Case Study Series

WATER MANAGEMENT, LIVESTOCK AND THE OPIUM ECONOMY

Social Water Management

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This report is one of seven multi-site case studies undertaken during the first stage of AREU's three-year study "Applied Thematic Research into Water Management, Livestock and the Opium Economy".

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AREU was established by the assistance community working in Afghanistan and has a board of directors with representation from donors, UN and multilateral organisations and non-governmental organisations (NGOs).

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Glossary[1]

ab (colloquially *aw*)	water, river
abdan	water cistern or night storage reservoir
arbab	village or community leader
bagh	garden, orchard, vineyad
bahar	spring (season)
band	dam, barrier, weir
blok	literally "block"; a group of interdependent canals which have water-sharing arrangements during summer (Herat/Hari Rod: an administrative subdivision of an individual canal)
chak bashi	community-level water bailiff on tertiary canals (northern Afghanistan)
dari	unit of weight equivalent to 5 kg (Nangarhar)
darya	river
dasht	semi-arid plain
hashar ab	water-sharing arrangement
hawz	traditional water tank; accumulating pool or small reservoir at the head of an irrigation system to permit larger unit flows to be delivered, or for irrigation during 12 hrs outflow using 24 hrs inflow
ijara	leasehold (usually last a number of years rather than one planting season)
ijaradar	tenant farmer
jangal	forest, woodland, scrub
jar	temporary channel or dyke in river or wash bed to harvest subsurface water or springs (during summer months)
jerib	unit of land measurement; 5 *jerib* = 1 ha (2000 m^2)
joy	canal, ditch, open drain irrigation channel (small or medium)
juftgaw	unit of irrigated land: flow/volume to area ratio under which water rights or turns are allocated on main canals; derives from a yoke of paired, ploughing oxen and reflects area ploughed by two oxen for different soil types and land slopes; directly proportional to irrigated area and often approximated by *jerib*; the entitlement of any particular community is the sum of all individual *juftgaw* of that community
karez	underground canal system that taps aquifers by gravity through a series of underground galleries or tunnels; often extends many kilometres before surfacing to provide water for drinking and irrigation; *karez* comprise three

[1] The transliterations in this report are not necessarily those of the author.

	sections – water collection, water transportation and distribution
khairat	charitable giving (in kind or cash) for religious purposes and for gaining of merit
khana	house or household
kharwar	Kabul: equivalent to 80 *ser* at 7 kg per *ser* (560 kg) Mazar-i-Sharif: equivalent to 80 *ser* at 14 kg per *ser* (1,120 kg) Herat: equivalent to 100 *man* (400 kg)
khazan	autumn
khel	clan, sub-tribe of Pashtuns
kishtamand	cultivator, contract labourer (usually only for one planting season or at most one agricultural year; also commonly a tenant farmer (Herat)
kishtamandi	sharecropping system (Herat)
kok bashi	tertiary, or community-level, water master
kuchi	nomad
mahalla	suburb, area of a city or village
maldar	owner of herds and cattle (a synonym for *kuchi* nomads whose main source of livelihood is from herds of sheep, goats and camels)
malik	landlord, village or community leader (Pashto)
man	measurement of weight equivalent to 7 kg (Kabul), 4 kg (Herat), 4.5 kg (Kandahar), 5 kg (Peshawar), 14 kg (Balkh)
mard	man, person
masjid	mosque
mirab bashi	water master or bailiff responsible for all of a primary canal (northern Afghanistan)
mirab	water master or bailiff; in some areas of Afghanistan (including Herat), assistant to *wakil*, equivalent to *chak bashi* or *kok bashi*
mohafiz	warden, guardian
mullah	community religious official; head of mosque
nowbat	rotation (of crops), turn
nowbat-i-kalan	greater (water) rotation (Nangarhar)
nowbat-i-khurd	lesser (water) rotation (Nangarhar)
paikal	unit of land measurement equal to 500 *jerib* (100 ha); measurement (flow/volume to area to tax) of water allocation (Balkh River)
paw	approximately 7 kg (Kabul)
qala	fort, fortified compound
qarz	loan, debt
qawala	land tenure document, title deed
qawm	extended family, tribe, clan

rod	river (Herat)
roz	day
sarband	traditional diversion weir to divert water from river, stream or wash into main canal
sawab	religious merit, or an act done to accrue religious merit
ser	4–7 kg of grain (location dependent)
shab o roz	24-hour irrigation flow, or night–day system; ratio of time-to-flow for traditional water allocation and water rights. Irrigators have rights to a number or fractions of hours of water in any one rotation series. For example, where the only crop is wheat, the rotation is 24 hours of water for every 20–30 ha of land in a 12.5-day rotation. If the land owner has more or less land the water is adjusted proportionally. On day 1 the *mirab* supplies water to top-end users and works downstream through the canal network. On day 12.5, water is delivered to tail-end users and restarted at the top on day 13. *Mirabs* deliver water throughout the 24-hour period, and farmers who receive their allocation during the night will receive their next allocation during daylight hours.
Sharia	Islamic law
sharwal	municipality
Shia	branch of Islam to which most Hazaras, many Heratis and Kabulis, and some Kandahari Pashtuns belong
shora	local council, traditional assembly of elders (clan-based, tribal or ethnic) which runs community affairs
spingira	elder
sufi	follower of mystical Islamic order
tabistan	summer
tirmah	autumn (Herat)
wadi	a wash which tends to flood during the rainy season
wakil	water master or bailiff responsible for all of a primary canal (Herat); district representative (in cities)
zimistan	winter

Abbreviations and Acronyms

AD	Anno Domini (Christian Era date)
ADB	Asian Development Bank
AREU	Afghanistan Research and Evaluation Unit
BC	Before Christ
BRAC	Bangladesh Rural Advancement Committee
BRIWRMP	Balkh River Integrated Water Resource Management Project
CAFE	Central Asian Free Exchange
CARE	Care International
CDCs	Community Development Councils
DACAAR	Danish Committee for Aid to Afghan Refugees
DAI	Development Alternatives Inc.
DEW	Department of Energy and Water (formerly Department of Irrigation, Water and Environment)
EC	European Commission
EIRP	Emergency Irrigation Rehabilitation Programme (World Bank-financed, FAO-implemented)
EU	European Union
FAO	Food and Agriculture Organisation
GAA	German Agro Action
GIS	Geographical Information Systems
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)
HVA	Helmand Valley Authority
IDP	internally displaced person
INGO	international non-governmental organisation
IWRM	Integrated Water Resources Management
KRBP	Kunduz River Basin Project
MAAHF	Ministry of Agriculture, Animal Husbandry and Food
MEW	Ministry of Energy and Water
MMI	Ministry of Mines and Industry
MoF	Ministry of Finance
MRRD	Ministry of Rural Rehabilitation and Development
MUDH	Ministry of Urban Development and Housing
NEPA	National Environment Protection Agency
NGO	non-governmental organisation
NIPP	National Irrigation and Power Programme
NSFWS	National Strategic Framework for the Water Sector
NSP	National Solidarity Programme
PPTA	Programme Planning Technical Assistance

PRT	Provincial Reconstruction Team
RAMP	Rebuilding Agricultural Markets Programme (USAID)
RBA	River Basin Authority
SBC	Sub-Basin Council
SMEC	Snowy Mountain Engineering Company
UNAMA	United Nations Assistance Mission to Afghanistan
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children's Fund
UNOPS	United Nations Office for Project Services
URD	Urgénce Rehabilitation Développment
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
WUA	Water Users Association

Contents

1. Introduction

This study was undertaken as part of the initial stage of the Afghanistan Research and Evaluation Unit's applied thematic research project "Water Management, Livestock and the Opium Economy", in cooperation with the Danish Committee for Aid to Afghan Refugees (DACAAR) in Ghazni and Herat and German Agro Action (GAA) in Nangarhar and Kunduz. This report presents findings from research which took place during November and December 2005 at primary research sites in four provinces (Nangarhar, Ghazni, Kunduz and Herat) focusing on the management structures and social organisation of irrigated water distribution and allocation. It examines indigenous methods of water management at community and canal level, as well as the various techniques used by communities to manage water and resolve conflict. The technical and structural aspects of water management are dealt with in the companion report *Irrigation Systems*.

1.1 Social water management in Afghanistan

Afghanistan has an ancient community-based social water management system centred around community-embedded "water masters", or *mirabs*. This system, which generally transcends ethnic, religious and provincial boundaries, has persisted for thousands of years.

Although the breakdown of social cohesion over the last three decades, along with the exodus of many communities as internally displaced persons (IDPs) or refugees in camps in Pakistan and Iran and some government interventions, have placed the system under severe stress, the "water master" system has survived and has often been the sole means of managing in-canal and on-farm water distribution. With the return of communities to their former lands, which began in 1992 and is continuing, the system has reasserted itself.

In this respect, Afghanistan has been fortunate in never having been subjected to long-term colonisation by European powers – which would inevitably have resulted in the nationalisation or at least the state management of most, if not all, irrigation systems. The decade of Soviet occupation (1979–89) was insufficient, both in terms of length and level of control of rural areas, to undertake the kind of nationalisation of irrigation that took place a generation earlier in the Central Asian states during Stalin's era.

There have been a number of large-scale state-sponsored irrigation schemes in Afghanistan since the 1940s which have had mixed success. Schemes such as the Helmand Valley Authority (HVA) and the Nangarhar and Baghlan irrigation schemes have all been capital-intensive projects. By their very nature, they have tended to reduce, undermine and even eradicate community-based participation and water management, replacing them with central management by civil servants and government technicians often working out of Kabul or the provincial capital rather than from within the communities served by the scheme.

The HVA, for example, resulted in the nationalisation of 1,800 square miles of community-managed river valley under the jurisdiction of "expert" commissioners in Kabul.[2] Ironically, the present government, through the Ministry of Energy and Water

[2] N. Cullather, "Damming Afghanistan: Modernization in a buffer state", *Journal of American History*, 2002:512–37. See also: O. Zakhiwal, "The Helmand Valley Project', *Institute of Afghan Studies* (www.institute-for-afghan-studies.org/Foreign%20Affairs/us-afghan/helmand_0.htm).

(MEW), has been seeking to undo this and re-assert the power of community water management, in particular the *mirab* system, in these Helmand and Arghandab valleys. Despite these state-sponsored canal interventions, the *mirab* system has survived, albeit with somewhat reduced powers. In the HVA, the water master system appears to have reasserted itself over the last two decades in response to the absence of central government management of the primary canal systems. In Nangarhar, on the Surkh Rod River, a *mirab* is still employed on each government-owned primary canal to supervise the opening and closing of the control gates, though he is paid in kind for his work by the irrigators.

It is often assumed that every irrigated water source in Afghanistan has a *mirab* system, however the findings of this and previous studies reveal that this is far from the case. Not only do *mirabs* often not have a role in state irrigation systems, many non-formal irrigation systems also do not have a specific water master to manage the distribution from primary or secondary canals, *karez* or springs.

Communities which have very limited water sources, and therefore little irrigated land, often appoint a senior elder of the community or communities with water rights to manage a particular irrigated water source, rather than a *mirab*. This individual is usually the *arbab*[3] of the community with the greatest area of irrigated land and the largest water allocation in the system. This seems to be particularly the case among communities which were formerly nomadic or semi-nomadic *maldar*s (herders), such as the *kuchi*, who have bought marginal rainfed or semi-irrigated land but retained their original *shora* structure in which *mirabs* had no part as they owned no irrigation rights. Furthermore, in the primary research sites, initial findings suggest that *karez* are generally not managed by *mirabs* but by the community *shora*. In fact, many *karez* are privately owned and managed by extended families or clans rather than communities as a whole. In such a scenario the *shora* has little interest or say in the water management of these *karez*.

While this elder (usually referred to in Pashto, Turkman and Tajik as "white beard") responsible for water rights issues does not formally hold the office of *mirab*, the concept of community-based irrigation management still exists. Indeed, the principle of community-based management of irrigation is a nationwide phenomenon. However, this social management is weaker in state-owned irrigation systems and non-existent on privately owned water sources (private *karez* and all rural tube wells).[4]

The hierarchical structure of the water master system, as well as the terminology used to describe them, differ from region to region. For example, on the canals of the lower Balkh River Basin, known as Hazhdah Nahr (Eighteen Canals), there is a single, canal-wide water master who holds the title of *mirab bashi* ("head water master"). He is appointed by irrigators with water rights to manage water issues on the primary canal from the point of intake from the river to the tail of the system. Under him are a number of *mirabs* and *chak bashis* who are responsible for community-level and on-farm water distribution on the secondary and tertiary canals.

[3] The *arbab* is a senior elder of the traditional community *shora*, who represents the interests of his community to district and provincial government. In return, every adult male in the community or communities he represents pays him a fixed annual amount of wheat or cash equivalent.

[4] There are a number of tube wells which supply piped water to major towns in Afghanistan such as Ghazni. This water is managed and sold by the state to consumers; there is no social element in the management of these wells.

In the Qala-i-Zal district of Kunduz province, the *mirab bashi* has the same function as on the Hazhdah Nahr of Balkh, but he is assisted by only one or two *mirabs*, who are known there by the Turkic term, *kok bashi*.

The major urban canals in and around Herat, such as the Joy-i-Naw, Injil and Guzara canals, are divided into blocks (*blok*) under the supervision of a *wakil*, who has the same function as the *mirab bashi* of northern Afghanistan. The *mirabs* serve under the *wakil* and are responsible for a cluster of contiguous settlements within a particular block.

Despite regional and linguistic differences in terminology, the role of the water masters has a number of common features throughout Afghanistan:

- They are appointed solely by land owners or their nominees on the canal in question, rather than by provincial or national government (that is, by those with irrigation rights, taxable by the government, to the canal).
- Their appointment is not hereditary but depends on the goodwill of the communities they serve. Irrigators can, and frequently do, replace individual water masters for failing to perform their tasks with diligence or with sufficient integrity.[5]
- Water masters all live within the catchment area of the canal they serve, and they either own land irrigated by the canal, or sharecrop the land of other land owners who have water rights to the canal.
- Generally, primary canal water maters (*mirabs*, *mirab bashis*, *wakils*) are from tail-end communities – the part of the canal most at risk from water scarcity.
- With very few exceptions,[6] they are paid and supported by the irrigators of the canal rather than by government.
- Water masters, in the past, were exempt from military service.

Water masters share a number of common tasks:

- To ensure and police the equitable distribution of legal entitlements of in-canal and on-farm water.
- To supervise and maintain flow in the primary intake as well as in-canal and on-farm structures.
- To mobilise resources for and supervise cleaning and repair of canal beds and banks.
- To reconcile disputes between canal irrigators over water sharing issues.
- To act as mediators between adjacent up and downstream communities who share the same water source (usually a river or spring) over water sharing issues.
- To represent irrigators to district and provincial government.

[5] Afghan proverbs about water masters indicate a certain ambivalence about their trustworthiness and impartiality. For example, "Either be a son of a *mirab*, or live at the head of the river" (*ya bacha-i-mirab bashi, ya dar sarband-i-darya bashi*), in other words, if you want to have your water right you either have to be a relative of the *mirab*, or live at the head of the canal – on the assumption that if you live at the tail end of the system you are never going to receive your full rights, even if there is a *mirab*.

[6] One or two of the *wakils* of the urbanised canals in and around Herat receive a small stipend from the provincial government.

Where canal communities traditionally appoint a canal-wide water master, whether a *mirab bashi* or a *wakil*, this individual (in addition to being a land owner and water user of the canal in question) is invariably a man of influence and power, since one of his tasks is to represent the canal irrigators and, by extension, the canal communities as a whole to district and provincial government, international organisations, donors and other organisations planning or implementing interventions on their canal. On the other hand, *mirabs*, *chak bashis* and *kok bashi* are mainly drawn from the ranks of sharecroppers or minor land holders who only own one or two *jerib*.[7] Often these *mirabs*, *kok bashi* and *chak bashis* are unable to support themselves or their families from the income they receive as *mirabs*.[8]

Water rights to individual canals are allocated on the basis of land ownership, as irrigated or semi-irrigated agricultural land is never sold without an accompanying water right. Generally these water rights are linked to taxation, with the total water right for a particular canal being the sum of all individual allocations. Each primary canal, and therefore each secondary and tertiary canal, has a legal water right which is known to all irrigators and community leaders. Terminology, however, differs from region to region. On the Hazhdah Nahr canal system of the lower Balkh River, the flow-to-area-to-tax ratio is known as a *paikal*.[9] In the lower Hari Rod (including the Atishan canal) and Herat city area the primary water right is known as a *juftgaw*, which is in turn divided into four "ploughs". The area irrigated by one *juftgaw* or *paikal* is variable but the taxation on each of these units is usually standard throughout the canal system.

Both systems are hundreds of years old: in the case of Herat it is believed that the current *juftgaw*-age system was established during the reign of the Timurid ruler, Sultan Husain Baiqara (1469–1506 AD). In the case of the lower Balkh basin, it is likely that the *paikal* system is at least as old. Indeed, since it was the Persian Achaemenids (6th–3rd century BC) who first established large-scale irrigation systems, and given that both Herat and Balkh were important provinces or *satrap*s of this empire, it is likely that it was during this period of early history that the irrigation of Balkh and Herat was first laid down.

On smaller canals and on farms, water is allocated and rotated according to area and by the night–day system (*shab o roz*) – that is, in multiples or fractions of 24 hours depending on area. In Zala Qala of Kunduz province, the same system is referred to as *mardi kar* (a man's [daily] work). Water from small canals is rotated through the system according to the number of total night–days on the canal.

For example, in Turmai village in the upper Jaghatu valley in Ghazni Province, both the upper and lower canals which supply the village's land have an 8- or 10-day rotation within the canal. One of the *shora* leaders has rights to six hours of water (which he refers to as *nim-i-chasht* or "half a noon") every 8–10 days.

Where land sold is for urban development (housing units or industrial development), water rights are generally not sold to the householder, industrialist or developer but are retained by the farmer who uses the additional water to intensively irrigate a

[7] 5 *jerib* = 1 ha

[8] See J.L. Lee, 2005, *Mirab and Community Irrigation Management in Herat Province* (Mirab Specialist Report, SMEC), Asian Development Bank, Western Basins Programme Planning Technical Assistance Mission, p. 46.

[9] Lee, *Mirab and Community Irrigation Management in Herat*; see also, J.L. Lee, 2003, *Water Resource Management on the Balkh Ab River and Hazdha Nahr Canal Network: From Crisis to Collapse*, UNAMA/CAFE.

smaller area of land. In the case where a farmer sells all his land for urban development, as is the case on the Joy-i-Naw in Herat city, the water rights lapse and are not reassigned. In effect, these water rights would default downstream to the tail-end users.[10]

1.2 Migration in rural Afghanistan

This preliminary social study highlights the extent to which voluntary and involuntary migration has played a major role in defining rural Afghanistan over the last 150 years.

Large numbers of Turkmans have settled in Zala Qala district of Kunduz, and are representative of an even greater refugee crisis and settlement situation which affected Afghanistan in the 1920s and 30s and brought the country to the verge of war with the Soviet Union.

In both Herat and Kunduz, *khels* of the two main Kandahari Pashtun tribes (Ghilzai and Durani) have abandoned their nomadic or semi-nomadic lifestyle, bought up marginal, semi-rainfed land and become sedentarised with varied results. At least some of these Pashtun settlers and migrants are clearly struggling to subsist from their land and appear to have very poor farming practices.[11]

The study areas in Herat Province have also seen a sedentarisation of the nomadic and semi-nomad Aimaq (Jamshidi, Taimani) and Timuri tribes.

All of these migratory movements took place many decades before the invasion of Afghanistan by the Soviet Union, and they are indicative of a wider phenomenon of social engineering undertaken by the Amirs of Afghanistan. This included extensive forced and involuntary migration of ethnic groups from the 1880s to the early twentieth century under Amir Abdul Rahman Khan: the confiscation of indigenous peoples' lands by the state and the distribution of that land to loyalist Pashtun tribesmen; internal exile of political enemies; and successive, but often unsuccessful, attempts to settle nomadic communities, in particular the Pashtun *kuchi* or *maldars*.

Such large movements of population must have created major impact not only on the social fabric of tribes and clans who were relocated (either forcibly or voluntarily), but also on the social cohesion, agricultural activities, water resource management, land tenure and grazing rights of the host communities.

The communist coup of 1978, followed in December 1979 by the invasion of the Soviet Union to prop up the faltering socialist government, was the catalyst for yet another wave of displacement, both internally and externally. Internally, populations fled both ways. Those in urban areas who wished to join the *mujahidin* abandoned their villages near provincial centres which were controlled by government backed up by Soviet troops, and fled to more remote mountain areas. Others, such as teachers, who lived in areas attacked or controlled by *mujahidin*, fled to safe areas where they were protected by government troops.

Many millions of Afghans chose exile in refugee camps in Iran and Pakistan, leaving villages abandoned and land lying fallow. In these places, irrigation systems, particularly *karez*, collapsed either as a result of direct bombardment or through neglect.

[10] See Lee, *Mirab and Community Irrigation Management in Herat*.
[11] Sir Zar and Gharak in Herat appear to be particularly marginal in this respect.

Seventeen years after the withdrawal of Soviet troops in 1989, and fourteen years after the fall of the Soviet-backed regime of President Najibullah and the rise of a *jihadi* Islamist government which saw the beginning of the return of refugees, all of the primary research areas are still to some degree trying to rebuild their lives after over two decades of bitter conflict.

