

Afghanistan Research and Evaluation Unit
Synthesis Paper Series

WATER MANAGEMENT, LIVESTOCK AND THE OPIUM ECONOMY

Challenges and Opportunities for Strengthening Licit Agricultural Livelihoods



Alan Roe

April 2009



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About the Afghanistan Research and Evaluation Unit

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Acronyms

AGCHO	Afghanistan Geodesy and Cartography Head Office
AL	Alternative Livelihoods (a pillar of the National Drugs Control Strategy)
ANDS	Afghanistan National Development Strategy
ARD	Agriculture and Rural Development
AREU	Afghanistan Research and Evaluation Unit
CDC	Community Development Council
EC	European Commission
FAO	Food and Agriculture Organisation of the United Nations
GAA	German Agro-Action
GoA	Government of Afghanistan
GPS	Global Positioning System
I-ANDS	Interim Afghanistan National Development Strategy
IWRM	Integrated Water Resources Management
MAAH	Ministry of Agriculture and Animal Husbandry
MAIL	Ministry of Agriculture, Irrigation and Water
MCN	Ministry of Counter Narcotics
MEW	Ministry of Energy and Water
MRRD	Ministry of Rural Rehabilitation and Development
NDF	National Development Framework
NGO	non-governmental organisation
NRVA	National Risk and Vulnerability Assessment
PAL	Project for Alternative Livelihoods
RBA	River Basin Agency
SCWAM	Supreme Council for Water Affairs and Management
UN	United Nations
UNODC	United Nations Office for Drugs and Crime
USAID	United States Agency for International Development
WOL	Applied Thematic Research into Water Management, Livestock and the Opium Economy
WUA	water users association

Glossary

<i>Amlak</i>	lands department, MAIL
<i>arbab</i>	village or community leader
<i>band</i>	dam or diversion structure
<i>buluk</i>	group of adjacent canals with water sharing agreements
<i>firman</i>	royal decree
<i>halal</i>	permissible under Islamic law (e.g. meat from livestock slaughtered according to Islamic practice)
<i>hasher ab</i>	water sharing agreement
<i>hashar</i>	community agreement (e.g. regarding labour for canal repair)
<i>hawz</i>	traditional irrigation accumulation pool
<i>juftgaw</i>	unit of irrigated land determined by the area a pair of oxen can plough daily
<i>karez</i>	underground aqueduct dug into hillside to tap groundwater and channel it out onto the surface for utilisation
<i>Khel</i>	A Pashtun tribal division
<i>kok bashi</i>	water master of a secondary canal
<i>Makhzans</i>	provincial court archives
<i>mirab</i>	water master
<i>shab-o-roz</i>	literally “day and night”, the traditional system of irrigation
<i>shura</i>	traditional council of elders
<i>urf</i>	customary law
<i>wakil</i>	senior water master

Currency Exchange

At the time this work was conducted, \$1 US dollar exchanged for approximately 50 Afghani’s and 60 Pakistan Rupees.

Executive Summary

This paper brings together key findings and recommendations arising from the second year of research conducted by the Afghanistan Research and Evaluation Unit (AREU) under the auspices of the “Applied Thematic Research into Water Management, Livestock and the Opium Economy” project (hereafter abbreviated to WOL). Funding for this project has been provided by the European Commission. This paper builds directly on the research findings presented in the first-year WOL Synthesis Paper, and so constitutes a companion to that earlier document.

The major objective of this research is to enhance the sustainability of Afghan rural livelihoods and reduce dependency on illicit crops by providing policymakers with clear and accurate information on the use, management and role of natural resources in farming systems, and how these influence opportunities for agricultural development. The research is intended to produce evidence-based recommendations to increase the effectiveness of agricultural and rural policy. To achieve this goal the WOL project team has undertaken an ambitious programme of field research, spanning eight Afghan provinces and many rural communities, using a combination of research methods and integrating diverse thematic studies through an empirically grounded farming systems approach.

The second year of the WOL project coincided with the formulation of key natural resources management, agricultural and rural development strategies in the form of the Interim Afghanistan National Development Strategy (I-ANDS) sector strategies. I-ANDS established poverty reduction and equitable economic growth as overarching development goals, while the approach to implementation of individual sector strategies emphasises the role of community or market institutions in leading development. Consequently, an important theme in second-year WOL studies is the potential for farming communities to respond to planned opportunities for agricultural growth, and how policy initiatives can be most effectively implemented.

Findings in overview

The second year of WOL research provides evidence of systemic inequities that affect access to natural resources and livelihood opportunities in rural Afghanistan. These inequities have complex origins. Households and communities may be disadvantaged by their physical location and agro-ecological context, or marginalised by their ethnicity, political affiliations or socioeconomic status. Customary and informal rural institutions have a particularly significant role, as they serve to mediate access to important natural resources such as land and water. WOL research suggests that these institutions tend to reflect local power and wealth structures, and thus perpetuate or even exacerbate inequality of opportunity. In many instances, the rural power balance is the de facto outcome of recent decades of conflict and instability. While cause for concern in their own right, structural inequalities in resource access also affects the ability of different sections of the rural population to respond to and participate in agricultural growth.

Afghanistan National Development Strategy (ANDS) sector strategies that prioritise strengthening value chains for horticultural products will primarily benefit farmers with preferential access to irrigation water, and economic growth will therefore initially be focused in areas that are already comparatively prosperous. Even where horticultural production can be stimulated outside of prime irrigated lands, evidence suggests that a significant proportion of the benefits will be directed back to landowners and patrons, because of the high incidence of sharecropping in those areas. The growth of agribusiness around centres of farm production is expected to lead to wage labour opportunities. Although rural Afghan labour is very mobile, such wage labour incurs opportunity costs, particularly where demand for on-farm labour is high.

Evidence from both land and water management studies suggest that customary and informal systems of resources management may be least

effective where natural resources are scarce, highly contested, and the vital interests of stakeholders are affected. This raises questions regarding the universal applicability of community-based management, and whether it may be more relevant to some management situations than others. Nevertheless, given the observed performance of informal institutions in natural resources management, there is a clear need for strengthening governance, accountability and inclusivity. The reform and empowerment of informal natural resource management institutions (potentially through links to other community-based governance initiatives, such as Community Development Councils), will be a key strategy for addressing the structural inequities that threaten to perpetuate rural poverty, livelihood insecurity and continuing dependency on illicit crops in some areas.

Approaching agricultural development from a farming systems perspective, the findings of WOL research cast further light on the complex relationship between agricultural production and the construction of rural livelihoods. Evidence suggests deep integration between farm production to supply markets, farm production to supply the household, and off-farm economic activities. Although the relative importance of each component varies with individual household strategies, the current policy emphasis on production for markets risks overlooking the valuable contribution that the production of foods for domestic consumption makes to the agricultural sector. This is particularly true in remote areas, where access to markets may be irregular, opportunities for off-farm incomes are limited, and farm cash flows often in deficit. In these situations, production for domestic consumption will be integral to sustaining farming activities and producing a surplus for markets.

Theme-specific research findings and policy recommendations arising from the second year of WOL research are detailed below.

Land Tenure

Securing rural land tenure has been identified as a prerequisite to facilitate agricultural growth,

combat livelihood vulnerability and help stabilise rural society in Afghanistan. A comprehensive land registry that can serve as a foundation for future land administration is clearly needed, but there are many challenges in establishing such a registry. There is little useable information on rural land holdings, and the institutional capacity to gather more is limited. In addition, the uncertainties and ambiguities surrounding land title make this an inopportune time to seek a determination of final title. However, much can be learned from land registration in other post-conflict situations internationally.

Although there are major challenges to establishing a formal cadastral-based land registry, there are strong arguments in favour of the registration of deeds as an intermediate step to determining full title. A deeds registry would offer many benefits (to both users and the Government), could be accessible to communities, and can be started immediately at comparatively low cost.

Furthermore, while planning for agricultural growth and poverty alleviation tends to assume farmer land ownership rights, WOL research suggests that up to 30 percent of irrigated land may be held under forms of subordinate rights (principally sharecropping arrangements). The proportion of land held in this way changes during the year; therefore, depending on when they are undertaken, national surveys may fail to capture the actual amount of land cultivated under these arrangements. In addition, WOL findings show that the sharecropping terms for high-value cash crops (such as those prioritised under the agricultural sector strategy) heavily favour the landowner over the farmer. This finding is particularly important in understanding how the benefits of planned growth in the horticultural subsector will be spread.

Consequently, agricultural development initiatives intended to benefit the most vulnerable may be more effective if directed at strengthening economic activities that are not subject to sharecropping terms (e.g. through off-farm wage incomes, or livestock production).

Water Management

Research confirms that farmers of semi-irrigated upper catchment areas face fundamentally different types of irrigation problems than those in the lower catchments. While water availability at source is a major constraint in upper catchment areas, potential system improvements may allow available resources to be more effectively managed, adding to the agricultural options and security of farmers in outlying rural areas. This would benefit vulnerable communities, which are in some areas heavily reliant on opium cultivation, and thus be consistent with pro-poor policy objectives.

Management of irrigation water in irrigated river valleys is highly organised and regulated under traditional mechanisms. In theory, it offers all participants in the water management system a fixed entitlement based on their individual cultivated area. However, in practice there is evidence of systemic inequities, both in terms of access to water and labour contributions to canal maintenance, with upstream communities benefitting disproportionately. Communities at the head of canals have a dual advantage: they can grow more diverse and higher-value crops, and can also achieve higher yields than downstream communities. This often results in gradients of prosperity and livelihood security in the rural landscapes along Afghanistan's irrigation systems.

WOL studies suggest that an underlying challenge for the function of customary water management institutions is that the consequences of deviating from established rules and allocations are currently passed downstream, with upstream water users effectively unaccountable. When there is sufficient water flow to meet the major needs of all irrigators (upstream and downstream), community water management systems may be effective in fine-tuning the water allocations between participants. However, severe water stress is likely to overwhelm the capacity of community water management to redress scarcity.

These findings emphasise the need for an overarching basin-scale framework that holds all water users accountable, and suggests that the greatest

management challenges for River Basin Agencies will be in coordinating water management between water users at the basin level, where there is no precedent for cooperation.

Livestock

WOL livestock studies suggest that production of small ruminants under extensive rangeland systems (i.e. nomadic pastoralism or integrated into rainfed farming systems) tends to be more market-orientated than in irrigated farming systems, where animals do not usually constitute a major source of farm income. Indicative gross livestock production margins appear to confirm this. Thus, while the highest productivity may be achieved with livestock integrated into irrigated farming systems, gross margins may be compromised by relatively high feed input costs. The best livestock gross margins appear to be achieved through low-input, low-output systems in which animals rarely achieve their genetic potential. However, these extensive forms of livestock production are increasingly threatened by loss of access to traditional grazing lands and land degradation.

Livestock markets involve a range of participants at different stages of the chain. However, in some regions of the country transaction costs incurred when moving animals can be high (up to 7.5 percent of the value of stock); these costs tend to be passed back along the value chain, reducing the prices paid to producers.

