wakils*—and the staff of NGOs involved in irrigation management support activities. Special efforts were made to include women informants, both women farmers and female staff members of NGOs.

¹ SMEC International and Agrisystems Ltd, Islamic Republic of Afghanistan: *Western Basins Water Resources Management and Irrigated Agriculture Development Project* (Asian Development Bank Technical Assistance Consultant's Report) (Kabul: Government of Afghanistan, Ministry of Irrigation, Water Resources and Environment, 2005), 53.

Table 1: Field visit details

Canal- section	Villages visited	Informant details
Injil- upper section (<i>bola buluk</i>)	Teriyaq, Udhran	Two male farmers
Injil - middle section (<i>mein buluk</i>)	Kabiyan, Sara nau	Two male farmers
Injil- lower section (<i>poen buluk</i>)	Ghaibatun	One male farmer and focus group discussions with farmers
Jui Nau - lower section (<i>poen buluk</i>)	Sak suleman	One male farmer and one female farmer

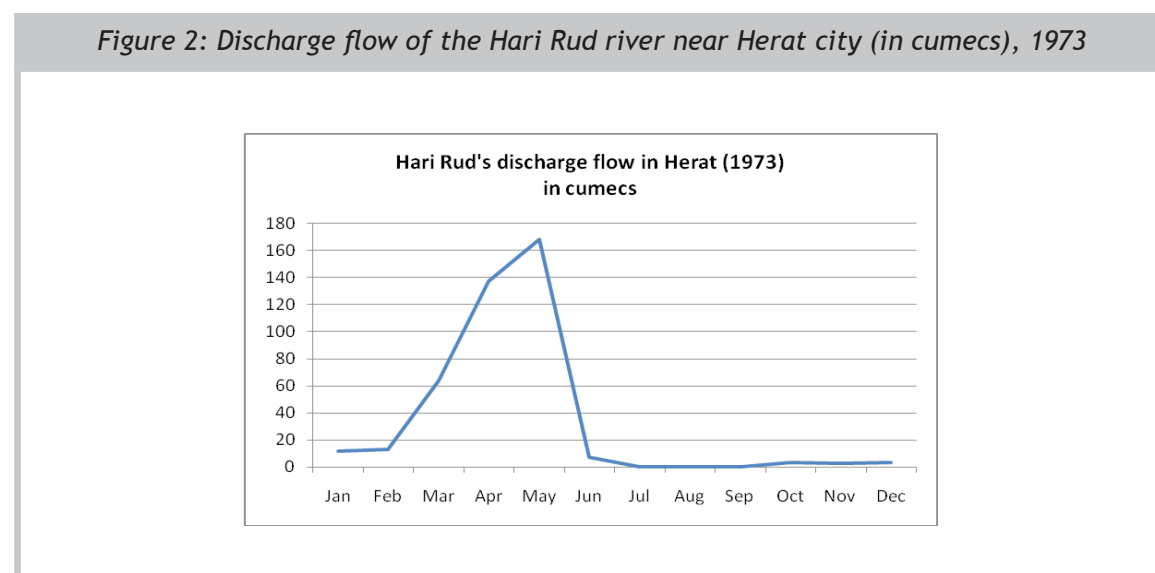
1.2 Context

Geographical context

There are three river basins in Herat Province, with the Hari Rud contributing to the major share and very minor parts of the Kushk Wa Kashan Rud and Bala Murghab basins. The Hari Rud river originates in the high mountains above 3000 m. The main tributaries of the Hari Rud river are the Darya-i Lal and Kawgan rivers. A large proportion of the basin is rangelands; only two to three percent of the land is irrigated. The amount of area cultivated with single or double crops depends on the flow in the Hari Rud river.²

The flow in the Hari Rud river peaks in April to May and then reduces significantly after that.³ From July to December, the river is fed mostly by groundwater emerging as springs. From December to mid-February, flow in the river remains low due to snowfall in the higher reaches, but from February onwards, as the temperature rises, snow melts and flow in the river increases. One of the earliest irrigation studies commissioned in the 1970s by the Government of Afghanistan's Ministry of Agriculture and Irrigation assessed discharge flows of the Hari Rud, and Figure 2 shows a typical discharge flow diagram for the Hari Rud in Herat for the year 1973.

Figure 2: Discharge flow of the Hari Rud river near Herat city (in cumecs), 1973



Source: ERCON⁴

2 Favre, Raphy, and Golam Monowar Kamal. *Watershed atlas of Afghanistan*. 1st ed. (Kabul: Ministry of Irrigation, Water Resources and Environment, 2004), 125-129.

3 Favre and Kamal, *Watershed Atlas of Afghanistan*, 27.

4 ERCON, *Hydrological Investigation of the Hari Rud Basin Between Marwa and Ghuryan, Afghanistan*,

Socioeconomic context

Herat is one of the most progressive provinces in Afghanistan because of its historically dynamic leadership and strong trade with Iran. Herat is the second-largest province (after Kabul) in terms of population and urbanisation. The city of Herat is one of the few cities in the country with 24-hour power supply, as it is on the Iranian power grid.

Urbanisation in Herat is characterised by a remarkable feature of population distribution: there are a large number of settlements (332 out of the total of 2170) with populations of 1000 or more, which account for 15 percent of the total population of the province. This level of urbanisation is second only to Kabul Province. The average settlement population in Herat is about 400, and a high proportion of large-sized settlements is a common feature of all districts in the province.⁵

Dari and Pashto are the two main languages spoken in the province (98 percent of the population speak one or both of these). Dari is widely spoken in 1663 of the 2170 settlements, or 76 percent, while Pashto is spoken in 466 settlements, accounting for 22 percent. Other languages spoken in the province include Turkmani and Uzbeki.⁶ Access to radio is almost universal and about 55 percent of the population have access to television.⁷

The two canal systems of Injil District under study draw upon the Hari Rud river as their source. Injil District surrounds the district of Herat city, with an estimated population of 232,915 spread over 159 settlements. Injil is one of the most heavily mined districts in Herat Province. About one quarter of the houses in the district were destroyed during the years of conflict and the number of internally displaced people (IDPs) is estimated to be over 63,000.⁸

UNHCR estimates the ethnic composition of Injil District to be: 55 percent Tajik; 40 percent Pashtun; four percent Hazara; and one percent Turkmen.⁹ The ethnic mix noted during field visits to villages along the Injil canal reflected these proportions. The upper and middle sections of the Jui Nau canal were inaccessible due to security concerns related to local warlordism.

Injil District is at the forefront among Herat's districts as a major producer of wheat, maize, vegetables (cauliflower and spinach) and fruit (melons, grapes, pomegranates and mulberry). Injil is also one of the major producers of commercial crops such as cotton, sugar, sesame, tobacco and others. Other commercial crops grown across Herat Province include olives and sharsham (rapeseed for oil).¹⁰

According to UNHCR's district profile of Injil, water availability is not a critical issue in the area. The district is fed by range of water sources: canals, traditional groundwater harvesting structures known as karezes, springs, shallow wells and tube wells with hand

Volume 1 General Report (Kabul: Government of Afghanistan, Ministry of Agriculture and Irrigation, 1974), 17-20.

5 Central Statistics Office and UNFPA, Herat: *A Socio-economic and Demographic Profile* (Kabul: Government of Afghanistan, 2003), 3.

6 Central Statistics Office and UNFPA, Herat: *A Socio-economic and Demographic Profile*, 15.

7 Central Statistics Office and UNFPA, Herat: *A Socio-economic and Demographic Profile*, 20.

8 UNHCR, District Profile: "Hirat Province, Injil District," http://www.aims.org.af/afg/dist_profiles/unhcr_district_profiles/western/hirat/injil/injil.pdf, 2002 (accessed 26 August 2008).

9 UNHCR, District Profile: Hirat Province, Injil District, 1.

10 Central Statistics Office and UNFPA, Herat: *A Socio-economic and Demographic Profile*, 33-34.

pumps. The profile estimates that the average distance between locations where water sources are available is about 1-2 km.¹¹

This appears to be similar in other parts of Herat Province. River water is the primary source of irrigation for about 37 percent of the population in 654 villages in the province. Springs supply irrigation to 315 villages (most of them large villages, covering a total population of about 280,000). Other water sources include streams and conduits, with these providing irrigation to about 897 villages.¹² Earlier data from the 1960s indicates that almost 98 percent of the irrigated area in Herat Province was irrigated by rivers and streams.¹³

1.3 What are irrigation inequities?

Irrigation inequities can be understood in several ways. There are two basic ways of experiencing inequality or inequity: in accessing the resource—for example, people upstream have better access compared to those downstream; and in its use, or the amount or share of the water people get, which can depend on their socioeconomic status. In both cases, further probing of the conditions that underpin or drive the differential experienced by people suggests that inequities and inequalities mutually construct and perpetuate each other: unequal access to resources generates inequity, and inequitable distribution of resources leads to inequality.

At the core of these inequities are the dynamics of social differentiation among local communities. While physical access to water is important, inequalities experienced in accessing and using water are largely driven by local social and power relations. The spatial and social variability in irrigation distribution affects agricultural productivity, which exacerbates social and economic inequalities. Furthermore, increasing inequalities can lead to conflict and social unrest.

It is therefore critical to understand the reasons for and consequences of irrigation inequities more deeply. How are inequities produced and how are they mitigated? More fundamentally, how can inequities be best understood and how can that knowledge be used to improve lives? More fundamentally, what criteria and conditions define equity, universal or particular? These questions have long been of interest to researchers studying justice and equity issues in peasant irrigation, and many have discussed these issues in the context of the imposition of external ideas of equity in designing irrigation systems, planning and policymaking, usually where the particular interests of the powerful are primary driving forces. When development assistance brings with it external ideas of efficiency and standardisation, this can often override local ways of ensuring justice and equity in irrigation distribution:

Their [of concepts about justice, equality and equity] practical definition and implementation are often dominated by the groups, sectors, entities and societies of the powerful. More and more often, local concepts about these values—based on a specific historical background, a logic of their own, differently expressed and applied—are uprooted and cast adrift in the community. They are standardised and institutionalised according to the criteria and norms of the others, who can thus more readily establish the rules of the play, concealing their own interests and

11 UNHCR, District Profile: Hirat Province, Injil District, 1.

12 Central Statistics Office and UNFPA, Herat: *A Socio-economic and Demographic Profile*, 32.

13 Favre and Kamal, *Watershed Atlas of Afghanistan*, 36.

*formulating policies that justify their interventions.*¹⁴

This does not mean that all external interventions have negative consequences; external interactions can also lead to the hybridisation of principles of distribution and can strengthen local institutions and systems.¹⁵

Lauderdale suggests that the issue of power relations driving inequities in the context of external interventions can be addressed by:

*...deriving principles of justice within a particular historical and comparative context. That is, justice can be conceptualised within social relations and material conditions that are specific and concrete.*¹⁶

The principles of justice and equity by which a community organises itself emerge through processes of contestation, negotiation and cooperation. These processes are necessitated by the nature of irrigation distribution, which is based on “mutual dependence and intrinsic obligations for intensive cooperation among users.”¹⁷ The rules of distribution and the criteria for equity draw upon this mutual dependence and obligations to cooperate. The rules and criteria must also be continuously defended and justified within broader society, in what Boelens and Davila describe as a process of evolution “both inwardly and outwardly.”¹⁸

Previous studies of irrigation systems have highlighted the strengths of peasant knowledge and organisation in arriving at equity criteria, and they have drawn attention to the need to understand these better. Stressing the importance of understanding the process of peasant organisation, Boelens and Davila observe that equity in irrigation systems is not inherited as a “cultural expression”, but that, “. . .they [peasants] have to work on them and fight for them, amidst a structure of unequal powers, diverging interests and heterogeneous identities.”¹⁹

In other words, “[e]quity must be understood as a dynamic social and political construction, contested at various levels.”²⁰

Equity is not restricted to the outcomes, but also relates to the processes and instruments used in producing these outcomes. This study made an effort to focus on all these aspects of the production of equity—or, rather, inequity. At the same time, what are the social relations and power structures that legitimise those processes of production? How are these contested at various levels? These are some of the questions that are relevant to understanding inequity, and levels of equity in irrigation management can be understood and explored as:

14 Rutgerd Boelens and Gloria Davila (eds), *Searching for Equity: Conceptions of Justice and Equity in Peasant Irrigation* (Assen, The Netherlands: Van Gorcum, 1998), 4.

15 Rutgerd Boelens, “Equity and Rule-Making,” in Boelens and Davila (eds), *Searching for Equity*, 17.

16 Pat Lauderdale, “Justice and Equity: A Critical Perspective,” in Boelens and Davila (eds), *Searching for Equity*, 6.

17 Rutgerd Boelens and Gloria Davila, “Water Users’ Organizations, Support Approaches and the Defence of Equity,” in Boelens and Davila (eds), *Searching for Equity*, 420.

18 Boelens and Davila, “Water Users’ Organizations,” 419.

19 Boelens and Davila, “Water Users’ Organizations,” 419.

20 L. Cremers, M. Ooijevaar and R. Boelens, “Institutional Reform in the Andean Irrigation Sector: Enabling Policies for Strengthening Local Rights and Water Management,” *Natural Resources Forum* 29, no. 1 (2005), 40.

*...equitable distribution among different water users and uses; equitable distribution of the services involved in irrigation development (e.g. agricultural services and training for users, subsidies and rehabilitation and support for organization and management); equitable distribution of the added agricultural production and other benefits under irrigation; equitable distribution of burdens and obligations related to functions and positions; and equitable distribution of rights to participate in the decision-making process.*²¹

This case study was informed and guided by some of these understandings from earlier works on equity in peasant irrigation systems, and attempts were made to understand the principles of justice implicit in the rules and rule-making processes among communities in Injil District, Herat Province. However, this does not by any means imply that local distribution systems are always equitable. The objective was to understand the power structures that produce and perpetuate the equities or inequities experienced by the communities, and in the process to critically analyse the discourses and dominant forces that legitimise rule making processes.