1.3 Research sites

The primary research sites are located in four provinces, Nangarhar, Ghazni, Kunduz and Herat, and demonstrate considerable variations in terms of geography, climate and agricultural activities, as well as social management of water supplies.

Fieldwork was conducted in the four study areas in November–December 2005:

15–21 November 2005 **Nangarhar:** Jalalabad; Surkh Rod

22–24 November 2005 **Ghazni:** Band-i-Sultan; Qala-i-Naw; Zala Qala; Pyada Rah

27–30 November 2005 **Kunduz:** Afghan Mazar; Dana Haji

1–5 December 2005 **Herat:** Gawashk; Tunyan; Gharak; Sir Zar; Khalifa Rahmat-i-Ulya

Table 1. *Primary research sites, GPS coordinates and elevations*

Province	**District**	**Settlement**	**Site coordinates from GPS readings** (* indicates readings taken from maps)		**Elevation (m)**
Nangarhar	Achin	Khawaji	N 34° 01' 00"*	E 70° 37' 37"*	~1700
		Otarkhel	N 34° 03' 17"*	E 70° 38' 46"*	~1470
		Sra Qala	N 34° 07' 38"*	E 70° 43' 00"*	~950
		Maruf China	N 34° 11' 45.5"*	E 70° 42' 24"*	~690
	Batikot	Janikhel	N 34° 15' 22"*	E 70° 44' 38"*	~550
Ghazni	Khwaja Umari	Chel Gunbad	N 33° 43' 40.47"*	E 68° 23' 18.49"*	~2360
		Turmai	N 33° 41' 7.10"	E 68° 23' 56.0"	2300
		Qala-i-Naw	N 33° 38' 8.60"	E 68° 25' 12.50"	2255
		Zala Qala	N 33° 38' 49.3"	E 68° 18' 56.7"	2560
		Pyada Rah	N 33° 40' 26.2"	E 68° 20' 27.6"	2490
Kunduz	Qala-i-Zal	Dana Haji	N 36° 58' 24.50"	E 68° 31' 52.20"	335
		Afghan Mazar	N 36° 57' 41.80"	E 68° 34' 41.80"	340
		Wakil Jangal	N 36° 54' 52.70"	E 68° 34' 58.40"	345
	Khanabad	Alam Bai	unknown	unknown	~800
		Abdul Nazar	N 36° 34' 7.40"	E 69° 7' 29.00"	~800
Herat	Pashtun Zarghun	Gawashk	N 34° 17' 30.10"	E 62° 39' 41.50"	1090
		Tunyan	N 34° 18' 22.20"	E 62° 31' 5.90"	1030
		Gharak	N 34° 20' 23.70"	E 62° 36' 12.20"	1165
	Kushk	Khalifa Rahmat-i-Ulya	N 34° 46' 10.40"	E 62° 17' 30.10"	1305
		Sir Zar	N 34° 44' 45.30"	E 62° 18' 57.40"	1490

The sites display a range of irrigation systems. They include communities with more than enough water, ones with water shortages, and others, such as Sir Zar, which are barely agriculturally viable and have severe problems getting any water at all. There are communities who have a single water source and ones which have a variety of water sources for irrigated agriculture.

As well as traditional surface irrigation systems which draw water from rivers, there are both private and community-owned sub-surface irrigation systems and *karez*,[12] and surface springs from which water is distributed through canal networks. Water sources in the study areas include:

- unlined canals of a variety of lengths which draw water from a river or spring;
- underground *karez*;
- tube wells;
- dam seepage;
- wash water; and
- areas which combined opportunistic use of intermitted wash and rain water.

Climates range from the sub-tropical mountainous communities of Nangarhar to the rain-scarce, semi-arid uplands of Kushk in Herat. Communities vary in size considerably, from ones with under 50 households (Sir Zar, Gharak, Pyada Rah) to those with over 300 households (Tunyan, Qala-i-Naw).

Of the nineteen primary research sites, twelve are mono-ethnic communities[13] often based on close kinship. Of these, eight are Pashtun,[14] two Tajik,[15] one Turkman (refugees from Central Asia rather than indigenous[16]) and one Hazara.[17] The majority of sites have been settled by Sunni Muslims, while only two sites have any Shia Hazara representation (Pyada Rah and Qala-i-Naw and Ghazni). There are no Uzbek or Ismaili communities in any of the primary research sites. Turkic speaking groups are represented by two Turkman settlements (Dana Haji and Afghan Mazar), which share a common origin as refugees from Bokhara, and as such are relative new-comers to the area. Of the eight mono-ethnic Pashtun communities, there are a variety of different clans represented from the two major tribal divisions of the Pashtuns of Afghanistan – the Ghilzai and Durani.

Multi-ethnic communities such as Tunyan (Herat) and Qala-i-Naw (Ghazni) organise themselves according to the medieval *mahalla*, or district, system which allows communities to live at some distance from each other yet within the same community boundary. It will be an important element of future research to examine the inter-community dynamics with respect to water management, land ownership and tenure, and livestock and rangeland sharing.

1.4 Data collection

Two consultants were assisted by AREU and its partner NGOs' national research assistants. In addition to field visits to study areas, interviews were conducted in all provinces (where possible) with the head or deputy head of the Department of Irrigation's District Irrigation Officers, the caretaker (*mohafiz*) of the Band-i-Sultan and other irrigation officials. AREU's national provincial research assistants accompanied the expatriate research team on all field visits.

[12] *Qanat* in Iran, *falaj* in Oman.
[13] All five sites in Nangarhar; Zala Qala and Pyada Rah in Ghazni; Dana Haji, Abdul Nazar and Alam Bai in Kunduz; and Sir Zar and Gharak in Herat.
[14] All five sites in Nangarhar; Zala Qala in Ghazni; Sir Zar and Gharak in Herat.
[15] Alam Bai and Abdul Nazar, although as these villages were not visited, it is possible that there are some other ethnic groups represented in these communities.
[16] Dana Haji. Afghan Mazar has a number of *kuchi* families as well as Turkmans.
[17] Pyada Rah.

Meetings were held with:

- MEW officials in Kabul, including consultants involved in water and irrigation management issues;
- other provincial government officials involved in irrigation interventions including the provincial branches of the Ministry of Rural Rehabilitation and Development (MRRD);
- provincial officials of the Food and Agriculture Organization's (FAO) Emergency Irrigation and Rehabilitation Programme (EIRP) (working out of the MEW's provincial offices); and
- field staff of AREU's research partners, GAA and DACAAR.

In Kunduz the research team had a number of meetings with staff from the Kunduz River Basin Project (KRBP).

In all research locations unannounced visits to communities were made, with the exception of Nangarhar. Individuals interviewed included water masters (*wakils*, *mirab bashis*, *mirabs*, *chak bashis* and *kok bashi*), heads and members of traditional community *shora*, other tribal elders and officials of individual Community Development Councils (CDCs) of the National Solidarity Programme (NSP) where such organisations existed. In communities of ethno-religious diversity, every effort was made to ensure representation of the various ethno-religious groups. Some side-of-road interviews were conducted with individual farmers and water users.

Two consultants for AREU's broader research project on "Water Management, Livestock and the Opium Economy" attended a workshop organised by USAID-RAMP and Development Alternatives Inc (DAI) on a draft charter of internal regulations for Water Users' Associations (WUAs) held at the Ministry of Agriculture, Animal Husbandry and Food (MAAHF) on 8 December 2005.

1.5 Security and research restraints

Security considerations in Nangarhar meant the research team was unable to visit any of the primary research sites there. The *mirab* of Khawaji in Otarkhel district, along with a member of the traditional Shinwari *shora* of the same village, came to the GAA offices in Jalalabad to be interviewed. The team visited the Surkh Rod district of northwestern Nangarhar to obtain some triangulation information regarding social water management and interventions by several actors. There was insufficient time in Ghazni to visit Chel Gunbad, however the team visited all the other study sites: Zala Qala, Pyada Rah and Qala-i-Naw. In Kunduz two field visits were made to Afghan Mazar and Dana Haji. Some information regarding the upstream community of Wakil Jangal was obtained from community leaders in Afghan Mazar. Time did not allow the two research sites in Khanabad district to be visited. In Herat all field study sites were visited.

2. Policy and Institutional Environment

Responsibility for water resource management is divided between several ministries: irrigation rests with MEW; on-farm water issues rest with MAAHF; and permits for ground water extraction and tube wells rest with the Ministry of Mines and Industry (MMI).

A number of other ministries have entered the water resource management arena since the present government was elected:

- Through the municipalities (*sharwal*), the Ministry of Urban Development and Housing (MUDH) is responsible for urban water supply, sewage disposal, pollution control and other urban water issues such as watering of public parks. In Ghazni, for example, there is a separate department of the provincial government that manages the city water supply which is supplied from tube wells.
- The National Environment Protection Agency (NEPA) has also assumed a role in water where it impinges on the environment.
- MRRD, which is well resourced, has been implementing small- to medium-scale rehabilitation of in-canal structures as well as flood control measures and wash and river training.
- The Ministry of Finance (MoF) plays an important role, as each ministry is required to present an annual budget for rehabilitation of canals and other water sources for its approval. The MEW, in particular at provincial and district level, appears to have little or no finance for such works.

At subnational level, each of these institutions has a provincial department based in the provincial capital. Often the governor of the province is involved in coordinating interventions by different government agencies and NGOs. There are one or two Department of Irrigation (MEW) field officers in each of the districts in which the primary research sites are located.

Under the current government's National Irrigation and Power Programme (NIPP), the lead ministry of the "Joint Project Team" is MEW.

The official policy aims of irrigation reform are:

- reduced government expenditures;
- improved water delivery to farmers;
- improved water use efficiency;
- increased irrigation area;
- improved plant growth and higher yields of crops; and
- changed cropping patterns and increased diversification.

The policies are designed to increase profitability of irrigation agriculture to farmers, and to the national economy.

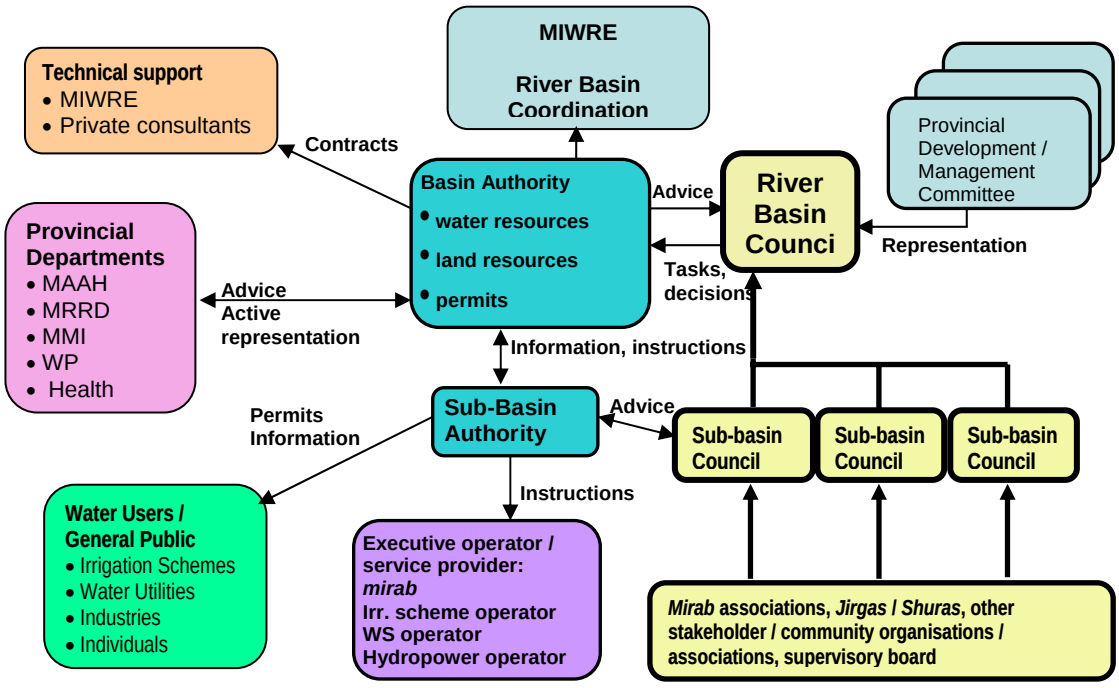
Over the last two years, MEW, and government and donors in general, have undertaken a difficult and sometimes problematic transition from emergency to development programming. With the former programmes coming to an end, plans are being laid for long-term, multifaceted, integrated projects which include physical rehabilitation, better management of on-farm water, renegotiation of water rights on primary canals, institutional strengthening and capacity building.

Considerable funding, running to many millions of US dollars, has been pledged by a number of major international donors, and this is channelled through MEW. This will allow not only a considerable amount of physical rehabilitation to degraded irrigation systems, but it will also present a rare opportunity for the government of Afghanistan to undertake major reform of water rights and encourage increased community participation.

The National Strategic Framework for the Water Sector (NSFWS) includes the establishment of River Basin Authorities (RBAs), Sub-Basin Councils (SBCs) and Water Users Associations (WUAs) (figure 1). National RBA policy provides a role for community water masters, primarily as important components of WUAs. At present, the nascent WUAs consist more or less solely of *mirabs* and other water masters, though the intention is to gradually broaden the franchise.

There is general agreement by both government and the donor/implementer community that the strengthening of traditional water management systems is an important element in any future management plan for RBAs and the overall management of irrigation systems. The agricultural sector policy document also affirms the importance of WUAs.

Figure 1. *Proposed river basin institutional structure*



Under government plans, WUAs are intended to feed into SBCs, though the exact role of water masters in RBAs and SBCs is still being debated by the various donors. One of the reasons for ongoing debate is that government policy was laid down at an early stage of the present government *before* field studies were undertaken. Now that these studies are underway, it is becoming apparent that there are many cultural and regional divergences in the social management of water. At present there is no consensus regarding the future form, structure, responsibilities or legal framework of WUAs. A draft charter and internal regulations for WUAs has recently

been drawn up by USAID-RAMP and DAI, while the latter has also drafted a new Water Law which, at the time of writing, had not yet passed into law.

The WUA charter and regulations were discussed at a workshop in December 2005 at MEW. This and other workshops held earlier in 2005 have presented a number of concerns and differences in approach to community irrigation management within the international donor community, consultants and government advisers. A particular concern expressed in these meetings is that any new Water Law and WUA charter should be sufficiently flexible to allow for regional and cultural variations – which would reduce, rather than increase, the degree of government involvement in on-farm water management.

At present there are a number of pilot projects underway, or in the process of commencing, which are mandated to establish RBAs and WUAs. The Asian Development Bank (ADB) is about to commence work on the Hari Rod, a project which includes the creation of a Hari Rod RBA as well as WUAs. The ADB is also funding the Balkh River Integrated Water Resource Management Project (BRIWRMP) which commenced in mid 2005 and which, at the time of writing, has established nascent SBCs in two sub-catchments (Sholgara and the Hazhdah Nahr canal network). The European Union is funding the KRBP, which, in mid 2005, established three sub-catchment commissions as the first stage of the RBA plan. USAID-RAMP has been working on the establishment of WUAs in the Helmand Valley, and is commencing similar pilot projects on the Guzara and Injil peri-urban canals of Herat city.

Government reform of water management, however, faces immense challenges, not least of which is the fact that the current government has been in continual flux since the fall of the Taliban. Social, legal and managerial reform of national infrastructure such as irrigation systems is difficult enough for a stable and established government. But when a government's writ does not reach beyond the provincial governor's office in many places, the odds against their success are greatly increased. Government continues to grapple with complex issues of establishing a sustainable tax base, major reform of the civil service and institutional structures, the establishment of democratic society, poor security in many provinces and the burgeoning opium economy.

The fact that no one ministry has overall responsibility for water resource management (though such a ministry has been proposed by at least one deputy minister) has been problematic. Despite MEW being designated as the coordinating ministry in the national strategy for water resource management, the level of coordination, cooperation and information exchange between different ministries is often poor, and on occasions non-existent. Implementation of policy is hampered by inter-ministry rivalry which, in some cases at least, is exacerbated by personal, political or party rivalries.

The role and function of ministries continue to evolve. MEW has effectively been under a sentence of death for at least a year; plans to incorporate it as a department of MAAHF have been delayed due to resistance from MEW. Both ministries continue to have to address important administrative issues, while at the same time trying to implement national policies and provide at least some form of supervision of several capital-intensive irrigation projects.

3. Findings from Nangarhar

3.1 Description of the study areas

Due to the security situation, no field visits were made to either Batikot or Achin districts. Not much data was therefore obtained from the Batikot study area, but data on the Achin study areas was obtained from GAA field staff, the provincial and district officials of the Department of Irrigation and FAO/EIRP. In addition the research team held meetings in Jalalabad with the *mirab* of the Khawaji–Otarkhel block and the head of Khawaji clan *shora*.

Both Batikot and Achin districts are exclusively Pashtun (Shinwari tribe). Poppy cultivation has long been a traditional activity in this area, and it has received an additional boost by the drought and other water shortages, as well as the destruction and degradation of irrigation systems over the past 25 years (which has meant less efficient delivery of on-farm water). Many younger men are day labourers in Jalalabad or across the border in Pakistan's North West Frontier Province. These Shinwari tribesmen have close links with Pashtuns on the Pakistan side of the border and use these connections for smuggling opium (raw and processed) and other high-value goods.

The mountain communities' traditional agricultural activities are supplemented by animal husbandry, as irrigated land is scarce. They also earn additional income from harvesting the diminishing forests of juniper and oak in the Spin Ghar mountains, and selling it on the Jalalabad market. More recently, some mountains communities, realising that the loss of forest has had effected soil erosion and the loss of the lucrative trade in pine nuts (*jalghoza*), have decided in their clan *jirga* to stop cutting down the *jalghoza* pine trees for timber or fuel.

The provincial Department of Irrigation has one district irrigation officer who covers Batikot and Achin districts.

3.2 Achin district

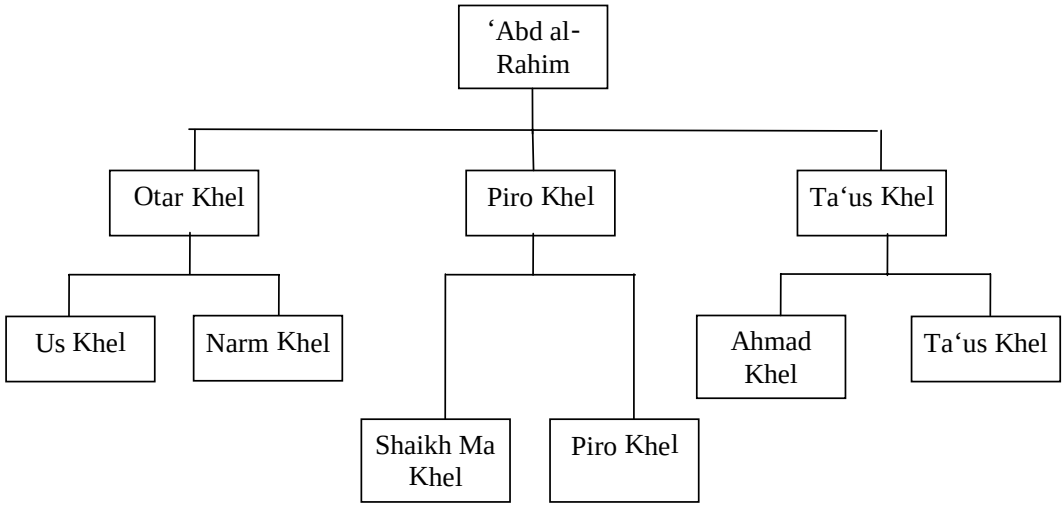
As well as exploiting the intermittent river and wash water (snow melt and rain run off), many valleys in Achin district also utilise *karez*, many of which have been cleaned and rehabilitated by GAA over recent years. Many of the vertical shafts and horizontal tunnels of the *karez* have collapsed as a result of war and general neglect, and the communities lack the skill and time to rehabilitate them. During the recent drought a number of the *karez* springs and other water sources dried up, and many of them remain dry despite the good snows and rains of 2004–05. This is the case with the Otarkhel *karez*.

Two primary research sites in this district, Otarkhel and Khawaji, both draw water from the Paikha Khwar River and wash. In addition, Khawaji has a spring which is used in irrigation. The total irrigable land is estimated by community elders at around 500 *jerib* (100 ha).

Demography and social background

The population in the two study communities are all Shinwari Pashtuns, descended from a single male ancestor (figure 2). The elders state there are 200–300 households in Otarkhel. The community are unable to say when they settled in the area, however those in Khawaji say they moved further up the valley from Otarkhel because of population pressure in the Otarkhel area.

Figure 2. *Genealogical tree of the Otarkhel Shinwari Pashtun clans*



Water sources

Irrigation in the upper Paikha Khwar valley is mainly from rainfall and snow melt, rather than from a permanent source of water such as a spring or glacier in the mountains. The village of Otarkhel lies downstream of Khawaji and is served by the Shah Toot canal. Khawaji village is in a narrow valley and its irrigation comes from two canals, one on the left and one on the right bank of the river. There are seven water mills on these canals.