Collated data on livestock market transactions reveal very limited correlation between animal condition (e.g. size, age or weight) and price, and therefore few obvious incentives for producers to invest to improve animal condition. Nevertheless, anecdotal evidence suggests a growing practice in which farmers buy small numbers of weaned lambs from rangeland producers and fatten these on cultivated fodder, crop byproducts and residues, before selling them at a higher price. This can constitute an important form of diversification for small farmers, and adds value within the livestock sector.

While strategies to strengthen value chains for

horticultural crops will primarily benefit those with preferential access to land and irrigation water, the development of value chains around livestock has the potential to target comparatively resource-poor and marginalised agricultural producers, including farmers in remote rangeland areas, and smallholders or sharecroppers in river valleys who are unable to produce high-value crops. The development of such value chains would contribute to poverty reduction, and also represent the most effective strategy for stimulating economic growth.

The Opium Economy

Decisions by farmers to cultivate opium are made within the context of the broader farm and household economy. Consequently, different communities engage with the opium economy in different ways and for different reasons, reflecting local capacity, available resources and other local opportunities. Changes in local conditions alter the context in which farmers make decisions on whether to cultivate opium. This helps explain the divergent trends in poppy cultivation between provinces, neighbouring districts and communities, and even within communities on the basis of individual household circumstances. It also explains why simplistic explanations have previously failed to account for the complex dynamics of opium cultivation in Afghanistan.

WOL studies suggest that a counter-narcotics policy focused on suppressing the areal extent of poppy cultivation (which has been adopted as a key measure of success in the “war against drugs”) risks targeting the symptoms of the opium economy, rather than its root causes, and is unlikely to facilitate a sustainable transition away from the crop.

Whether farmers can respond to government incentives or threats to reduce poppy cultivation depends on their ability to construct a livelihood outside of the opium economy (i.e. whether or not they have a choice to grow poppy). Observations from three Afghan

provinces have suggested a range of factors that are likely to enhance prospects for sustainable transitions away from opium cultivation. These include preferential access to natural resources, good market access, agricultural diversity, and opportunities for supplementary incomes. Evidence from Nangarhar suggests that given the correct enabling environment, there can be strong incentives for households to move away from poppy cultivation. Indeed, data show that under some favourable conditions farmers can achieve better gross margins from some high-value crops than from poppy. In these cases, significant changes have been observed in the local economy, with some high-value licit crops attracting mobile traders to buy from the farm gate and even offering prepayment for crops, a practice previously associated only with poppy.

Establishing the conditions under which farmers can sustainably exit the opium economy must be a priority for an ongoing counter-narcotics policy. There is a need for multi-sectoral development activity, with a particular focus on those communities most disadvantaged in their access to natural resources and economic opportunities. However, achieving a sustainable, opium-free rural economy is likely to take many years, and policymakers should appreciate that not all provinces, districts or socioeconomic groups will make progress toward this goal at the same rate. Nevertheless, there is a strong case for pressuring wealthy opium farmers to exit from the trade (i.e. those who clearly have the resources to stop growing opium, but choose not to).

General Recommendations

Address inequities in access to natural resources

Initiatives are required to help strengthen the capacity and governance of community-based institutions and mechanisms that mediate access to natural resources in Afghanistan. While this may require some legislative reform and external oversight, considerable progress can be made by making decision-making more inclusive and fostering wider participation. Linking natural

resource decision-making to emerging decision-making structures such as Community Development Councils (CDCs) may, in some cases, help redress inherent power asymmetries.

Balancing pro-poor and economic growth agendas

Rural Afghan communities have differing capacities to participate in the growth of prioritised agricultural subsectors. While growth in the horticultural subsector will tend to reinforce the socioeconomic status quo, well-targeted interventions to strengthen livestock value chains can bring pro-poor opportunities to remote and marginal rangeland areas, and to small farmers, and is also the most rational approach to development of the livestock subsector. Effort should be made to avoid concentrating all agricultural initiatives, services and facilities in the populated river valley areas, where development activities have traditionally been focused.

Strengthen farming systems, not only market chains

Stimulation of agricultural production for markets also requires that the livelihoods of farming communities working within the agricultural sector be supported. At present, development strategies tend to focus narrowly on building market chains for agricultural products, but farm livelihood security can also be enhanced by improved access to off-farm incomes, or by supporting farm production for domestic consumption. Development planners must take a broader view of how agricultural livelihoods are constructed.

Support transition to licit agricultural livelihoods

Creating an enabling environment that supports a sustainable transition to licit agriculture will require a long-term effort to address the underlying causes of poverty and disadvantage in rural Afghanistan. This will involve measures that specifically target community needs (e.g. extending economic opportunities to outlying areas, fostering livelihood security and addressing asymmetries in access to resources). Efforts to suppress poppy cultivation

must selectively target those sites where farmers can choose whether or not to grow poppy.

Necessary tradeoffs between economic growth and rural stability

The current policy focus on achieving economic growth in the agricultural sector is not in all cases consistent with the broader political goal of achieving rural stability. Policymakers need to consider and balance the tradeoffs inherent in fostering a competitive rural economy and building a stable rural society, recognising that rural stability is a prerequisite for sustainable growth of the rural economy.



WOL research participants, Kabul

1. Introduction

This paper synthesises and presents the main findings and conclusions emerging from the second year of the Afghanistan Research and Evaluation Unit (AREU) study “Applied Thematic Research into Water Management, Livestock and the Opium Economy” (abbreviated to WOL). The European Commission provided funding for this project.

The major objective of the WOL project is to enhance the sustainability of Afghan rural livelihoods and reduce dependency on illicit crops by providing policymakers with clear and accurate information on the use, management and role of natural resources (with a specific focus on land, water, livestock and opium cultivated within the agricultural economy). The project is expected to generate evidence-based recommendations for improving the effectiveness of agricultural policy and rural programming.

Overall, the research adopts an integrated approach, viewing decisions about the use of individual resources within a wider farming systems and livelihoods context. The approach further recognises that farm (and rural livelihood) systems are part of a complex and dynamic biophysical, social, political and economic system.

The second year of the WOL project ran from May 2006 to April 2007. Activities during this period built directly on preliminary findings and research questions raised during the project’s first year. Work continued in close collaboration with project partners across seven Afghan provinces.¹ Consequently, this paper is a companion to the first WOL Synthesis Paper, and adheres to the objectives

and research strategy laid out in that document.² As with the first paper, this paper is organised into several discrete parts, drawing together the main findings of thematic studies and then integrating these into principal policy recommendations for the agricultural and rural development sectors.

Section 2 briefly revisits the project context, objectives and research methods set out in the first WOL Synthesis Paper, and the subsequent four sections present research findings on individual themes of land tenure, irrigation water management, livestock and opium cultivation, respectively. The seventh section explores how farm and natural resources-based production intersects with rural livelihoods through the allocation of on- and off-farm labour and through production and domestic consumption of farm products. The final section reviews and summarises the study’s major findings and implications, setting out interim recommendations for policymakers.

1 The WOL project consortium, led by AREU, also includes the Danish Committee for Assistance to Afghan Refugees (DACAAR) and German Agro Action (GAA) as nongovernmental organisation (NGO) partners. Research was undertaken with the full cooperation and support of four Afghan Ministries: the Ministry of Agriculture Irrigation and Livestock (MAIL), the Ministry of Rural Rehabilitation and Development (MRRD), the Ministry of Energy and Water (MEW), the Ministry of Counter Narcotics (MCN) and the Research Centre of Kabul University.

2 Alan Roe, *Water Management, Livestock and the Opium Economy: Natural Resources Management, Farming Systems and Rural Livelihoods* (Kabul: Afghanistan Research and Evaluation Unit, 2008).

2. Context, Objectives and Methods

A comprehensive overview of Afghan agriculture and its policy context at the time the WOL project was presented in the first WOL Synthesis Paper.¹ The first part of this section builds directly on that contextual background, and provides a summary overview of the agricultural sector and evolving policy environment during the second year of the WOL project.

The second part of this section builds on the research strategy and preliminary findings of the first WOL Synthesis Paper, and sets out the specific second-year WOL research objectives and methods used to achieve them.

2.1 Background to the agricultural sector

While agriculture has traditionally occupied a central position in Afghanistan's economy, intermittent conflict, severe drought and chronic instability during the 20 years prior to the establishment of the transitional Government weakened and undermined the sector's productive capacity. However, while the situation in rural Afghanistan after 2001 was widely portrayed as one of "crisis," not all agricultural subsectors were affected in the same way, and some proved more resilient to disturbance than others. It has been argued that the situation in rural Afghanistan was much more nuanced than indicated by the crisis narratives,² but the circumstances (a fast-growing population, lack of resources, infrastructure in disrepair, a growing dependency on food imports, and increasing cultivation of the opium poppy) led the Government of Afghanistan and its international partners to prioritise the rehabilitation of agriculture within the National

1 Roe, WOL: Farming Systems and Rural Livelihoods.

2 For further discussion, see Ian Christoplos, *Out of Step? Agricultural Policy and Afghan Livelihoods* (Kabul: Afghanistan Research and Evaluation Unit, 2004). Also see Jo Grace and Adam Pain, *Rethinking Rural Livelihoods in Afghanistan* (Kabul: Afghanistan Research and Evaluation Unit, 2004).

Development Framework (NDF) of 2002. The role of agriculture is highlighted in Pillar 2 of the NDF.³

In the years immediately following the establishment of the transitional Government, rural development and programming efforts tended to be largely uncoordinated (a legacy of programmes during the years of conflict), and delivered piecemeal by non-governmental organisations (NGOs) and international agencies in response to localised emergencies. Initially, the key line ministries⁴ for agricultural and rural development (supported by international consultants) focused on institutional reform and capacity building. Strategic planning for the sector began in earnest after the NDF was completed, and thereafter the Government increasingly took the lead in sector coordination. Major planning initiatives of 2004 and 2005 included the drafting of sector strategies and the Agriculture Master Plan.

2.2 Policy directions for agricultural development

In January 2006, the Interim Afghanistan National Development Strategy (I-ANDS)⁵ was presented at the London Conference to serve as the roadmap for economic recovery and progress towards achieving

3 Government of Afghanistan, *National Development Framework*, (Kabul: GoA, 2002).

4 The Line Ministries are those that undertake direct extension and implementation and works at provincial level and are thus represented by provincial departments. In May 2006, those directly involved in agricultural development included the Ministry of Agriculture and Animal Husbandry (MAAH), the Ministry of Rural Rehabilitation and Development (MRRD) and the Ministry of Energy and Water (MEW). The Ministry for Counter Narcotics (MCN) was not a line ministry, and worked through other line ministries to implement its rural development programmes. In 2006 the Ministry of Agriculture and Animal Husbandry (MAAH), was redesignated the Ministry of Agriculture, Irrigation and Livestock (MAIL).

5 The Interim Afghanistan National Development Strategy (I-ANDS) subsequently moved toward a finalised Afghanistan National Development Strategy ANDS (2008) through a three-year consultative process.