To inform and strengthen the design of sustainable and long-lasting external interventions, it is necessary to appreciate the foundation elements of prevailing community-based institutions.²² Furthermore, it is important to acknowledge that equitable principles or rules do not necessarily lead to equitable outcomes. The process of implementation, negotiation and modification in realising the outcomes are as significant as rule-making and associated power structures. The production of inequities is a dynamic process undertaken within a range of social and institutional spaces, and understanding the source of inequities cannot take place without delineating the dynamics involved.²³

This report focuses on the community water management institutions of *mirabs* and *wakils*. It presents not only the rules of irrigation distribution in Injil District, but also the rule-making processes that contribute to production of inequities. Specific technological and institutional provisions for ensuring equity in the face of various inequalities and power structures are discussed, and an attempt is made to capture the dynamics of negotiations involved in the process.

21 Cremers, Ooijevaar and Boelens. "Institutional Reform in the Andean Irrigation Sector," 40.

22 Boelens, "Equity and Rule-Making," 29.

23 Boelens, "Equity and Rule-Making," 30.

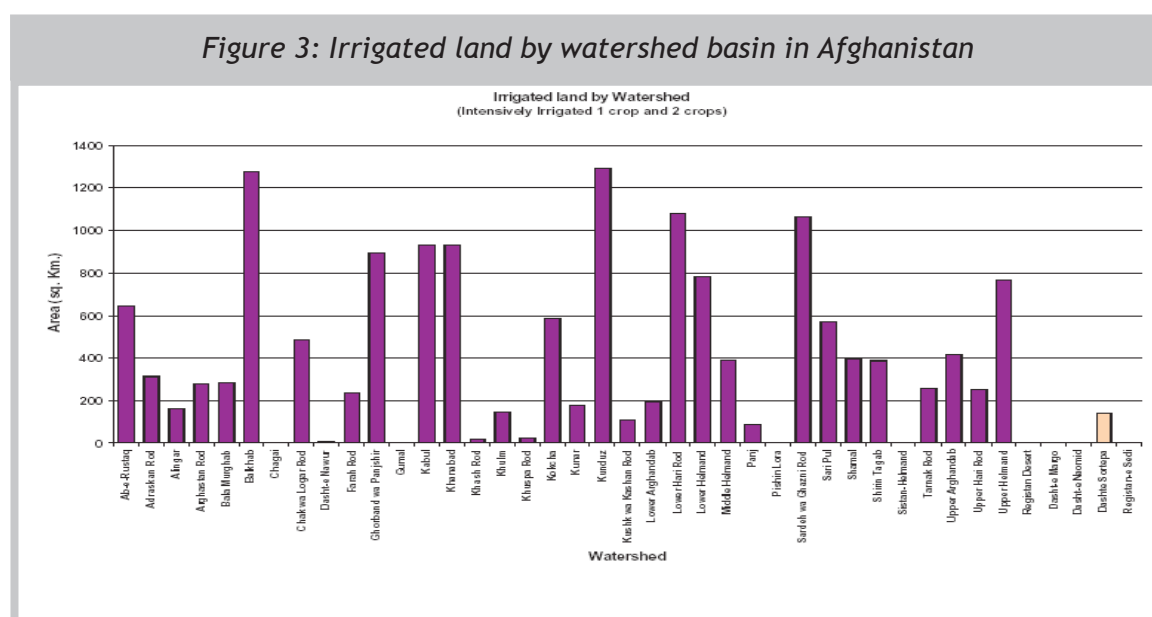
2. A Tale of Two Canal Systems in Injil District

Both the Injil and Jui Nau canals are primary canals taking off from the Hari Rud river on its right bank and flowing through Injil District. The Injil canal is an older canal system compared to the Jui Nau.²⁴ As shown in Figure 1, the canals run parallel to each other and adjacent to Herat city. Initial discussions with locals indicated that both of the canals have vibrant and well-functioning institutions of *mirab* and *wakil* in place for irrigation management. The upstream sections of the Jui Nau canal posed some security challenges to outsiders, but the *wakils* and *mirabs* were still able discharge their regular duties.

As one of the first steps in the fieldwork, a focus group discussion with field-level staff of relevant NGOs and the irrigation department was conducted in a workshop setting. A preliminary round of interviews with the irrigation department officials was also held. These interactions revealed that the management of the canal systems and the functioning of institutional arrangements—both formal (state) and informal (community)—are governed within the framework of three distinct divisions of the canal system: the upper section (*bola buluk*), the middle section (*mein buluk*) and the lower section (*poen buluk*). Water rights, privileges and contingency measures were distinctly different in each of these sections. The fieldwork locations were chosen so as to cover the three sections of the canals.

2.1 History, extent and characteristics of the canal systems

The two canals are located in the Lower Hari Rud basin—a basin with one of the largest proportions of irrigated land in the country (Figure 3). However, the irrigated land in the basin amounts to just two percent of its total area. Figure 4 presents a discharge flow diagram for the Lower Hari Rud basin in 1978, and it can be seen that the discharge flow is similar to that of 1973 (Figure 2).

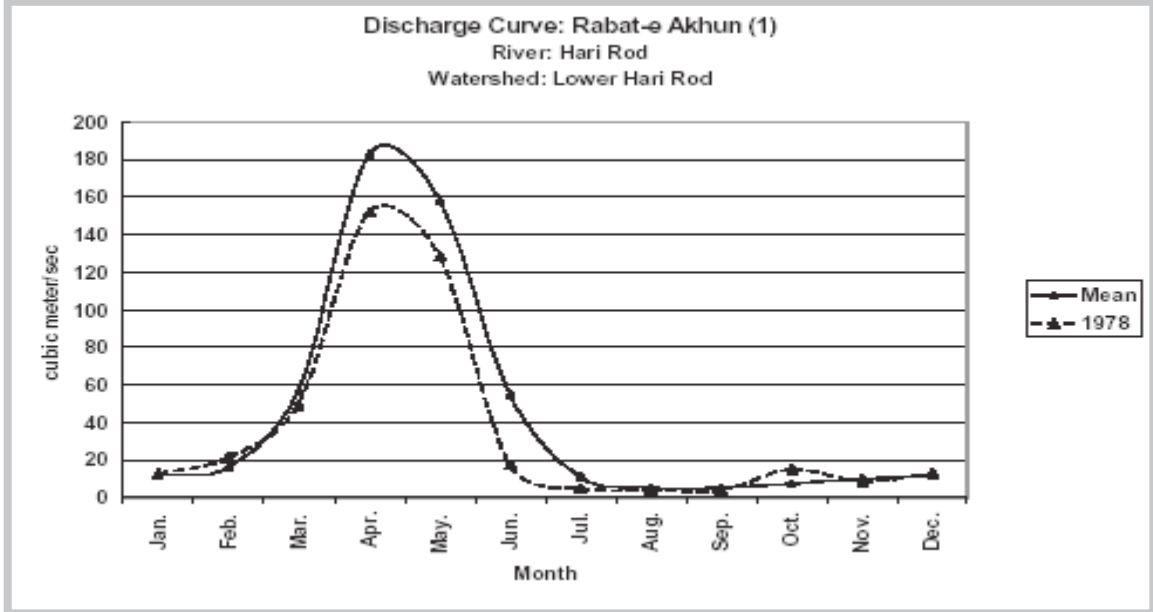


Source: Favre and Kamal²⁵

24 “Jui Nau” translates literally as “new canal.”

25 Favre and Kamal, *Watershed Atlas of Afghanistan*, 105.

Figure 4: Discharge flow of the Lower Hari Rud basin, 1978

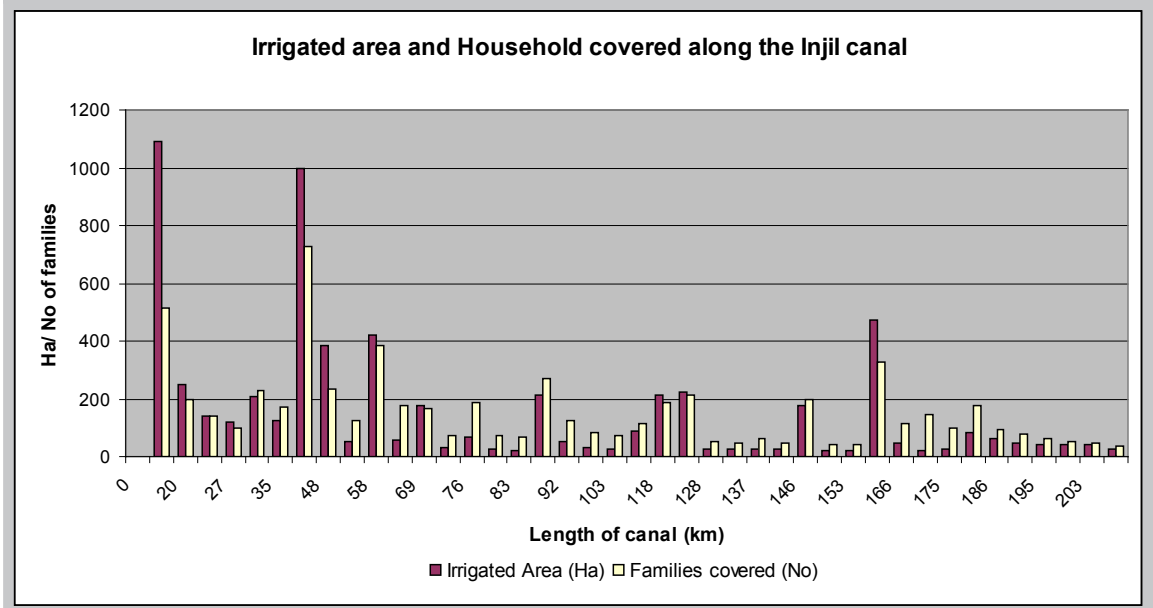


Source: Favre and Kamal²⁶

Injil canal

The Injil canal is one of the longest canals of the Hari Rud, measuring more than 200 km, and flows around the fringe of Herat city. Through a huge network of about 40 secondary and many more tertiary canals, the canal irrigates more than 6,000 ha (6,248 ha according to recent data from the Department of Water, Herat) and serves about 6,350 families.²⁷ The distribution of irrigated land and the number of families served along the canal length is shown in the Figure 5. The width of the canal varies between 2 m and 5 m.

Figure 5: Land irrigated and households served along the length of the Injil canal



Source: Department of Water, Herat

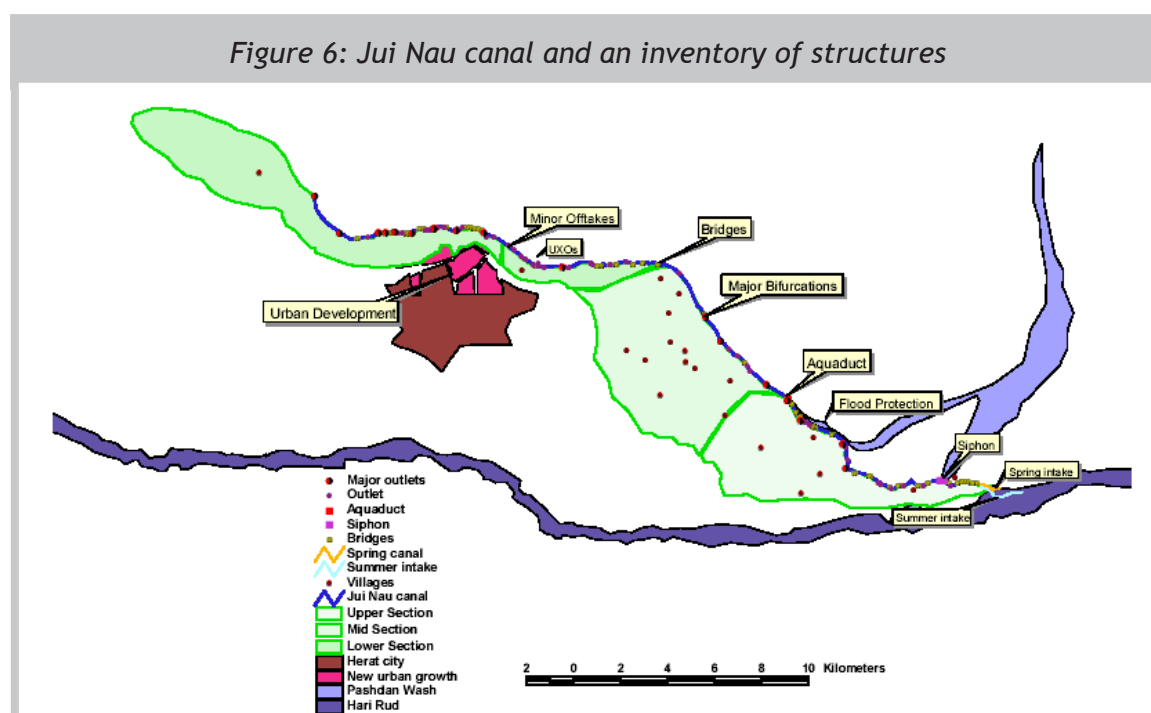
²⁶ Favre and Kamal, *Watershed Atlas of Afghanistan*, 129.

²⁷ Another estimate of the land irrigated under Injil canal is 37,000 jeribs (about 7,400 ha) (personal communication with hydrologist at the Department of Water, Herat).