Primary canals with intakes on the Paikha Khwar River, Khawaji and Otarkhel sub-catchment (from up to downstream):

Left-bank canals

1. Surkh Kheli
2. Sholgara
3. Landi
4. Otarkhel (waters Otarkhel village and Shah Toot)
5. Pakhel
6. Ahmad Namasi
7. Akhun Zardgan

Right-bank canals

1. Jerandu Sarband ("mill intake")
2. Ming Jawaru (Jawaringar?) Band
3. Deqan Band
4. Jawarigar Band ("gamblers dam")

The intakes of these canals are being repaired by the NGO Bangladesh Rural Advancement Committee (BRAC), under the NSP. BRAC employs local labour at a rate of 150 Pakistani rupees (approximately US$2.50)[18] per day. The community contributes one day's free labour per week. However, the *mirab* and elders stated that

[18] The Pakistani rupee is widely used as an alternative to the Afghani in Nangarhar Province.

on this unpaid work day the labourers merely take the day off from NSP work and still count it as a "community contribution".

Water management

Water rotation in Achin district's eleven canals is on a 16-day (24-hour period) cycle, which is divided up into a 4–5 day sub-cycle to ensure that crops do not desiccate. Flow and volume is determined in-canal and in-river by the use of a measuring stick or hand span. During the recent drought, the water rotation was not modified, but the flow and volume in the canals was a great deal less. In summer, water is scarce (the river valley is technically a wash rather than a river); the communities still sow all available land with summer crops but expect at least a proportion of them not to reach maturity. This survival mechanism hedges the bets of the community and can realise benefits if the year's rain and snow melt is above average.

Despite claims by some sources in Jalalabad that the *mirab* system has collapsed, it was observed to still be functioning, albeit at a reduced level and supplemented by the involvement of village and sub-catchment-level *jirga*s or clan meetings.

Every village has its own *shora* in which the heads of individual sub-clans, or *khel*, sit along with the village *mullah*. There is a block of 30 villages in the middle to upper valley. All Shinwaris of these communities' Otarkhel clan meet regularly to discuss inter-communal and inter-valley issues, with each community sending one representative to these *jirga*s. Among other issues, this inter-community *jirga* discusses water-sharing issues within its sub-catchment, however not every community on the Pirkha river/wash attends this meeting. Sra Qala, for example, does not send a representative to this council, but is a member of another Pirkha sub-council which represents a cluster of communities lower down the watershed.

Water management in communities is organised between contiguous clusters of villages that are from the same clan group using the 24-hour *shab o roz* system. Disputes over water allocation and water rights are handled by the clan elders at a clan meeting or *jirga*; they are rarely if ever referred to the district government.

There is one *mirab* for all eleven canals who resides in Khawaji and has been the *mirab* of this sub-catchment for two years since he inherited the *mirab* role on the death of his uncle. Whilst the position of *mirab* is hereditary, it does not automatically pass from father to eldest son, or eldest head of household to the next eldest head of household. Instead, the sub-catchment *jirga* meets following the death of the *mirab* and appoints the most suitable member of the family to the post. The current *mirab*, prior to his formal appointment, worked with his uncle assisting him in his duties and may well have been nominated by his uncle to the *jirga* as his chosen successor. He is assisted informally by his brother, and his work is seasonal, since in the summer months there is no water in the wash to manage.

Unlike other parts of the country, the franchise for the election of the *mirab* is not confined solely to land owners who have irrigation rights, or to their nominated representatives. Under Shinwari customary law, any adult male from any of the communities in the sub-catchment is entitled to a "vote" on the issue.

In return for the *mirab*'s services, the sub-basin communities pay him the equivalent of 250 *dari* (around 1,250 kg) of wheat per year. Payment can also be made wholly in cash (Pakistani rupees), or part cash, part kind. In the last agricultural year (2004–05), those who paid in cash did so at the rate of 60 rupees (US$1) per *dari* of wheat. At this rate, the *mirab*'s annual income for his work as water master totals 15,000

Pakistan rupees, or US$255. The area irrigated by the eleven canals is estimated at around 3,000 *jerib*, or 600 ha; annual income for the *mirab* is therefore around $0.425 per hectare. The *mirab* owns 1 *jerib* and one goat. Payments in cash are made in early January; payment in kind is due at the end of the wheat harvest. This payment is due from all irrigators regardless of whether their crop produces a yield or not.

Maintenance on the eleven canals takes place during the Afghan month of Hamal (21 March–20 April).[19] Each village served by the canals nominates a single elder who is knowledgeable about water rights to represent them to the *mirab*, to ensure that labour is apportioned fairly and that each community is not cheated out of any allocation as a result of changes in the canal bed, banks or intake. Cleaning and routine maintenance is done by land owners and/or their sharecroppers or labourers. However, in the case of an urgent need because of unexpected problems such as a landslip or blockage, the *mirab* can appeal to the sub-basin *jirga* for additional labour.

Problems identified by the *mirab* and *shora* head included cross-flooding during the rainy season and the peak snow melt period, resulting in some damage to canal banks as well as the washing away of the primary intakes (*sarband*). Intakes often have to be repaired or replaced several times a year.

Sra Qala shares irrigated water from the same wash with six upstream communities. In total the communities have 21 night–day allocations, of which Sra Qala's allocation is one night–day for around 85 *jerib* of irrigated land. Seasonal adjustments are required to manage the scare resource, and the distribution of water through the system is based on negotiation arbitrated by the community *jirga* and elders.

In Maruf China, another area of water scarcity at the tail of the wash, the *mirab* is only engaged during spring when there is sufficient water in the wash to provide some irrigation for the community.

Irrigation for Janikhel comes from the Nangarhar canal network, and water rights were allocated during the era of President Daud (mid 1970s). On the basis of this allocation the five communities which share the water have established an informal night–day allocation system. There is a *mirab* who is paid in kind at the rate of 40 *man* (280 kg) of wheat at harvest time, and 40 *man* of maize at the end of the summer harvest.

3.3 Surkh Rod district

Following security restrictions which prevented the researchers from visiting Batikot or Achin districts, a field visit was made to Surkh Rod district northwest of Jalalabad. The team looked at water management on the Qara Khushkak or Qara Su wash. Interviews were held with community representatives from the villages of Zargaran and the downstream community of Shamsha Pur, both of which are on the left bank of the wash.[20]

A number of canal management, river training measures and cross-river structures have been undertaken by international actors over the last two decades – with mixed results. These include FAO/EIRP and the Provincial Reconstruction Team (PRT)

[19] See Appendix for the Afghan solar (*shamshi*) calendar.
[20] According to international convention, left and right banks are determined by facing downstream.

which have built a bridge across the Surkh Rod at Shamsha Pur, and conducted river training. In Shamsha Pur the *malik* (village representative) complained that the PRT structure, which was designed to prevent flood and erosion on the left bank below the bridge, had merely redirected the problem of flooding onto his land upstream from the bridge.

Zargaran

Zargaran village has water rights to the Kushkak and Sayedan canals, which draw from the Surkh Rod River. The *mirab* of the Kushkak canal has served in the role for the past five years. For domestic water the community has a single well (dug in 2001 by an NGO) which is poorly sited at the highest point in the village. It is almost dry and the hand pumping mechanism broke a year ago and has not been repaired. Water for domestic use is now brought from the wash on the south of the Surkh Rod, which marks the village boundaries to the north.

The population of Zargaran is one extended clan of Durani Pashtuns (Muhammadzai clan), who claim descent from Amir Dost Muhammad Khan, the "Great Amir" (*Amir-i-Kabir*) of Afghanistan (d. 1862), the founder of the Muhammadzai dynasty. The clan was given the land in Zargaran by one of the Amirs of Afghanistan, but the exact period is not known. Despite Nangarhar being overwhelmingly Pashtun in culture and language, many of the Zargarani Muhammadzais only speak Dari.

A number of *kuchi maldar* (nomadic pastoralists) of the Salozai clan camp around the village during the winter months and migrate up the Kabul River in spring. At least two families of *kuchi* have settled in the village, bought small parcels of land and built houses. The male members of these *kuchi* families sharecrop, but also keep a number of animals.

Shamsha Pur

Shamsha Pur is located about 5 km downstream from Zargaran. On the south it is bordered by the Qara Khushkak wash and the Surkh Rod River to the north. The community owns land adjacent to the PRT bridge across the wash. Prior to the bridge's construction, the communities on the left bank had to wade across the Surkh Rod to the north and were often cut off during the flooding period of the wash and the Surkh Rod River.

Irrigation in the village is from the Surkh Rod and is delivered on-farm through the Shamsha Pur secondary canal which has its bifurcation at Qara Bagh. The community's shallow well, dug by an NGO, is almost dry and the pumping mechanism in disrepair; instead the community uses water from the Surkh Rod. The *kuchi* women use the water from the wash for their laundry. Ritual ablutions are performed by the men in the canal. There is no *karez*.

The tertiary canal which serves this community is 6–7 km long. Cleaning is carried out by the land owners' sharecroppers on an as-needs basis, as the canal does not suffer from heavy silting. Those who do not own land or work on the irrigated land do not participate in any of the cleaning activities. Cleaning is usually done from the head of the canal to the tail, but the system is flexible. The labourers work as a gang and divide the cleaning allocation between them. Work is allocated proportionally to the amount of land and water rights of each landlord or sharecropper at the rate of one person per day for those with less than 20 *jerib* (4 ha) of land, and two people per day for those with over 20 *jerib*. Only one or two individuals own more than 50 *jerib*. A landlord with 30 *jerib* of land, or his sharecroppers, is

expected to clean more metreage of the canal than a land owner with 10 *jerib*, since under the traditional *hashar* system the former landlord is required to provide more labourers than those with less land. Under normal circumstances it will take the community 6–7 days to clean the canal from head to tail.

In the last two years' cleaning cycle, the *hashar* system has been modified because of external interventions implemented by an international organisation (a Food-for-Work programme in the first year and a Cash-for-Work programme in the second). In the former, labourers (not just sharecroppers or land owners) were paid at the rate of 7 kg of wheat per working day, in the latter, payment was at the rate of US$2.50 per day.

Water management

There is one *mirab* on each of the canals drawn from the Surkh Rod River. His primary function is to operate and maintain the control gates which release water into the primary canals. In addition, the *mirab* is required to alert the canal communities in case of any breach of the canal dykes and banks.

The present *mirab* was appointed two years ago; the former was voted out of office by the community as he was not deemed to have been sufficiently diligent or honest in his job. At community level, water distribution is carried out under the supervision of the *malik*, or nominated elders of the traditional *shora*, who also arbitrate water sharing disputes. All water rights are said to be enshrined in formal title deeds (*qawala*) based on the cadastral survey of President Daud Khan.

The communities have two kinds of fixed payments for the *mirab*:

1. An amount of wheat or maize per *jerib* of land cultivated, paid per crop (subject to the crop being harvested).
2. 1 *charak* (approximately 1.75 kg) of wheat or maize per *jerib* per agricultural season. This system is the traditional one.

In Shamsha Pur, water distribution is on a rotation or turn (*nawbat*) basis, based on the traditional *shab o roz* system. Ten communities in total use the water of the Qara Bagh canal: six at the head and four at the tail. The tail end communities operate a variable summer and winter rotation in-canal, known as the "greater, or large, rotation" (*nowbat-i-kalan*) and the "lesser, or small, rotation" (*nowbat-i-khurd*).

- ***Nowbat-i-kalan*** operates during peak flow periods which coincide with low demand – from around mid October to mid June. This rotation is based on a ten night–day cycle in the canal and on-farm, with each of the ten canal communities entitled to one night–day water right.
- ***Nowbat-i-khurd***, also known as the "Rotation of the Four Villages" (*Nowbat-i-Char Deh*), is only operated in the four tail communities during the low-flow, high-demand period – that is from the Afghan solar months of Sawr to Mizan or even Qaws (mid April to mid October or even mid November). Under this system, whilst the six communities at the head of the canal continue to operate the *Nowbat-i-Kalan*, the tail-enders reduce the allocation of the four villages and apportion water by the hour or fractions of an hour.

During the recent drought, however, there was no water in the wash and little in the Surkh Rod, and the tail-end communities suffered severely with many of their fruit trees drying up.

In Shamsha Pur the elders interviewed admitted that in days of King Zahir Shah they had had serious water disputes with other irrigators at the head canal. Eventually the dispute was taken to the provincial governor and, by implication, to central government. According to the village *malik*, the governor "punished" the down-stream communities, giving away two days of their rotation entitlement to the six communities at the head of the canal. This was most likely one of the reasons why the four villages at the tail had to create the *nowbat-i-khurd* system. It appears that this decision still causes problems between these communities.

4. Findings from Ghazni

4.1 Description of the study areas

The study areas in Ghazni are all located in the Khwaja Umari district of Ghazni Province. They are located in the upper to middle catchment of the Jaghatu River, below Band-i-Sultan but above Ghazni city. Zala Qala and Pyada Rah are situated in the rangeland above the irrigated area of the Jaghatu River. The remaining communities all draw some irrigated water from the river.

AREU's research partner in Ghazni, DACAAR, has been building control structures and conducting rehabilitation of canal and in-river structures on the Jaghatu River for around nine years. It has also been digging shallow wells in communities throughout the area along with a number of other rural development projects.

Population figures for the Jaghatu valley have yet to be collected, but there are more than twenty major communities below Band-i-Sultan and above Ghazni which use the water of the Jaghatu River for irrigation. The area is well watered and much cultivation takes place during both winter and summer.

The ethnic makeup of the valley and Khwaja Umari district is diverse. Whilst Pashtun tribes, both Durani and Ghilzai are the dominant tribal groups, there are also considerable populations of Persian-speaking Tajiks (*farsiwans*), Shia Hazaras and Sunni Timuris.[21] There are some settler and nomadic Pashtun *kuchi* communities in the rangeland and on the spring line in the upper hills. In large communities, such as Qala-i-Naw where there are three major ethnic communities (Tajik, Pashtun and Hazara), the various ethno-religious groups occupy distinct sections, or *mahalla*, of the village.

Band-i-Sultan

Band-i-Sultan (spot height of 2,400 m at the top of the dam) is 32 m high. It is located in the upper Jaghatu valley. The dam is designed to provide storage and flood control in the upper and middle reaches of the Jaghatu River, and irrigated water to Ghazni city and the tail of the river system. Its releases are specifically designed to provide irrigation for wheat cultivation in the lower valley south of Ghazni. At present the dam is under repair following a major breach of the dam in 2004 and no water is being stored while the repairs are undertaken.

Figure 3. *The medieval walls of Band-i-Sultan exposed during repair operations to the present dam (photo courtesy J.L. Lee)*

Communities in the upper and middle reaches of the river valley below Band-i-Sultan claim they do not see much benefit from the dam, however the twice-annual releases provide some water for their canals and during the dry summer months the communities tap the considerable

[21] The Timuri tribe claims to be of Arab descent, but it takes its name from Amir Timur Lang (Tamurlaine), the conqueror of Middle Asia during the 14th century. How the community came to Ghazni is unknown; there has been little or no study of this tribe since the 1880s.

subsurface seepage from the dam by digging *jar* or temporary ditches in the river bed. In addition, the dam presumably raises the water table in the downstream valleys which benefits the shallow wells as well as assisting cultivation of the extensive fruit orchards along the length of the river valley above Ghazni.

The present Band-i-Sultan was constructed by German engineers in 1901–02 during the first year of the reign of Amir Habibullah Khan. This replaced a medieval dam, said to have been originally constructed by Sultan Muhammad of Ghazni (998–1030 AD) and then destroyed by Amir Timur Lang (Tamurlaine) in the 14th century AD. Walls of the original dam can be seen now that the reservoir has been drained (because of the recent breach of the dam).

In spring 2005, the eastern (lower) dam wall was breached and severe flooding occurred all down the Jaghatu and Ghazni Rivers. Bridges, intakes and flood protection walls were washed away or destroyed by the flood wave. Many houses and parts of Ghazni bazaar were washed away or inundated, and a number of people drowned. On close inspection, the actual destruction in the upper to middle Jaghatu valley above Ghazni was more modest than government and press reports claimed at the time. The impact of the breach of the dam appears to have been mitigated by the fact that the dam breach occurred in two or three stages. All the primary research sites except Pyada Rah and Zala Qala were affected, to a greater or lesser degree, by the breach of the dam. The reason for the collapse of the dam has been widely debated in the press, and at national- and provincial-level government. Currently there is a World Bank project to rebuild the breach of the dam, and during the field visit work was well underway with the dam walls expected to be re-closed within a few months.

The current *mohafiz-i-band* or *masul-i-band* lives in the community of Petawak, immediately downstream from Band-i-Sultan, and has been the caretaker of the dam for around 20 years. This village has water rights to the Jaghatu River. His office is a hereditary one, passed to his grandfather in the time of Amir Habibullah Khan when the current dam was constructed. Originally, he claims, his grandfather was nominated by the elders of the communities below Band-i-Sultan because of his honesty. On the basis of this recommendation, the government appointed him to the position and paid him a government salary. The *mohafiz* receives a monthly income of 2,000 afghanis per month from the Department of Irrigation in Ghazni Province, even though his actual village is within the provincial boundaries of Wardak (the site of the dam is actually in Wardak Province rather than Ghazni, as are two of the uppermost settlements immediately below the dam site – Bed-i-Mushkin and Petawak). Despite the dam and two of the villages below it being in Wardak Province, Wardak has no authority over the operation of the dam. He claims he receives no income, whether in kind or cash, from the communities on the Jaghatu River. As well as his income from the government, the *mohafiz* owns 12 *jerib* of irrigated land in Petawak.

The *mohafiz-i-band* operates the control gates on the Band-i-Sultan. There are two fixed releases every year, in spring and in late autumn. There are two control gates operated by screw release valves located at the top of the dam. Opening the rotating screw raises the gates in the base of the eastern dam wall and releases water into large bore metal pipes. A 180-degree rotation (or half a turn) of the release valve is estimated by the *mohafiz* as the equivalent of raising the gate level by one inch. According to the *mohafiz* the maximum opening of each gate is 12 inches, equivalent to 25,360 "turns" of the screw.

- On 25 Hut (14 March) the gates are closed on to dam to allow it to fill from rain and snow run off from the upper catchment.
- On 10 Jawza (2 June) the Department of Irrigation in Ghazni obtains authorisation from the governor of the province to open the gates, and then instructs the *mohafiz* by official letter to open the gates. This letter also states how many inches the gates should be opened. The *mohafiz* then carries out the order.
- The dam gates are open for 8–10 days from 10 Jawza to 18 or 20 Jawza (10 or 12 June). By the end of this period the dam is always empty as it does not have a large containment area, and the gates are closed again to collect any additional snow melt or rain run off.
- On 10 Mizan (3 October) the dam gates are opened fully by order of the Department of Irrigation in order to allow the pipes and gates to flush out gravel and silt, and they remain open until 25 Hut when the cycle begins again.
- Between 19 Jawza and 10 Mizan, control gates will only be opened if the dam is too full and is threatened with overtopping,[22] and then only by one or two turns (1–2 inches).

There is some flexibility within the system: communities (particularly downstream of Ghazni city which are water-starved) can petition the Department of Irrigation to open the gates a few days earlier if there is a particular problem with lack of water. The same applies during the summer period (Jawza to early Mizan). If there is water in the dam, the Department may agree to the opening of the gates a fraction of an inch to allow some water down the system and to keep the bed of the river from drying out and affecting the water table and seepage levels.

It is extremely rare, according to the *mohafiz*, to have to open both control gates at the same time: he claims that in his twenty years he has never had to open both gates simultaneously. Presumably, then, the two-gate system allows one to be closed for repair and maintenance.

According to communities upstream of Ghazni and below Band-i-Sultan, the real beneficiaries of the two annual releases are the communities south of Ghazni which have very little water for irrigation. The releases provide two irrigations to these communities' wheat crop, and without it wheat cultivation would be marginal, if not wholly unsustainable. The communities upstream do benefit from the raised water table, the seepage from under the dam which is tapped in-bed by the use of *jar*s, and increased protection of their banks, intakes and land from peak flows and flash floods. However, the elders on Turmai claim that the releases usually wash away their intakes, which then need to be rebuilt. The dam is purely for irrigation and flood control, and provides no domestic water or hydroelectric power to Ghazni or any of the surrounding communities.

It was reported by both government and community sources that during the reign of President Daud a feasibility study for the construction of a new dam at Khwajagan, 4–5 km upstream from Band-i-Sultan, was undertaken. This dam would have had a much larger containment area, but plans were thwarted by the fall of President Daud in 1978.

[22] The nature of the construction of the dam is such that its integrity would be threatened by it filling to the level of the dam wall.

During the recent drought water tables and in-river summer springs from the dam's seepage fell dramatically as the amount of water available in Band-i-Sultan dropped. In order to keep orchards alive, many returnees from Pakistan paid for tube wells to be dug. Whilst as yet the project has no formal inventory of the number and location of these tube wells, there are said to be more than 100 tube wells within this particular area, with others under construction. Most if not all of these tube wells have no government permit, are often located within a few metres of the community's canals or the river bed, and are usually dug within a few hundred metres of each other. There is no community control over these tube wells, and doubtless members of the traditional *shora* who own land are as complicit in the digging of such wells as other landlords. The impact of these tube wells on the water table, as well as the cost of the sale of water on farming, is an issue which needs further research, as there is currently little systematic information available on this.

4.2 Turmai

Turmai is located on the left bank of the mid Jaghatu valley, and the *shora* elder interviewed claimed that there are more than 500 *jerib* (100 ha) of irrigated land farmed by the village. There is a DACAAR field office in the settlement and it has undertaken a number of irrigation, water and sanitation and social programmes in the district. DACAAR field staff and one of the members of the traditional *shora* were primary sources of information during the field visit.