Table 1. Relevant strategic benchmarks identified under the I-ANDS

	Theme	Five-year strategic benchmarks
6.3.2	Counter Narcotics	<ul style="list-style-type: none"> By the end of 2010, the Government will design and implement programmes to achieve sustained reduction of land under poppy cultivation by strengthening diversification of licit livelihoods and other measures
7.3.3	Land Registration	<ul style="list-style-type: none"> By the end of 2007, a fair system for settling land disputes will be in place By the end of 2007, the registration of rural lands will be underway
8.5.3	Irrigation	<ul style="list-style-type: none"> By end of 2010, the efficiency of irrigation water management, participatory decision-making and institutional reform will increase and be more equitable
8.5.3	Agriculture	<ul style="list-style-type: none"> By the end of 2010, the necessary institutional, regulatory and incentive framework to increase productivity and create an enabling environment for legal agricultural and rural industries will be established Public investment in agriculture will increase by 30 percent

the Millennium Development Goals.⁶ Agricultural and Rural Development (ARD) constituted one of the major elements of the social and economic development pillar of the strategy, and drew substantively from the Ministry of Agriculture and Animal Husbandry (MAAH) master plan of 2005. The I-ANDS set out a number of benchmarks for progress across all sectors, and these goals were formally agreed on under the London Compact.⁷ Benchmarks within the Agricultural and Rural Development sector varied widely between very tangible outputs (e.g. number of wells sunk) and more ambiguous goals (e.g. “creating an enabling environment”). The benchmarks with key relevance to WOL research are summarised in Table 1.

Although some of these benchmarks were subject to amendment through the consultative I-ANDS process, ministries with sector responsibilities were faced with the challenge of developing specific strategies and implementation programmes to achieve these benchmarks. This became a priority action for policymakers and their international partners during 2006 and early 2007. Major policy

6 See Government of Afghanistan, *Afghanistan National Development Strategy: An Interim strategy for Security, Governance Economic Growth and Poverty Reduction*, available from [http://www.reliefweb.int/rw/RWFiles2006.nsf/FilesByRWDocUNIDFileName/KHII-6LK3R2-unama-afg-30jan2.pdf/\\$File/unama-afg-30jan2.pdf](http://www.reliefweb.int/rw/RWFiles2006.nsf/FilesByRWDocUNIDFileName/KHII-6LK3R2-unama-afg-30jan2.pdf/$File/unama-afg-30jan2.pdf), 2006, (accessed 26 April 2009).

7 *Building on Success, The Afghanistan Compact* (London: The London Conference on Afghanistan, 2006), available from <http://www.oecd.org/dataoecd/24/27/39149051.pdf> (accessed April 2009).

initiatives for this period included the preparation of a 1) new draft land policy,⁸ 2) draft water sector strategy,⁹ 3) new draft agricultural strategy¹⁰ and 4) revised implementation plan for the Alternative Livelihoods (AL) pillar of the National Drugs Control Strategy¹¹ (see Figure 1 over page). While some of these initiatives built on earlier sector documents, the process of re-tailoring actions and outcomes to fit the overarching I-ANDS framework represented a first serious attempt to develop an integrated strategy that encompassed natural resource management, agriculture and rural development. The strategy process was an attempt to foster cross-ministerial cooperation through the establishment and function of sectoral working groups, but met with considerable frustration.

Draft strategies produced for the agricultural and water sectors of the I-ANDS echo earlier policy documents in envisaging a more limited role for government in the regeneration of the agricultural and natural resources sector.

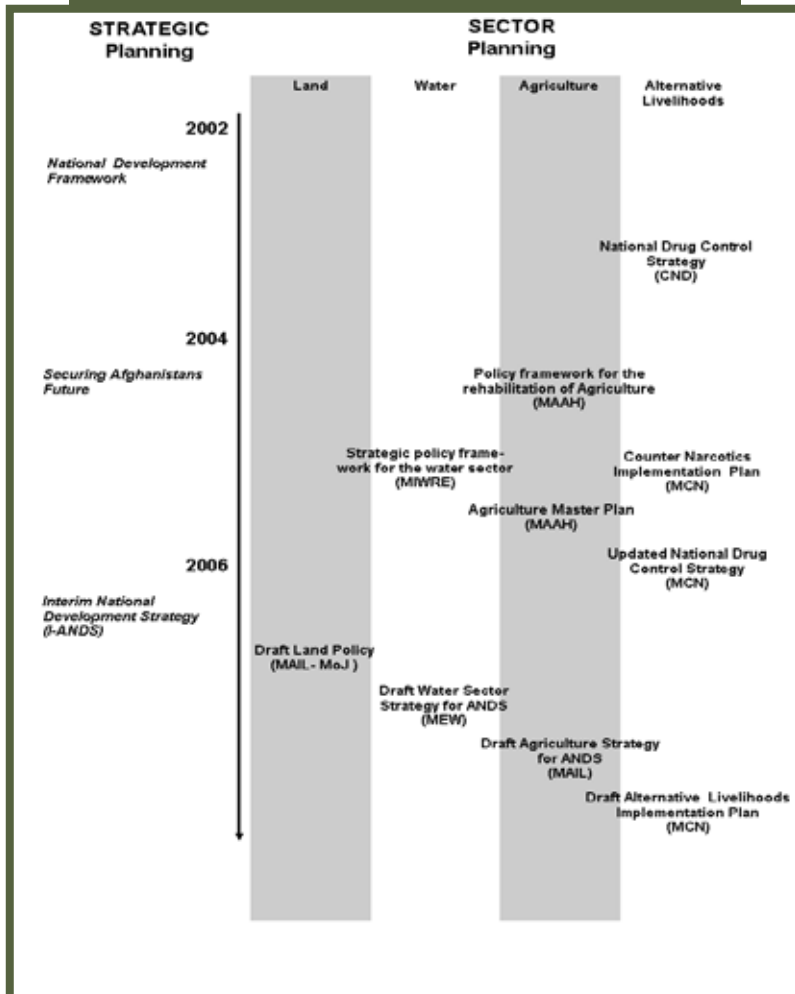
8 Undertaken by the Land Policy working group, with MAAH/MAIL (Lands Department) and Ministry of Justice as leading partners.

9 Undertaken by the Supreme Council for Water Affairs and Management (SCWAM) working group, with MEW and MAIL (Irrigation Department) as leading partners.

10 Undertaken by the MAAH/MAIL.

11 Undertaken by the Ministry for Counter Narcotics, with support from the Alternative Livelihoods working group.

Figure 1. Key documents in evolving policy process for the agricultural sector



Over the coming five years, the MAIL is embarking on a process of reform whereby it creates the necessary environment for the private sector to take over responsibility for providing many “private good” services and inputs. The role of government is changing from service provider to becoming one of policy and development strategy formulation.¹²

While the agricultural strategy highlights the importance of the private sector in building agro-industries, it also promotes the transfer of responsibility for key natural resources (grazing lands, forests and wilderness) to community-based

12 Ministry of Agriculture, Irrigation and Livestock, “Agriculture Strategy for the Afghanistan National Development Strategy (Draft),” (Kabul: MAIL, 2007), Section 5.1.5.

management. Similarly, the water strategy proposes the devolution of management responsibilities to water-user institutions through the introduction of Integrated Water Resources Management, organised at the river basin level.

When the Ministry judges the councils and agencies are capable of taking over their legal responsibilities, these responsibilities will be delegated as per the new water law.¹³

The emphasis on devolving management responsibilities for agricultural resources to communities inevitably highlights the need for good governance and strengthening of rural institutions. This issue is highlighted in all sector strategies. Likewise, revised strategies for the I-ANDS demonstrate clearer coordination in ministerial planning. For example, natural resources management programming in the agricultural strategy clearly follows the Integrated Catchment Management approach established by the MEW, and expressly supports the Ministry of Counter Narcotics Alternative Livelihoods Implementation Plan. This latter plan displaces ideas of narrow crop and income substitution with the notion of incorporating counter-narcotics goals into wider national programmes, notably those concerning agriculture and rural development.

Mainstreaming is ensuring all development projects should be planned with an awareness about how they contribute to building alternative livelihoods. As these projects and programs are planned at the level of line ministries and donors it is important that they share a common understanding about what the impact of their program will be at district and provincial level.¹⁴

Both agriculture and alternative livelihood

13 Ministry Energy and Water, “Water Sector Strategy for the Afghanistan National Development Strategy (Draft)” (Kabul: MEW, 2007), Section 3.1.

14 Ministry Counter Narcotics, “National Drug Control Strategy: Alternative Livelihoods Implementation Plan, Revised version” (Kabul: MCN, 2007), Section 2.5.

strategies highlight the need to first secure farmland tenure in order to encourage licit private sector agricultural investment and improved natural resource management. The draft land policy constitutes a statement of principles, one that recognises the right of all Afghans to access land and the existence of both formal and informal tenure systems. It emphasises the need for an effective land administration, but indicates that this should work in close coordination with local communities. The policy states that customary property rights may be recognised and that communities can adjudicate disputes through their own institutions, where this does not contravene the law; both are important in outlying rural areas.

*It is national policy that access to land resources be clarified and secured as part of integrated natural resource management which springs from community-based resource management.*¹⁵

By the first quarter of 2007, emerging strategies for the agriculture and natural resources management sector displayed increased integration and consistency as a consequence of working within the I-ANDS framework. The substantive direction of policy remained unchanged, although the documents were in many cases clarified and streamlined. Strategies widely emphasised scaling back the role of the central government in service provision and agricultural resource allocation, instead shifting the onus for driving agricultural regeneration onto the private sector, and placing responsibility for resource management and allocation on community institutions. High-value horticultural crops and livestock have been prioritised as subsectors that will lead agricultural development through the construction of value chains.¹⁶

2.3 Pro-poor growth and agricultural development

There has been considerable debate over how to

¹⁵ Government of Afghanistan, “Draft Land Policy” (Kabul: GoA, 2007), Section 2.2.6.

¹⁶ MAIL, “Agriculture Strategy,” Section 2.2.

achieve the I-ANDS stated objective “to achieve pro-poor growth,”¹⁷ and whether programmes set out in individual sector strategies (including agriculture) really can benefit the poorest and most vulnerable.¹⁸ This debate reflects a broader discussion in the development literature about what is meant by pro-poor growth and the conditions under which it can be facilitated.¹⁹

While it is now widely agreed that economic growth is a prerequisite for poverty reduction, many argue that growth in itself is not necessarily pro-poor. Some development economists contend that the trickle down hypothesis has been discredited, and that policies that are truly pro-poor should ensure that growth benefits the poor more than the non-poor.²⁰

Agriculture is widely recognised as the principal factor driving national economic growth and poverty reduction in many developing countries, and thus the impact of policies intended to foster growth in this sector has been closely scrutinised. A study conducted in 2005 examined the impact of economic liberalisation in agriculture on rural poverty and pro-poor growth in 12 developing countries since the 1990s. The study concluded that poverty declined overall in all but one of the 12 countries.

Differences in natural resources and access

¹⁷ Government of Afghanistan, National Development Strategy: An Interim Strategy for Security, Governance, Economic Growth and Poverty Reduction (Kabul: GoA, 2005), Summary report, page 4.