Land ownership in the command area of Injil District appears skewed, although this research project did not collect data about landholding patterns. Afghanistan's land Gini coefficient is about 0.57, with 2.2 percent of the population holding 19 percent of land.²⁸ Landholding patterns in Injil are likely to be similar to this. Field visits revealed that there are significant economic inequalities among households, and landholding patterns varied accordingly.

Jui Nau canal

The Jui Nau canal runs parallel to the Injil canal, close to Herat city. The canal is fed by a combination of sources: the Hari Rud river during peak season and a separate set of intake canals from springs and trenches in the mid-channel during low seasons. The main canal is 32 km long with about 101 discharge points for the secondary canal network. The command area of the canal is about 7,500 ha, but the irrigable land is 5,100 ha. Within this, in a favourable year only 3,000 ha of this land is cultivated.²⁹



Source: SMEC International and Agrisystems Ltd

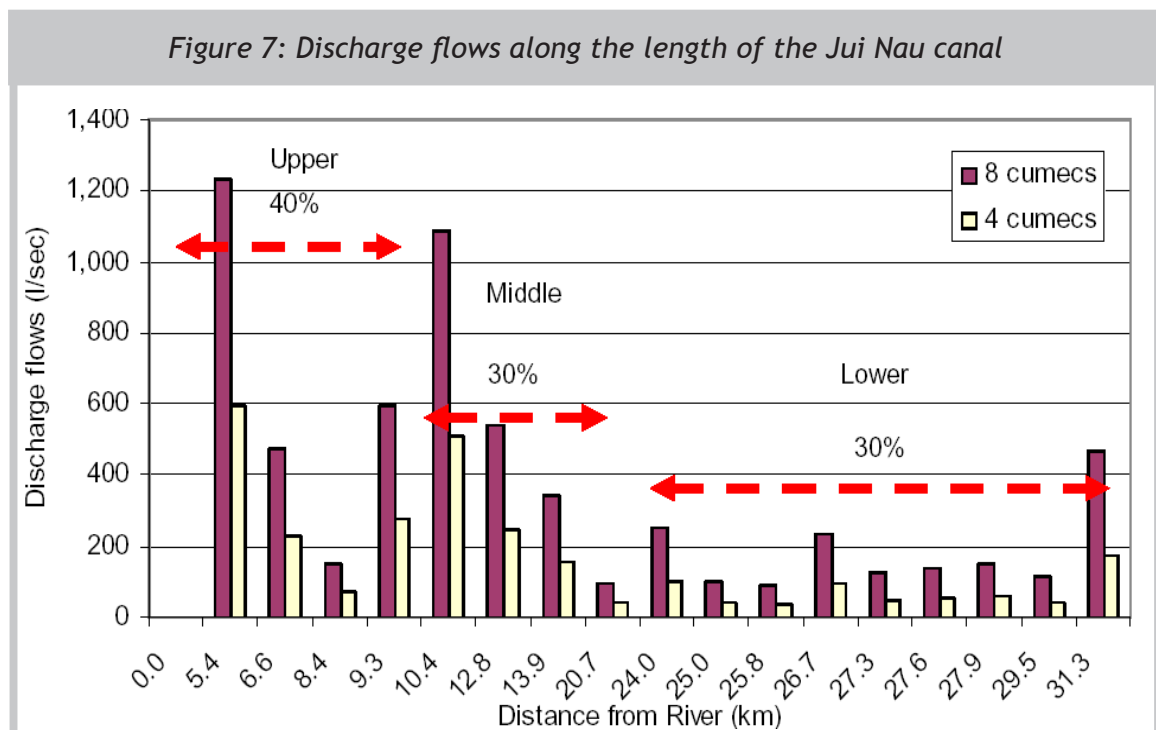
Land ownership in the command area of the Jui Nau canal is skewed, as it is in the other parts of the country. The SMEC International and Agrisystems report provides some data on the Jui Nau canal, including that it serves about 7,000 households, of which 15 percent belong to the “medium” wealth group (according to the classifications used in the National Risk and Vulnerability Assessment undertaken in 2003). These “medium” wealth group farmers cultivate 40 percent of the irrigated area in small farms of about 2 ha in size. The other 40 percent of the land is cultivated by smaller farmers with landholdings of less than 1 ha. The rest of the land (20 percent) is held by wealthy farmers and is usually cultivated on sharecropping basis. Sharecroppers are often landless households, and there are estimated to be around 3,000 sharecropping families in the command area of the canal. Wheat is the major crop sown, taking up nearly 70 percent of the land. Other crops include fodder crops (ten percent), orchards and vineyards (ten percent),

28 The World Bank, *Afghanistan: Poverty, Vulnerability and Social Protection, An Initial Assessment* (South Asia Region: Human Development Unit, The World Bank, 2005), 9.

29 SMEC International and Agrisystems, *Western Basins Water Resources Management*, 31-32.

and vegetables, cotton and maize in the rest.³⁰

Figure 7 shows a discharge flow graph for the Jui Nau canal, illustrating the typical inequities of water availability in the different sections of the canal. It shows discharge flows for different sections of the canal for two flow rates, 8 and 4 cumecs. The effect of changing intake flows from the main canals on the distribution of water into the secondary canals is clear.³¹ The interesting feature of this distribution is the relatively similar patterns of discharge flows between the sections. The flow rates do not decrease along the length of the canal, only across sections. In a typical canal flow, the discharge rates along the length of a canal should fall constantly due to various losses along with the diversions into secondary and tertiary canals. However, in this case the discharge flows increase as they reach the middle section and again in lower section. This may be due to a particular way of designing diversion structures to ensure a certain level of discharge flow for each section. This is not known, but it is worth noting the measures that have possibly been taken to maintain equity along the inequitably located sections of the canal.



Source: Rout, *How the Water Flows*, p. 27³²

2.2 Interrogating irrigation inequities in Injil District

Irrigation systems in Injil District are entirely community managed; the government is not directly involved in water distribution. Conversations with Department of Water officials and relevant NGOs suggested that this is the case throughout the Province of Herat. This

³⁰ SMEC International and Agrisystems, *Western Basins Water Resources Management*, 37.

³¹ Rout uses this graph to discuss the performance of canal systems. See: Bob Rout, *How the Water Flows: A Typology of Irrigation Systems in Afghanistan* (Kabul: AFGHANISTAN RESEARCH AND EVALUATION UNIT, 2008), 27-28.

³² Figure 7 shows actual discharge flows in the canal, whereas the earlier graph for the Injil canal shows the irrigated area and households served at different sections along the length of canal. Similar data indicating discharge flows for the Injil canal is not available; however, figure 7 illustrates the inequalities experienced by communities at different sections of the canal.

research showed that there is a set of drivers and factors that combine to produce the inequities that exist in irrigation in Injil: power relations associated with social, ethnic and cultural differences; and physical, spatial and structural factors. Interestingly, the

Taximot Hakobe Ab: the indigenous manual for distribution of water

The irrigation department in Herat uses a 500-year-old indigenous manual to guide distribution of irrigation water. It was written by Maulana Abdul Rehman Jami (1414-1492), a literary scholar and mathematician from Herat. The department claims that it still uses the principles from this manual to design canals, their control and their regulatory structures.



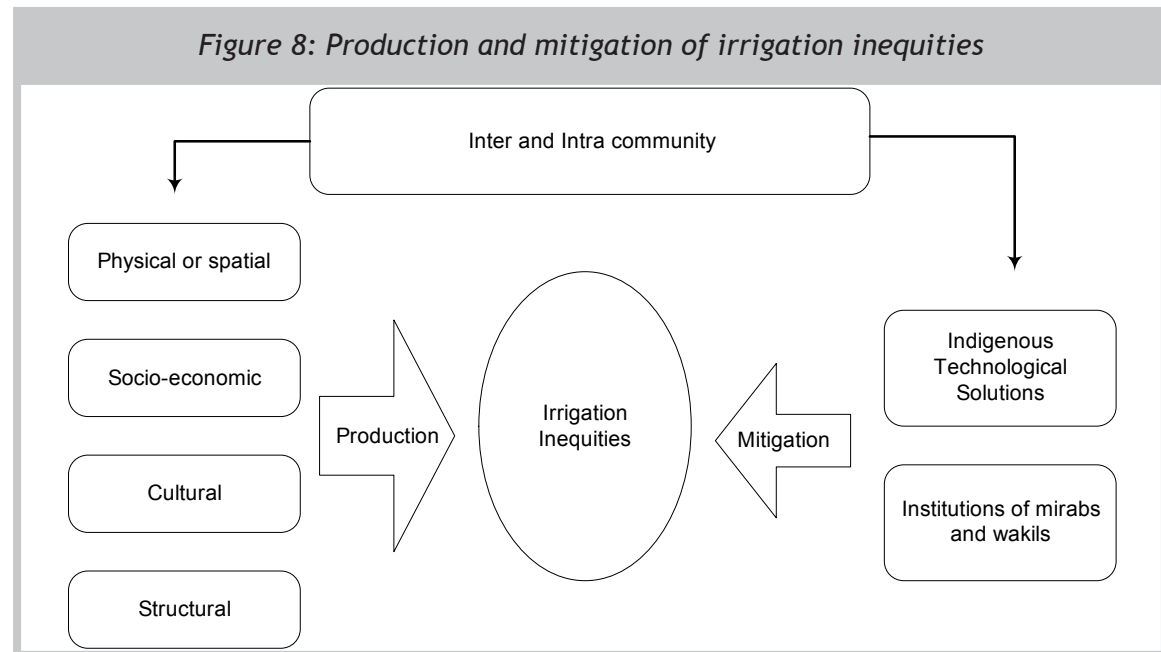
Photos: Srinivas Chokkakula

The manual is apparently followed throughout Herat Province. The director of the irrigation department showed the book to the researcher during an interview. The book, handwritten by Jami himself, had been restored and is kept in a tattered leather case. It is treated as confidential and kept strictly under lock and key. No one has access to it except higher officials in the department.

A brief glimpse of the book during the interview revealed detailed hydrological drawings and calculations, but as it is in Persian the specifics of what precise principles or techniques are followed from the book could not be confirmed. Some examples given by the staff of the Department of Water suggested that Maulana Abdul Rehman Jami had a brilliant mind and was deeply concerned with equity issues in distribution. For example, Jami recommended reducing the width of the canal as it proceeds downstream to ensure that the depth of the flowing water column and its velocity are maintained equitably and the water flows sufficiently into the secondary and tertiary canals downstream. Jami also put forward some creative designs for weirs and other control structures so that the water would flow proportionally to the extent of land irrigated by the particular diversion structure.

Further conversations with Department of Water officials indicated that Jami's detailed calculations were made from a survey he did of the lands irrigated by the canal. He apparently maintained records of lands irrigated, cropping patterns and canal parameters. Jami made hydrological calculations and designed weirs and other structures using well-refined mathematical principles. Some of the basic principles in book may sound elementary from the point of view of current advanced hydrological modelling techniques, but the fact that these principles were devised some 500 years ago reveals something of the genius of this scholar.

community-managed irrigation systems in Herat also exhibited many technological and institutional innovations aimed at mitigating these inequities. This section provides a deeper understanding of how these various elements interact towards, at least in principle, generating equitable outcomes and how these indigenous systems sometime fail to do so. A schematic conceptual framework of the production and mitigation of irrigation inequities is presented in Figure 8.



2.3 Background to irrigation distribution in Injil District

Before discussing the inequities present in Injil and their dynamics, it is useful to understand the basic framework within which community-managed irrigation distribution occurs. The canal system includes intake and offtake structures, followed by a primary canal that runs through the command area. The secondary canals convey water to settlements through diversion and control structures on the primary canal. A primary canal is further split or diverted to feed another set of secondary canals. Once the water reaches a settlement, a network of tertiary canals takes it to individual farms.

The Department of Water is responsible for the construction and maintenance of intake and offtake structures and for the construction of the primary canal. Beyond these structures, irrigation distribution is managed by a group of water masters—part of an elaborate institutional structure of *mirabs* and *wakils*. The *mirab* and *wakil* system is not a nation-wide phenomenon, but there are several variations of it that still exist in parts of Afghanistan.³³ These institutions are apparently deteriorating in many places, but in Herat they are prevalent and active.

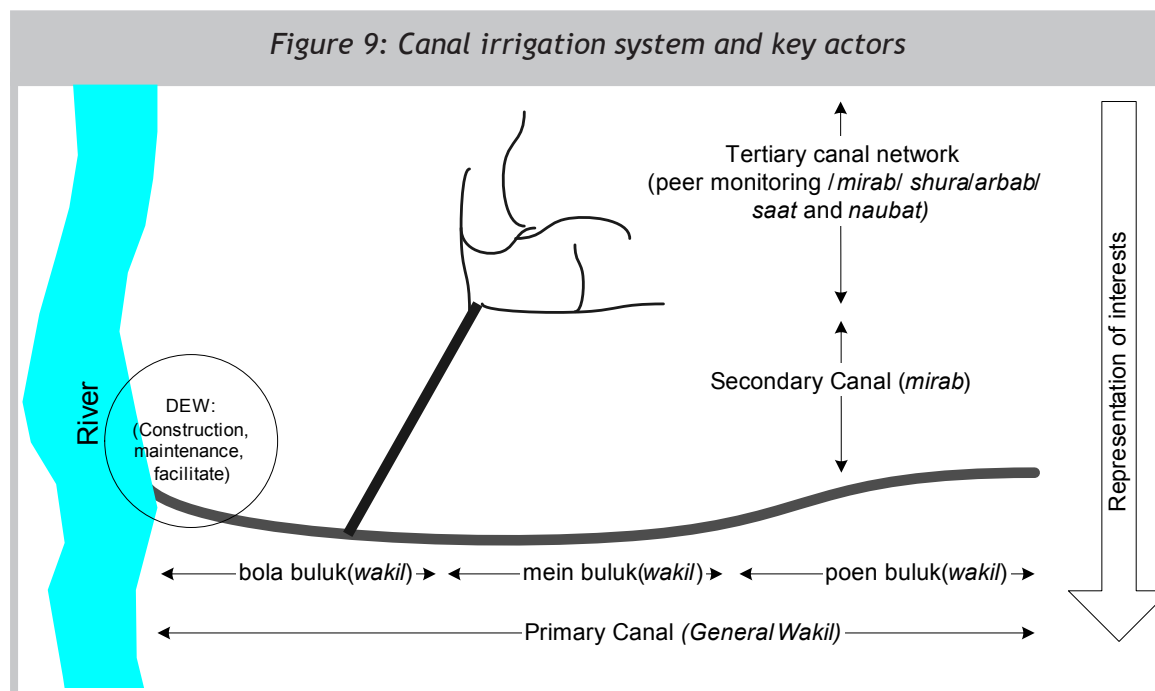
The primary canal is divided into three sections, with a *wakil* appointed to each section. Above the three *wakils*, there is a head *wakil* for the entire canal section.³⁴ *Wakils* are

³³ Jonathan Lee, *Social Water Management* (Kabul: Afghanistan Research and Evaluation Unit, 2006), 46-48.