On-farm water rotation in Turmai

A member of Turmai's traditional shora *owns 5* jerib *of land. This land is not one block, but is split between Joy-i-Bala and Joy-i-Payin.*

He has water rights totalling six hours (literally, nim-i-chasht *or "half a noon") every 8–10 days: three hours from the upper canal and three hours from the lower canal.*

In 2004 he planted 3 jerib *of his land with winter wheat and 1* jerib *with other winter crops, and reserved 2* jerib *for planting with potatoes, an important cash crop, in spring (late March).*

Water management

Turmai has water rights to two canals with intakes on the Jaghatu river, which are now semi-permanent structures built by DACAAR (it has also built cross-river weirs to provide a head for the canal intakes). The two intakes are known as the upper canal (*joy-i-bala*) and lower canal (*joy-i-payin*). The lower canal also provides irrigated water to the "Bini", or Bain-i-Sang, community.

Both canals operate on an 8–10-day rotation within the system using the traditional *shab o roz* system for on-farm allocation. During the peak flow periods in late spring the community close their intakes on the river to relieve flood pressure in canal. During summer, when water flow is low, the gates are left open and water is rotated in-canal and on-farm. Water allocations and water rights are well known by all land owners and their sharecroppers.

The communities do not employ formal *mirabs*; instead water distribution in canals is supervised by the head of each community's traditional *shora*. The reason for not employing a *mirab* is said to be due to the fact that these communities do not suffer from water shortages, unlike those at the tail of the river system (who do have *mirabs*). The head of the provincial Department of Irrigation, who holds regular meetings with *mirabs* from other districts of Ghazni, stated that apart from the control of releases from Band-i-Sultan, his office has little to do with the communities downstream from the dam, since they do not suffer from water shortages.

The communities operate a system of informal water exchange and water sale on-farm which they refer to as a "loan" (*qarz*). During periods of low flow and water scarcity, upstreamers who may have an excess of water in their allocation may agree to "loan" water to an adjacent farmer who needs additional water for his crops. The two farmers will agree on the amount of water (in terms of hours or fractions of hours), and the downstream farmer will be required to repay the loan some time in the future. The repayment may be made either through the same number of hours or minutes of water being claimed by the upstream farmer at a later date, or in terms of a percentage of the lender's crop at harvest.

Sometimes communities at the tail of canals may appeal to upstreamers for additional water on the basis of *sawab* – an act of meritorious charity. In such cases, upstream communities may or may not agree to the release of additional water, but usually do so in order to save face, to demonstrate their religious credentials as true Muslims and to accrue merit. It is unclear what, if any, repayment is required in this case. The sale of water for cash is common in the valley, but this form of sale is overwhelmingly carried out by owners of tube wells rather than irrigators using water from the river.

In addition to having water rights to the Jaghatu River, which is delivered by canal, the community has one *karez* – but the spring has dried up. When the *karez* was in operation, it was primarily used as a source of water for domestic purposes and for watering the community's livestock. If there was sufficient water in the *karez*, it was used to water 4–5 *jerib* of plum orchards (these have now been cut down as they died during the drought).

There are dozens of tube wells in the valley in Qala-i-Naw – most of which were dug during the 1990s in response to the severe drought. These wells are all privately owned and are on private land. Whilst the MMI is supposed to issue a permit prior to the construction of a tube well, this rule is mostly ignored. All the wells are dug without government permits. The tube wells also lie outside the remit of community *shora* and community water managers, even though they inevitably impact on surface and ground water levels; they are essentially private initiatives which take no account of the wider social and hydrological issues. From observation, at least some of the tube wells have been dug adjacent to surface water sources, such as a secondary canal, or adjacent to the river bank, and they are also often dug close within a few metres of each other.

4.3 Pyada Rah

Pyada Rah, located in the western slopes of the Jaghatu River along a spring line, is a small and relatively homogeneous Hazara Shia village of 20–30 households. There are two *qawm*, of which the dominant one is the Sayeds who claim descent from Muhammad through the family of Ali and the Shia Imams. There are no Ismaili Hazaras in this valley. The Hazaras appear to have little to do with the dominant Pashto communities around them, and tend to keep to themselves. As the village is so high, it commands no water rights to the Jaghatu River; instead the community relies on a number of *karez*.

Land is scarce and land holdings small. There are a number of individuals who do not own any land and many of the younger men are working in various cities in Afghanistan as day labourers. External income from these labourers is clearly important, if not crucial, to the community's survivability.

During the field visit, interviews were held with the head of the village *shora* and his son. Information provided suggests that a number of new Hazara families have moved into the community from Qara Bagh in Wardak, and that there are some problems with *kuchi* livestock grazing their fields.

The community has an NSP-CDC whose committee consists solely of members of the traditional community *shora*. Like many of the communities in the Jaghatu sub-catchment, the community has opted for the purchase of a diesel generator and the installation of electricity for their NSP project.

Water management

There are four *karez* which supply water to this community. As is usually the case, each functioning *karez* has a collection area, or *hawz*, at the point where the water from the *karez* emerges from its tunnel. The community also has some intermittent springs for irrigation in Abi Qol wash.

Table 2. Karez *in Pyada Rah*

***Karez* name**	**In operation?**	**Number of vertical shafts[23]**	**Number of days on-farm rotation**
Shewan Ab	yes	30	10 days
Saq Ab	yes	15	10 days
Butawak	yes	2	not given
Bagh-i-Jub/Karez-i-Bagh	no	–	–
Khinjakak	yes	3	not given

Two of the *karez*, Khinjakak and Butawak, are owned by one extended family descended from a single ancestor, and are in effect private. Distribution from these canals is a matter of the families concerned and the *shora* does not have any authority over water distribution from these *karez*. The two families do not sell the water from these *karez*, as they are some distance from other people's land.

There is no *mirab* system and water distribution is supervised by the traditional *shora* if there is a problem. Water in all the *karez* is distributed on-farm according to the traditional *shab o roz* system. Cleaning of the public *karez* is not done every year. DACAAR has assisted in the rehabilitation of some of the *karez*. During the drought many people dug shallow wells in their own compounds.

4.4 Zala Qala

The population of this community is around 100 households. It is about 5 km south of Pyada Rah, and at about the same elevation. Topographically there is more irrigated land, many more springs and, consequently, more *karez*. Irrigated water is managed and supervised by the traditional tribal elders; there is no *mirab*. In this community, all irrigated land is watered from *karez*.

The community is all Pashtun, mainly Ghilzai but there is also one Durani clan. Ghilzai *khels* include Ludin (originally from Logar), Sulimanzai and Osmanzai. The

[23] The number of vertical shafts is an indication of the length of the *karez*: the more shafts, the longer the *karez* is likely to be. The distance between shafts varies according to the depth of the horizontal channel and the spring it taps.

community is far more viable than Pyada Rah in terms of survivability; there is much more land and some residents own shops in Ghazni.

Water management

The community leaders claim that their *karez* do not provide sufficient water to irrigate all their land in any one season, and a fallow system is in operation on all farms. As with other *karez*-reliant communities, this is no *mirab* and water disputes are solved by a village *shora* at which elders represent each clan or *khel*.

Water for domestic consumption is a problem due to the elevation of the village. There are at least two shallow wells said to be 8–15 m deep, but inspection suggests they are much deeper. One well is stated to have been dug to a depth of 80 m but it has now gone dry. Two NGO-constructed wells in the village are on private land and may not be available for all community members. Again, some people have dug shallow wells in their own compounds.

4.5 Qala-i-Naw

The community of Qala-i-Naw is located in the lower Jaghatu valley on the left bank of the river above Ghazni. It is the largest village in Khwaja Umari district, and probably the largest in the whole of the Jaghatu catchment. It has eleven Sunni and two Shia mosques.

Ethnically the community is diverse, with the dominant, original, inhabitants being Tajiks, while in addition there are Pashtun Duranis and Shia Hazaras (Seyed and Bayat clans). It appears that the Pashtuns have greater political leverage than both the Tajiks and the Hazaras. Even so, the majority of the land, about 75 percent or 1,000 *jerib*, is still owned by Tajiks. Pashtuns and Hazaras own a total of around 100 *jerib* per community. Each community owns some land on each of the three canals.

The communities have a traditional *shora* on which one representative of each *mahalla* sits. In addition, the community has formed two NSP-CDCs which the tribal *shora* controls. The community has obtained two grants of NSP money, both of which are being used for an electrification programme. As well as implementing the NSP programme, DACAAR has a number of community development, irrigation rehabilitation and well digging programmes in Qala-i-Naw.

Water management

Qala-i-Naw has a single *karez*, Karez-i-Rab, sourced from a spring on the southeast side of the valley under the scarp of the hills which lead to the main Kabul road near Kotal-i-Rawza. There is not much water in this *karez*; it irrigates 6–20 *jerib* of land on a 7 night–day cycle. The *karez* is difficult to maintain and clean due to the presence of hard, yellow, stone strata which at one point the *karez* passes through. All together around 150 households use water from this *karez*, mostly for domestic purposes and for the watering of livestock.

Table 3. *Qala-i-Naw canals and water allocation*

Canal name (upstream to downstream)	**Night–day (*shab o roz*) on-farm rotation**	**Area (in *jerib*)**
Joy-i-Bala	10	500
Sokhta Jangal	10	350
Jangalak	6	300

There are three canals with intakes on the Jaghatu River. On-farm water is distributed by the traditional *shab o roz* system.

In the summer months when the river is not running, the community digs into the river bed and taps sub-surface flow through the *jar* system. There is sufficient sub-surface flow in the river bed to provide irrigation to all three canals. However, during the recent drought, this sub-surface water disappeared and the community suffered severely from the lack of water for their orchards and lands.

The system of water loans, or *qarz,* is an acceptable practice between farmers sharing the same canal. There are also many tube wells that have been dug by landlords. Landowners sell water to others downstream for cash (200 afghanis [US$4] per hour) or a percentage of yields. The *shora* representatives state categorically they have nothing to do with the private regulation of these tube wells, even though they understand that in the medium term they have severe impact on the ground water levels. It is likely that *shora* members have dug tube wells on their own land.

Canal operation and maintenance

Landlords and their sharecroppers and labourers undertake a major annual cleaning of all three primary canals around the Afghan New Year at the end of March (Hamal). Labour contribution is according to the traditional *hashar* system: the more land an individual owns on the canal, the more labour days must be provided. However, while the *hashar* system applies to the amount of labour contributed, there is no *hashar* system operating in-canal, and the small and large landlord, or his labourers, are required to clean as much as the next person. As with all such *hashar* labour systems, the cost of labourers' wages is borne by the land owner.

Table 4. *Example of water rotation and labour contribution in Qala-i-Naw*

Name of canal	Land owned (in *jerib*)	Night–day (*shab o roz*) entitlement	Labour contribution during annual cleaning
Joy-i-Bala	3	9 hours every 10 days	1 person every 2 days
Sokhta Jangal	3	11 hours every 10 days	1 person per day
Jangalak	6	6 hours every 6 days	1 person per day

The supervision and organisation of the *hashar* cleaning is the responsibility of one of the tribal *shora* as the community does not have a *mirab*. Cleaning commences at the head of the canal, at the intake, and finishes at the tail of the system. If in the process of cleaning a major problem is encountered, the *shora* leaders can call on others, who are not land owners, to assist. This would apply if there was a flood and the canal broke its banks, or if there was major cross-flooding. In the former case, if the flooding damaged the houses or possessions of individuals who did not own land or irrigation rights to the canal, the landowners would be required by the *shora* to pay compensation to the victims.

DACAAR and CARE have constructed a number of permanent structures in river, including cross-bed weirs and permanent intakes. Under DACAAR's principles for such interventions, once these structures have been completed they are handed over to the community under a formal agreement – which includes an undertaking to maintain and repair the structures at the community's cost. However, in discussions with the head of the provincial Department of Irrigation in Ghazni, officials stated

that the repair and maintenance of these permanent, on-river structures was the responsibility of the government in general, and their own department in particular.

Qala-i-Naw suffered more than other communities from the surge from the breached Band-i-Sultan. Wing gabions along the river as well as the concrete road bridge constructed by DACAAR were badly damaged, though the weirs and intakes survived relatively unscathed. Under DACAAR's rules, the community should undertake the repairs of both the gabions and the bridge, but it is more than six months since the flood and nothing has been done yet. It appears the community are trying to persuade another NGO to rehabilitate the structures. This raises the important issue of how the community perceives ownership of such structures, and what is required for communities to actually take ownership and responsibility for operation and maintenance. Clearly signing a document during a handover ceremony is insufficient to instil that sense of ownership.

Figure 4. *Qala-i-Naw: The road bridge over the Jaghatu river destroyed during the breach of Band-i-Sultan (photo courtesy J.L. Lee)*

The main street of the community is actually a wash which floods during late spring and early summer. Again, nothing has been done by the community to prevent this annual surge of water through their bazaar, even though it must seriously impact on access and trade. Lower down the wash, below the main street but above the river bank, an absentee land owner has paid for the construction of a considerable length of gabion wall around 2 m high to enclose and protect his land from both the river and the wash from the bazaar.

5. Findings from Kunduz

5.1 Issues affecting social water management

GAA's project manager in Kunduz identified land ownership as a major issue in social water management in Kunduz Province, citing in particular the seizures and redistribution of land made during the period of the Amirs and Kings of Afghanistan – the legality of which is still disputed by those who were dispossessed. Other issues identified were refugee returnees (Kunduz has seen the largest number of returned refugees of all provinces in Afghanistan) and an overall increase in population which has seen an increase in land prices, particularly in the peri-urban areas of Kunduz.

The director of the Department of Irrigation identified as a serious problem the unregulated extension of water-demanding crops such as rice, cotton and vegetables throughout the more water-rich areas of the Kunduz and Khanabad sub-basin, which has adversely affected delivery of water to the tail end of the system.

The lower Kunduz basin has very high soil salinity levels, which is attributed to poor drainage and a high water table.[24] In some cases salinity has rendered land virtually uncultivatable. Areas of high salinity are found in Zala Qala district in the Aq Tepa and Char Gul canals.

Another issue is a long-standing, low-grade dispute between Kunduz Province and Baghlan Province over water allocation.

Many communities live on marginal lands in the upper catchment. Mia Ali and Alam Bai settlements, south of Khanabad have no water source at all; water must be brought in by donkey from several kilometres away.

5.2 The Kunduz River Basin Project

Interviews were held with the European Union (EU)-funded Kunduz River Basin Project (KRBP), GAA and the head of the provincial Department of Irrigation. The implementation of an RBA in Kunduz is much further advanced than anywhere else in Afghanistan, and the province provides a useful environment in which to examine the reality of policies which, until a year ago, were purely theoretical.

As part of the EU project, two social research programmes have been established to examine social water management issues in the Kunduz basin. GAA has the contract for the Kunduz Province research programme, which will be undertaken by Bonn University. The second research programme, under the management of the Aga Khan Development Network, is due commence in Baghlan and Takhar Provinces, and will be carried out by the French NGO Urgénce Rehabilitation Développment (URD).

The specific objectives of these research programmes, as stated in the EU call for proposals, are:

> *...to assist communities in improving the social and technical management of their irrigation schemes, ensuring the poor and marginalised are not*

[24] However, one of Afghanistan's major sources of rock salt is an open-cast mine in Kunduz, which suggests that salinity may be, in part, due to the presence of large salt deposits near the surface in the north of the province.

> *excluded, and that such communities have access to the participation mechanisms of Kunduz River Basin Management institutions.*[25]

Both programmes are of three years' duration and have yet to commence, though the URD researchers were present at a joint meeting of AREU, KRBP and EIRP. The terms of reference for both research projects include the establishment of WUAs as part of the overall RBA strategy. The RBA model which is being piloted in Kunduz is based on Zimbabwe's National Basin Authority.

KRBP has already established two SBCs in Kunduz and Takhar/Baghlan, with the overall centre for the nascent RBA in Kunduz city. These are all provincially based. The Baghlan SBC includes two representatives from each of the provincial departments of Irrigation, Agriculture, Rural Rehabilitation and Development, Environment, Women's Affairs and Energy from both Kunduz and Baghlan. In addition, there are positions for two *mirabs* nominated by the Department of Irrigation, one cooperative member nominated by Department of Agriculture, and two representatives of the upper catchment nominated by GAA.

At present, the SBCs are receiving training from KRBP on the function and benefits of RBAs. The SBCs also exchange information and discuss cooperative and technical issues related to the Kunduz and Khanabad rivers, and they are eventually to take on the responsibility of data collection. In addition, KRBP have a number of training programmes and regular meetings with *mirabs* throughout the lower and middle Kunduz basin.

In order for such radical changes to river basin management to be effectively implemented, it is important to have (at provincial government level at least) some understanding of the concept of RBAs, CBAs and WUAs. While this is not the case in the other study areas, in Kunduz the head of the provincial Department of Irrigation is an active support of reform.

The director of the provincial Department of Irrigation has considerable experience: he previously served in the same position during the 1980s and has worked with UNICEF. As well as supporting the river basin approach, he has been attempting to reform the *mirab* system by moving the traditional election period from spring (when *mirabs* are very busy with canal cleaning) to the slack period of November. He is also attempting to introduce secret ballots for *mirab* elections, in order to prevent the influence of commanders and other factions. Of the 36 major canals on the network under his authority, twenty canals have completed elections for primary canal *mirabs*. He stated that it was his hope that by 10 December 2005 (20 Qaws) all the primary canal communities would have completed their elections.

The franchise for election of *mirabs*, however, remains the traditional one – that is land owners or their labourers or sharecroppers. Though the Department appears to have had some success with the reform programme, in the communities of Zala Qala district which were visited, these new-style elections had yet to be introduced. In addition, the head of the Department of Irrigation holds a twice-yearly meeting of *mirabs* at his Kunduz offices, one on 1 Hamal (*naw roz*) and the other on 1 Sonbola (23 August).

[25] EU, 2005, *Social Management of Water in Afghanistan (Kunduz River Basin Programme): Guidelines for Grant Applicants Responding to the Call for Proposals for 2005*, p. 4.

5.3 Afghan Mazar

Afghan Mazar is located on the Kunduz River above its confluence with the Khanabad River, around 47 km from Kunduz. The usual motorable route is north from Kunduz and then west across the Dasht-i-Abdan, although there is a more direct (but more difficult) route along the right bank of the Kunduz River.

Demography and social background

The elders of Afghan Mazar state the population of their community at 200–300 households. The majority were refugees in Pakistan during the war and most of the men fought with Jamiyati Islami from 1979–89. The population began to return in 1992 following the fall of President Najibullah and the establishment of an Islamic state under the Jamiyat's supreme leader, Rabbani. They state they received no assistance from UNHCR when they returned and had to rebuild their houses and community from their own resources.

The dominant ethnic group in the community is Turkman, from the Salar tribe. According to the community elders, they migrated en masse in the late 1920s from Bokhara, now in Uzbekistan. The Turkmans and many others in this stretch of the sub-basin were allowed to set up their camps in the lower end of the Khanabad–Kunduz basin, an area which was renowned for being a wilderness full of wild beasts and dangerous animals.[26] It is a tribute to the resilience of these Turkmans to note that over the last 70 years they, and others like them, have tamed the wilderness, dug secondary canals, bought land and established strong communities which are economically viable. Over the years the Turkmans of Afghan Mazar bought up small parcels of land and, despite their previous history of being partially, or totally, migratory pastoralists, adapted to a settled agricultural lifestyle.

As the name Afghan Mazar suggests (*mazar* means "grave"), prior to the arrival of Turkman refugees this settlement had at least some Pashtun (Afghan) presence. Today there are around 40 households of Malikzai Pashtuns, said by the Turkmans to have originally been *kuchi maldars*, or pastoralists. They live in a separate *mahalla* of the village, and their knowledge of Pashto is limited (their first language is either Dari or Turkic). The two clan heads of the Pashtun community were not available for interview during the field visit, however the traditional village council includes these two individuals as members. According to the Turkman elders, the Pashtuns own some land with water rights in the area under a form of contractual (*karadati*) system.

Both Turkman and Pashtun communities graze their animals in the Dasht-i-Abdan plateau, but they say they have no right to cultivate it, even if there was water. The name Dasht-i-Abdan, "Wilderness of the Water-Holders", suggests that this low plateau area may have some ancient water collection points which were in the past used to catch rain and snow melt to as a supplementary water source for livestock.

Land ownership appears to be a problem in Afghan Mazar. Some of the Turkman community claims it has legal title deeds (*qawala*) issued during the cadastral survey of the 1970s, while others appear not to have any proof of legal title. This is probably due to the fact that at least a percentage of the land now cultivated by the Turkmans was previously *dasht* (wilderness or rangeland) which no one cultivated up until the time the community settled there. This would imply that like the Turkmans of Dana Haji to the north, the community actually cut new secondary canals for

[26] Even today wild boar are a menace to farmers in area as they churn up fields and eat the grain.

irrigation and reclaimed land which had been abandoned, or brought new areas of land into cultivation. It is probable that the land now cultivated by the Turkmans was originally rangeland that was grazed, if not "owned", by the Pashtuns, since there appears to be a dispute over ownership and grazing rights between the Turkmans and Pashtuns.

There is an NSP-CDC in the community which has voted to use its NSP funds to install electricity in the community.