¹⁸ For a wider discussion of this issue, see Afghanistan Development Forum, “From Liability to Asset: Ensuring Pro-Poor Growth in Afghanistan” (Draft for discussion at the Afghanistan Development Forum, 2005) and William Byrd, “Afghanistan Needs Pro-Private Sector Growth” (Unpublished draft, World Bank, 2005).

¹⁹ See for example, Aart Kraay, “When is growth Pro-Poor? Evidence from a panel of countries,” *Journal of Development Economics* 80, no 1 (2006):198-227; and M. Ravallion, “Pro-Poor Growth: A Primer,” Development Research Group, World Bank, available from http://209.85.173.132/search?q=cache:F1myuRPG9KoJ:siteresources.worldbank.org/INTPGI/Resources/15174_Ravallion_PPG_Primer.pdf+Ravallion,+pro-poor+growth&hl=en&ct=clnk&cd=1&gl=au, 2006, (accessed April, 2009).

²⁰ See for example N. Kakwani and E. Pernia. “What is Pro-Poor Growth?” *Asian Development Review* 18, no 1 (2000): 1-16.

*to markets often result in uneven growth and growing inequality within the sector, between large and small farms and between regions.*²¹

The study further highlighted the inherent risk and vulnerability experienced by smallholder farmers in newly liberalised economies, and identified this as a factor contributing to poverty. In addition, it revealed that in all 12 countries, economic reform in agriculture seemed to lag behind reform in other sectors. The African case-study countries in particular face great difficulty establishing enabling environments for private sector replacement of government functions.²²

Even where strong liberalising and pro-growth agendas prevail, it may be acknowledged that greater market engagement heightens risks for producers of agricultural commodities, if traditional risk-management arrangements are removed and farmers left vulnerable to market instabilities. There is also recognition that certain classes of producer may be excluded from supply chains on the basis of their ability to achieve production standards or competitive economies of scale.

*The process of transformation from a system wholly dependent upon low productivity agriculture to one that is diverse, dynamic and presents increased opportunities to poor people is not entirely virtuous...it is a process with serious imperfections, the principle one being that in communities with poor market access, poor endowments of natural resources and low levels of political and social capital, poverty persists...*²³

Accordingly, growth models that emphasise liberalisation and private sector stewardship see smallholder farmers necessarily transitioning from smallholder agriculture into labour opportunities associated with the growth of agribusiness and

21 World Bank Agriculture, "Rural Development and Pro-Poor Growth: Country Experiences in the Post Reform Era," Agriculture and Rural Development Discussion paper 21 (2005), page 43.

22 Kraay, "When is Growth Pro-Poor."

23 T. Mahoney, "Enabling Pro-Poor Growth through Agriculture" (Unpublished paper, Regional Meeting on Agricultural Trade and Development in South East Asian, Countries, 2005), page 15.

agricultural markets, and the absorption of smallholdings into more competitive entities. However, it is questionable whether this approach would lead to poverty reduction and greater livelihood security in Afghanistan.

The need for some form of economic growth in order to reduce rural poverty is recognised, but there is little consensus on the need for (or the attributes of) special strategies to ensure that growth is pro-poor. These questions are of particular importance in Afghanistan, where chronic poverty is widespread, risk and vulnerability are high, and institutions offering social protection may be weakened.²⁴

However, consensus has been reached on some points. Most importantly, there is growing recognition among all development economists that agricultural policies must focus on the livelihoods of people within the sector, and not only the output of the sector. This realisation leads to a more comprehensive appreciation of the networks, structures and processes that affect rural livelihoods, and the factors that need to be considered as important for agricultural policy. As a result, there is an increasing recognition of the differences in rural livelihoods (in terms of farm assets, capacities and context) and the role (if any) that agricultural production plays. This, in turn, led to wider acceptance of the need for better policies that are sensitive to both the organisation of farm livelihoods and local agro-ecological and economic development contexts.

There are important knowledge gaps that must be addressed if poverty reduction is to be addressed through agricultural policy: how farming systems fit within rural livelihoods and the wider rural economy in Afghanistan; how agricultural resources and livelihoods are differentiated by localised opportunities for (and constraints on) participation in sector growth; and how policy might best address these specific needs.

Research conducted during the first year of the WOL project confirmed that farming systems in Afghanistan are highly differentiated by access

24 Afghanistan Development Forum, "From Liability to Asset."

to resources and opportunities. The research also highlighted some of the associated risks and vulnerabilities, including the emphasis on subsistence agriculture, inequities in rural power relations, and the complex factors that drive opium poppy cultivation. Nevertheless, despite widespread poverty, most farming households were found to be resilient, dynamic and innovative, with a large proportion engaging with labour markets, using informal networks and institutions, and otherwise diversifying economic activities in response to changing conditions.²⁵

Agricultural sector policy must foster dynamic growth within this complex livelihoods framework, while ensuring that the poor will be able to participate in new opportunities, and thereby contribute to further growth. Specific research objectives for the second year of the WOL project (within the context of broader project objectives) were framed in the light of this policy challenge.

2.4 Research objectives

The overarching research objectives of the WOL project are set out in the first WOL Synthesis Paper, and include generating evidence-based recommendations for enhancing the productivity and sustainability of agriculture, strengthening rural livelihoods, and reducing dependency on opium poppy cultivation.

During 2006, rapid policy process advancement focused on horticulture and livestock, with the objective of stimulating rural economic growth. However, WOL research findings during the first year suggest that many of the farming households studied were not well positioned to take advantage of this planned economic development. Therefore, studies in the second year focused more closely on how farming systems actually work (in terms of resource access, production, consumption and market access), and their impact on rural livelihoods. The overall objective was to identify opportunities and constraints affecting farmers'

participation in agricultural and rural strategies, and how these can be refined and implemented. A specific enquiry that arose from the first year of research focused on the relationship between farmers' decisions to cultivate opium and the impact of economic liberalisation and the growth of agricultural markets.

In addressing the overall research objectives of the WOL project, a number of subquestions were raised at the end of each thematic section in the first Synthesis Paper. These questions were derived from key points and issues emerging from the first year of the WOL project, and constitute a framework for advancing the project toward its second and third year goals. Some of these questions (notably those relating to the performance and function of agricultural systems) were used to structure research activities during the second year of the project (Table 2).

2.5 Research methods

As during the first year of the WOL project, second year studies used a number of complementary methods, combining in-depth thematic studies with more structured longitudinal data collection and physical measurements.

During the second year of research, six thematic studies were undertaken.²⁶ Researchers selected case-study sites that had the best potential to inform specific research questions. Consequently, studies during the second year of the WOL project have a narrower geographic focus, but by concentrating efforts on fewer sites achieve greater depth than previous studies. Opium-related studies alone continued in the same provinces as during the first year (albeit with a shifting focus of enquiry). As before, thematic studies encompassed a range of research methods, including structured and semi-structured interviews with key informants, and the use of secondary data.

25 Roe, WOL: Farming Systems and Rural Livelihoods.

26 These studies were individually published as part of the WOL case-studies series.

Table 2. Supplementary research questions emerging from the first year of WOL research

<i>Land Tenure</i>	What proportion of land is cultivated under the different forms of tenure? How does tenure status change through time or under different agro-ecological conditions?
	Why is there such diversity in sharecropping terms? Is there evidence for a relationship between sharecrop terms and the productive value of land?
	How equitable are informal tenure systems and what are the implications for agricultural policy?
	How can (and should) government use customary land rights and informal tenure systems as the basis for a national land administration?
<i>Water Management</i>	Are customary systems of water management fundamentally inequitable? Can these inequities be measured?
	How does irrigation water supply affect yields, crop choices and land management?
	To what extent can the impact of irrigation efficiency be measured in livelihoods?
	How do water management institutions respond to water scarcity? What strategies do they adopt and how effective are they?
<i>Livestock Production</i>	If feed is a primary constraint on livestock production, how are animals managed and fed, and how are these feeds accessed?
	How do gross margins for livestock production compare with other crops, land use and production activities? What does this suggest about the allocation of cultivable land to fodder allocation?
	Which forms of livestock production have the strongest potential for development for market supply?
	How do livestock markets function and what problems exist in building livestock value chains?
<i>Opium Economy</i>	How are the gross margins associated with opium relative to other crops?
	How does opium production fit into farming systems and rural livelihoods?
	What is the impact of government policy, growth in market opportunities and agro-climatic variables on farmers' decisions to cultivate opium?
	Why is opium cultivation established in some areas and not others?
<i>Livelihoods</i>	What do farm budgets indicate about farmers' capacity to respond to market opportunities?
	What patterns of labour are associated with small farming and what is the potential for engaging with labour opportunities off-farm?
	What are the relative contributions of farm and off-farm activities to rural incomes? Does this differ between different production systems?

Box 1. Farming conditions

Early winter rains in late 2005 made Afghan farmers optimistic that 2006 would be a good year. Consequently, there was widespread investment in agriculture, and large areas of rainfed land were ploughed and seeded. However, after January 2006, many parts of Afghanistan experienced a dry period resulting in below-average precipitation for the season as a whole.

Through spring and summer, many parts of the country experienced scarcity of irrigation water, and crops were affected. Wheat production fell from 4.27 million tonnes in 2005 to 3.1 in 2006, leading wheat prices to rise in the second half of the year.

Of the four primary provinces where WOL research is conducted, only Kunduz had a good agricultural season in 2006. The other three provinces experienced drought conditions.

However, good rainfall came early at the end of the year and this was sustained through the 2006-2007 winter season. All provincial research sites received above-average rainfall in November and December 2006

Data source: Seasonal Agrometeorological Bulletin (2005-2006) and (2006-2007) US Geological Survey

Table 3. Distribution of households within monitoring group

Province	Research site	No. households (Total: 236)	Production system
Ghazni	Zala Qala	7	Semi-irrigated
	Pyada Rah	2	Semi-irrigated
	Qala-i-Naw	27	Irrigated
	Turmai	11	Irrigated
	Chechel Gumbad	6	Irrigated
Herat	Khalifa Rahmat	12	Rainfed
	Tunian	13	Irrigated
	Gawashk	10	Irrigated
	Ghorak	7	Semi-irrigated
	Sir Zar	12	Rainfed
Kunduz	Abdul Nazar	5	Rainfed
	Alam Boy	4	Rainfed
	Dana Haji	5	Irrigated
	Wakil Jangal	19	Irrigated
	Afghan Mazar	17	Irrigated
Nangarhar	Maruf China	11	Semi-irrigated
	Sra Qala	11	Semi-irrigated
	Khawaji	7	Semi-irrigated
	Othar Khel	10	Semi-irrigated
	Janikhel	18	Irrigated
Nomads	Khomari Khel	12	Pastoral
	Kutub Khel	10	Pastoral

Longitudinal monitoring of farms and households was also initiated in 2006.²⁷ Farm monitoring was a strategy used to generate a structure of systematically collected data to which other studies could refer. Specifically, monitoring was designed to capture farmers' management choices and the contribution of farming systems within the context of broader livelihoods. The household was identified as the most relevant level for this study, because it is the primary unit of production, consumption and decision-making.