³⁴ The head *wakil* is also addressed as the “general *wakil*” and the *wakils* of the sections as “deputy

elected through a democratic process. The head *wakil's* primary responsibility is to coordinate with the Department of Water to ensure that water is supplied through the main canal. The other *wakils*, also known as deputy *wakils*, are responsible for water distribution in their respective sections. Maintenance of the primary canal is also the responsibility of *wakils* and they mobilise the beneficiary communities to carry out these maintenance activities.

The design and construction of diversion and control structures for the secondary canals is the responsibility of the Department of Water, which is supposed to do a periodic survey of command area and calculate the extent of irrigated land under each secondary canal. The diversion and regulatory structures are designed according to the irrigation requirements of the area irrigated by the secondary canal. The construction and maintenance of the secondary canal (in most cases, more than one secondary canal) is the responsibility of the *mirab*. The *mirab* is also generally elected by the community, and in the majority of the villages visited during fieldwork this was the case. There are, however, cases where the position of *mirab* has been passed down over generations through same family. The appointment of the *mirab* can also be an ad hoc decision taken by a dominant group in the village.³⁵ The ethnic composition of the settlement and associated power relations are important factors in the election of a *mirab*.



More than one secondary canal can feed farms belonging to one settlement, and one secondary canal can feed water to more than one settlement. A *mirab* can manage one or more secondary canals feeding one or more settlements. As mentioned, the *mirab* is responsible for the construction and maintenance of secondary canals with the help of community members, and he also coordinates with the *wakils* to ensure flow into the secondary canals. The typical everyday tasks of a *mirab* include: checking any unauthorised breaching of the canal upstream; collecting and mobilising people for maintenance activities; maintaining the diversion and regulatory structures, especially

wakils."

35 Vincent Thomas and Mujeeb Ahmad, A Historical Perspective on the *Mirab* System: A Case Study of the Jangarok Canal, Baghlan (Kabul: Afghanistan Research and Evaluation Unit, 2009).

the *natre* (square weir) and *kulb* (circular outlet); and coordinating and mobilising labour for main canal and river bed maintenance activities.

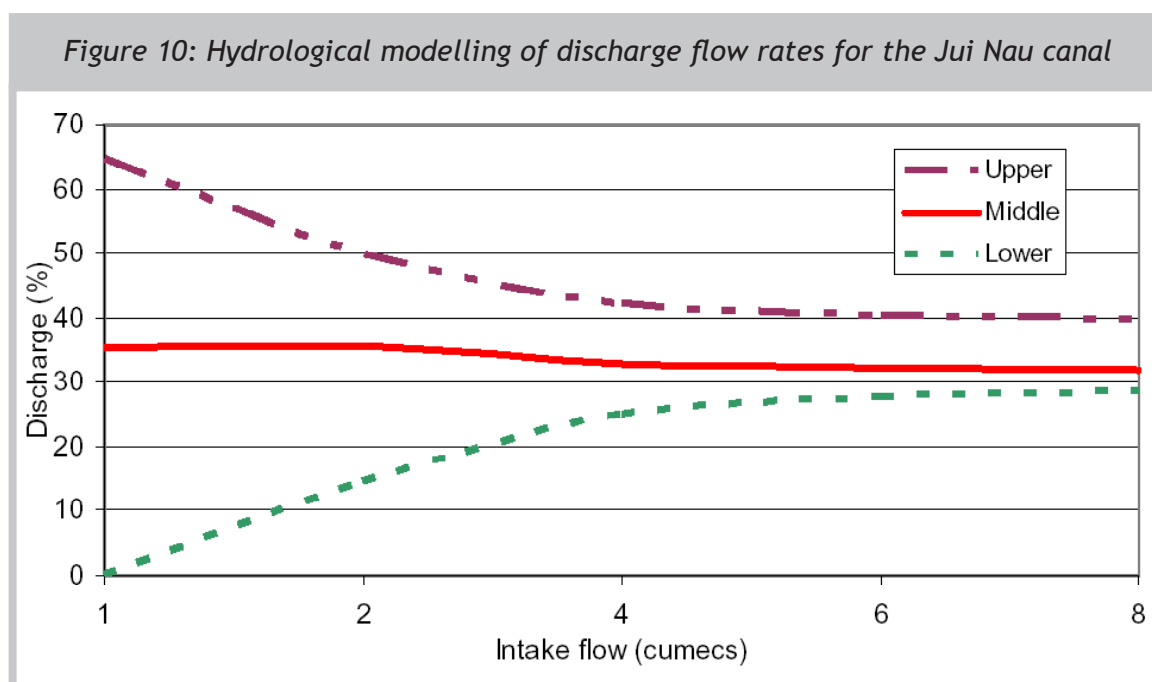
The tertiary canal network that takes water from secondary canals to individual farms is not the responsibility of the *mirab*, but individual farmers may choose to coordinate with the *mirab* in relation to the construction of their canals and during the diversion of water. Water diversion and monitoring of the quantity of water flow is done entirely through peer monitoring according to the individual water rights that correspond to their landholdings. The distribution of water is done through the system of *saat* (the allocated time interval of water flow allowed in each cycle in proportion to the landholding of the farmer) and *naubat* (the order in which the water flow is allowed in each cycle). Conflicts about water distribution are resolved through the involvement of the *mirab*, the *arbab* (village elder) and sometimes also the *shura* (village governing committee).

3. Production of Inequities

The fieldwork for this case study revealed a range of factors that contribute to the production of inequities in access to, and distribution of, irrigation water. First and foremost, the spatial association of water and its fluvial nature generate inequities along the length of the canal: communities upstream always have better access compared to those downstream. The second set of factors is those related to socioeconomic differences and associated power relations, while strained ethnic relations in Afghanistan also play a role. The social or economic status of communities or individual households, irrespective of where they are located, can impact upon their access to a resource. Warlordism and gun power are still prevalent in the country and have great influence on social relations among some communities. The third set of factors are those related to weaknesses in water management institutions, while the fourth relates to prevailing cultural norms, the dominant of these being gender-related inequities. Finally, the kind of land entitlement that a household has and the water rights associated with that often lead to inequities. Structural factors that also influence access to irrigation water include those that are a result of outdated traditional land relations combined with the “statelessness” or lack of effective government that Afghanistan has experienced over the past three decades. The high rate of returning IDPs and refugees adds further complications to this scenario.

3.1 Spatial and physical factors

The discharge flow graph of the Jui Nau canal illustrates the types of inequities experienced by communities along the length of the canal (Figure 7). The variation in accessibility and availability of water spatially is a basic inequity in any canal irrigation system and forms the core of an asymmetrical power relationship among the people sharing the resource.



Source: Rout, *How the Water Flows*, p. 28

Rout shows that for an 8-cumec discharge rate in the canal, 40 percent of the intake

flow is distributed in the upper section, whereas 30 percent is distributed in each of the middle and lower sections. Hydrological modelling using the actual offtake locations of the channel, cross-sectional areas and water levels shows that the distribution of discharge flow rates is further skewed when the flow rates are less than 4 cumecs. Interestingly, however, the flow rates remain constant at 4 cumecs across the sections.³⁶

The photographs in Figure 11 illustrate in real terms this spatial inequity. The first was taken close to Herat city, about 5-10 km from the Hari Rud river in the upper section of the Injil canal. The second was taken the end of the Injil canal, in the village of Ghaibatun. Water scarcely reaches these sections of the canal.³⁷ It can also be seen that in the upper section the canal is lined, whereas in Ghaibatun the canals are unlined and lack any maintenance except for the control structures.

Figure 11: Flows in the upper section (close to Herat) and lower section (Ghaibatun village) of the Injil canal



Photos: Srinivas Chokkakula

The canal section in Ghaibatun displays the typical conditions at the end of a canal experiencing a high degree of inequity. For reasons associated with widespread illegal poaching, warlordism in upstream sections and weak and inefficient *wakil* administration, the canal receives little water. The secondary canal infrastructure remains well maintained because of the work of a reportedly honest and highly regarded *mirab* in the village.

The entire Ghaibatun village depends on four bore wells owned by wealthy farmers for irrigation. The village, comprising about 100 households, is serviced by a parallel tertiary canal network that transmits water from these wells. The rules of the rotational system, the *saat* and *naubat*, of the Injil canal irrigation cannot be applied to the distribution of the bore well water. At the same time, the maintenance of the canals for distributing the bore well water is not the responsibility of the *mirab*, so it is up to those farmers buying water from the bore wells to construct canals to their farms from the source bore wells.

³⁶ Rout, *How the Water Flows*, 27-28.

³⁷ One of the participants in the *wakils'* workshop observed that the flow in the downstream sections of the Injil canal was affected by the canal passing through the city and many people taking water from it for construction purposes.

Figure 12: Parallel canal networks in Ghaibatun village



Photos: Srinivas Chokkakula

Arrangements for the supply of water from bore wells are negotiated by individual farmers with the owners of the bore wells. In addition to meeting the expense of the diesel needed to run the bore well pump, the farmer must also pay on a per-hour basis. In the case of a sharecropper farmer in Ghaibatun, each hour of pumping water costs 160 Afs. He cultivates 5 *jeribs* of land and needs at least one hour of irrigation per week.³⁸ The bore well is an additional source of income for the wealthy farmer who owns it. He owns land in the village but lives in Herat city, and he rents out his land through sharecropping arrangements.

Figure 13: Bore well irrigation in Ghaibatun village



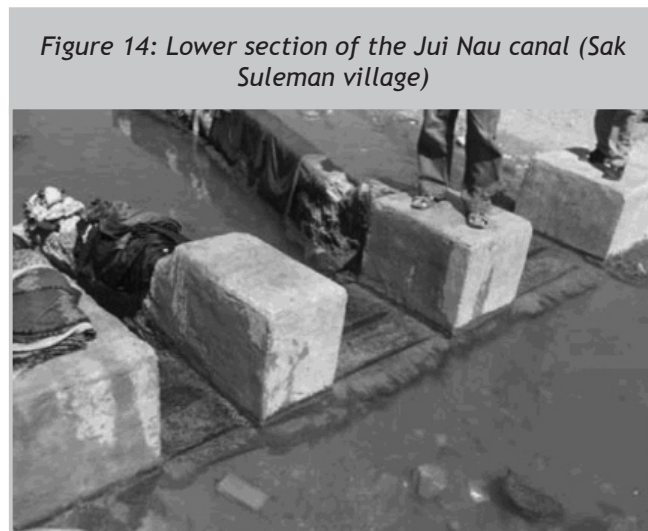
Photos: Srinivas Chokkakula

³⁸ Sharecropping arrangements include sharing of both the costs and the benefits by the owner and the sharecropper farmer. The owner's share is two-fifths and the sharecropper's share is three-fifths.

3.2 Socioeconomic differences and ethnic relations

As mentioned, Herat Province is characterised by ethnic diversity. Historically tenuous relations between various ethnic groups in Afghanistan have been well documented.³⁹ Interviewees' stories of conflict and violations of water distribution suggest that these relations remain tense. However, not all water-related conflict can be attributed to ethnic relations—disparities in income and warlordism also impact upon social relations among communities sharing the canal.

A common reason for the kind of inequity between upper and lower sections shown in Figure 11 is large-scale illegal breaching of canals upstream. Farmers deepen diversion weirs, construct illegal canals or increase the height of diversion structures to get more water into the canal. It is the responsibility of the *wakil* to monitor this, but they are not always equipped with the power required to regulate violations. Farmers upstream who resort to poaching are sometimes warlords backed by gun power; in other cases, the *wakil* is under their influence—for fear of their lives or simply for favours from these farmers. Farmers along the Injil canal observed that one of the *wakils* is weak, and therefore there is inadequate flow of water in the lower section of the canal—in this case, there is no water. In contrast, the head *wakil* of the Jui Nau canal is a wealthy and powerful man who is also a police officer and can negotiate violations effectively. This is possibly the reason why the lower section of Jui Nau canal receives a good supply of water. Figure 14 shows the water at the end of the Jui Nau canal in Sak Suleman village.



Photos: Srinivas Chokkakula

³⁹ For a history of ethnic relations in Afghanistan, see: Ahmed Rashid, *Taliban: Islam, Oil and the New Great Game in Central Asia* (London: I.B. Tauris, 2002).