Water management

Afghan Mazar is the tail end village on the Char Gul canal which has its intake on the Khanabad River above its confluence with the Kunduz. In all, the canal is around 30 km long and suffers from a number of structural problems. The Afghan Mazar canal is also referred to as Kandahari canal, probably its original name.

The communities irrigated from the Char Gul canal are:

- Safi
- Baluch
- Char Gul
- Jangarak or Shah Ariq (sometimes referred to by the Turkmans as Jangar)
- Deh Afghan
- Afghan Mazar

Water allocation from the Char Gul canal is by the traditional *shab o roz* system, which is known locally as *mardi kar* – that is, a person's (or man's) work. In Afghan Mazar, one *mardi kar* equates to 30 *jerib* of irrigated land. There are 78 *mardi kar* along the length of the Char Gul canal, making an approximate command area of 2,340 *jerib* (468 ha). However, there is some suggestion that the *mardi kar*-to-area ratio varies along the canal length. This is quite likely: the equivalent flow-to-area measure in Herat, the *paikal*, is less at the head of the canal than in the middle and tail of the canal on a number of the larger, peri-urban canals around Herat such as the Joy-i-Naw. According to the elders of Afghan Mazar, there was originally an additional 4 *mardi kar*, making a total of 82, but this area of 4 *mardi kar*, or 120 *jerib*, was lost when the present road, which passes through the community, was built. On-farm water is distributed as fractions of hours.

According to the elders the Char Gul canal has a command area of 700 *jerib* of land. There is a primary canal water master who is referred to as the *mirab*, the equivalent of the *mirab bashi* on the Balkh River or the *wakil* of the Herat canal network. The current *mirab* lives in Afghan Mazar and was appointed in February 2004. He replaced the previous *mirab* who the water users accused of illegally selling water.

Under the *mirab* there are a number of *kok bashi* who are responsible for the secondary and tertiary canal network of individual communities. At present only two of the *kok bashi* positions are filled, and there was some discrepancy among informants about whether there should be three *kok bashi* or one for each village on the canal. The current *kok bashi* represent the tail-end communities and tail-end secondary canals. Afghan Mazar has its own *kok bashi* who lives in the settlement, and a second *kok bashi* lives in Char Gul. Probably due to the fact that the communities at the head of the canal have fewer water problems, upstream *kok bashi* are not seen as a priority.

Payment to the *mirab* has been made in cash since the community returned to the area; presumably because of neglect of the land followed by the drought, there was not sufficient wheat to pay the *mirab*. Payment in 2005, however, was made for the first time in wheat at the rate of 4 Kabuli *ser* (28 kg) per *mardi kar*. This makes a total payment in kind for the canal of 2,148 kg, or just less than 1 kg of wheat per *jerib* of land. Payment is made by land owners or their labourers at the end of the wheat harvest.

Canal operation and maintenance

The river below the confluence of the Khanabad and Kunduz Rivers is meandering and slow moving. A number of dry ox-bow lakes indicate that over the decades the canals intakes and even the canals themselves have needed to be redug. The length of the canal and the depth of its bed in certain areas, particularly in the Char Gul village area, are time consuming and present serious cleaning problems for the community. The bed is deep and quickly becomes heavily silted. As a consequence, moving silt out of the bed to the banks, which are several metres high, requires a gang of three to four men working together to lift the silt. As the intake of the Char Gul primary canal is around 20 km upstream from Afghan Mazar, cleaning at the head of the canal involves a great deal of travel time for the community. The *mirab* estimates that it takes up to 60 days, or two full calendar months, to clean the whole canal from head to tail.

Annual cleaning takes place in the month of Hut (mid February to mid March). It is carried out under the traditional *hashar* system and performed only by landlords and their tenants or sharecroppers. Labour is allocated proportionally according to the *mardi kar*, that is according to area irrigated and owned. Under this system one person per day is required from those who own 1 *mardi kar* (30 *jerib*); those who own 20 *jerib* contribute one person every two days; land owners with 10 *jerib* contribute one person every third day.

5.4 Dana Haji

This community is located on the Aq Tepa canal, around 13 km northwest of Afghan Mazar. Like Afghan Mazar, it is Turkman, with second- and third-generation refugees from the Bokhara region of Central Asia. According to the elders, there are no other ethnic groups represented in the village. There are a total of eighteen communities with irrigation rights to the Aq Tepa canal.

Dana Haji appears to have suffered from a variety of pest infestations in the last twelve months, which has affected yields of wheat, cotton and fruit trees. They also complain of diseases which have killed many animals over the last year or so.

Water management

Irrigated water for the community comes from two secondary canals on the Aq Tepa canal: Dana Haji and one the villagers refer to as the “bank of the river” canal (*joy-i-lab-i-darya*). Dana Haji lies towards the tail of the Aq Tepa system, although there is at least one community, Saq Saqala, which lies further downstream from them.

According to the elders, when they first came to Afghanistan in the 1920s, they were allowed to settle in this location as it was uncultivated. Gradually they purchased land from surrounding communities, including some Uzbek land owners who moved out of the Zala Qala district. According to one informant, while the Aq Tepa canal was in existence when they arrived, his father had to cut a series of (presumably)

tertiary canals on their land with his own hand, which implies that as well as purchasing land the community also reclaimed waste land and cut new irrigation channels.

The community has rights to a total 28 *mardi kar* from the Aq Tepa canal; presumably this is the sum of both the upper and lower canals.

On-farm water is managed according to a complex and clearly ancient tradition – one which would need more study in order to be fully understood by the outsider. On-farm water is allocated according to a "weight-to-time" ratio: farmers are allocated water on-farm in *paw* per minute (*daqiqa*). A *paw* is equivalent to one sixteenth of a *ser* (with a *ser* reckoned at 7 kg) – approximately 327 grams.

One *paw* of water is considered to be suitable for 1 *jerib* of land in Dana Haji, however in other canal communities a *paw* of water is assessed as being enough for 10 *jerib* of land. The *paw* of water equates to 7.5 minutes (*daqiqa*) of actual release on-farm. Therefore, in Dana Haji a farmer with 10 *jerib* of land will be entitled to 10 *paw* of water, equivalent to 75 minutes of water on-farm.

This on-farm weight-to-time system is part of the canal-wide rotation system known in Dana Haji as *mardi kar*. In the middle section of the Aq Tepa canal, one *mardi kar* is equivalent to 16 *jerib* and 4 hours of water; at the head of the canal one *mardi kar* is equivalent to 32 *jerib* and 8 hours of water. It was not possible in the time available to grasp the complexity of this system, and it is clearly an important issue to be studied more deeply during the second phase of this research project.

As with all canals, the physical problems identified were: the non-permanent intakes; heavy silting of the canal; and the erosion of banks adjacent to the meandering river. However, unlike other canals in the primary research sites, the middle to end stretch of the Aq Tepa canal has an urban pollution problem. Above Dana Haji the canal runs through the Aq Tepa bazaar and is increasingly used by shopkeepers as a means of disposing of waste products – from plastic bags to sewage. There is a particular problem in one bifurcation which freezes in the winter and quickly becomes blocked with trash from the shops.

The *mirab* of the Aq Tepa canal has served in the position for ten years. There is also a *kok bashi* for Dana Haji, who lives in the community. He has served in the post for six years. He receives a single payment in wheat from all land owners at the rate of 3 Kabuli *ser* (21 kg) per *mardi kar*.

A suggestion has been made that the *mirab* and *kok bashi* should be required to attend an annual meeting to be re-elected, rather than continue in the post until a pressure group calls a meeting to discuss his replacement. Though the community had heard of the provincial Department of Irrigation's plans to move elections to Qaws (November/December), they continued their traditional elections. Indeed, it was clear from the field visits that communities have little or nothing to do with the District Irrigation Officer, let alone the provincial officers in Kunduz.

The right to vote or attend the election of *mirabs* and *kok bashi* is restricted to land owners or their representatives who have irrigation rights on the canal in question. Such meetings are usually held in the main mosque in Aq Tepa, the district headquarters of Zala Qala district.

6. Findings from Herat

6.1 Planned irrigation interventions

A number of major irrigation interventions are being planned in Herat:

- In July 1005, the ADB completed a six-month Programme Planning Technical Assistance (PPTA). In 2006, ADB contractors will commence a 5–6-year multimillion-dollar plan which includes major works on the Joy-i-Naw canal, on the Pashdan Wash (Karokh district) and in Obeh district. The contractors will also be taking the lead in the development of a RBA for the Hari Rod, with a mandate to set up *mirab* associations/WUAs and SBCs.
- FAO's EIRP has funding from two major donors, the World Bank and the German government (GTZ), to implement major structural interventions along the Hari Rod. The GTZ project has a greater emphasis on the social aspects of water management and on-farm water use. As part of the GTZ programme, EIRP has produced a series of Dari publications for *mirabs* and farmers under the generic title "Training Programme for *Mirabs* and Farmers", including "Regarding the Maintenance and Repair of Canals and Irrigation Structures" and "On the Collection and Use of Rain Water".
- USAID-RAMP is planning major structural rehabilitation on the Injil and Guzara canals, and it has engaged DAI to establish *mirab* associations or WUAs along these two canals.
- The PRT in Herat recently approached the provincial Department of Irrigation requesting project proposals, and in response it has been asked to consider building protection structures for the Atishan canal across the Surkh Rod wash.
- DACAAR has been working in irrigation, river training and flood protection in Herat Province for around eight years. It has carried out a number of medium-scale interventions, including irrigation rehabilitation and shallow wells in Pashtun Zarghun and Kushk districts. It has established a WUA in Tunyan on the Atishan Canal, one of AREU's primary research sites. This is the only functioning WUA in all of the four provinces in this research project, and possibly the only one currently operating in Afghanistan. DACAAR is also implementing the NSP programme in Pashtun Zarghun and Robat-i-Sangi districts, where at least some communities have opted for the rehabilitation of small in-canal and trans-canal structures.

In effect there are currently five major international actors with similar mandates: the rehabilitation of irrigation systems (along with flood control and some on-farm water management) and the establishment of WUAs.

6.2 Atishan canal

The Atishan canal is an ancient canal, 30–35 km in length, located on the right bank of the Hari Rod. The canal's name means "fire worshippers" and is said to be derived from when the Zoroastrian faith was still practised in the region.[27]

At the time of the field visit a number of major interventions were underway or being planned on the canal. These include:

[27] There is a legend in Herat city that the ancient bridge over the Hari Rod, the Pul-i-Malan, was the bridge which Zoroaster himself crossed when seeking refuge from persecution further west.

- FAO/EIRP: primary canal work including "improving" the intake structure of the canal on the Hari Rod;
- NSP, implemented by DACAAR: small structures on secondary and tertiary canals. DACAAR have previously installed a gated structure on the Tunyan secondary canal and aqueducts across washes for the primary canal; and
- PRT: protection for primary canal as it crosses the Surkh Rod wash east of Tunyan.

According to the *wakil* or administrator[28] of the canal there are twelve major settlements with water rights to the Atishan canal. As with all the major canals on the Hari Rod River, these communities are located on the left bank, that is, on the down slope of the canal.

Table 5. Juftgaw-*age and approx. command area on Atishan canal, by settlement (from head to tail)*[29]

Community/area served	***Juftgaw*-age (120 *jerib* = 1 *juftgaw*)**	**Command area (*jerib*)**
Gawashk	6	720
Pushtin	6	720
Tarin (12) and Pusht-i-Turin (1 *rob*/*qulba* = 0.25 of a *juftgaw*)	12.25	1,470
Aliabad	13	1,560
Qala-i-Nawak	4	480
Tunyan (four suburbs)	20	2,400
Qala-i-Haji Jahangir Khan (two bifurcations)	2	240
Qala-i-Seyed Muhammad Khan	not given	not given
Khalisa	20	2,400
Qala-i-Zawar Khan	not given	not given
Aliabad	14	1,680
Jenda Khan	20	2.400
Minor secondary canals	2.75	330
Total	**120**	**14,400**

Water is allocated according to the *juftgaw* (literally "a pair of yoked oxen") which is a measure based on a flow-to-area-to-tax, similar in concept to the *paikal* on the lower Balkh River basin. The total *juftgaw*-age of the Atishan canal is 120. A *juftgaw* on the Atishan canal appears to be a standard area of 120 *jerib*, though during interviews with Gawashk community one respondent stated that a *juftgaw* at the head of the canal was a smaller area. Taxation on land and water is determined according to the *juftgaw*-age of an individual land owner, however there has been

[28] In Herat the primary canal *mirab* is called a *wakil*, not a *mirab bashi*. The *wakil*'s subordinates on the secondary and tertiary canals are *mirabs*, and they are responsible for clusters of contiguous villages. Next is the *chak bashi* who is responsible for on-farm water distribution only. The term *wakil* has a number of usages in Afghanistan: it is used for "ambassador", "viceregent", "parliamentary representative" or "delegate", and an urban official who represents urban districts. In this case the term is best translated as "administrator", since he supervises the management of the canal, or "representative", since one of his duties is to represent the needs of the canal irrigators to the district or provincial government.

[29] Source: the *wakil* of Atishan canal.

no collection of this water-land tax since the mid 1970s and no effort appears to be being made by government to collect either this, or tax, on agricultural land.

DACAAR figures give a command area of 20,000 *jerib* or 4,000 ha, and an EIRP survey gives the number of households at 20,000, with 4,283 land owners and 14,560 share-croppers.

The *wakil* of the Atishan canal lives in Tunyan, one of this research project's study communities. He is a Pashtun who has served as *wakil* for around 30 years – that is, throughout the period of the civil war. In addition to sitting on the community's traditional *shora*, the *wakil* is also a member of Tunyan's NSP committee.

There are two *mirabs* to assist the *wakil*: one lives in Tunyan and has been a *mirab* for seven or eight years; the other is from Jenda Khan and was elected in March 2005. The latter did not replace a previous *mirab*, but was added to the pool of *mirabs* to provide additional assistance to the *wakil*. The *wakil* stated that in the past the Atishan canal had at least one *mirab* who represented the communities at the head of the canal.

Elections of *wakil* and *mirabs* take place at the end of Hut to early Hamal – that is, over the period of the Afghan and Persian New Year (mid March). In keeping with traditional practice, only land owners and their sharecroppers or labourers are able to vote or attend the meetings. As there are a large number of absentee landlords in the area, and indeed throughout Herat Province, the larger land owners usually send a representative (*namayesh*) rather than attending in person. As there are a large number of land owners on the canal, the individual communities have pre-election meetings in their communities and nominate two individuals to represent them at the general meeting. Presumably these individuals are required to vote for a particular nominee in line with the majority wishes of the community's land owners.

The *wakil* and *mirabs* are paid in wheat at the end of the wheat harvest. At the time of interview (early December 2005), the *wakil* admitted that some farmers still owed him wheat for this year's work. Payment is made as a lump amount of 2,400 *man* (1 *man* = 4 kg) or 9,600 kg per annum. This wheat is then divided between the *wakil* and the *mirabs*. The *wakil* takes 50% (4,800 kg) of the wheat, and the other 50% is divided equally between the *mirabs*. With two *mirabs* currently on the Atishan canal, each *mirab*'s wheat entitlement is 2,400 kg. Taking the command area of the canal as 14,400 *jerib* or 2,880 ha, the total income for *mirabs* and the *wakil* for their work is 3.33 kg per ha, of which 1.66 kg goes to the *wakil*.

Water management

The water source of the Atishan canal is the Hari Rod River. During peak flow periods, water from the river runs freely into the intake through the mud and stone diversion structure across the river. However in summer the river, which runs in a wide bed, does not usually run into the off-take and instead the community has to dig temporary channels (*jar*) to tap springs much higher up the river, just below Marwa. The construction of the *jar* is labour intensive, but in the absence of any permanent control structures the community has no other option for irrigating summer crops.

The Atishan canal is part of a wider block (*blok*) of adjacent canals known as the Atishan Block (*Blok-i-Atishan*), which is meant to have a summer water-sharing arrangement (*hashar ab*) with the Marwa block whose off-takes lie above their own.

The Atishan Block consists of the following canals:

- Blok-i-Atishan
- Blok-i-Pusht-i-Zarghan (or Shaflan)
- Blok-i-Kambaraq
- Blok-i-Fushkan

The four upstream canals which are meant to operate the *hashar ab* with the Atishan block are:

- Marwa (Marwabad) canal (with the most water)
- Zamanabad
- Burya Baf
- Shukur Khan

According to the *wakil* of the Atishan canal, during the summer months these four canals should go to a summer rotation of 5 days in 10 for the Atishan Block, though this rotation is now no longer adhered to by the Marwa block. When this allocation is enforced, the Atishan block of canals then divides the water between themselves on the basis of one day per canal.[30]

This agreement appears to have been established before the drought which occurred in 1971–72, during the reign of King Zahir Shah. However, during this period, water shortages which resulted from the drought upstream led to the Marwa block arbitrarily suspending the *hashar ab* agreement. After much pressure, the upper block agreed to allow 2 days of the 5 days' water as an act of religious charity (*khairat*) rather than as a right – but this was insufficient for the community to sustain their crops. The issue was brought before the district and provincial governor who tried to meditate, but all efforts at reconciliation failed and in the end the Atishan and Marwa block of canals took to their guns and at least one person was killed.

The Atishan block then appointed a single *wakil* and sent him to Kabul to appeal to the central government. He returned with a decree signed by Zahir Shah which required the Marwa block to return to the original *hashar ab* agreement of 5 days in every 10. The Marwa block upheld this agreement only for two years, presumably because by then central government had broken down.

Under the Taliban the Atishan block appealed again for the reinstatement of the *hashar ab* agreement, to which the Taliban consented (the Taliban themselves enforced the law). With the fall of the Taliban, the Atishan blocks' rights were again "eaten", as the *wakil* expressed it. In spring 2005, the *hashar ab* system failed again, and once more the Atishan canals sent a single representative to Kabul. He managed to obtain a decree signed by President Karzai which reasserted their right to *hashar ab*, which he then presented to the governor of Herat. The governor in turn wrote to the district governor but again the Marwa block refused to revert to the original rotation. As matters stand now the *hashar ab* rotation is still unenforceable.

The overall result is that communities on the Atishan canal, and the rest of the Atishan block, claim that they are water-starved during summer, which threatens

[30] However, in Gawashk the elders stated that the allocation is alternated: one day for Atishan, one day for the other canals, and one day for Atishan, that is three in five days for Atishan, two in five days for the remaining canals.

their summer crops (invariably cash crops). As a survival measure the Gawashk elders state that during the summer months, water in the Atishan canal should be reduced from 24 hours per *juftgaw* every 6 days to 1.5 hours per *juftgaw* every 10 days – making some summer crops such as vegetables no longer viable. The water is usually used to water orchards rather than crops.

According to DACAAR, annual cleaning requires 6,000 man days, and the total population of the canal command area is 10,855 "persons".[31] Canal cleaning takes place around the Afghan New Year and lasts about 30 days.[32]

6.3 Gawashk

Demography and social organisation

Gawashk is a settlement with at the head of the Atishan canal. The estimated population is 100–150 households of mixed ethno-linguistic origin, including Pashtuns (Alakozai, Tarin, Kakar), some Wardaki Pashtuns (mostly absentee land owners), Persian-speaking Timuri and a small number of Tajiks and Moghuls.[33] The Pashtuns claim to be the original settlers here, but they cannot say when they migrated to Gawashk from Kandahar.

There is a traditional village *shora* drawn from representatives of the various Pashtun tribes and ethnic groups. The Kakar, Alakozai and Tarin Pashtun *khels* all have a representative on the *shora*; similarly the Timuri, Tajiks and Moghul tribes each have a single representative. The village *mullah* is the sole representative of the Jamshidi Aimaq tribe in the community.

Water sources and land tenure

Although Gawashk is the uppermost settlement on the Atishan canal, the intake of the canal itself is located several kilometres upstream, just below the township of Marwa, or Marwabad.

The land on which Gawashk stands was once owned by the government, and the community sharecropped on the land. However, "a long time ago" the land was bought by two members of the community, probably Pashtuns, who then distributed the land among clan members. Those individuals who were could not afford to buy land then still do not own any. The water rights to the land were transferred with the sale of the land and remain the same as they were when it was in government ownership. The community leaders claim that during the cadastral survey of President Daud's era they all received official

Water, land and labour in Gawashk

The head of the Tarin Pashtun khel *owns 45* jerib *of land and has rights to 12 hours of water every 6 days. However, as this is insufficient land to support his family, he also works as a contract labourer, or* kishtamand*, on land owned by an absentee land owner.*

* * *

The arbab *of Gawash owns no land of his own. Instead he is a contract labourer on a farm of 120* jerib*. He shares this work with three other related households. Collectively the four households receive three fifths of the yield with two fifths going to the land owner. The* arbab *has to bear all the costs including seed and fertiliser. The landlord lives in Herat.*

[31] DACAAR, November 2003, *General Information Collection about Atashan River*.
[32] DACAAR, *General Information Collection about Atashan River*.
[33] Sometimes referred to as Mongols in anthropological literature; "*Moghul*" is the Persian variant of "*Mongol*".

title deeds for the land. The Tajiks and Timuris do not own any land, and sharecrop for others.

One community member used to own a *karez* (the Karez-i-Sabzwari) but this was sold to the government some years ago as taxation on livestock was very high. The *karez* was primarily used for domestic water supply and watering animals.