This monitoring built directly on the baseline survey of the previous year, which established agricultural

²⁷ These studies were individually published as part of the WOL case-studies series.

and socioeconomic profiles for each of the 20 primary research sites around Afghanistan. These baseline results were used to select a sample of 236 farming households that reflect the incidence and distribution of assets and farm resources within their wider communities. While these sample households and farms are not statistically representative of their communities, at each research site they are congruent with the wider community profiles established by the 2005 baseline survey.²⁸

Using this approach, households identified for inclusion in the sample group for monitoring encompassed irrigated (126), semi-irrigated (55) and rainfed (33) production systems, as well as nomadic pastoral (22) households. The representation of these types of farming households within the monitoring group is summarised in Table 3. WOL field researchers undertook data collection at the end of each three-month period, with data retrospectively recorded for the winter, spring, summer and autumn seasons.

Standardised datasheets were designed and used to ensure the internal comparability and integrity of the data collected, both between research sites, between production systems (and resource conditions), and through time.

The WOL baseline survey indicated to researchers that men and women each hold specialist areas of knowledge relating to farm and household management. Therefore, separate (but simultaneous) interviews were conducted to differentiate gender-based knowledge. Two special datasheets were designed for completion during

²⁸ The selection of the monitoring group and design of data collection is described more fully in Alan Roe, *Water Management, Livestock and the Opium Economy: Findings from the First Year of Farm and Household Monitoring* (Kabul: Afghanistan Research and Evaluation Unit, 2009).

Table 4. Main data collected through farm monitoring

	Sections	Data collected
<i>Male datasheet</i>	Water	Sources and quantity used Amount received Irrigation maintenance Problems with irrigation
	Land	Type of land and terms of tenure
	Cropping	Cropping pattern Agricultural inputs Crop production and yields Consumption/sale/storage of crops Marketing of crops Cultivation problems
	Livestock	Livestock inventory Changes since last record Reasons for change Livestock inputs Livestock outputs Consumption or sale of products
	Labour	Labour resources Tasks on-farm Use of external labour Off-farm waged labour and incomes
<i>Female datasheet</i>	Consumption	Household constitution Types and quantities of food consumed Origins of food consumed Internal allocation of foods
	Labour	Female labour on-farm Women's farm decision-making Female work on dairy production Female work weaving for cash income
	Natural resources	Collection and use of wild plants Collection and use of natural fuels
<i>Market datasheet</i>	Farm gate prices	All commodities produced or consumed

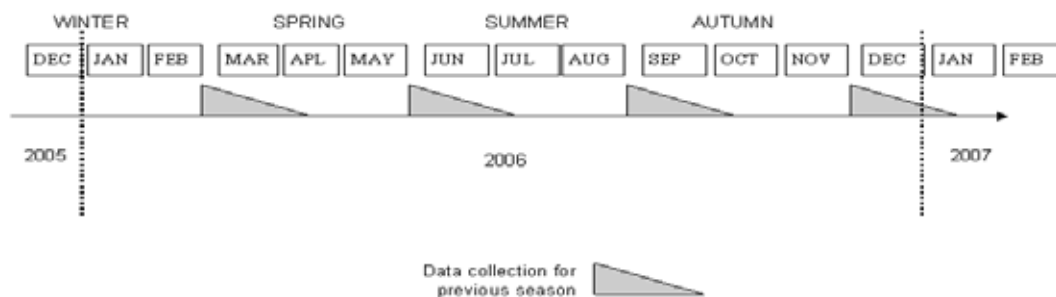
each farm visit, one for male (head of household) respondents, and the second for female (senior female or female head of household) respondents. A third datasheet recorded farm gate prices for local agricultural products, services and commodities at the time of data collection. An overview of the main data collected is summarised in Table 4.

The research team sought to ensure that the data collected was of high quality.

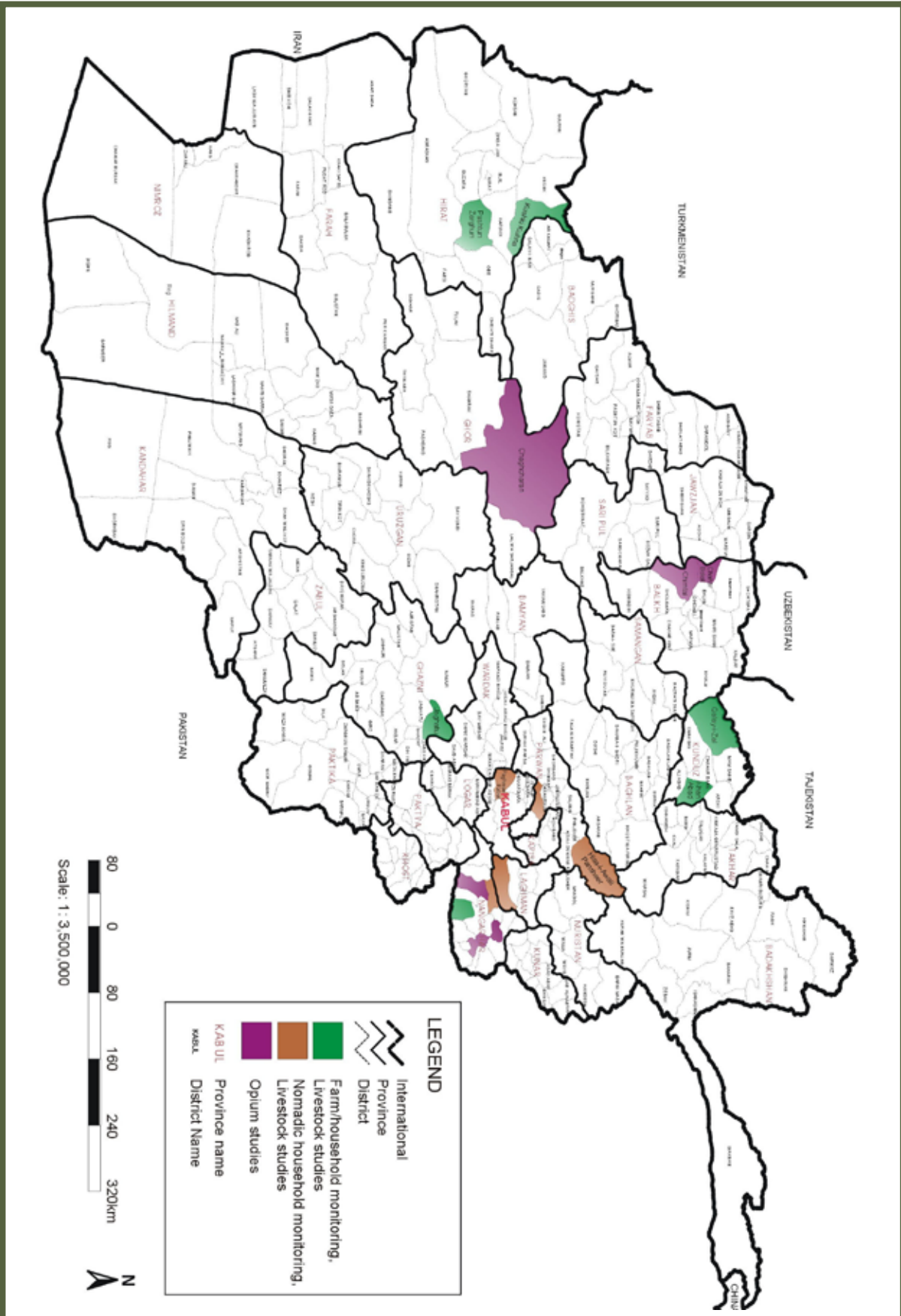
In addition to establishing data collection protocols and providing extensive training for field teams, teams were subject to supervisory evaluations in the field and team supervisors immediately reviewed the completed datasheets. The objectives, requirements and outcomes of monitoring were discussed with community elders and with all households that agreed to participate before data collection began. Maintaining a strong collaborative relationship with communities and local government officials was fundamental to collecting data effectively. The first four "rounds" of monitoring collected data from households for the winter, spring, summer and autumn seasons of 2006 (see Figure 2), giving researchers an overview of natural resource use and farm management during this period.

In addition to interviews, the WOL research team established a system of taking measurements relating to livestock production and aspects

of irrigation flows during the first year of research. These measurements continued to be taken during the second year of the project, and findings arising from them were presented in the related thematic studies.

Figure 2. Household monitoring schedule during the second year of WOL research

Map 1. Locations of WOL research activity in Afghanistan (2006-2007)



3. Land Administration and Tenure

The first year of WOL research reaffirmed that access to land (whether private or common property) underlies all other aspects of agricultural production and livelihoods in Afghanistan. Researchers found that in nearly all cases, Afghan farmers owned and otherwise accessed agricultural land under informal rights and customary tenure mechanisms. Initial observations indicated that these traditional mechanisms also function at the intra-communal level, leading to the suggestion that these customary land tenure systems could be drawn on when planning a national land administration. However, preliminary studies raised some important issues relating to resource access equity with respect to subordinate land rights (e.g. sharecropping).

The need to identify steps toward achieving policy goals under Afghan rural conditions was highlighted during the second year of WOL research by the preparation of the Government's draft land policy, and the 2007 I-ANDS benchmark for establishing a system of land registration. Researchers analysed the principal opportunities and constraints relating to initiation of land registration, with reference to the experience of other countries emerging from conflict.²⁹

I-ANDS strategies for agricultural growth and poverty reduction prioritise the development of horticulture and value chains for high-value crops, and thus it is necessary to consider the significance of recent findings on land tenure status in the implementation and outcome of these policies. The following discussion draws on some of the evidence from the second year of WOL research, and then highlights the relevant policy implications.

3.1 The need for an effective land registry

29 Alec McEwen and Sharna Nolan, "Water Management, Livestock and the Opium Economy: Options for Land Registration," (Kabul: Afghanistan Research and Evaluation Unit, 2007).

Since the formation of the Transitional Authority in 2002, the absence of an effective land administration has been identified as a major hurdle for agricultural development, as discussed in an earlier publication.³⁰

The first year of WOL research confirmed that customary land tenure systems widely underpin basic agricultural production and informal transfers of land within communities. However, because ownership is not formally registered and recorded, farmers remain vulnerable to illegal appropriation of their land by powerful individuals and to opportunistic claims on property supported by spurious evidence, as well as to genuine confusion over ownership rights. The lack of a land registry and recognised entitlements to land appear to be contributing to widespread disputes over land. These result in social and civil instability, and agricultural under-productivity. Consequently, an effective method of land registration has been identified as a first step to establishing a comprehensive land administration, which would include mechanisms for registering claims, facilitating allocation and transfers of lands, and adjudicating property rights at the community level.³¹

Effective land registration is expected to offer increased security of tenure, reduced likelihood of ownership or boundary disputes, simpler and less costly transactions, improved access to credit, and increased market values for land. Importantly, it is anticipated that land registration would help free up markets for agricultural land, which are currently stifled. Furthermore, improved security of tenure and rising land values would act as both a stimuli for farmer innovation and increased investment in land, consistent with agricultural development plans.