During the *wakils'* workshop, the head *wakil* of the Jui Nau canal reported that widespread poaching had been taking place on the Jui Nau before he took over. There had been more than 40 illegal diversions along the length of the canal, and he had had to work for two years to stop this illegal poaching of the water. He had campaigned extensively with people along the canal and mobilised the local arbabs and shuras to monitor poaching. It was only after he had been able to arrest the illegal extraction that the last village on the canal, Sak Suleman, began to receive a reliable water supply.

The illegal poaching of water in upstream sections is not restricted to primary canals. Focus group discussion with four *wakils* of canals in Injil District revealed that poaching also happens on the river sections. Injil District has a total of six primary canals on the right bank of the Hari Rud river, which irrigate the entire district. Injil and Jui Nau are the most downstream canals of the six. The *wakils* who participated in the workshop told of an instance of ongoing poaching by a warlord from the river just upstream from the Injil canal. The warlord had constructed a canal and was tapping water from the spring in the river bed, substantially affecting the amount of water flowing into the Injil canal during low seasons.

“The rule of experts”: Idolisation and inequity

Maulana Abdul Rehman Jami and his water management treatise, *Taximot Hakobe Ab*, enjoy iconic status in Herat Province—among ordinary people as well as government officials. According to a staff member from Herat’s Department of Water who participated in the study’s focus group discussions, the book is used highly effectively in two ways: in cases of conflict about the allocation of water, officials quote that the allocation was made according to Maulana Jami’s book, which is usually accepted by people with deep respect; alternatively, powerful people who have influence over the water masters—*wakils* and *mirabs*—take advantage of the ingrained respect for the treatise among the general populace and quote the book in order to unfairly allocate water shares.

Illegal poaching along the primary canal is most rampant in the Injil canal. A farmer in the village of Kabiyan, in the middle section of the Injil canal, named particular individuals upstream involved in poaching of water. These poachers take as much water as they want, and apparently not even the government can stop them from doing it. All are warlords and former mujahiddin commanders who exercise gun power. They also enjoy some influence over government officials. Farmers sympathetic to the head *wakil* of the Injil canal suggest that this is one of the reasons why the *wakil* is considered weak and inefficient. The former head *wakil* of the Injil canal voluntarily stepped down and refused to continue because he believed he could not get water to downstream sections under such circumstances.

As the Injil canal flows through the city of Herat, its flow is also affected by some unauthorised extraction of water by city-dwellers. Garbage is also dumped in the canal and city-dwellers do not contribute to the maintenance activities of the canal. This conflict of interest between urban and rural users is present in the Jui Nau canal as well. In the recent past, government agencies in Herat have been developing a large garden on the outskirts of the city. Jui Nau passes by this garden and the agencies involved in developing the garden extract large quantities of water from the Jui Nau canal without any accountability. People downstream mobilised themselves and made representations to the mayor and the governor of Herat city, but their efforts were

in vain. Even the tough and efficient *wakil* of the Jui Nau canal could not do anything because it is government agencies that are involved and the water extraction is being done for a “genuine” purpose. People in the downstream sections are suffering because they no longer receive sufficient water for their crop requirements, and they have begun to depend more on alternative sources such as dug wells and bore wells. Farmers lament that there should be some way of compensating for this lost water. This inequity—produced by conflict of interest between rural and urban interests—is another major challenge for the government to resolve. Such conflicts are beyond the scope of the institutions of *wakil* and *mirab*.

3.3 “Kinks” and “weak links” in institutions

The integrity and efficiency of the *mirab* and *wakil* institution is critical to the success of irrigation management systems. These qualities of the *mirabs* and *wakils* on the Injil canal were not cast into doubt by farmers in the upper section, but of those in the middle and lower sections, many stated that the *mirabs* and *wakils* can be dishonest. Some farmers in Udhran village (close to the upper section of the Injil canal) receive water for irrigation from a branch canal of the primary canal. These farmers are located on the lower section of the branch canal and were skeptical when they heard comments about the *mirab* “doing good work.” They openly accused the *mirabs* and *wakils* of unfair practices and of taking bribes. Bribing a *mirab* for favours in water distribution is a known and widely prevalent practice across Afghanistan.⁴⁰

A farmer from the middle section of the Injil canal said he had paid the *wakil* to get more than his allocated water; he made this allegation in the presence of the local *mirab* without any counter-explanation from him! This farmer, from a smaller village, Gerdob, close to Kabiyan, had lost one of his legs in a landmine blast, but he was still very resourceful and entrepreneurial. Unlike other farmers in his neighbourhood, he had had a dug well constructed on his farm, with the help of CRS, to supplement canal irrigation. He also admitted that the *wakil* gets away with corrupt behaviour because there is no collective action against it among villagers.

Figure 15: Dug well on a farm to supplement canal irrigation



Photo: Srinivas Chokkakula

⁴⁰ Thomas and Ahmad, *A Historical Perspective on the Mirab System*, 47-48.

When the *wakils* or *mirabs* fail, or there are repeated offences of illegal breaching of canals, the normal route for redressal for farmers or the concerned *mirab* is to approach the Department of Water with the complaint. The Department of Water communicates the offence to the police department, and it is left to the police to deal with it. The Department of Water does not have any other means by which to regulate these offences nor does it have any power to enforce compliance. It appears that most of the time the police department does not take such reports seriously; even if it does, the violators find ways of avoiding punishment—usually by giving bribes or using their links and influence with the police. In the absence of *wakils* and *mirabs* having the power, ability or courage to punish violators of the irrigation management system, government is expected to act—but the Department of Water has just two field staff for the entire district who are hardly equipped to deal with violators. Their lives and jobs are always under threat and they prefer to remain indifferent to violations or simply report instances of violations to the police department.

3.4 Cultural factors: gender inequities

One of the most prominent and clearly visible inequities in irrigation distribution is associated with the gender inequalities in Afghan society. Deeply entrenched patriarchal gender relations influence women's access to and use of resources.⁴¹ While women can purchase land in Afghanistan, this does not often happen. Land ownership by women invariably occurs through inheritance from fathers or husbands, and decades of war has left Afghan society with many widows endowed with land and farms. About 56 percent of female-headed households in Afghanistan own land and farms.⁴² Women often enter into sharecropping agreements within their family, usually their brothers or fathers.⁴³

Water allocations come with the land inherited or owned by women, so water rights for irrigation are protected and do not change if a woman owns the land. However, inequities associated with a woman's ownership manifest themselves in different ways—for example, as restrictions on their participation and negotiation in institutions associated with irrigation distribution. Afghan culture restricts women from working in open fields; they can only work in kitchen gardens protected by compound walls. Women are also not allowed to attend public gatherings, so women farmers rarely, if ever, meet the *mirab* who provides water to their farms.

Because women's access to land depends on gender relations, some effort was made during this research to understand how gender relations affect irrigation inequities. With the help of CRS's women field staff, a case study of a woman farmer was carried out in Sara Nau village on a branch canal of the Injil canal called Jui Injil. Sara Nau is located in the middle section of the branch canal. The farmer is a widow with a 13-year-old son and a daughter who works as a teacher in the local school. She, along with her children, lives with her parents. Her two brothers and her sister along with her husband also live in the same house.

The woman owns 3 jeribs of land and a cow, which were inherited from her husband. She rents land for sharecropping to her brother-in-law (her husband's brother). The

41 Earlier AREU research discusses this aspect at length; see: Jo Grace, *Who Owns the Farm? Rural Women's Access to Land and Livestock* (Kabul: Afghanistan Research and Evaluation Unit, 2005) and Liz Alden Wily, *Looking for Peace on the Pastures: Rural Land Relations in Afghanistan* (Kabul: Afghanistan Research and Evaluation Unit, 2004).

42 Alden Wily, *Looking for Peace on the Pastures*, 26-27.

43 Grace, *Who Owns the Farm?*, 12.

arrangement is that two-fifths of the produce is hers and three-fifths belongs to the sharecropper. She bears the costs of fertiliser and water from bore well, if required. Annually, she pays about 2,000 Afs for fertiliser and another 2,000 Afs for water. On top of this, she has to pay for the services of the *mirab* and *wakil*. As her contribution to the maintenance of canals, she pays the cost of 50 percent of the labour that she has to contribute, while the sharecropper contributes the other 50 percent. At the end of the year, after deducting all her expenses, she earns enough wheat to feed herself and her children. Sometimes she is able to earn extra income through selling surplus wheat and other produce in the market. She also makes carpets at home to further supplement her income.

She cannot work on the farm because she is not allowed to work in open fields. She works in the kitchen garden, where she grows saffron (as part of a development assistance programme run by CRS). Even if it were socially acceptable for her to work on larger-scale agriculture activities on the farm, she was not sure if she could manage the physical labour involved. She was also concerned about her security. In any case, she appeared sufficiently well placed with the support she was receiving from her father and her husband's family that she does not need to think about alternative options.

This woman farmer knows the name of the *mirab* who provides water to her land, but she could not recall the *wakil's* name. She has almost never interacted with either of them; the sharecropper deals with them on her behalf. She has never participated in the election of the *mirab* or *wakil*, nor was she aware of the elections taking place. She was also not aware of the rules of allocation of water for her land, even to find out if she was getting her due share of water. She said everything was taken care of by the sharecropper, but she hopes when her son becomes old enough he will take over the farming.

This disassociation from the process of water-sharing arrangements and lack of participation in the institutions that manage water distribution pose questions about the type of ownership of land that the woman farmer enjoys. How is it possible under such circumstances to consider that women farmers are equal participants in accessing and using water? This case shows that while cultural constraints may not have a direct impact on the productivity of her land because the woman farmer trusts her sharecropper (who happens to be a member of her own family), in other cases women might well be exploited because of their ignorance of the system and lack of opportunities to participate in it. Even here, cultural factors impact on this woman farmer indirectly by forcing her to rely on her sharecropper for farming and also to interact with the *mirab* and *wakil*. A woman farmer's ability to participate in the relevant institutions is an important aspect of her empowerment process—and it is totally lacking here. In this sense, unequal access to institutions and the inability to participate in them fully is a form of inequity that works against women.

Local CRS staff observed that the situation with women is improving with the recent forming of a women's *shura* under the National Solidarity Programme (NSP). Some villages have women's *shuras* that actively and successfully promote women's empowerment—for example, in a village in Guzara District the women's *shura* worked with the men's *shura* to set up a school for girls.

3.5 Structural factors

Water allocation and water rights are intricately connected with land ownership and entitlements. For instance, when a farmer buys land from another farmer, the farmer pays the price of the land as well as the cost of the water share associated with that land. These structurally driven factors produce other inequities, as discussed below.

It is known that water allocation is governed by a set of rigid rules related to *saat* and *naubat* for a given landholding. However, what if the irrigated land under a secondary canal increases? How do the holders of water rights provide water for this land? There are two versions of how current irrigation management practices cope with the increasing of irrigated land. One version, given by a lower-level staff member at the Department of Water, is that Maulana Jami's book has all the details of the lands to be irrigated along the canal and sets out the quantity of water to be supplied to these landholdings. Lands later brought under cultivation are not supplied with the canal water; they are expected to be irrigated by alternative sources, such as wells. This is the case even when a farmer who has canal water rights brings more land under cultivation over time. The farmer's water rights remain as they are given in the register of Maulana Jami. The other version was given by higher-level staff members at the Department of Water, who asserted that a socioeconomic survey along the canal is carried out periodically and records of the land under irrigation are updated. The control structures on the canal are redesigned accordingly and new secondary canals are constructed. This version appeared to be true, at least in part, as several NGOs and funding agencies are involved in supporting irrigation rehabilitation projects throughout Afghanistan. These agencies insist on updating records and providing water for additional lands not previously irrigated. However, it is also true that many tracts of newly cultivated land are excluded from irrigation distribution schemes. In Injil, at the farmer level, the reason for exclusion usually given is that these lands were not registered in Jami's book. The truth seems more likely to be that the periodic survey of lands to update the canal systems and irrigation allocation does not take place. These inequities that are linked to the type of land entitlements held are referred to here as "structural inequities."

There is another category of land that receives irregular treatment in terms of the way in which water rights are allocated. Many parts of Afghanistan have experienced frequent change in leadership. Different leaders have granted certain land entitlements to farmers during their regimes, and these have often not been provided with the associated water rights.⁴⁴ On the other hand, there are other similar lands that have better water rights associated with them. Land distributed by the government under various development programmes or through subsidies is known as "*khaluse*" land. The land owned by farmers and acquired on their own is called "*rayati*" land. *Khaluse* land cannot be sold by the farmer. Effectively *khaluse* land is still owned by the government, but farmers have the right to cultivate the land and to receive an allocation of water. For historical reasons, *khaluse* landholdings tend to have better water rights associated with them. These lands were originally owned by feudal farmers, and because the owners were wealthy and powerful they always had better water rights. After the formation of the Afghan state and during reformist eras, land was redistributed to poor and disadvantaged farmers. Along with this transfer of land, water rights were also transferred, so most *khaluse* lands still enjoy better rights than *rayati* lands.

This variation in water rights depending upon whether the landholding is *rayati* or *khaluse*

⁴⁴ These are different from the known typology of land ownership; see: Alec McEwen and Brendan Whitty, *Land Tenure* (Kabul: Afghanistan Research and Evaluation Unit, 2006), 3-4.

Table 2: Types of land and associated water allocations

	<i>mirab 1</i>	<i>mirab 2</i>	<i>mirab 3</i>	<i>mirab 4</i>	
				subcanal1	subcanal2
<i>Section</i>	Upper	Middle	Lower	Middle	Middle
<i>rayati</i> land per jerib	15 mins every 4 days	20 mins every 4 days	25 mins every 4 days	15 mins every 8 days	10 mins every 8 days
<i>khaluse</i> land per jerib	30 mins every 4 days	20 mins every 4 days	25 mins every 4 days	15 mins every 8 days	10 mins every 4 days

is not uniform across different sections of the canal. The *mirabs* who attended the workshop and participated in the focus group discussion provided details about water rights against the type of land in their service areas (Table 2).