Water management

Gawashk has rights to 6 *juftgaw* or 720 *jerib* of land. Water in the Gawashk secondary canal is rotated every six days on the *shab o roz* system, and is determined on-farm by the number of *juftgaw* an individual land owner owns. During the dry summer months the community must adjust the rotation according to the amount of water available. This is primarily due to the breakdown of the *hashar ab* arrangement between the Atishan and Marwa canal blocks. Water management is undertaken by the *shora* and not by a *mirab*, though issues related to the intake of the wide canal are referred to the *wakil*.

Gawash's staple crop is winter wheat planted in Qaws (November). Planting of summer crops takes place around the Afghan New Year (mid March), but up to 25 percent of land in any one year is fallowed due to the lack of water. The community elders stated that in spring 2005 they had not planted any seeds because of insufficient water.

The village as well as a number of other communities along this stretch of the right bank of the Hari Rod suffer from bank erosion, and over recent decades over 150 *jerib* of land has been washed away.

6.4 Tunyan

Demography and social background

Tunyan is the largest and most influential village on the Atishan canal. Not only does the *wakil* of the canal live in the village, but one of the *mirabs* also lives there.

The community is multi-ethnic with four major ethno-linguistic groups. The Pashtuns come from the Durani and Ghilzai tribes and consist of Nurzayi, Ghilzai, Barakzai, Mushkwani and Achakzai. There are also a number of Baluch and substantial minorities of Timuri, or Kakari, Persian-speakers and Tajiks known as Zuri who are said to come from the Chaghcharan area. Each of these tribal groups lives in their own suburbs or *mahalla*. A few new settlers have moved into the village over the last few years, but there has not been a large influx of IDPs from Faryab or Badghis, as there has been in other areas of the Hari Rod.

There is a tribal *shora* which meets regularly to discuss community issues including water, though the *wakil* and *mirab* tend to dominate these discussions. Members of the tribal (*qawmi*) *shora* also sit on the NSP-CDC.

The community was badly affected by the war and many of the population fled to Iran or to the mountains in the south where they fought under Gulbaddin's Hisb-i-Islami. Many of the houses were destroyed during that time and much of the land lay fallow. The community began to return from 1992 onwards, following the fall of President Najibullah.

During the reign of the Marxist Nur Muhammad Taraki (1978–79) some of the larger landlords had their land taken away and distributed to the landless, but when the

mujahidin took control in 1992 this land tenure documents were nullified. A number of individuals in the community were given land under this distribution, but they have now no right to claim it as it has reverted back to the original owner (the landlords from pre-1978).

The community leaders complain that while there is a DACAAR office in their village, they do not see a great deal of benefit from it. However, DACAAR have undertaken rehabilitation and flood protection work on the Atishan canal, dug shallow wells in Tunyan and are now implementing the NSP programme in the village. Compared to other communities on the Atishan canal, it appears that Tunyan is receiving a reasonable share of international aid.

Water sources

Tunyan is located in the middle section of the Atishan canal and has a great deal more water-to-land than Gawashk. In Gawashk, the area of land available is severely constrained by the hydraulic boundaries of the canal and the river. Tunyan has water rights of 20 *juftgaw*, which gives a command area of 2,400 *jerib*.

Tunyan has four secondary canals providing water to the community:

- Tunyan
- Miyan Deh-i-Tunyan ("centre of the village")
- Mahalla-i-Masjid-i-Jame Tunyan ("congregational mosque suburb")
- Mahalla-i-Gaw Khorhan-i-Tunyan ("cow-drinking/eating suburb", or area designated for watering of cattle)
- Mahalla-i-Qala-i-Kohna-i-Tunyan ("old fort suburb")

Water management

Around two years ago DACAAR established a WUA for the Atishan canal, based in Tunyan. The head of the WUA is *wakil* of the Atishan canal as well as a member of the NSP-CDC. The bookkeeper and secretary are also from Tunyan.

A charter or foundation document was established in September 2003 which lays out the objectives, composition and responsibilities of the WUA. The charter's terms build on established systems of governance and social water management, and does not seek to impose an external concept of WUAs. It is written in simple and straightforward Dari, making it comprehensible to ordinary villagers.

The WUA raises money for operation and maintenance of community irrigation structures through a saving and membership system. Each member is required to pay a fee to join and is expected to contribute a small sum at every monthly meeting. DACAAR officials report that so far the WUA has saved around 50,000 afghanis. The money is intended to fund future operation and maintenance on the Tunyan community's tertiary canals.

The Tunyan WUA is the result a local initiative, rather than an organisation established as a result of government policy or external policy imperatives. It was set up in response to a request from the community for DACAAR to conduct additional structural work on Tunyan's canals. At the time DACAAR did not have a budget for these works but encouraged the community to establish what is, in effect, a savings-based cooperative for irrigators. The charter was drawn up by DACAAR staff in consultation with the community, and as such it is highly pragmatic. The WUA appears to have community acceptance even though its actual function is limited.

The community of Tunyan complains that the breakdown of the *hashar ab* arrangement with the Marwa canal block has reduced their potential to grow summer crops. Even so, it appears quite capable of growing vegetables and some cotton, and there are a number of orchards. As such, the water shortages cannot be as severe as in Gawashk. One land owner has dug a tube well for his orchards and sells excess water to his neighbours.

6.5 Gharak

Demography and social background

Gharak is a small settlement of around 35 households, located in the upper slopes of the northern Hari Rod valley to the north-northwest of Gawashk. The community is all Alakozai Pashtuns related to the two original families who originally settled here. Their mother tongue is now Dari, while a few speak or understand Pashto.

The fact that the community still uses the traditional *kuchi* goat skin tents, that their predominant activity is animal husbandry, and that they have poor farming practices, suggest that despite the claims to the contrary, originally this clan were semi-nomadic pastoralists, or *maldar*s. The Hari Rod valley is an important winter and spring grazing and camping ground for both Pashtun *kuchi* nomads and Taimani Aimaq semi-nomads. There are many settled *kuchi* in the lower to middle reaches of the Hari Rod valley below Chishti Sharif, many of whom have bought rainfed and semi-irrigated land in the upper reaches of the hill country. Interestingly, given their probable background and ethnicity, the community has refused camping or grazing rights to the nomadic *kuchi*. Other, non-Pashtun communities in the upper slopes of the Hari Rod *do* permit customary grazing and even allow *kuchi* to camp near their public wells.

Gharak has a seven-member tribal *shora* which supervises community affairs. The *arbab* lives in the adjacent settlement of Khanabad. The head of the Gharak *shora* is also head of the NSP-CDC, and the CDC office is located in his guest room.

The community were all originally landless labourers (*kishtamand*) who worked on the estate of Zaman Jan (after whom the adjacent village and canal of Zamanabad is named). Following the fall of King Zahir Shah, President Daud put pressure on the largest land owners to sell some of their estates to their landless peasants, threatening to seize land if this "request" was not granted. Zaman Jan decided to sell off some of his land, and six individuals from Gharak purchased some of it. One elder stated that his father purchased land (1,353 *shamsi*) in 1974 for which he paid 25,000 afghanis. The purchase came with a title deed (*qawala*). Around ten households still do not own any land and work as *kishtamand* on the land of other Gharakis. *Kishtamandi* proportions here are two thirds to the *kishtamand*, one third to the landowner, with the *kishtamand* bearing all the costs.

The village was abandoned during the war and the population fled to the mountains south of the Hari Rod and fought as members of Jamiyati Islami. They returned in 1992 with the fall of President Najibullah but are still rebuilding some of the houses which were bombed or destroyed by neglect.

The community is poor and cannot survive on its agricultural output alone. A number of younger men are working as labourers in Herat and Iran, and send remittances back to their family. It seems that without such remittances the community would not be sustainable.

None of the children attend school as the nearest primary school is in Turan, several kilometres away. Access to medical treatment and supplies is also difficult. There is no car or taxi in the village and individuals needing to travel to Herat or Obeh must walk to the main road 5 km away and catch the local, privately run bus (*sarwis*).

Water sources

Water for irrigation comes from a single perennial spring about 800 m up the gorge above the village. This spring supplies two canals, one on either side of the wash, and the majority of water is used to irrigate land. Irrigation is supplemented by water from the wash during spring (Hamal to Sawr) but it usually dries up by early to mid May. As such much of the wheat grown is semi-rainfed. Due to lack of water, 50–75 percent of potential arable land is fallowed every year.

There is a second spring around 1.5 km up the valley at Lakhsh Awar which is used during spring when some community members camp there to graze animals. However transhumance is not a part of the customary annual agricultural lifecycle, and is only performed when the spring rains fail and water is scarce in the wash.

Water management

Distribution of canal water from the spring is on an hourly rotation known as *saat bakhsh*. Given the scarcity of water for irrigation, the night–day system (*shab o roz*) is inappropriate. The community does not employ a *mirab*; instead the *arbab* takes the responsibility for the water management and, if disputes are not solved, the matter is referred to the community tribal *shora*.

During the recent drought the community was unable to grow much wheat and they were forced to sell livestock. For this reason, livestock levels are low and will take some years to recover.

Until October 2005 the community relied on the spring for domestic water but DACAAR has recently dug a 70 m well near the mosque which provides at least some of its domestic and ritual washing requirements. However, because the well is deep the water is quickly used up at peak times (for prayers), and pumping the water to the surface is hard work, especially for children. The community says that a second well would be sufficient to meet their domestic water needs.

6.6 Kushk district: Khalifa Rahmat-i-Ulya

Demography and social organisation

Khalifa Ramhat is located in the upper part of the valley in southeastern Kushk. There are two villages of the same name, Khalifa Rahmat-i-Ulya ("Upper Khalifa Rahmat") and Khalifa Rahmat-i-Sufla ("Lower Khalifa Rahmat"). Despite sharing thesame name, however, the upper and lower Khalifa Rahmats do not appear to have been the result of the expansion of one village into two. The lower (Sulfa) village is populated mostly by the Persian-speaking (originally semi-nomadic) Timuri tribe. Some of them still live in tents during the summer months. Much of the land in Khalifa Rahmat-i-Sufla was owned by one individual whose son was Prime Minister of Afghanistan during the reign of President Najibullah. During the 1980s, he sold a large portion of his estate to his fellow villagers (of the Timuri tribe), who were probably *kishtamands* on his land prior to that.

Both communities take their name from the grave of a Sufi sheikh, known as Khalifa Rahmat, of the Jamshidi Aimaq tribe. According to the inscription on his grave he

died in 1802. The shrine of the sheikh is located on a low hill on the east side of the valley, and marks the border of the two settlements' land.

While the majority of the Timuri population of the valley are settled, there are a few households who appear to be semi-sedentary. There are a substantial number of Pashtun *kuchi* who use the area as a grazing ground for their animals during the summer months. They usually arrive at the time of the wheat harvest and their animals graze the stubble of the fields, providing manure for farmers at the same time. The communities engage in trade with the *kuchi*, exchanging the *kuchi*'s dairy produce for wheat, fruit and other produce. During the winter the *kuchi* move to Badghis, across the mountains to the east of the valley.

The community has a large area of rainfed land and some fruit trees, orchards and vineyards, and coppice poplar and mulberry trees for winter fuel. In the past they used to farm the small amounts of surviving juniper forest in the mountains to the south of the valley, and occasionally the more extensive forest remnants across the range to the east in Badghis, but this is a long distance to transport wood.

This and other communities in the upper valley practise transhumance and have temporary settlements (*ailaqs*) in the slopes of the mountains above the valley at Masjid-i-Sangi ("the stone mosque") which is around three hours walk away. This area is used for grazing of animals in spring; there is no cultivatable land there.

The upper community is organised around a community-based *shora*. The village shares an *arbab* with an adjacent Turkman village of Azhda Qul. The *arbab* receives an annual payment of 5 kg of wheat per adult head of population for his work. His total in-kind annual income as *arbab* is stated as 500 kg of wheat, implying that there is a total of 100 adult males in the two communities.

There is a *wakil* who represents a larger cluster of communities in the upper valley, and sits on the district *shora* in Robat-i-Sangi, the district centre of the Kushk region.

Water management

Water for irrigation comes from a river which is fed by a perennial spring in the mountains to the south. This spring ensures irrigation can be carried out during the summer months, while other adjacent communities are unable to plant summer crops. During late spring (Jawza, or May/June) the river is full of rain and snow run off, but it soon dries up. Flash floods are common in the river valley during this month. As the road to Robat-i-Sangi is along the river bed, the upper villages in the catchment are often cut off for several days by flooding. There is an alternative route to Robat-i-Sangi, but it is only for pedestrians, horses and donkeys.

Table 6. *Water rotation on Khalifa Rahmat primary canal*

Villages with water rights (head to tail)	Water rights and rotation (24-hour periods)
Qala-i-Ghuchi	1
Khalifa Rahmat-i-Ulya	5
Khalifa Rahmat-i-Sufla	1

Three communities share the water from the spring which runs in a primary canal with numerous secondary and tertiary canals serving each community. The waters of the primary canal water are rotated on a 7-day basis (that is, seven 24-hour periods). In Khalifa Rahmat-i-Ulya water on-farm is delivered at the rate of 1 hour per *jerib*.

According to the *arbab* of Khalifa Rahmat-i-Ulya, there are around 500 *jerib* of irrigable land shared among 150 households. There are a number of large land owners but the majority of the community own small plots of less than 10 *jerib* (2 ha) with an average holding of 2–3 *jerib*. The total command area of the canal is 650 *jerib*, which accounts for why the community has five times the water allocation of the two other communities.

The canal communities tend to only elect a *mirab* for the canal where there is a problem with water shortages in the canal. During the recent drought there was a single *mirab* who was appointed to arbitrate disputes and allocate what water was available during the period of scarcity. In 2005 the snow and rains were good so the communities saw no need to appoint a *mirab*. Instead the *arbab* of each of the three villages, doubtless assisted by the *wakil* who appears to be an influential individual, supervised both the water allocation and the cleaning. Where there is no *mirab* appointed, the wheat entitlement of the *mirab* is paid to the *arbab*. The total payment this year to the *arbab* as *mirab* from all three communities was 5 Herati *kharwar* or 2,000 kg of wheat (100 *man* or 400 kg = 1 Herati kharwar).

Repairs to the primary intakes on the river are carried out during the month of Sawr (April/May) but during peak flow or flash floods the off-take can be washed away and require rebuilding.

Cleaning of the primary canal bed takes place twice a year: at New Year (mid March) and a minor cleaning in "the second month of summer" or Asad (July/August). Both cleanings are carried out under the supervision and direction of the *arbab*. Cleaning is only done by land owners and their nominated *kishtamand*s according to the customary *hashar* labour system. Labour is apportioned on the basis of 1 person day per *jerib* of land. In-canal cleaning is also proportional to the amount of land owned and irrigated: a land owner who has 10 *jerib* of land will be assigned a longer length of the canal to clean than an individual who only owns 1 *jerib*, on the basis that the individual with 10 *jerib* will be required to provide more labourers than the individual with 1 *jerib*. Cleaning is done in a gang from the head to the tail of the system.

There are also seven shallow wells in the village, most of them dug by DACAAR.

6.7 Kushk district: Sir Zar

Demography and social organisation

Sir Zar is in another valley to the southeast of Khalifa Rahmat-i-Ulya. It consists of around 50 households of Durani Pashtuns of the Nurzai tribe and the Serkhani clan. According to the elders of the community, they originally lived "in Iran" in the Zinda Jan area, where they were primarily semi-nomadic pastoralists but where they owned a very small amount of irrigated land.

Around 50 years ago the elders decided to sell up and move to Sir Zar where there was more grazing land for their animals. At the time land was cheap and there was a good source of water with a *karez* that had several springs. The clan pooled money for the purchase of land and divided the plots proportionally amongst those who had contributed money.

A number of individuals did not have sufficient resources to buy into the land purchase, but they moved with the clan and are now *kishtamand*s on other clan members' land. At least one member of the original migration is still alive. Here the *kishtamand* takes eight ninths of yield and the land owner only one ninth, while the

kishtamand is obliged to cover all the costs of planting, ploughing and reaping. *Kishtamands* are not bound to any particular landlord and are free to change their employer at the end of each harvest. The *ijara* or sharecropping system is not practised and is regarded as degrading by the community.

During the *jihad* period the community fled the area for the hill country to the south and could only visit the village during the night for fear of aerial bombardment. They were therefore not able to cultivate much land and many of the houses were destroyed. They returned to the area from 1992 onwards.

A number of younger members of the community now live or work in Herat or Iran. Apart from income from migrant labour, the community supplements its income by weaving carpets – pile, felt and kilims. During the drought the community had to sell of much of their stock for slaughter and livestock levels are now low. The area is also heavily overgrazed.

The community is organised around a tribal *shora* of sixteen elders.

Water sources

Around fifteen years ago the springs which supplied water for irrigation dried up, with the consequence that the community is now living on the margins of subsistence. They have no water for agriculture during the summer months, and now rely totally on rainfed wheat planted in winter. They have a few trees in compounds and three wells dug by DACAAR. The pumping mechanisms of all three wells have broken; the trained repair man lives in a distant community and has not visited for two years.

The only other water source is a small and intermittent supply of water from the river bed (*wadi*), which dries up in the month of Sawr (end April) until the autumn. This water is primarily rain and snow run off and is conserved in a small earth dam which is built across the *wadi*. Water for drinking is brought from this containment area as there is insufficient water in the village well.

7. Data Analysis

7.1 Water masters

Roles and functions

Initial field visits indicate that the *mirab* does not exist as a nationwide phenomenon. Even where there are water masters, there are considerable regional variations in the structure (although the role is more or less standard throughout the country).

In a number of the communities studied, the formal position of *mirab* does not exist as a traditional means of social water management, or, in some cases, the *mirab* is a temporary post created as a response to a specific need, usually chronic water shortages or an intercommunal water dispute. In a number of the communities, a senior community elder or the *arbab*, combined his role as a *shora* member with the work of a *mirab*. This was particularly noticeable in the study areas in Ghazni and some communities in the rangelands of Herat Province.

Where there are formal water masters, the management structure varies. On the Hari Rod, a major river system where there are numerous canals (often over 30 km in length), a three-tier system of water masters exists: *wakil*, *mirab* and *chak bashi*.[34] A similar hierarchy exists on the Hazhdah Nahr canals on the lower Balkh river basin. As other studies have shown, however, even within the same river basin, such as the Hari Rod and Balkh Ab, the hierarchical structure of water masters can vary from sub-basin to sub-basin. Furthermore, as far as the Hari Rod is concerned, there are also distinct differences in internal administration of individual canals. On the peri-urban canals of Herat city, such as the Joy-i-Naw, Joy-i-Injil and Joy-i-Guzara, the canal is divided into a three-block (*blok*) system: upper, middle and lower. Each block has a number of *mirabs* serving under a single canal *wakil* and the *paikal*-age varies from block to block within the canal. There are also variations in the amount paid to individual *mirabs*. Finally, the *mirabs* can represent either one particular community, or a cluster of contiguous communities within the block.[35]

The Atishan canal, over 30 km in length, has a canal *wakil*, but he is assisted by only two *mirabs*. The block system does not apply within the Atishan canal proper, but instead the term *blok* refers to a cluster of contiguous canals (such as Blok-i-Atishan, Blok-i-Marwa) which are required to carry out water-sharing (*hashar ab*) during the dry summer months.[36] In the Balkh and Kunduz river systems, the canal master is referred to as a *mirab bashi*. In the Qala-i-Zal district of Kunduz, the *mirab bashi*'s assistants are termed kok bashi, on the lower Balkh River, as *mirabs*.

On shorter canals and where there is an intermittent supply of irrigation from washes or springs, the management structure is flat and consists of one or two *mirabs* with no overseer (*wakil* or *mirab bashi*). In Khalifa Rahmat of Herat, the three water-sharing communities elect a single *mirab* only when there are severe water shortages.

Most of the Pashtun communities in the study areas do not employ the *mirab* system at all. Instead they rely on the traditional tribal and clan *jirga*s, with the duties of

[34] There is another office, the *bandwan*, who is also a *mirab*. He is responsible for supervising the maintenance and repair of the intake when it is closed for annual cleaning.
[35] See Lee, *Mirab and Community Irrigation Managament in Herat*.
[36] See Lee, *Mirab and Community Irrigation Managament in Herat*.

mirab assumed by either a senior clan leader or the *arbab* (this is the case in Zala Qala, Sir Zar and Gharak). Only the Otarkhel in Nangarhar has a specific water master, but even there this is a single individual who manages a block of contiguous canals drawn from a single wash.

This disparity in approach can be accounted for by the fact that the Shinwaris of Nangarhar have always been sedentary Pashtuns, and the Otarkhel region is their native tribal territory. The other Pashtun communities in the study areas are migrants who were previously nomadic or semi-nomadic pastoralists and new to settled agricultural pursuits. As such, the *mirab* system is not indigenous to these communities, and solutions to water-sharing are sought within the traditional social framework rather than adding an additional and potentially competitive, layer of management. The *mirab* appears to be a phenomenon evolved by sedentary agriculturalists with access to substantial irrigated water and irrigated land.