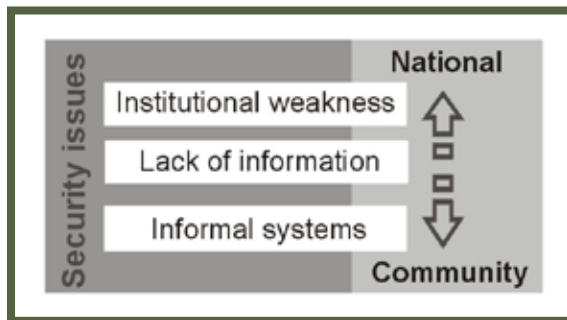
30 See Liz Alden Wily, *Land Rights in Crisis: Restoring Land Tenure Security in Afghanistan* (Kabul: Afghanistan Research and Evaluation Unit, 2003) and Liz Alden Wily, *Looking for Peace in the Pastures: Rural Land Relations in Afghanistan* (Kabul: Afghanistan Research and Evaluation Unit, 2004).

31 Government of Afghanistan, *National Development Framework*.

3.2 Challenges to achieving land registration

Several major challenges will need to be overcome to achieve effective land registration in Afghanistan, including institutional weaknesses, the lack of an existing information base, the entrenchment of informal systems, and general insecurity. These challenges are closely interlinked and are present from the community to the national level (Figure 3).

Figure 3. Challenges to land registration in Afghanistan



Afghanistan has a long history of attempting to administer land, but the lack of institutional capacity remains one of the greatest challenges to rural land registration. In theory, responsibility for rural land administration falls primarily to the *Amlak* (lands department) at the Ministry of Agriculture Irrigation and Livestock (MAIL). Other state institutions are also involved, including the Afghanistan Geodesy and Cartography Head Office (AGCHO), the Ministry of Justice and departments of the Ministry of Rural Rehabilitation and Development (MRRD), as well as provincial and district authorities.

The *Amlak* and AGCHO have been largely inactive for decades, however, and are very poorly resourced. Some staff have surveying and cartographic training, but this was typically 30 years ago, and staff therefore have limited understanding of modern digital surveying and data management techniques. Visits to provincial *Amlak* offices reveal that land records have not been updated for many years, are poorly archived, and in some cases are deteriorating through mismanagement. In many instances, there are no resources for staff to travel outside of provincial offices, and security constraints also hinder movement. It is clear that

without very substantial investment, training and capacity building, these departments could not assume responsibility for a centralised land administration and effective lands registry.

Compounding the chronic weakness of land administration institutions is the absence of a functional legislative framework. Afghanistan's complex political history leaves a legacy of multiple frameworks, decrees and statutes applied by successive regimes. These different sources of law are in many cases inconsistent, piecemeal and sometimes contradictory, allowing competing claimants to the same land. Thousands of land claims accordingly overwhelm the Government court system, but public confidence in this system of adjudication is low due to concerns over ethnic biases and corruption. However, the completion of the Draft Land Policy by the I-ANDS Land Policy working group in January 2007³² represented a major step toward establishing a political and legal framework within which a land administration could be established. However, until this policy is fully understood throughout government agencies, and legislative and other implementation tools are in place, it will be difficult to make meaningful progress on land registration.

A second major challenge to the registration of rural land in Afghanistan is the lack of an existing framework of land administration records or comprehensive cadastre. Despite the historical precedent for record keeping, land records (such as they exist) are today dispersed throughout a range of institutions including the *Amlak*, the Department of Cadastral Survey at the AGCHO, and various provincial and district authorities. In some areas, the courts serve as repositories of land records, with thousands of deeds in their provincial archives (*Makhzans*). Even were it possible to collate all existing land records, these come in a wide variety of forms, as customary law (*urfi*) documents witnessed by neighbours, elders or local leaders, or as deeds notarised through the court system. Other landholders claim land rights from grants made by kings or former rulers; legal

³² The (Draft) Land Policy was approved by the Cabinet in September 2007 to become the National Land Policy

letters, decrees or firman (royal decrees) may document these. Further evidence is held in the records of the cadastre, although most current entries are recorded as “unconfirmed” because title could not be conclusively established. Other evidence includes taxation records compiled during the 1970s, although these were based on unreliable and unsubstantiated self-reporting.

A national cadastral survey that commenced in the 1960s progressed for nearly 30 years before being abandoned by the Taliban. During that period, about 30 percent of agricultural lands were surveyed, mainly around Kabul, Kandahar and Herat. All information was recorded in analogue formats and most surveyed areas were not connected mathematically to the national triangulation network, meaning they could not be geographically related to each other.³³ Indeed, the current status of cadastre in Afghanistan is so poor that it has been deemed better to start any new survey from scratch rather than try to update existing information.³⁴ The task of undertaking a comprehensive cadastral survey of lands would be an enormous task in terms of time and resources: The Department of Cadastral Survey has no idea how long such an endeavour would take to complete (probably decades), but the first three years alone have been budgeted at close to US\$2 million.³⁵

A third potential obstacle to the establishment of a central land registry is that many rural communities currently use informal and customary systems for managing, recording and transferring land rights, and under most circumstances they feel that these systems serve their needs well. The first year of WOL research showed that while some types of land transfer are documented informally within communities, many are not. To a large degree, villagers rely on oral history and local community

33 Alec McEwen and Brendan Whitty, “Water Management, Livestock and the Opium Economy: Land Tenure” (Kabul: Afghanistan Research and Evaluation Unit, 2006).

34 Afghanistan Geodesy and Cartography Head Office, “Project Document for National Cadastral Survey 2003” (Kabul: Afghanistan Geodesy and Cartography Head Office 2003).

35 AGCHO, “Project Document.”

knowledge to determine boundary locations. Dispute resolution at a community level by elders or councils was described as generally effective, and bestowed an acceptable degree of tenure security to farmers (at least among those who participate within the same land rights system).³⁶ Farmers perceived their informal systems to be accessible, simple, cheap and legitimate, while often viewing government and court institutions as tainted by ethnic bias and corruption.

However, the situation is more complex than one in which community values represent a rural “ideal.” Considerable inequities are associated with traditional land relations in Afghanistan, and land use transactions such as sharecropping and mortgage may favour landed (and sometimes absentee) elites over landless tenants and other groups disadvantaged by age, gender or ethnic groups.³⁷ Nevertheless, WOL research found that most farmers would like to see existing customary entitlements and documentation formalised in some way to offer them greater protection.

Consequently, future steps toward land registration in Afghanistan should recognise two distinctive features of land relations: the value of an established and functioning system of land rights, and the capacity for communities to adjudicate internal disputes with relative success and legitimacy. Traditional systems are not only cheap but simple and rooted in community values. Accessibility and local control are perceived by communities to guarantee integrity of both land records and of the system itself.

Finally, in present-day Afghanistan, security concerns permeate all aspects of policy implementation, governance and community land management. The lack of physical security and increasing insurgency in the provinces tends to overshadow the national Government’s commitments to devolve powers and responsibilities to the provincial or community level. Provincial or sub-provincial governance structures

36 McEwen and Whitty, “WOL: Land Tenure.”

37 For wider discussion of rural land relations in Afghanistan see Wily, “Land Rights in Crisis.”

are chronically weak and politically unreliable, further exacerbating this trend, and fostering a Kabul-centric administrative outlook. Physical insecurity obviously constitutes a threat to the process of collecting evidence of land ownership, as does the prevalence of illicit crops (primarily opium poppy) in some areas. Opium cultivation may be a contributing factor to the incidence of rural conflict, and uncertainty and sensitivity surrounding land ownership.³⁸ The cultivation of illegal crops combined with rural insecurity have produced an environment in which powerful and influential individuals have been able to appropriate large areas of land. The displacement and gradual return of approximately three million Afghan refugees is resulting in a deluge of claims and counter-claims on land now under occupation or use by others. While many claims are genuine, some are made by individuals seeking to take advantage of the turmoil.

The lawlessness and unequal division of power that is characteristic of rural Afghanistan presents challenges for all aspects of civil governance and administration. Some argue that effective registration of land is impossible given the current instability, while others counter that stability and security are unlikely to be achieved until an equitable and effective land administration mechanism is developed and implemented.

3.3 Land registration post-conflict: Lessons learned

Afghanistan is not unique in its experience of conflict and rural instability, nor in the challenges it faces in moving toward the registration of agricultural lands to allow an effective land administration. In supporting the work of the I-ANDS Land Policy working group, WOL researchers undertook a brief survey of how the process of land registration has been approached in other post-conflict environments, and the lessons to be drawn from

these approaches.³⁹

This comparative study encompassed nine countries that have emerged from periods of civil conflict over the last 20 years. Case studies included four African, four Asian and one European country. While these drew on the wider context for registration and the specific measures adopted in each country, an additional five key issues emerged from the study (see Table 5):

- The state's position on individual ownership of land.
- How land registration should be implemented.
- The types of evidence admissible to support land claims.
- How adjudications of disputed claims were undertaken.
- How land records were recorded.

The way that each country dealt with each of these five issues is summarised in Table 5. Broader lessons learned arising from the comparative study are given in Box 2.

Most jurisdictions aim to develop a system that will ultimately confer full legal title on landholders. However, due to political instability, problems of implementation and lack of resources, some governments have commenced with a preliminary registration of claims as an interim and achievable first step. As well as paving the way toward land titling, preliminary registration of documents can serve to support property markets.

38 J. Koehler, "Conflict processing and the Opium Economy in Afghanistan." (Jalalabad: PAL/GTZ, 2005).

39 McEwen and Nolan, "WOL: Land Tenure."

Box 2. Lessons learned from comparative study of post-conflict land registration

The issue of whether a state land administration system should be rooted in the private or public ownership of lands was essentially ideological, but the majority of states have opted for a system based on rights of private ownership.

There is a tendency for states to drive land registration through “systematic” programmes. “Sporadic” voluntary registration by landholders is more protracted but may be favoured where the state lacks financial or technical resources.

In addition to legal documents, most jurisdictions accept customary law, informal documents and oral testimonies as evidence to substantiate claims to land. This convergence of traditional and statutory rights can help legitimise the land registration process.

Adjudication processes can either be led by the state or undertaken by the community with state facilitation.

Some jurisdictions have opted for a high-tech, cadastre-based registry from the outset. Others have started with interim, low-tech forms of recording due to a lack of resources or technical capacity. However, the complex technical requirements for a cadastral survey and computerised registry have in some instances led to delays.