Further probing into this variation in water rights revealed that there is no standard rule that is universally applied. The rules are ad hoc and evolve on the basis of the extent of each type of landholding to be irrigated under a particular secondary canal and the amount of water allocated to that secondary canal section. Water allocations are sometimes reworked within the community to provide for the additional land; however, this process is not universal and depends on local power relations. The variation between the two cases of middle sections (in Table 2) under the administration of same *mirab* (*mirab 4*) illustrates this point.

These rules may appear to be inequitable at the scale of the canal: for the same type of landholding, the water allocation can vary in different sections. The location-specific rules and corresponding sense of equity among communities is notable. The rules vary on the basis of the need to distribute the available water fairly, and agreement upon them depends on the negotiation space that exists among the users. In some cases, local power relations may not allow for such negotiations, and water allocations may remain inequitable and unfair. In the absence of a standardisation of the process by the government to allocate water for different types of land or additional land, inequitable allocations may persist.

In other words, these rules are not concerned with maintaining equity at the canal level. The equity principles are restricted to the secondary canal, and they evolve through a process whereby the *mirab* and farmers can draw benefit from that specific secondary canal. The conceptual discussion of irrigation inequities in Section 1.3 is germane (in particular the work of Boelens and Lauderdale), showing that concepts of justice and equity are highly subjective and emerge from local contexts.

4. Ways of Mitigating Inequities

4.1 Indigenous technological solutions

It was not possible to confirm if Maulana Abdul Rehman Jami's treatise contains all the technological principles that are currently in practice. However, the centrality of equity concerns in these principles is remarkable: for a society that is perceived to be rigidly hierarchical and defined by inequalities and power imbalances, the display of equity concerns underlying indigenous technological principles is worth noting. This may be the reason why the traditional institutions of *mirabs* and *wakils* have survived and been sustained. The following sections discuss some of these indigenous technological principles observed to feature strong equity concerns.

One of the first principles is the design of canals. The width of canals tapers and reduces along the canal heading downstream. This is reportedly discussed in Maulana Jami's treatise. This tapering ensures that there is a sufficient column of water flowing along the length of the canal. Though this is a standard practice in modern irrigation systems, it is claimed that Maulana Jami's treatise stipulates it to be one of the principles to ensure the share due for downstream users.

The other principle—one not always followed in modern irrigation systems—is the design of control structures. The width of control structures such as weirs also increases in a downstream progression; for example, for a particular extent of land that needs to be irrigated, if the width of the weir is 4 cm in the canal's upper section, it must be more than 4 cm in the middle and lower sections in order to draw similar volumes of water, given the reduced depth and velocity of the water column. Furthermore, the width of a weir should be designed to be proportional to the land it irrigates. Each secondary canal has a fixed command area, with the width of the weir structured in accordance with the canal section in which it is located. Figure 16 shows photos of typical control structures used to divert water into secondary canals from the Injil canal. Each of these weirs supplies water to a separate secondary canal with a specific command area. The varying width of the structures can be seen.

Figure 16: Variation of width of weirs according to land to be irrigated



Photos: Srinivas Chokkakula

There are several slight differences in the design of the weirs and creative application of simple hydrological principles to ensure that the water allocation is fair. For instance, the weir sill (the height of the crest from the canal bed) is an important consideration in regulating the flow of water into the secondary canal. The deeper the crest and the closer it is to the bed of the canal, the higher the flow over the crest; therefore, sill levels are made deeper in the downstream sections of canals. In upstream sections, where the depth of the water column is relatively high, the sill of the weir is constructed well above the bed level of the canal. This is commonly how inequitable abstractions are made by upstream communities—through the often nearly invisible deepening of the sill levels of their weirs.

Another creative design of control structures is shown in Figure 17. These are circular weirs located in the walls of the primary canal. The flow through the weir feeds into a secondary canal. Circular weirs are usually located in upstream canal sections to feed into small command areas. The advantage of this design is that it limits the rate of flow, irrespective of the depth of the water column flowing through the primary canal (with only a minor difference due to the pressure of the water column). It is also possible to totally restrict the flow through circular weirs using a sliding gate (for which a slot can be seen in the photo). Together, the diameter of the circular weir, the height at which it is located above the bed of the canal and the size of its command area define its design. Multiple stacked circular weirs can be used to further control flow rates into secondary canals. This design is claimed to be one of those featured in Maulana Jami's treatise. During spring, when the water flow levels in the canal are high, the water is allowed to flow through all three weirs. During winter, when water availability is low, the top weir holes are closed using the sliding gate to allow more water to flow downstream.

Figure 17: Circular weir designs

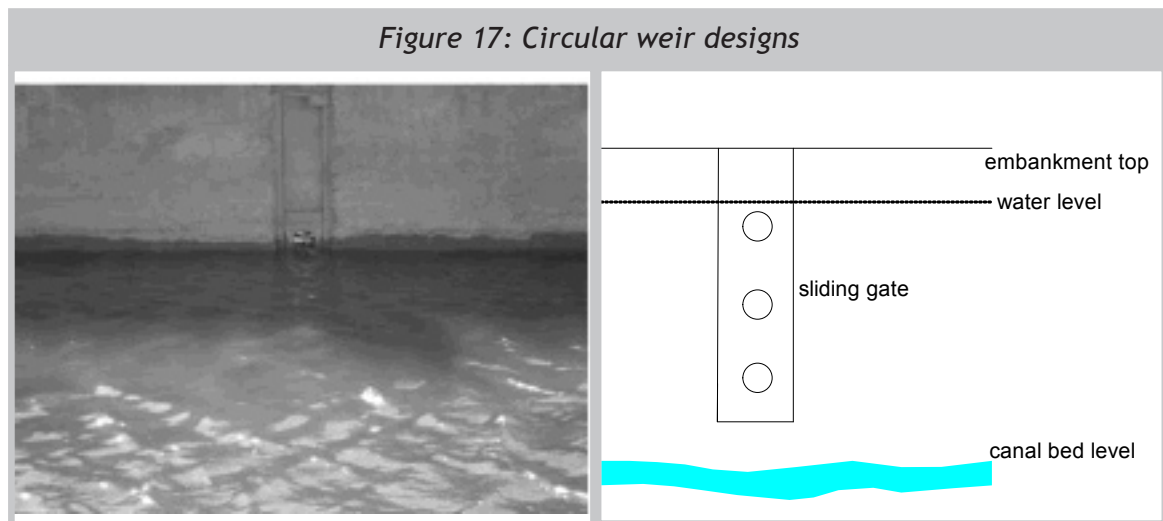


Photo: Srinivas Chokkakula

4.2 The institutional spaces of *mirabs* and *wakils*

Two water management officers at the Department of Water oversee irrigation management in Injil District on behalf of the government. The government's role is limited to technical design and construction of the primary canal and the diversion and control structures. The system of *wakils* and *mirabs* works in tandem with the irrigation department to manage the sub-distribution of water. As noted earlier, *wakils* and *mirabs* are "elected" members⁴⁵; *wakils* look after the primary canal while *mirabs* look after secondary canals. There is a *wakil* for each section of the primary canal (upper, middle and lower), and there is a head *wakil* responsible for the entire primary canal and supervision of the three *wakils*.

Mirabs are responsible for making regular assessments of the maintenance requirements of the secondary canal and for keeping farmers informed of this. *Mirabs* are compensated annually in kind, usually a crop share—for example, at the rate of 4 kg of wheat per jerib of land. This unit varies among settlements. Some proportion of the wheat is given to the *wakil* of the section—usually half or more. Where farmers do not grow wheat, they pay the equivalent cost of the wheat in cash at current market rates. The *mirabs* who participated in the workshop said they receive 80-120 kg of wheat per 100 jerib of land as the exclusive share of the *mirab*.

The *wakils* and *mirabs* interviewed during this research held that the compensation they receive is not their incentive to do the work and that it does not even pay for the cost of the fuel for monitoring. What are the incentives, then, for putting in this kind of effort? In most cases, the *wakils* and *mirabs* stated that it is a service to their fellow farmers. However, the position of a *wakil* is also a means of gaining recognition and can be an important step in an individual's upward mobility as a leader or politician. It is also possible that the positions are materially rewarding in a different way, such as through the clandestine bribes they receive. Thomas and Ahmad, in their historical study of the *mirab* system, provide a description of widely rampant corrupt practices of *mirabs* in Baghlan Province in the Kunduz river basin. There, the *mirabs* and *wakils* take advantage of deeply entrenched power structures and adopt a range of tactics to elicit bribes and favours from farmers.⁴⁶ The *wakil* and *mirab* system in Injil did not appear to be any different, although the two canals studied represented two quite different pictures. The head *wakil* of the Injil canal was elected as *wakil* only two years ago. Most respondents on the Injil canal expressed dissatisfaction with his work and accused him of corrupt practices. Some were sympathetic to the fact that he could not do much due to warlordism along the canal, but overall there was widespread resentment and most users wanted to elect a different *wakil* at the next annual meeting. On the other hand, the head *wakil* of the Jui Nau canal was highly regarded for his work and considered a strong and upright leader.

The case of the Jui Nau canal is an example of how a strong and efficient *wakil* can make a difference in reducing inequities. The village of Sak Suleman, at the end of the lower section of the Jui Nau canal, enjoys a good supply of water. The farmers in the village gave the entire credit for this to the current head *wakil*, who has held the position for the past four years. Before his tenure, the village received scarce water due to poaching in the upstream sections. The farmers there stated that for a period of time they had changed the *wakil* almost every year because none of them could manage the situation.

45 The election of *mirabs* and *wakils* is not necessarily truly democratic and may often represent the "vote" of a powerful group; see: Lee, *Social Water Management*, 47.

46 Thomas and Ahmad, *A Historical Perspective on the Mirab System*, 47-50.

Since the current *wakil* has taken office, they have been receiving more water. This is partly because he is powerful and wealthy, but his honesty and uprightness have also earned him the respect of people in other sections of the canal. Farmers in Sak Suleman mentioned that recently there had been continuous breaching of the Jui Nau canal upstream. The head *wakil* had acted on this by closing all the secondary canals along the stretch of the canal where water stealing was happening, and no one dared to question his authority. Finally, after 20 days of closure, he opened the canals, and since then there has not been any illegal breaching.

Figure 18: Final point of the Jui Nau canal in Sak Suleman



Photos: Srinivas Chokkakula

4.3 Institutional interlinkages for the management of inequity

One salient feature of governance at the village level is the apparent active functioning of key actors in irrigation management. There is no precise description of the specific responsibilities of any of these actors, but they appear to function without much conflict among themselves and each of the institutions plays an effective role in resolving disputes over water sharing. In addition to the *mirabs* and *wakils*, who are exclusively involved in water management, there are two additional institutions that actively participate in water management—the *shura* and the *arbab*. The *shura*, institutionalised by the Karzai government after 2004, comprises elected representatives for village governance.⁴⁷ The *shura* focuses exclusively on the internal governance issues of the village and coordinating with the government.

An *arbab* is a village elder—an appointed individual who commands respect among the people living in the village. In most cases, the *arbab* is the most powerful individual in the village by virtue of his wealth, his family connections, gun power or sometimes simply his knowledge. Previously, the most powerful man was “elected,” even if he was not acceptable to everyone; however, the method of selecting *arbabs* is changing. In more recent times, senior villagers have begun to meet and discuss possible candidates and nominate the most acceptable man to be *arbab*. Sometimes even a very poor man

⁴⁷ The *shura* is the official governance body at the village level, but it is the exclusive domain of men. The legislation allowed the formation of a separate *shura* for women, but not all villages have one. Few villages were able to put a women’s *shura* in place; there is one in Sak Suleman, but it has a very limited role and does not even coordinate with the *mirab* or *wakil*. Some NGOs have begun to work with women’s *shuras* as a way of implementing projects related to women’s empowerment.

known for his integrity is chosen as *arbab*. For example, the *arbab* of the Ghaibatun village is a poor farmer and sharecropper who lives with his wife on a farm owned by another farmer. His livelihood comes from his share of the farm's produce.

The *arbab* is not the head of the *shura*; he remains independent of the *shura* but acts as the main coordinator with the government. In most cases the *arbab* commands more power in the village than the *shura* does. Either the *arbab* or the *shura* can be approached for assistance with conflict resolution or grievance redressal, but the specific boundaries of responsibility for each are not clearly delineated, nor are they consistent across villages. However, no instances of conflict between these two institutions were reported during the fieldwork.

The experiences of farmers in Injil District suggest that all of these institutions are important in addressing grievances and resolving disputes. Disputes often arise between farmers about the duration and schedule of water flow. Farmers can also challenge the *mirab* on their management of the secondary canals; this often occurs when a *mirab* manages more than one canal within his service area. Instances of farmers resorting to violence during these disputes were reported. The *arbab*, *shura*, *mirabs* and *wakils* intervene at appropriate times to resolve these disputes, attend to grievance redressals or make decisions about punishment or compensation. The risk of violations being exposed in public, followed by humiliation and ridiculing acts, tends to act as an effective regulator of unfair practices in most instances. In cooperation, these institutions are largely effective and few disputes end up as complaints to the government or as cases in court.⁴⁸

However, there are some instances where all these institutions fail to address the illegal diversion of water. In the upper section of the Injil canal, at Teriyaq village, a warlord has constructed an illegal secondary canal. The *wakil* of the section tried to dissuade the violator, then he approached the local *arbab* and *shura* and mobilised community members to pressure him to stop the violation—but with no success. He complained to the Department of Water, which also did nothing to help. The *wakil* admitted he had to leave it at that point, and the illegal poaching continues to this day. He told the researcher that water availability has never been a serious concern for the upper-section users, so he does not feel too guilty about not having been able to stop the violation.