Relationship with the community

> *Even though you may be the son of the* mirab*, it's better to be one intake higher up (the canal).*[37]
>
> *Afghan proverb*

Where there is an institutionalised water master system, these individuals are "elected" by communities. However, it cannot be said that the election of these individuals represents some form of local democracy in which every community member has had a say in the election. With the exception of the Shinwari clans in the Paikha river valley, where all adult males appear to have a voice in the election of the *mirab*, the position of water master, whether it be *wakil*, *mirab*, *chak bashi* or *kok bashi*, is determined by the "vote" of a vested interest group, namely landowners with irrigated land and water rights to the canal in question. Water masters work for, and on behalf of, landlords who are by definition not the poorest or most vulnerable members of society. The water master is nominated to ensure that irrigated water reaches every land owners' fields by upholding ancient and customary rights enshrined in some form of legislation (such as *juftgaw* or *paikal*) or traditional usage equivalent to common law. Their role is not to provide food or work for the landless, the dispossessed, the internally displaced or other "vulnerables". They are there to serve the needs of a land-owning elite.

This is an important point when it comes to project planning. Improving the hydraulics of irrigation systems, on-farm water management and cropping patterns may increase yield and the area under cultivation, and assist Afghanistan to become more self-sufficient in agricultural produce, however the benefit of such interventions will only marginally improve the situation of the landless, the poor and the sharecropper and day labourer. Yet most major donors (World Bank, ADB, EU) include in their irrigation rehabilitation projects' terms of reference that any irrigation intervention should have a strong element of poverty alleviation.

At least a proportion of the water masters in the primary research sites hold their post by virtue of their political position or wealth, and they are able to maintain their position despite the complaints of the small farmer and sharecroppers. At least two of the water masters encountered during the research appear to be ex-*mujahidin* commanders. This is one of the fundamental flaws in the methodology of the *mirab*, and in fact all community-based "election" systems. There are no secret

[37] *"Garchi bacha-yi mirab ham bashi, behtar ast yak qalaq balatar bashi."*

ballots, and open discussion is followed by a form of consensus in which powerful and influential individuals, some of whom are still armed, can enforce their will on weaker individuals who dare not complain for fear of reprisal. In any community gathering, there are usually one or two individuals who, by virtue of their wealth, influence and government or militia links, can control the meeting and determine the decisions made. Needless to say, women do not attend such "elections", though if a woman does own land she can send a male representative.

On the positive side, the *mirabs* are entrenched in the communities they serve, rather than imposed from the outside like government bureaucrats. As well as having extensive knowledge of individual water rights and allocation, they are in a position to bring a degree of social pressure to bear on those who may seek to cheat the system. Water masters can be, and often are, replaced if their constituents believe them to be dishonest or tardy in their work. While annual general meetings may not openly discuss the effectiveness of water masters, in a number of instances in the primary research sites, corrupt, inefficient or lazy water masters were reported to have been replaced. In this respect, the community has more power over their water masters than they could ever have if water masters were government appointees.

The payments water masters receive for their work are slight in comparison to both the on-farm yields and the work undertaken. In-kind payments vary from region to region but returns for labour can be as low as US$0.50 per hectare (such as in Khawaji). Initial data on *mirabs*' incomes from the Hari Rod range from a high of US$232 per annum on the Joy-i-Naw to under US$100 per annum in Karokh and Pashdan Wash. When examined as a fee paid per hectare, the figures are alarming: incomes as low as US$0.29 per h on the Joy-i-Naw and under US$0.10 per hectare in the Pashtun Zarghun and Karokh districts of Herat are commonplace.[38]

There is a distinct lack of capacity and technical skills not only among the *mirabs* but in rural communities in general. *Mirabs* do not own earth-moving equipment and must hire it at very high rates. In Herat for example, the rent of a single tractor with trailer is 400 afghanis, or US$8.00 *per hour*.

While canal *mirab bashis* and *wakils* are often individuals with considerable wealth, influence and land, the same cannot be said for the majority of community *mirabs*, *kok bashi* or *chak bashis*, many of whom own very little or no land and are often sharecroppers (*ijaradar*) or contract labourers (*kishtamand*). Such low levels of income throw doubt on the sustainability of on-farm community water management, since the water masters' time is consumed by trying to eke out subsistence for their families. Low incomes and returns against work make it more likely that poor *mirabs* will accept bribes and payments from farmers to cheat the system. In effect, the post of *mirab* in most communities is a semi-voluntary position. Some water masters interviewed stated they did not want to take the job but were pressurised into the position and took it only because of the enhancement of social status that was accorded to them within their community.

7.2 Community perceptions of water management interventions

Throughout the study area, and indeed in all studies of social water management in Afghanistan, the universal concern of communities and water masters is not so much social as structural. While government, donors and international consultants make

[38] Lee, *Mirab and Community Irrigation Managament in Herat*, p. 44.

declarations and policy statements regarding RBAs and WUAs, at the community level the reorganisation of social water management is a very low priority. Terms such as "River Basin Authority", "watershed" and "Water Users Association" are not terms most communities are acquainted with. In the case of "watershed" there is no word in any of the national languages which can convey this English term with accuracy. For communities, their greatest concern is flood control and prevention, the degradation of intakes (the repair of which is very labour intensive), bank erosion due to changes in river beds, and problems of siltation and spoil removal. They quickly tire of social surveys when they see no practical outcome in terms of structures.

An important issue highlighted yet again by this study is the issue of ownership and future maintenance of permanent structures installed, commissioned and funded by the external donors or government. While it is traditional for water masters to collect funds from land owners and sharecroppers for minor operation and maintenance works, major repairs, particularly of permanent structures, continue to be beyond the financial and technical resources of rural communities.

DACAAR's principle, which is generally followed by NGOs and the majority of major donors such as ADB and EU, is to "hand over ownership" of permanent, in-river and on-canal structures to adjacent communities who sign an agreement that they assume responsibility for future operation and maintenance. It is argued that community ownership is engendered through the participation of communities in the construction, repair and rehabilitation of these structures.

However, on-the-ground realities are not as simple and it is clear that most communities do not see "ownership" in these terms. Communities will work on foreign-funded structural projects since the community contribution to the outlay is usually restricted to provision of labour. In some programmes, labourers and *mirabs* are paid for their work, often at a rate in excess of what a day labourer would earn. Once the structures are completed, the communities generally benefit from an improvement, and even an increase in, on-farm water delivery. It is not surprising, therefore, that a community would agree to sign a "hand over" document, since they know that without the NGO or contractor bearing the major costs of the intervention, it would never be carried out.

It remains to be seen whether communities will in fact assume responsibility for costly repairs to in-river and intake structures, or whether they have the technical expertise to undertake such maintenance. The evidence so far does not seem to be consistent with the social theory. The bursting of the Band-i-Sultan in Ghazni provides an interesting test case: a series of surges from the breached dam washed away a number of "permanent" in-river concrete structures, constructed within the last three to four years by CARE and DACAAR. Damage included degradation of some weirs and intakes, back scouring and under scouring of gabions, and the collapse of the concrete bridge at Qala-i-Naw. Under the theory of social ownership and transfer, the responsibility for the repair of these structures lies with the communities along the banks of the Jaghatu River which benefit from these interventions. Yet as far as could be ascertained during the research, no community has made anything more than a minimal effort to repairs to these structures.

At Qala-i-Naw, even though the collapsed central pier of the river bridge has severely restricted access to the main road to Ghazni for larger vehicles, the community has merely thrown crude sandbags and large rocks into the collapsed middle

section to allow some smaller vehicles and motorbikes to cross. The wing gabions above and below the bridge which were overtopped by the flood and badly back scoured also remain unrepaired.

Similar situations were noted with a number of large NGO structures on the right bank of the Hari Rod in Pashtun Zarghun and Karokh districts and on the Surkh Rod in Nangarhar. Some of these structures have failed, become silted up or partially collapsed to the detriment of the supply of water and river training. Despite this, none of these communities have taken the initiative to undertake proper repairs to these structures. Where communities have carried out operation and maintenance, it has been basic, "low-tech" and minimal. The interventions, such as they are, appear to be carried out only when it is deemed that failure to act will result in serious threat to the community either through flooding, a substantial loss of water in their canals or increased erosion of canal or river banks. Generally these interventions are crude sandbag and stone structures which offer only temporary relief for the problem. Operation and maintenance at community level is not performed according to a predetermined annual plan; rather it is crisis management. The dyke is plugged only when the leak threatens a particular community.

In the minds of most water masters and community leaders there is a clear line drawn between where their responsibilities end and where those of government and donors begin. This line tends not to coincide with the one drawn by NGOs, government or other contractors. The consequence is that maintenance falls between the cracks, with communities and government/donors disputing who is responsible for what repairs.

Apart from lack of funds, there is probably a reluctance among land owners to pay for expensive operation and maintenance, and clearly a strong sense of aid dependency. After all, why should poor communities pay for expensive repairs when sooner rather than later some foreign donor will not only pay for the repairs, but even pay labourers from surrounding communities for their work?

7.3 Water management and water sharing

As with the *mirab* system, there are significant regional variations in the management, rotation and distribution of irrigated water, even within provincial and district boundaries. While the basic on-farm system of night–day allocation applies more or less universally in Afghanistan, there are many regional variations.

Different water sources tend to be managed differently, with communities adopting pragmatic approaches to its division and distribution. On the major canals which have intakes on major river systems, such as the Hari Rod and Kunduz Rivers, the social and political issues created by large canals and major river systems are far more complex than where there is a single stream which provides irrigation to one or two small communities.

In the cases of the Kunduz and Hari Rod and the other major river systems of Afghanistan, the communities who share the canal water are large and often ethnically very varied (compared, for example, to the Hazhdah Nahr canals in the lower Balkh River). These canal communities not only have to manage in-canal and on-farm water, but must pay attention to the rights and actions of other communities on adjacent upstream and downstream canals. Upstream communities which illegally extract more water than their entitlement by widening their intake or damming the river can serious affect the sustainability of crops for downstream communities.

Communities on larger river systems must negotiate in-canal between large numbers of ethnically diverse communities, while also negotiating with other communities not on their own system but extracting water from the same river. Water disputes on such systems, such as the Hari Rod, have far wider political and regional implications, as is shown by the Atishan block's dispute with the Marwa block. The workload for communities in terms of management of water resources stretches far beyond a small cluster of contiguous villages negotiating water-sharing agreements during the dry season, and this explains the need for a hierarchical and formal *mirab* structure.

At the other end of the spectrum, communities such a Sir Zar, Pyada Rah and Gharak have a single, very limited water source and either have exclusive rights to its water or share it with one or two other communities. As such, issues are localised and are part of the everyday conflict resolution activities of traditional community or clan *shora*. In these cases adding another level of power in the form of a *mirab* could make matters worse by undermining the authority of the *shora*. When water issues arise, these communities always ensure that the matter is handled by their traditional *shora* or a nominated member, rather than someone from outside the existing power structure.

Unlike surface water sources, *karez* can be either publicly (that is, community) or privately owned and managed. Based on research so far, it can be concluded that the community *shora* only takes responsibility for on-farm water from a *karez* if it is a "public" water source (for example in Pyada Rah in Ghazni). Even then, a formal *mirab* is not considered necessary for a *karez*, and water issues are handled by *shora* elders. As far as the primary research sites are concerned, with the exception of Zala Qala in Ghazni (where there is extensive irrigation through a series of *karez*), the *karez*'s primary function appears to be the provision of domestic water for human and animal consumption. Where *karez* water is used for agricultural purposes, it appears to irrigate only a few acres – often orchards rather than crops (for example Turmai and Qala-i-Naw in Ghazni).

In the past some individuals have dug *karez* at their own expense in order to bring water to their own lands, rather than for the benefit of the community as a whole. In Pyada Rah in Ghazni, the two private *karez* are "owned" and managed exclusively by a kin group. Private *karez* such as these lie outside traditional community power structures. The same applies to tube wells, which are invariably privately owned and dug not just to provide water to private land but also to sell water for profit to adjacent, downstream farmers. Again, such private enterprise initiatives lie outside the remit of the traditional community water management structures, making regulation of them far more problematic.

The fact that many *karez* and all tube wells are private and not community owned or managed has a number of implications for the establishment of WUAs and SBCs. These groups are being formed using existing *mirabs* along with provincial government representatives. In many areas, however, it is privately owned *karez* and tube wells which are the sole or main source of irrigated water. *Mirabs* in particular, and community leadership in general, see these water sources as being outside of their remit. The regulation of tube wells is particularly problematic as it is clear that despite the theoretical control the MMI is meant to exert over their establishment, there is in practice a complete absence of enforcement of the permit law.

While it could be argued that as the central government strengthens, regulation of tube wells might possibly be enforced, management of extraction from tube wells

remains highly problematic. The proliferation of tube wells in areas such as Ghazni threatens to impact negatively on the water table, and may already be doing so. A number of DACAAR wells in the area appear to have dried up. Proper regulation of tube wells will require not only a ban on them in some areas, but also the capping of some that have already dug – raising the issue of compensation to well owners for capital outlay and loss of valuable cash crops and income from water sales. In the long term, there are serious hydrological implications if government continues to avoid policing and regulation of tube wells.

In summary, there are significant regional variations in the social management of irrigation systems, and these variations relate not only to the amount of water, length of canals or the number of communities involved, but also to differences in cultural and customary practices. Researchers, donors, international actors and government agencies must avoid making generalised assumptions about the nature of community water management on the basis of one or two micro-studies. Even within individual river systems there are different paradigms used for social water management, and this has important implications for donors and government, as well as any future legislation regarding water masters, WUAs and RBAs. Policy and implementation must show considerable flexibility in accommodating significant regional and cultural variations in social water management.

8. Institutional Issues

In all four provinces visited, the study found that the Department of Irrigation was extremely under-resourced, with little or no budget. The earth-moving equipment it did have was old Soviet stock more than twenty years old, most in very poor repair. Provincial Departments of Irrigation are almost totally dependant on NGOs and external actors to carry out rehabilitation works. On occasion they may be able to loan a bulldozer from the municipality or other government department, but other arms of provincial government are often similarly under-resourced. While the Nangarhar Department of Irrigation had no working earth-moving equipment, the MRRD had several new tractors, trailers and bulldozers. The provincial head of the MRRD made it clear that they would never lend this equipment to the Department of Irrigation even though the MRRD are involved in irrigation interventions.

Technically qualified staff at provincial level are scarce. There was not one official with any formal degree in hydrology or irrigation engineering in any of the four provinces visited. Those who had graduate degrees were predominantly structural or design engineers trained in Eastern Europe, the USSR or Afghanistan during the 1980s. Provincial Department of Irrigation heads also complained that their most experienced engineers had left to work for a UN agency or an INGO.

With the exception of the Department of Irrigation in Kunduz, there was little understanding of macro-level issues or government policies related to water management. Department of Irrigation heads and their senior staff tended to make appeals for piecemeal structural repairs without any overall plan or strategy for individual catchments or sub-basins. Department of Irrigation officials reported that they occasionally visited Kabul to attend seminars but they seemed to have little understanding of wider policy issues. The position of these provincial heads is difficult as they have pressure on them from communities as well as central government to perform, but they do not have much influence at the higher level of government or policymaking.

Meetings between water masters and provincial and district Irrigation Extension Officers are more often reactive rather than proactive. Meetings are called when government wishes to inform water masters of government policy, or when international actors wish to obtain information or discuss an intervention in particular areas. Forward planning does not appear to be something that most provincial government departments undertake or understand.

In this respect, as in many others, Kunduz is the exception. The Department of Irrigation is proactive, particularly in its efforts to reform the *mirab* system and to make it more accountable and effective. There is a good sense of cooperation and liaison between the Department, GAA, KRBP, EIRP and the EU projects.

Financially, provincial officers must seek approval for their budgets from the MEW who, in turn, must petition and lobby for funds from the MoF. The process is excessively complex and takes many months for proposals and budgets to be approved and funds released. Even where plans are advanced for particular interventions at the provincial level, there is no guarantee that they will be approved, nor, even when approved, that the necessary funds for the project will be made available.

The government is meant to tax irrigated land according to *paikal*age and *juftgaw*-age, however four years into the present government no effort has been made to

collect tax on either irrigation rights or land. Were this done, the proceeds could be used to cover the cost of at least some urgent rehabilitation work. At present, government seems content to let external donors fund the irrigation sector rather than try to collect taxes from rural communities.

There is some degree of intergovernment liaison, usually with the governor calling provincial heads of MRRD, MEW and MAAHF together to try and ensure there is no significant overlap in their activities. At provincial level, UNAMA hosts sectoral meetings but attendance by NGOs is inconsistent. These meetings, while billed as coordination meetings, are in fact more like information exchanges or data acquisition meetings. There is still very little real coordination either along hydraulic boundaries or at river basin level. The RBAs and SBCs are designed to address such coordination issues and, if they work well, could provide a far greater level of integration for future interventions.

There is some confusion, even rivalry, between a number of ministries and provincial departments, each of which has been given a mandate for water and irrigation projects. Despite the MEW having been designated as the lead agency in water resource management, at provincial level each department works in isolation, and often in competition with others.

A typical example of this lack of interdepartmental liaison was demonstrated at the inaugural meeting in July 2005 of the Baghlan Sub Basin Authority. Four provincial departments (representing MEW, MRRD, NEPA and MAAHF) were present at the meeting, and all stated categorically that their respective ministries had presidential decrees that ceded them *exclusive* rights to authorise the digging of wells. Ironically, under the current law, it is another ministry – the MMI – which is legally responsible for tube and shallow wells.[39]

The situation is not helped by uncertainty about the future of the MEW and its provincial departments. Under the RBA policy plans, in theory the MEW and provincial DEWs will eventually cease to exist, to be replaced by RBCs and RBAs. So far, however, there is no sign of this happening and the recent draft Water Law which is circulating in the MEW continues to uphold the present multi-ministry policy on water resource management.

Interventions by international implementers, whether NGOs or private contractors working for international donors, continue to suffer from a lack of coordination and a common methodological approach to both the social and engineering aspects of their work. There is much potential for interventions to be piecemeal, without taking account of the wider hydraulic impact. On the Atishan canal, DACAAR, EIRP and PRT all plan interventions in the coming months, or have already commenced infrastructure improvements, and while each actor is working on a different section or aspect of this canal, adequate coordination will be required between to ensure the impact of each particular intervention does not impact adversely on overall hydrology of the canal. A similar situation of multiple interventions by NGOs which do not appear to have been coordinated was noted on the Kara Su wash in Surkh Rod, Nangarhar.

Government policy is to promote and work towards the formation of RBAs and WUAs, which implies a basin and catchments approach to water management interventions. While such an approach is both sensible and long overdue, the concept has yet to

[39] Minutes of the first Baghlan Sub-Basin Working Group Meeting, 10 July 2005.

make much impact on the ground. The KRBP is working well with GAA and other actors such as EIRP, and it is hoped that this work will become a model for others.

Major donors have a range of models and approaches to irrigation interventions and social water management. Some have a strong social research element while others emphasis on-farm water management, alternative livelihoods, crop diversification or poverty alleviation. Others are mandated to carry out shorter-term, high-impact projects which are heavily target- and donor-driven, and pay only token attention to social issues.

National policies on WUAs and RBAs were established in 2003, shortly after the present government came to power and following a quarter of a century of internecine war and massive social upheaval. Whatever the value or otherwise of such policies, they were clearly not based on ground-level realities, extensive field research or even a basic connection with those communities which would be most impacted by these policies. Instead, they were more donor driven and drew on theoretical and ideological models from other countries and continents. Now that more in-depth social surveys are underway, it has become clear that not only is a great deal of flexibility required to account for regional and cultural variations in water management, but also some aspects of the policies themselves need to be revisited.

There is a lack of consensus between donors and government about the way forward in irrigation management. Draft Water Laws are before the Minister for Energy and Water, but there does not seem to have been much discussion among the major players about the appropriateness of this legislation. The same applies to the current debate about the WUAs charter. The present policy and reform of social water management has been top down, meanwhile communities, perpetually suspicious of central government's intentions, show concern that WUAs, SBAs and RBAs are merely a covert means of forcing them to pay for water (forbidden, or *haram*, under Sharia law), and to push the burden of payment for future operation and maintenance onto communities which have insufficient financial and technical resources.

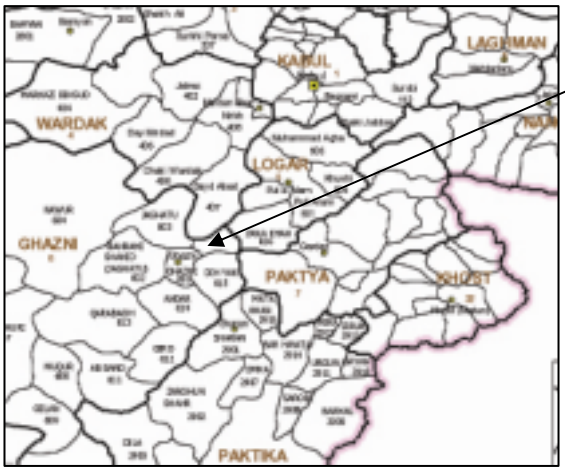
In methodological terms, it is vital to build on existing community structures – a position which has been adopted by most major donors' social consultants. There is a general consensus that the *mirab* system should be supported and strengthened, and most nascent WUAs consist solely of *mirabs* with training and capacity-building being focused on the community level to improve the water masters' performance and skills level.

At community level, *mirabs* are as poorly paid as government civil servants, and the reform of social management of irrigation systems must also address the issue of improving the incomes and livelihoods of the poorest *mirabs*. This is particularly important given that with so much infrastructure input planned, more time and work is being demanded of water masters by both government and implementers. Reforms could include: linking cash or kind payments to a percentage of each crop, rather than a single payment of wheat at the end of each year; increasing community contribution to *mirabs*; donations (or long-term lease) of unused government land for the support of *mirabs* and the future operation and maintenance of individual canals; and allowing *mirabs* to receive income from the tax on irrigated water (*paikal*, *juftgaw*).