Table 5. Comparative approaches to land registration post conflict

Country	Ownership		Implementation		Evidence		Adjudication		Recording	
	State	Private	Sporadic	Systematic	Informal	Formal	Community	State	Low-tech	Hi-tech
<i>Rwanda</i>		✓	✓		✓		✓		✓	
<i>Cambodia</i>		✓		✓	✓		✓		✓	
<i>Sudan</i>	✓		✓		✓			✓	✓	
<i>Mozambique</i>	✓			✓	✓		✓		✓	
<i>Uganda</i>		✓		✓	✓		✓		✓	
<i>Kosovo</i>		✓								✓
<i>Palestine</i>		✓		✓		✓		✓		✓
<i>Vietnam</i>	✓			✓		✓		✓		✓

Ownership: Whether all land is deemed the property of the state or whether private ownership is possible

Implementation: Whether registration is conducted sporadically or systematically

Evidence: Whether informal and customary evidence is admissible to support claims

Adjudication: Whether the adjudication of claims occurs at the community level or is undertaken by the state

Recording: Whether land records are built up through a computerised cadastre

While the focus of conventional approaches to land administration is often on “hard system” components, such as cadastre, surveying, boundary demarcation and information management, many believe that the special conditions of post-conflict environments mean that “soft system” components require greatest attention in the early stages.⁴⁰ Accordingly, emphasis should be placed on achieving social, political and economic stability through legitimate land registration, reconciliation and good governance. Adjudication should be incremental, transparent and participatory, and convened at the community level.

Furthermore, planners might consider that land registration initially be limited to provisional or qualified titles (such as deeds), which can remain open to challenge until being transferred to absolute title after a specified period of time (a sort of “cooling-off” period). This minimises the risk of social destabilisation through the revival of disputes. Indeed, some consider that the immediate post-conflict period is a bad time to register full title.⁴¹

3.4 Land registration: Directions for Afghanistan?

Drawing on extensive fieldwork, widespread stakeholder consultations and review of secondary data, WOL researchers suggest guidelines for land registration that recognise the unique conditions of rural Afghanistan and are consistent with both government capacity and donor praxis. This approach has been discussed at length elsewhere⁴², but key principles are:

- *Incremental implementation:* Registrations should be state driven, but progress should be phased and incremental, linked to the introduction of appropriate legislation, improved governance and evolution of legitimate mechanisms for adjudication. Rushing into a system of titling land parcels before these mechanisms are in place or land occupancy has begun to stabilise carries heavy risks.
- *Learning by doing:* It is inevitable that many lessons will be learned through piloting and testing approaches to land registration. Implementation of registration should remain adaptive and follow the principles of “learning by doing.”
- *A community-based approach:* Working closely with communities would strengthen the land registration process, engage community support and access customary methods for dispute adjudication. By engaging with communities, the system would be seen as transparent, equitable and legitimate. Implementation costs would be minimised and public access to the registry improved.
- *The registry archive:* The physical storage condition of records needs to be improved (with digitised records being the ultimate goal) and they need to be made more accessible for amendment and updating by users. Ideally, they should be accessible locally, which would also help with transparency. Duplicate copies stored in multiple locations reduce the risk of tampering, fraud or loss.
- *Starting low tech:* A new cadastral survey using the latest technologies is wholly desirable and necessary for an effective system of land registration and titling. However, it may take some time to build the technical capacity for this, and the survey itself would take years or possibly decades before completion. In the interim, there needs to be some progress toward land registration, so preliminary and pilot registration can use existing cadastral information, metes and bounds descriptions or simple GPS readings.

40 C. Augustinus and M. Barry, “Land management strategy formulation in post conflict societies,” *Survey Review* 38, no. 302 (2006): 668-681.

41 J. Zevenbergen and P. van der Molen, “Legal aspects of land administration in post-conflict areas” (Paper given at the 2004 Symposium on Land Administration in Post-conflict Areas, Geneva, 29-30 April 2004).

42 McEwen and Nolan, “WOL: Land Tenure.”

- *Preliminary registration of claims:* Until a comprehensive land policy and legislative framework (including an adjudication system) emerges, a useful starting point would be a preliminary registration of claims, involving the collation of land claims evidence of all types (including oral testimony and witnessed statements) according to customary law in the form of a standardised registry of land parcels. A significant proportion of these would be uncontested and therefore might ultimately be tantamount to title, but some would require further adjudication. A registry of this type would constitute an important first step toward the recognition of legal titles.

WOL studies highlight the need for a practical approach to land registration that works in close collaboration with communities, and builds on customary systems of land ownership; rural Afghanistan's challenging and complex conditions, human and material resource constraints, and the stated policy goals and development aspirations of government and donors necessitate this approach. The approach should initially emphasise legitimacy and social justice, thereby contributing to the stability of rural communities, rather than immediately awarding full title after potentially divisive adjudication.

While the final goal of the process will be a fully updated cadastre and computer-based land titles registry, initial steps toward this goal in the form of a preliminary community-based deeds registry can begin immediately. Indeed, such initial steps have already been undertaken.⁴³

3.5 Tenure status and subordinate land rights

Establishing and recording private ownership of land through registration of claims is a necessary step toward achieving agricultural and rural

policy goals. However, preliminary WOL research also points to the diversity of tenure status in rural Afghanistan and suggests that this diversity influences decision-making by farmers regarding land use. An assessment of the capacity of farmers to respond to pro-growth agricultural policies must be based on a better understanding of how much land is held under different forms of tenure, and how this tenure status affects agricultural productivity.

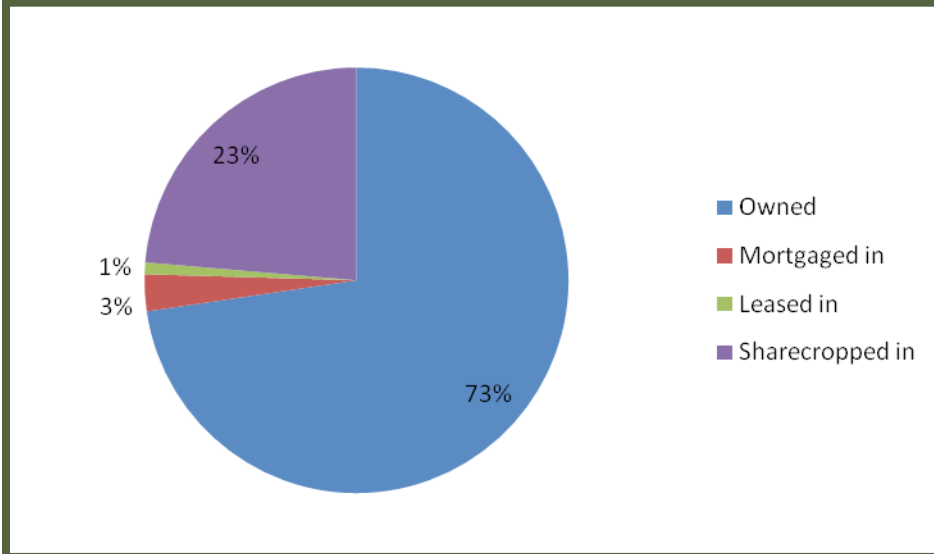
The WOL baseline survey indicated that between a one-quarter and one-third of all land cultivated at primary research sites was managed under subordinate rights (i.e. mortgage, lease or sharecrop). This is a higher proportion than generally acknowledged by other contemporary sources,⁴⁴ but data collected in spring 2006 (the season of most extensive cultivation) seem consistent with the initial findings (see Figure 4). However, the tenure status of cultivated land changes through the agricultural year, and the proportion of land reported to be held under subordinate rights diminishes after the harvest of winter crops, and again after the harvest of crops cultivated during the summer season (decreasing to 15 percent in the autumn).

This decrease occurs because most farmers enter into sharecrop arrangements for the duration of a calendar year, and after harvest they wait for early indications of the following year's agricultural conditions before committing to new terms. Thus, for a couple of months, during the summer and autumn, the proportion of land held under sharecropping arrangements appears to be lower, as the landless and landholders wait for indications of what the next season will bring. While it is in the interest of landless farmers to delay entering into new sharecrop agreements for as long as possible, if they defer this decision for too long they risk missing out on the best land when new agreements are brokered. The existence of a seasonal dimension to land relations means that assessments of tenure status that are based

43 Asian Development Bank. "Capacity Building in Land Policy and Administration Reform: Final Report." Technical Consultants Report. <http://www.adb.org/Documents/Reports/Consultant/38221-AFG/38221-AFG-TACR.pdf>, 2007 (accessed April 2009).

44 The National Risk and Vulnerability Assessment (NRVA) 2005 estimates about 6 percent of land nationally is managed under subordinate rights (although in some provinces this figure exceeds 20 percent).

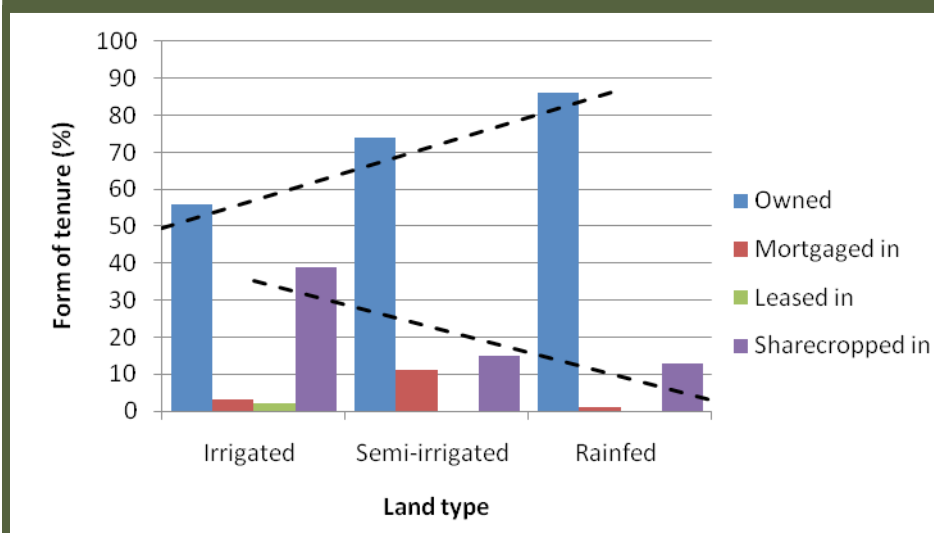
Figure 4. Overall proportion of land under cultivation by different categories of tenure (n=214)



irrigated (see Figure 5). In other words, the greatest diversity in tenure seems to be found in areas of higher-value irrigated land.

These findings are consistent with the hypothesis that the productive value of land influences tenure choices. Not only does irrigated land allow cultivation of high-value crops but, perhaps more importantly for landless sharecroppers, the risks of cultivation (especially those related to water scarcity and drought) are likely to be lower. First-year studies established that sharecropping as a land acquisition strategy may be intended to help spread risks to the landless farmer (by sharing costs of agricultural inputs); accordingly, the predominance of sharecropping on irrigated lands is unsurprising. Likewise, data shows that leasing of land (where the lessee carries all costs and risks) appears confined to irrigated valleys, where the highest-value crops can be grown in the greatest security, minimising the lessee's chance of incurring losses against his investment.

Figure 5. Tenure status of cultivated land by farm type (n=214)



on data collected at a single point in time should be treated with caution.

In addition to revealing seasonal change in the proportion of cultivated land held under subordinate rights, WOL monitoring data also highlights distinct trends in the prevalence of tenure forms across different farm types. Cultivation under subordinate rights (notably sharecropping agreements) is much more prevalent in irrigated lower catchments than on rainfed lands. Conversely, a higher proportion of cultivated land is owned in rainfed areas than in

First-year WOL studies observed that paying a mortgage is used to bypass cultural or other factors (such as *shafa*⁴⁵) that constrain the function of markets in the transfer of land. Monitoring data accordingly shows that acquisition and subsequent cultivation of land through mortgage is most common in upper catchment semi-irrigated areas where land is most scarce.