Government institutions largely stay detached from water management, partly because of limited resources and their inability to control or enforce irrigation distribution. It is possible that this is the primary reason why community-based institutions have survived and remain vibrant. Whenever there are changes in *mirabs* or *wakils*, which usually happens during an annual stakeholders meeting, the Department of Water is informed. The Department of Water takes note of these changes and issues authentication papers and identity cards to the new *mirab* or *wakil*. Other than this, currently in Herat the Department of Water is concerned only with the technical design and construction of the regulatory and diversion structures on the primary canal.

4.4 “Affirmative action” at work: empowering the disempowered

An important point to note about the election of a general *wakil* is that he can only be from the lower section of the canal. In this way, the highest-level *wakil*, or the

48 Jonathan Lee, *The Performance of Community Water Management Systems* (Kabul: Afghanistan Research and Evaluation Unit, 2007) 29-31.

most powerful water manager position, is reserved for a representative of the most disadvantaged section of the canal. This principle has also been observed in other parts of the country—for example, in Daulatabad District, Faryab Province.⁴⁹ The respondents in this study—farmers, *mirabs* and *wakils*—insisted that the underlying concern of this principle is indeed equity.

This is a kind of “affirmative action” at work to ensure that the interests of the most disadvantaged section’s farmers are best represented, and it was found to be in place in both the canals studied as part of this research. The highly regarded head *wakil* of the Jui Nau canal is from the lower section (in fact from Sak Suleman, one of the fieldwork sites). Even on the Injil canal, the head *wakil* comes from the lower section. However, while he lives in a village in the lower section, he does not have any land of his own there, and some farmers expressed the notion that this could be one of the reasons why he was not acting responsibly.

The stories told by farmers during this research about the election of *wakils* and the head *wakil* hinted at this being a democratic process. All the elderly people, *arbabs* of the villages, members of village *shuras* and *mirabs* of the villages along the canal assemble at one place on a given day and discuss possible candidates for the *wakil* positions.⁵⁰ The lower-section people discuss and nominate a person as their preference for the position of head *wakil*. People from the other two sections are expected to accept that nomination unless there are serious concerns about his integrity. In the absence of an acceptable candidate from lower section, people from other sections can propose a person for head *wakil* from their own section, but he must be acceptable to the lower-section people.

This kind of inequity management is also apparent in labour allocations for the maintenance activities of canals and the river bed. Upper-section farmers are expected to contribute one person per day per 10 *jeribs* of landholding, whereas lower-section farmers are expected to contribute one person per day per 20 *jeribs* of landholding. This is required only when maintenance schedules are announced. If a farmer has just 2 *jeribs* of land, he is expected to contribute one person-day of work for every five days. The *mirab* keeps an account of these requirements and calls for contributions accordingly. The *arbab* is an important actor in helping *mirabs* mobilise labour. *Wakils* also communicate labour requirements to the *arbab*. The extent to which these rules are implemented in practice is not clear, and with warlordism and weak institutions (of both the government and the community) still prevalent, it is not easy to mobilise labour from upstream sections. In the case of the Jangarok canal in Baghlan, Thomas and Ahmad describe how the *wakil* (“chakbashi” in Baghlan) failed to mobilise adequate labour, but the evolving circumstances are also noted: with the change in regime there is the potential for increasing space for community organisations to innovate and to mobilise resources for maintenance activities.⁵¹

4.5 *Hashar ab*: coping with contingencies

Hashar ab is an innovative community-based institution that is used to meet the contingency situations of drought and low water flows. It is a well-established and widely

49 Adam Pain, *Understanding Village Institutions: Case Studies on Water Management from Faryab and Saripul* (Kabul: AFGHANISTAN RESEARCH AND EVALUATION UNIT, 2004).

50 This is evidently not an entirely democratic process; only those people who are considered “elderly” participate in the process. Women are also totally excluded.

51 Thomas and Ahmad, *A Historical Perspective on the Mirab System*, 51-52.

accepted traditional institution through which water diversions to upstream sections are closed to allow water to flow to downstream sections. *Hashar ab* is operated with the active involvement of the *wakils*, who constantly monitor the water flow in the canal and, during the low season, meet to discuss the imposition of *Hashar ab*. The need for *Hashar ab* is usually prompted by *mirabs* in the downstream sections. Downstream users and *mirabs* involve the *arbabs* in their section to mobilise support for initiating *Hashar ab*.

Hashar ab involves the assessment of water requirements in the downstream sections and the calculation of how much water can be released without causing the upstream sections to suffer. The identification of sections, the schedule for closing or releasing water and the duration for doing so are discussed and decided among the *wakils*. This is then operationalised by the *wakils* with the help of the *mirabs*. In some cases, lower-section *wakils* also approach Department of Water officials to help facilitate the process of negotiating *Hashar ab* with other *wakils*. During an interview with officers of the Department of Water, a *wakil* of one of the canals in Pashtun Zargun District came to request the officers for such help. It was his belief that the coming season required a *Hashar ab* on his canal section and that a warlord in the upstream section had been illegally diverting water. The *wakils* of the section were therefore unable to organise the *Hashar ab*, and this *wakil* was seeking the assistance of government officials in the matter.

Hashar ab is apparently practised less frequently now than it has been in the past, and it remains largely the proactive involvement of the concerned *wakils* that makes it possible to operationalise the system. The farmers in Sak Suleman shared their experience of *Hashar ab* in recent times: about two years ago, the head *wakil* of the Jui Nau canal organised *Hashar ab* and closed the upstream canals for three days. Usually the *wakils*, *mirabs* and other people from the lower sections monitor the closure of canals in the upstream sections.

4.6 Coping through cooperation and collective action

There are several other coping strategies employed in contingency situations of scarcity or low seasons. These strategies draw on local customs and a spirit of cooperation among farmers.

Irrigation water distribution follows a schedule of rotation based on a given set of rules of *saat* and *naubat*. Sometimes when the flow is low, it does not always suit the schedules of some crops and in such cases farmers organise themselves by trading their water rights to suit their schedules. For instance, a farmer from Kabiyan trades his water right of one hour per four days with a neighbouring farmer so as to get two hours of irrigation at one go every eight days. In the *mirabs*' workshop, the participants mentioned that such trading among farmers is widely practised, and the *mirabs* proactively support and facilitate such arrangements. If a farmer requires more water in a particular cycle, his neighbours may offer their share, while they then use his share in other cycles. This trading largely happens on the "water for water" principle, which is not just a form of reciprocity but also a religious value. Sharia obligates farmers to respond to a neighbour's needs, so while the exchange of water for money is stigmatised and not allowed in Islam, the practice of exchanging water for water is widely prevalent.⁵² Though not allowed, farmers often trade water rights for money or for a certain amount of wheat or other crop.

52 Lee, *Performance of Community Water Management Systems*, 27-28.

An outstanding case of collective action to cope with scarcity was found in Sak Suleman, a village in the lower section and at the final point of the Jui Nau canal. The villagers have had a history of fluctuating fortunes with the flow in the canal. Before the current *wakil* took over about four years ago, they were receiving nearly no water. The villagers have been forced to look for alternative sources to supplement water from the canal. Sak Suleman has large expanses of desert land that are not very fertile. Farmers own large tracts of lands and practise rotational farming with the available water. For instance, a farmer who owns 90 *jeribs* of land cultivates it as rotations of 30 *jeribs* each year. Farmers in the area are generally poor and cannot afford their own wells. During the Taliban regime, when hardly any water flowed through the canal, farmers in the area decided to form into four groups of about 30 to 50 farmers each and construct collectively owned bore wells that would be useful to the entire village. Each farmer in the group made a contribution to the construction of the well according to their ability. Farmers mentioned that each well cost about 40,000 Afs. A separate rotational cycle and water shares were allocated to each contributing farmer. A five-day cycle was developed and the water allocation made in proportion to the farmers' contribution to the construction of the well. Currently, as there is now water available in the canal, not many farmers use water from the bore wells, and the five-day cycle and water allocation are non-operational. Farmers can take any amount of water as long as they pay for the cost of the diesel required for pumping. The cost of diesel is high these days, and not many farmers draw water from the bore wells.

Sara Nau village in the middle section of the Injil canal is another village with a similar common well that supplements the canal water. The common bore well was constructed through the contributions of all the villagers. When the water from the secondary canal stops, the *arbab* and *mirab* feed the canal with water from the common well. The rules of distribution applicable to the canal water are also applied in the case of water from the well. The cost of the diesel required for running the pump is distributed in proportion to landholdings.

4.7 Organising equity in obligations of maintenance

The Department of Water in Herat claimed that it designs and maintains the intake and offtake structures, the primary canal and the control structures but that the desilting and maintenance of the primary canal is the responsibility of the communities. The *wakils* discuss a schedule for desilting whenever it is necessary—usually annually—and communicate that to the *mirab*. They also request the *mirabs* to mobilise labour from the villages corresponding to the share of water to the villages. The *mirabs* allocate the labour to be mobilised among the farmers within their respective service areas, again in proportion to the individual shares of water.

Wakils supervise the desilting of the canal section. In the case of the Jui Nau canal, the head *wakil* claimed that labour mobilisation was also done two years ago for maintenance activities in the river bed—that is, desilting in the sections where the spring water emerges in the Hari Rud channel. It was an expensive affair, estimated at about US\$15,000. The cost was levied across the beneficiaries of the canal so that the works could be carried out.

The *mirab* is exclusively responsible for maintenance of the secondary canal section. He is also responsible for allocating labour responsibilities and mobilising the labour. This allocation of labour varies just as the compensation to the *mirab* changes in different parts of the district. For instance, in Udhran village the unit of labour allocation is one person per day per 10 *jeribs* of land. For each 10 *jeribs*, the *mirab* mobilises one person

for maintenance activities of primary and secondary canals. *Wakils* and *mirabs* maintain a list of people and their duties. When a person fails to attend, he has to pay for the cost of one person-day of labour.

Some development workers from NGOs involved in rehabilitation work explained during the fieldwork that the community institutions that manage maintenance are under threat because of development assistance programmes received in the form of NSP funds. The rehabilitation programmes pay for the work required in much of the maintenance that has otherwise been contributed as social obligation or on a voluntary basis by farmers. In some sections of the Injil canal, once the rehabilitation project was implemented and the NGO involved withdrew, farmers refused to clean and maintain the canals in the next cycle unless they were paid. They believe that local government is now not paying for this maintenance even though funds have been made available for wages. Although the development workers are clear about the fact that labour wages are to provide livelihood support during difficult times and in the short term, this is not always understood by communities, leading to the decay of community institutions which in turn affects secure irrigation supplies.

5. Conclusions

Recalling the discussion in Section 1.3, this study tried to understand what fairness and equity mean within the social spaces of communities in Injil District, Herat. To better understand and analyse this, a tabulated illustration of inequities and how these are generated is presented in Table 3. It also includes the technological solutions and institutional spaces identified for the mitigation of inequities in community irrigation management systems. This information is neither exhaustive nor complete, but it provides some idea of the range of inequities produced and the potential for their mitigation.

The approach used to generate this analysis was to investigate and interrogate the sense of equity shared by communities and how they practice that while engaging with local power relations, the dynamics of social differentiation and the many other interests involved.⁵³ The search for equity may then begin from this point.⁵⁴

Table 3: Sources of production and mitigation of inequities

Section/ Scale	Upper	Middle	Lower
Farm level	<ul style="list-style-type: none"> • Type of land entitlement and associated allocation of water • Lack of updating of newly cultivated lands • Not allowing women to work in open fields 	<ul style="list-style-type: none"> • Type of land entitlement and associated allocation of water • Affordability of alternative sources like well irrigation • Lack of updating of newly cultivated lands • Not allowing women to work in open fields 	<ul style="list-style-type: none"> • Type of land entitlement and associated allocation of water • Affordability of alternative sources like well irrigation • Lack of updating of newly cultivated lands • Not allowing women to work in open fields
Tertiary canal network	<ul style="list-style-type: none"> • Access to dispute resolution institutions; dishonest <i>mirabs</i> 	<ul style="list-style-type: none"> • Access to dispute resolution institutions; dishonest <i>mirabs</i> 	<ul style="list-style-type: none"> • Access to dispute resolution institutions; dishonest <i>mirabs</i>

53 Boelens and Davila, "Water Users' Organizations," 419.

54 Boelens and Davila (eds), *Searching for Equity*, 4; Lauderdale, "Justice and Equity," 6.

Secondary canal	<ul style="list-style-type: none"> • Dishonest <i>mirabs</i> and <i>wakils</i> • Illegal poaching in the upstream • Unauthorized breaching of weirs/ raising of diversion structures • Weak institutional spaces of arbab and shura • Detached and lack of participation of women in institutions 	<ul style="list-style-type: none"> • Dishonest <i>mirabs</i> and <i>wakils</i> • Illegal poaching in the upstream • Unauthorized breaching of weirs/ raising of diversion structures • Weak institutional spaces of arbab and shura • Detached and lack of participation of women in institutions 	<ul style="list-style-type: none"> • Dishonest <i>mirabs</i> and <i>wakils</i> • Illegal poaching in the upstream • Unauthorized breaching of weirs/ raising of diversion structures • Weak institutional spaces of arbab and shura • Detached and lack of participation of women in institutions
Primary canal	<ul style="list-style-type: none"> • Dishonest <i>wakils</i>; and not so democratic election of <i>wakils</i> • Illegal poaching in the upstream • Unauthorized breaching of weirs/ raising of diversion structures • Unaccountable extraction of state agencies and urban users 	<ul style="list-style-type: none"> • Dishonest <i>wakils</i>; and not so democratic election of <i>wakils</i> • Illegal poaching in the upstream • Unauthorized breaching of weirs/ raising of diversion structures • Low water flows • War lordism in the upstream • Unaccountable extraction of state agencies and urban users 	<ul style="list-style-type: none"> • Dishonest <i>wakils</i>; and not so democratic election of <i>wakils</i> • Illegal poaching in the upstream • Unauthorized breaching of weirs/ raising of diversion structures • Low water flows • War lordism in the upstream • Unaccountable extraction of state agencies and urban users
River bed	<ul style="list-style-type: none"> • Illegal poaching in the upstream • War lordism in the upstream 	<ul style="list-style-type: none"> • Illegal poaching in the upstream • War lordism in the upstream 	<ul style="list-style-type: none"> • Illegal poaching in the upstream • War lordism in the upstream