One of the shortcomings of the water master system is that there is a lack of overall planning and macro-level vision of water resource management. While on the whole water management on-farm and in-canal is effective, *mirabs*, *mirab bashis* and *wakils* rarely discuss wider river issues with their counterparts downstream or upstream unless there is an emergency or government officials or donors call a meeting in the provincial capital. In some cases, such as the Marwa–Atishan dispute or that of Sholgara and the Hazhdah Nahr sub-basins on the Balkh River, *mirabs* can be in conflict with each other for many years. Each *mirab*, *mirab bashi* or *wakil* represents a single canal, and inevitably promotes the interests of his canal irrigators over the interests of others. The formation of *mirab* councils as a precursor to wider membership WUAs in Herat, Kunduz and the lower Balkh River appears to be making some progress in increasing sub-basin cooperation and resolving long-standing water disputes. It is hoped that the creation of RBAs and SBCs will further improve the social aspect of catchment management.

At present, KRBP is the only programme that has established SBCs with two water master seats. While the presence of these community representatives is important, if not vital, to the success of these councils, the two individuals are nominated by the provincial Head of Irrigation rather than other water masters – opening up the possibility that these water masters lack true independence or that they could be nominated on the basis of personal or political allegiance. The balance of membership of these SBCs is biased in favour of government officials rather than community representatives, and care must be taken that in the establishment of RBAs and SBCs donors are not merely creating yet another layer of government bureaucracy and patronage.

Appendix 1: Maps of the Primary Research Sites



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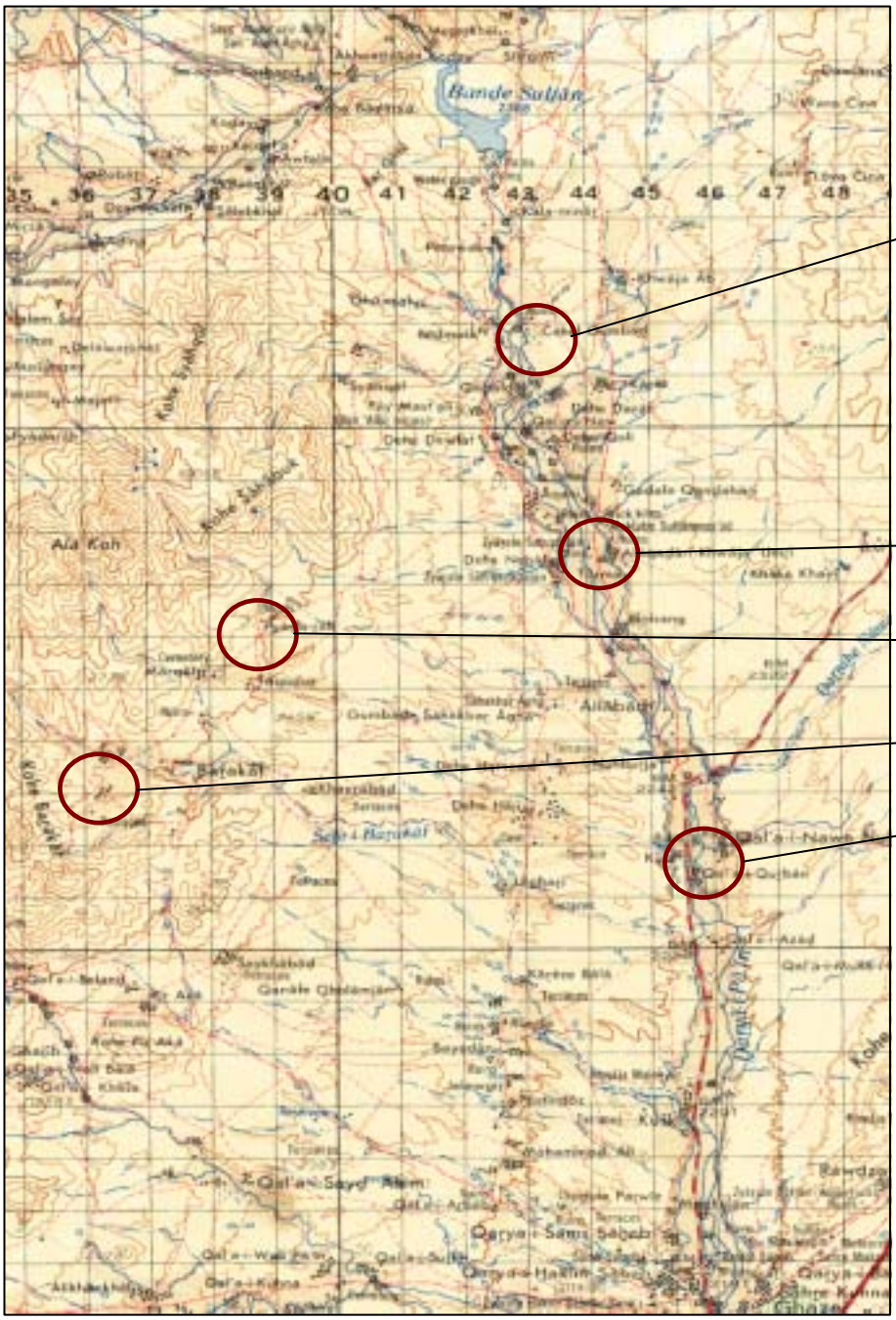
Khwaja Umari District



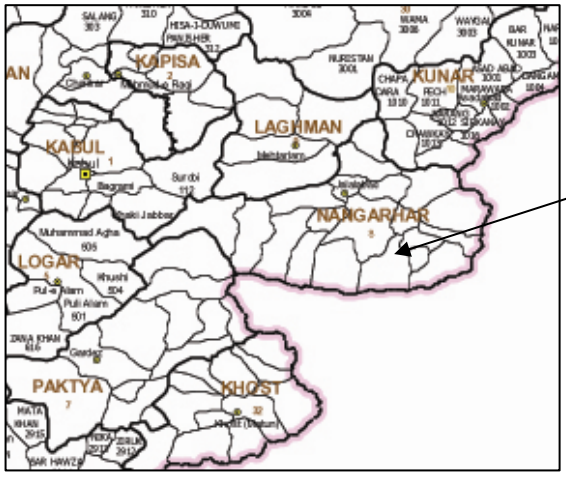
Chel Gunbad

Turmai

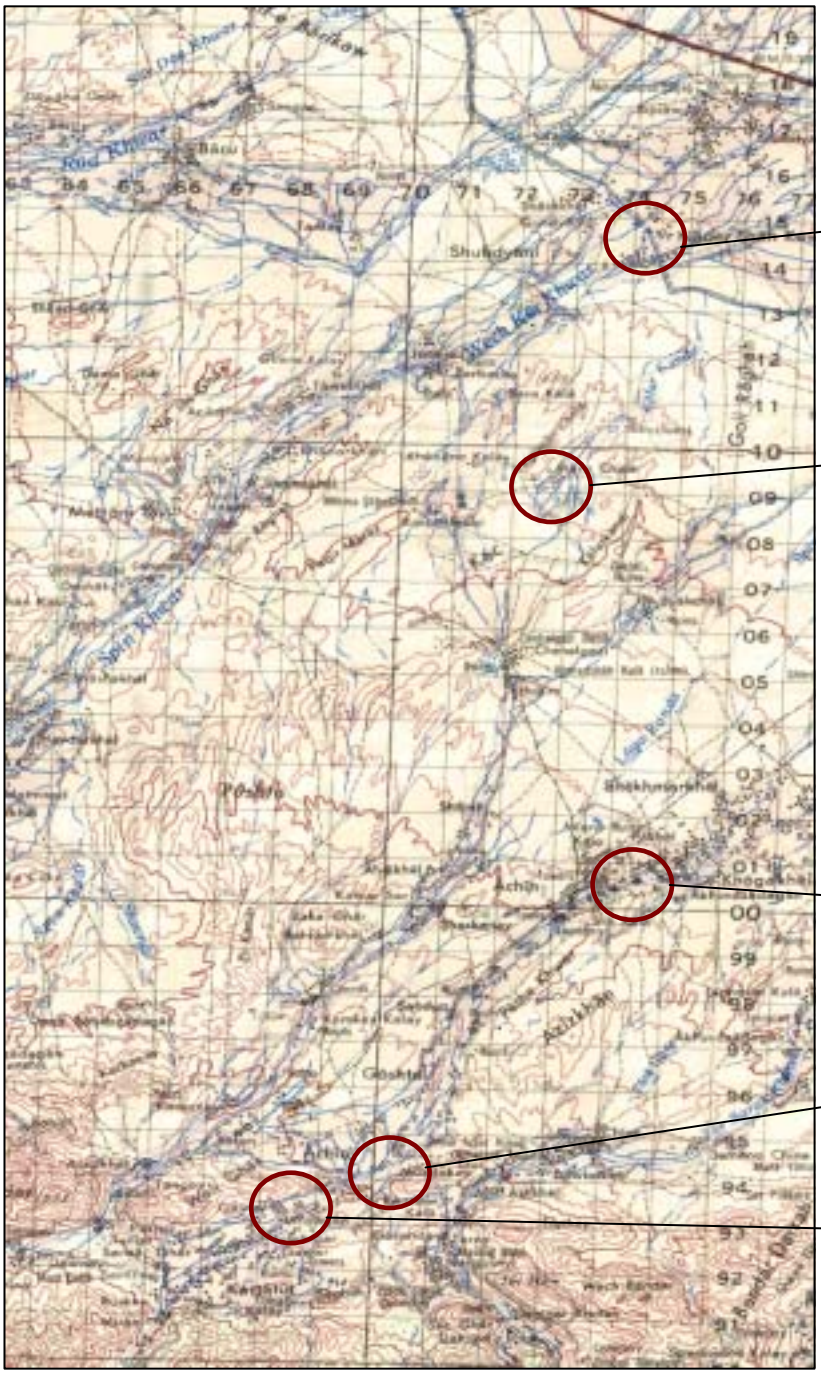
Pyada Rah

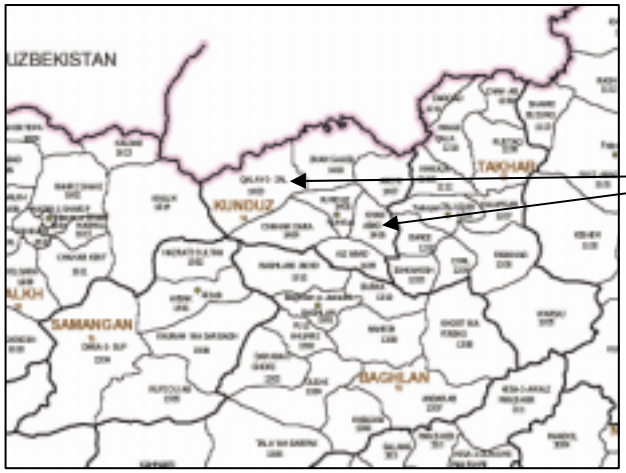
Zala Qala

Qala-i-Naw

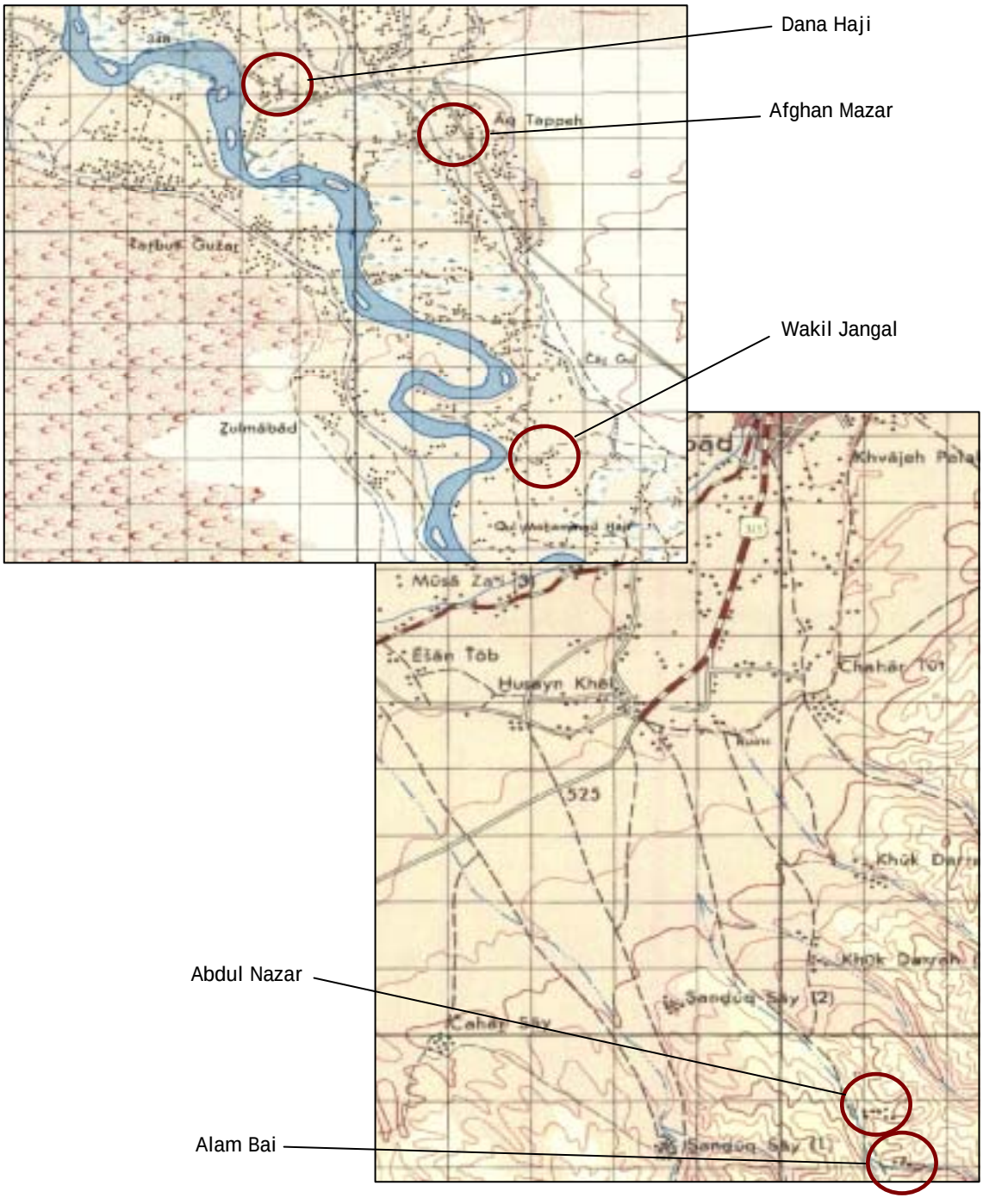


Nangarhar Province:
Achin and Batikot Districts

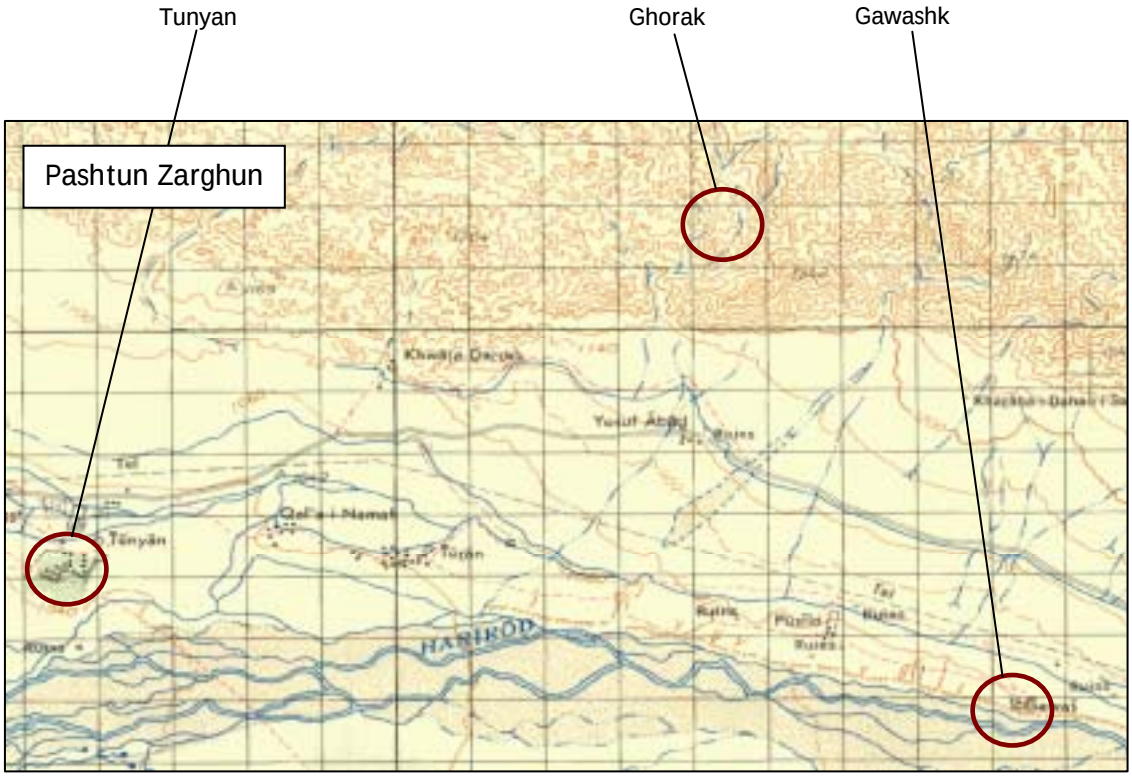


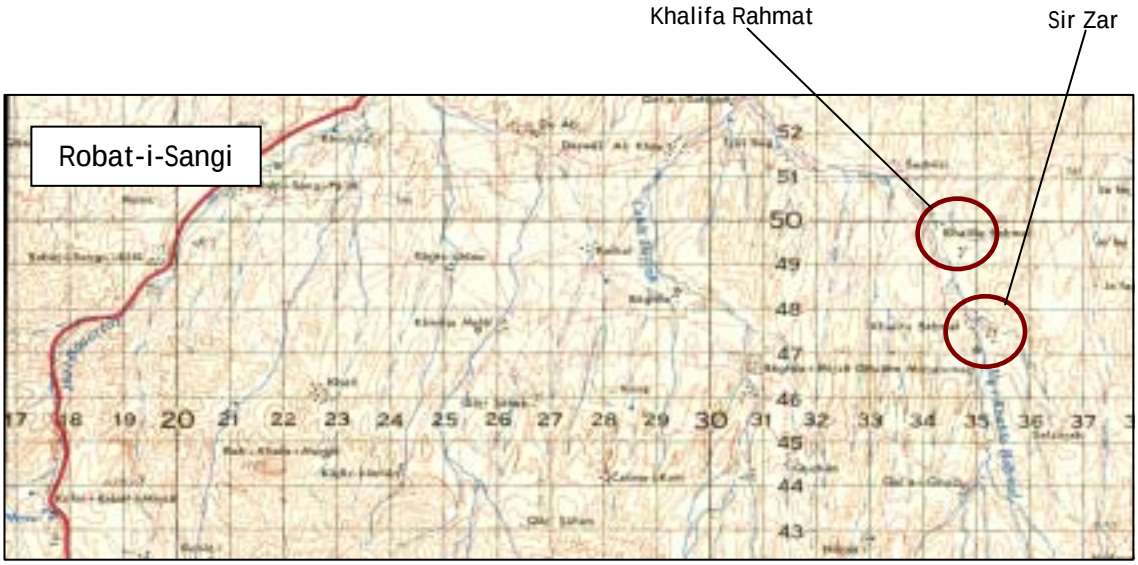


Kunduz Province:
Qala-i-Zal and Khanabad Districts



Herat Province:
Robat-i-Sangi and
Pashtun Zarghun Districts





Appendix 2: Afghan Solar (*shamsi*) Calendar

The Afghan solar (*shamsi*) year has the same number of days as a Common Era (CE) or AD year: 365. The Afghan solar year starts on 1 Hamal (New Year, or Naw Roz), which falls on 21 March, and it dates from the year of the *Hijri* (migration) of Muhammad in 621 AD, not from 1 AD. To find an AD/CE date from an Afghan solar year, add 621 to the Afghan year (for example, 1384 *shamsi* = 2004/2005 CE/AD).

When there is a CE leap year, 1 Hamal falls on 20 March and the additional day in the Afghan solar year is added to the last month of the equivalent Afghan solar year (Hut), that is, in mid March of the following CE year.

The Afghan solar calendar is divided into four seasons of three months each: spring (*bahar*), summer (*tabistan*), autumn (*khazan*, or *tirmah* in Herat) and winter (*zimistan*).

Season	**Afghan solar (*shamsi*) month**	**CE/AD equivalents (non-leap year)**
Spring (*bahar*)	Hamal	21 March to 20 April
	Sawr	21 April to 20 May
	Jawza	22 May to 21 June
Summer (*tabistan*)	Saratan	22 June to 22 July
	Asad	23 July to 22 August
	Sonbola	23 August to 22 September
Autumn (*khazan/tirmah*)	Mizan	23 September to 22 October
	Aqrab	23 October to 21 November
	Qaws	22 November to 21 December
Winter (*zimistan*)	Jaddi	22 December to 20 January
	Dalw	21 Janu
	Hut	20 February to 20 March

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