Mitigation of inequities			
Farm level	<ul style="list-style-type: none"> • Cooperation and trading of water rights 	<ul style="list-style-type: none"> • Cooperation and trading of water rights • Collective institutions for alternative sources like wells 	<ul style="list-style-type: none"> • Cooperation and trading of water rights • Collective institutions for alternative sources like wells
Tertiary canal network	<ul style="list-style-type: none"> • Efficient interlinkages between <i>mirabs</i>, <i>arbab</i>, <i>shura</i> 	<ul style="list-style-type: none"> • Efficient interlinkages between <i>mirabs</i>, <i>arbab</i>, <i>shura</i> 	<ul style="list-style-type: none"> • Efficient interlinkages between <i>mirabs</i>, <i>arbab</i>, <i>shura</i>
Secondary canal	<ul style="list-style-type: none"> • Indigenous technological solutions - design of control and diversion structures • Strong <i>mirabs</i> and <i>wakils</i> • Effective intervention of the state agencies • Dynamic process of election and reelection of <i>mirabs</i> 	<ul style="list-style-type: none"> • Indigenous technological solutions - design of control and diversion structures • Strong <i>mirabs</i> and <i>wakils</i> • Effective intervention of the state agencies • Dynamic process of election and reelection of <i>mirabs</i> 	<ul style="list-style-type: none"> • Indigenous technological solutions - design of control and diversion structures • Strong <i>mirabs</i> and <i>wakils</i> • Effective intervention of the state agencies • Dynamic process of election and reelection of <i>mirabs</i>
Primary canal	<ul style="list-style-type: none"> • Indigenous technological solutions - tapered canal width 	<ul style="list-style-type: none"> • Indigenous technological solutions- tapered canal width • Election of general <i>wakil</i> from lower section • <i>Hashar ab</i> 	<ul style="list-style-type: none"> • Election of general <i>wakil</i> from lower section- tapered canal width • <i>Hashar ab</i>
River bed	<ul style="list-style-type: none"> • Effective and strong state institutions 	<ul style="list-style-type: none"> • Effective and strong state institutions 	<ul style="list-style-type: none"> • Effective and strong state institutions

5.1 Indigenous technologies and institutions

This case study responds to a gap in informed understanding about local irrigation management systems that has been repeatedly highlighted in policy papers. Focusing on inequities, associated power structures and the processes that produce the inequities proved to be a fruitful approach. This helped to engage with the question of whether existing indigenous technologies and institutions in Afghanistan are inequitable and inefficient.

The study draws important findings that are relevant to ongoing discussions in water strategy policymaking, particularly in relation to setting up water user associations (WUAs) in Afghanistan.⁵⁵ Community irrigation management systems in Injil District display rich, vibrant and thriving institutions of *mirab* and *wakil* and deploy creative application of indigenous technical knowledge with deep concerns for equity.

From this perspective, the key findings of this research are as follows:

1. Equity has long been a central concern of indigenous technological knowledge and solutions practised in the design and implementation of irrigation infrastructure in the community irrigation systems of Injil District, Herat Province. Some of the principles observed in the design of canals and control and diversion structures exhibit particular concern for the equitable distribution of irrigation. These principles are believed to draw on the genius of Maulana Abdul Rehman Jami's 500-year-old manual for irrigation management. Much needs to be understood about the contribution of these traditions, their application and their practice in achieving equitable outcomes. Any effort to rethink and redesign irrigation distribution systems should begin from this point: understand the potential contribution of local traditions and indigenous technological knowledge in order to design equitable distribution systems.
2. The elaborate institutional structures of community management irrigation systems (including *mirabs* and *wakils*) appear to have the capacity to offer sufficient means, rules and rule-making processes to address inequities and their production. These institutions are currently threatened by historically tenuous ethnic relations, warlordism, increasing social and economic inequalities, deeply entrenched power relations and ineffective state involvement. The cases of the two canals focused on in this study show how each of these factors can affect the outcomes for farmers: communities along the Injil canal experience huge inequities, whereas inequities are not as pronounced along the Jui Nau canal. While the quality of leadership provided by the head *wakil* is the main point of contrast between the two cases, the difference in inequities cannot be entirely attributed to that difference. The ability of the *mirabs* and *wakils*, including the head *wakil*, to be effective is a result of the cumulative impact of the rest of the prevailing factors on their functioning. When these negative factors are countered by efficient and effective leadership—although not carried out using appropriate means—the institutions are able to produce equitable outcomes, as in the case of the Jui Nau canal. On the other hand, in the absence of such leadership and effective management the inequities become exacerbated, as in the case of the Injil canal.
3. The ecological context and social fabric of Afghanistan have nurtured the institutions of cooperation and collective action that have become the basis for

55 Kai Wegerich, *Water Strategy Meets Local Reality* (Kabul: AFGHANISTAN RESEARCH AND EVALUATION UNIT, 2008), 77-78.

various contingency strategies to cope with scarcity of water, such as the practice of *Hashar ab*. The collective spirit of cooperation in coping with scarcity and the custom of water rights trading to accommodate each other's needs are some other key features of these systems, and they suggest that the strength of established norms and practices of cooperation ensure the survival of irrigation management institutions. Irrigation distribution systems can build further on these traditions so that they become efficient and enduring ways of strengthening livelihoods.

This is not, however, to claim that the community management systems as they are practised are totally egalitarian and equitable, nor does the case of the Jui Nau canal represent the right means of achieving equity. However, the evidence is sufficient to argue that these institutions must be important foundational blocks for building efficient irrigation management systems, provided that the intervention of the government and the support from other agencies is appropriately planned and executed.

There is a need to further explore community irrigation systems to deepen understanding of inequities. This study was not able to capture adequate information about power relations at the community level and their impact on the production of inequities. This type of study would be most productive when approached using ethnographic methods and under conditions of assured physical security.

5.2 Community organisation and confronting inequities

Despite their thriving existence and potential to produce equitable outcomes, the community irrigation management institutions of *mirab* and *wakil* in Afghanistan face the reality of tenuous ethnic relations, deeply entrenched power structures, huge inequalities, warlordism and weak state governance. The system of *mirab* and *wakil*, with all its merits, may not be able to stand up against these factors; however, the key strength of the system is the fundamental existence of "peasant organisation." Endogenous development of peasant irrigation systems along with their associated injustices is a paradox that is necessary for the evolution of long-enduring community management systems.⁵⁶ Space for endogenous development of institutions implies the availability of cohesive bonding and collective struggle among peasants to fight and work against the prevailing injustices. The element of organisation and the processes involved are critical here.

The institutions of *mirab* and *wakil* in Injil District exhibit consistent and established norms of peasant organisation. The respondent farmers did not hesitate to acknowledge the inequities of the irrigation management system and the root causes of these inequities. At the same time, they were also aware of the means available to address inequities and the reasons for the failure to mitigate inequities. Many farmers said that they believed in the institutional processes involved and frequently discussed how they could use them to bring about change. For instance, many farmers along the Injil canal spoke about changing the head *wakil* at the next annual meeting. The institutions of *mirab* and *wakil* offer the strength of organisation and established space for engaging in processes of contesting and negotiating inequities. Any initiative by government or external agencies to formalise WUAs should build upon these key community-based strengths of the system of *mirabs* and *wakils*.

56 Boelens and Davila discuss this point at length; see: Boelens and Davila (eds), *Searching for Equity*.

5.3 Impose, transfer or build upon local community management systems?

Several earlier studies have debated the various water strategy papers for Afghanistan in which proposals for the creation of river basin agencies and WUAs are made.⁵⁷ Many countries with postcolonial histories that are more advanced than Afghanistan in adopting similar ideas and systems are still struggling to develop effective irrigation distribution systems. Afghanistan has an opportunity to learn from these experiences.

In Udhran village, the research team spoke to a farmer, a wise old man, who posed the question: “Why don’t foreigners learn Persian or Dari? And why do Afghans learn English?” This might initially seem to be a simple and an irrelevant question, but on reflection it captures the problems inherent in imposing external values and systems upon the formulation of water resource strategies and irrigation management systems.

It is not necessary for local technologies and institutions to be recalibrated to suit external interventions—it can be the other way around. External interventions and “innovations” can be modified to suit and build upon local knowledge systems and values. Recalling the discussion in Section 1.3, external interventions, rather than being imposed on local communities, can act as catalysts for the hybridisation of ideas, values and systems. The challenge is to draw that fine line between imposing external values and facilitating the fusion of external ideas with those community-based structures that are already, at least in part or historically, in place.

5.4 Linking formal and informal institutions

Linking local community-based institutions with formal state institutions with the goal of creating sustainable and effective irrigation management systems has been an issue of concern for some time.⁵⁸ The proposed Water Resource Management Policy seeks to formalise WUAs, and the Ministry for Energy and Water acknowledges the need to use the existing, vibrant community-based management systems as a starting point for the formation of the WUAs.⁵⁹ However, subsequent water strategy papers have worked on the general assumption that the traditional institutional structure of *mirabs* is largely dysfunctional and largely inequitable.⁶⁰ A comparison of this study’s findings with those of other earlier studies of *mirab* systems⁶¹ suggests that there is a great deal of variation in the status and functionality of *mirab* systems across the country. This variation is not only spatial, but has also varied over time. Thomas and Ahmad’s historical study of *mirab* systems in Baghlan Province shows how the functionality and performance of *mirabs* has changed over time. The effectiveness of these systems has always been dependent upon the effectiveness of their linkages with government institutions and state regimes.⁶²

57 For example, see: Wegerich, *Water Strategy Meets Local Reality*; and Ian M. Anderson, *Irrigation Systems* (Kabul: Afghanistan Research and Evaluation Unit, 2006).

58 For example, see: Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge, New York: Cambridge University Press, 1990).

59 Anderson, *Irrigation Systems*, 7-8.

60 Wegerich, *Water Strategy Meets Local Reality*, 27-28.

61 Other key studies of *mirab* systems have been undertaken by the Afghanistan Research And Evaluation Unit, see: Pain, *Understanding Village Institutions*; Anderson, *Irrigation Systems*; Lee, *Social Water Management*; Lee, *Performance of Community Water Management Systems*; Wegerich, *Water Strategy Meets Local Reality*; and Thomas and Ahmad, *A Historical Perspective on the Mirab System*.

62 Thomas and Ahmad, *A Historical Perspective on the Mirab System*, 55-59.

The institutions of *mirab* and *wakil* appear, in the case of Herat, to be vibrant and effective on the whole, with many of their limitations in addressing inequities having much to do with prevailing warlordism and weak governance. On the other hand, there are many positive aspects of these community management systems, and the potential for them to produce significant equitable outcomes has been well demonstrated.

It is necessary to critically re evaluate the strengths, weaknesses and potential of *mirab*- and *wakil*-based community institutions in the light of this study. Years of war, rampant warlordism and increasing socioeconomic inequalities have had a serious and deleterious impact on the ability of these institutions to function to their maximum capacity. In the absence of appropriate linkages with government institutions and effective means of ensuring accountability, rule-breaking and corruption have become commonplace.⁶³ However, cases such as that observed with the Jui Nau canal offer great hope of achieving equitable outcomes and systems. It is important to identify the kinks, or the failure points, and the weak links in the systems and to address these as part of the process of formalising irrigation management institutions in Afghanistan.

5.5 Inequities and the spaces of “statelessness”

Repeated breaching of canals in Kabiyan village and many other locations, particularly along Injil canal, were reported during the fieldwork for this study. In most instances, the *mirabs* and *wakils* had failed to resolve the problem even after approaching the Department of Water, and warlords or powerful landholders continued to divert water illegally. The Department of Water, with just two officers allocated to manage the entire district of Injil, admitted that it is not equipped to handle such problems. The jobs and lives of these officers are under constant threat from warlords who maintain gun power and critical influence over the local government. Approaching the police about the breaching of canals or other illegal behaviour in relation to water rights was not effective either, because the police were generally found not to want to “disturb the peace” by engaging in conflict with warlords. In fact, the presence of the government in the overall management of irrigation distribution is limited to the Department of Water providing technical support and issuing identity cards to *mirabs* and *wakils*. One of the key ways to deal with inequities would be through stronger government presence and intervention. This is not to suggest that the government should be more centralised and hierarchical, but it should intervene meaningfully by looking into the processes associated with the production of inequities, engaging with the power holders involved and extending support to the spaces for, and ways of, mitigating inequities.

It is necessary to appreciate that the current Government in Afghanistan is relatively new and that the democratic structures are in their infancy. Much of the inequities discussed in this report have been generated within the space of “statelessness.” The Government is yet to consolidate its position and take full control of all aspects of governance. The processes of democracy need to be strengthened; without this, the return to effective functionality of community-based institutions—spaces for the contestation and negotiation of water rights—cannot be fully realised.

63 Thomas and Ahmad, *A Historical Perspective on the Mirab System*, 53-54.

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