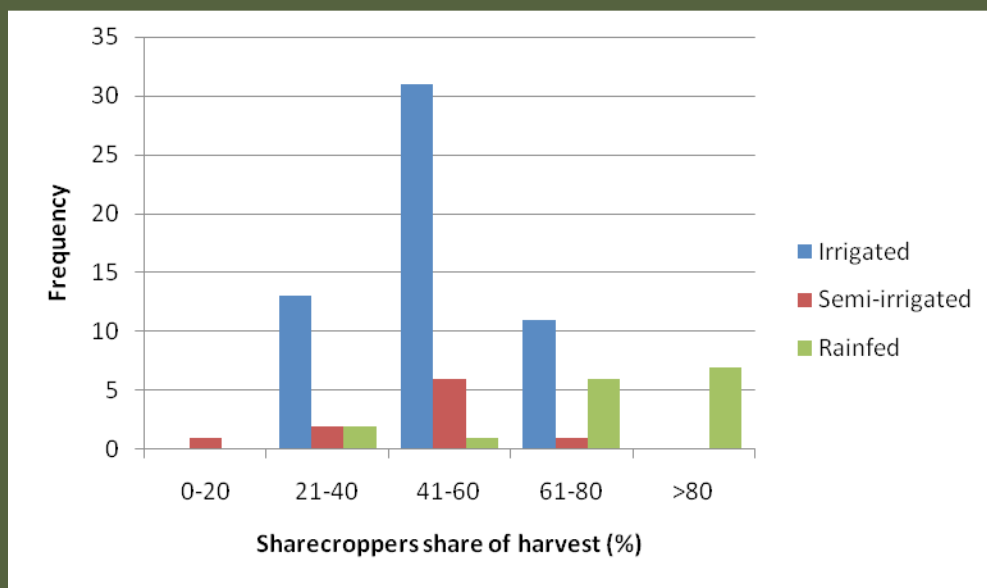
⁴⁵ *Shafa* rights compel a landowner wishing to sell land to offer it first to his heirs, and then his neighbours. This keeps land within families and communities but tends to stifle land markets.

3.6 Variation in sharecropping terms

WOL research shows that a significant proportion of agricultural land may be held under subordinate rights. By far the largest proportion of this is managed under sharecrop agreements, and sharecropping seems to occur predominantly at irrigated lower catchment sites. Within the WOL monitoring sample group, more than one-third of all irrigated land was cultivated under sharecrop agreements. Policy prioritising growth in horticultural production on irrigated lands will need to take into account the high incidence of sharecropping within this subsector.

On the basis of anecdotal evidence, it seems probable that the quality of land sharecropped will be a factor in determining sharecrop terms. Monitoring data from spring 2006 is used to explore this possibility. The frequency distribution of sharecrop terms by land type shown in Figure 6 reveals that the best terms for sharecroppers tend to be reported at rainfed sites (mean 76.53, Std dev 12.06), while sharecroppers cultivating on irrigated land tend to receive a lower percentage of the harvest (mean 48.09, Std dev 9.44). Sharecroppers on semi-irrigated land receive an even lower share of the harvest (mean 46.20, Std dev 13.70). These differences were found to be statistically different.

Figure 6. Frequency distribution of Sharecrop terms by land type (n=81)



The first year of WOL research showed that sharecropping terms (specifically the proportion of harvest received by the sharecropper) commonly range from 20 percent to 80 percent. Findings suggested that these differences could be related to factors such as land attributes, land availability and the respective contributions to agricultural inputs by landowner and sharecropper. However, beyond some anecdotal evidence, little was known about what influences these terms and therefore the viability of sharecrop-based livelihoods.⁴⁶

⁴⁶ For a fuller discussion and details, see Roe, *WOL: Farm and Household Monitoring*.

These disparities are likely linked to both land availability and productivity. If sharecrop terms were determined solely by land productivity (value of crops, yields and risk) sharecroppers would most likely receive the lowest share at irrigated land sites. However, the lowest mean share (albeit by a small margin) is received at semi-irrigated sites. As demonstrated by the first year of WOL research, land is most scarce at these sites and so landholders there command the best

terms. By contrast, rainfed lands are comparatively abundant and farming risks are higher, so demand for it is lower and sharecrop terms favour the sharecropper. Sharecroppers of high-value (lower risk) lands appear to receive a smaller share of the harvest than sharecroppers on lower-value (higher risk) rainfed lands, and it is instructive to consider why.

How true is the assumption that the poorest sharecrop terms are offered for the highest value crops? And does this supposition hold true for all land types? Unfortunately, monitoring data does not allow a statistical analysis of the relationship

between sharecrop terms and individual crops because individual cropped areas were not coded (and farmers often simultaneously cultivate multiple parcels of land held under diverse forms of tenure). However, when sorted by the best and poorest terms for each category of land, and identifying the main crops cultivated by each sharecropper the data indicates that the poorest sharecropping terms are reported by farmers cultivating high-value crops (such as poppy, stone fruit or horticultural crops), whereas farmers with the best sharecrop terms are consistently those predominantly cultivating low-value crops such as wheat and barley. This pattern holds true across all land types (see Table 6).

It is commonly assumed that widely differentiated sharecropping terms reflect differences in the relative contributions of agricultural inputs by the landowner and sharecropper. Anecdotal evidence from the first year of WOL research suggested that much of the difference in sharecropping terms was attributable to respective levels of contribution

to these inputs, but this is not entirely supported by the monitoring data. Four major categories of agricultural inputs (farm labour, seeds, fertilisers and farm traction) were studied within the context of reported sharecropping agreements. This data set shows that in the majority of cases, most agricultural inputs (for all types of land) remain the responsibility of sharecroppers. The largest exception is the provision of seed for irrigated lands, which are provided by the landowner in about 38 percent of cases. In all other cases sharecroppers contribute more than three-quarters of agricultural inputs on all land types.

The respective contributions of landowners and sharecroppers for different land types can be seen in Figure 7 (over page). In the majority of cases, sharecroppers receive little visible contribution from landholders to agricultural inputs, despite wide variation in sharecropping terms between different land types.

Table 6. Contrasting high and low terms of sharecropping by crop and land types

	Low share of harvest			High share of harvest		
	Farmer (%)	Crops cultivated	Village, Province	Farmer (%)	Crops cultivated	Village, Province
<i>Irrigated</i>	33	Apples, plums, fodder, potatoes	Chechel Gunbad, Ghazni	60	Wheat, barley	Tunian, Herat
	33	Plum, apples, potatoes	Chechel Gunbad, Ghazni	60	Wheat, barley, spices	Tunian, Herat
	33	Plum, fodder, potatoes	Chechel Gunbad, Ghazni	60	Wheat, barley, pulses fodder	Gawashk, Herat
<i>Semi-irrigated</i>	20	Opium poppy, maize	Sra Qala, Nangarhar	50	Maize, cotton	Maroof China, Nangarhar
	33	Apricot, apple, fodder wheat	Zala Qala, Ghazni	60	Wheat	Ghorak, Herat
	33	Apples, plums, wheat	Zala Qala, Ghazni	66	Wheat, barley	Ghorak, Herat
<i>Rainfed</i>	50	Chickpea, wheat	Sir Zar, Herat	83	Wheat, barley	Sir Zar, Herat
	50	Watermelon, melon	Abdul Nazar, Kunduz	86	Wheat	Sir Zar, Herat
	60	Barley	Khalifat Rahmat, Herat	86	Wheat	Sir Zar, Herat

3.7 Land: Opportunities and risks for agricultural policy

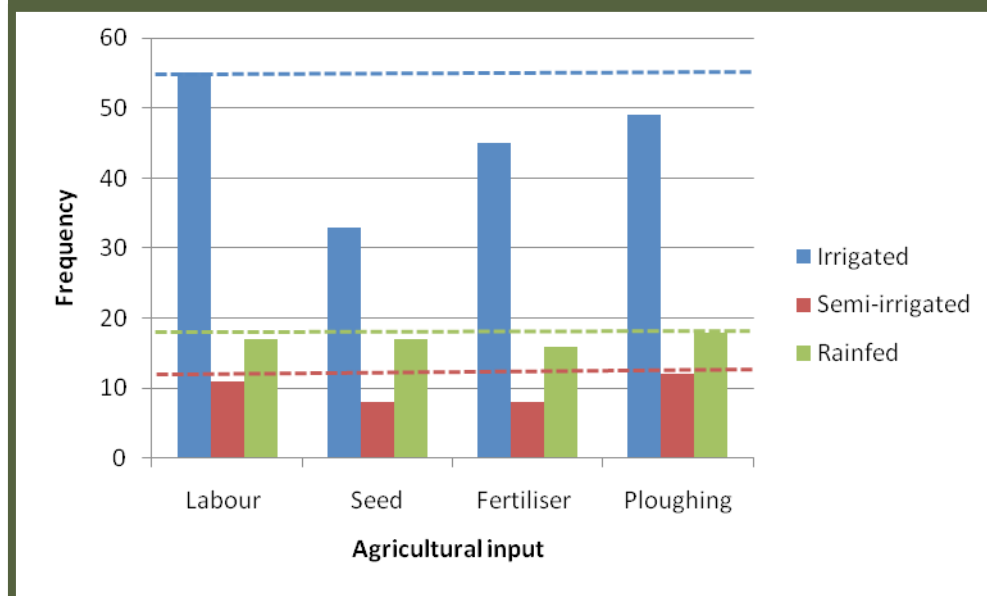
National strategies for agricultural growth and rural poverty reduction will ultimately depend on the introduction of an effective system of land administration in Afghanistan. Security of tenure and vibrant markets for agricultural land are necessary prerequisites to fostering agricultural competitiveness, investment and innovation in farming.

WOL research suggests that there are good arguments for initially limiting the registration of land to a collation of deeds and evidential material through a community-based process. This could serve as a preliminary step toward awarding full title when the appropriate government capacity, information baseline and legislative tools have been established. Nevertheless, a system of preliminary deeds registration could confer some of the benefits of a full registry. It would formalise individuals' claim to land and offer a level of recognition and protection while enabling the Government to compile an inventory of landholdings for taxation

or land management purposes. A deeds registry could also formalise the transfer of interests in land and so help stimulate rural land markets. Land registration of this type is well within the current capacity of government officials working with community institutions.

Policymakers must also recognise that a high proportion of agricultural land (particularly those areas suitable for cultivation of high-value horticultural crops) is managed under subordinate rights, primarily sharecropping. This will affect how wealth generated through growth in the sector disperses through the rural economy. The organisation of sharecropping terms as they now stand would direct the largest proportion of returns into the hands of the landowners. This raises the risk that growth in the horticultural subsector (where a high degree of sharecropping occurs) may exacerbate wealth differences, rather than reduce poverty among vulnerable sharecropping households. Subordinate land rights play an important role in facilitating access to land and, therefore, these need to be considered when planning pro-poor agricultural growth.

Figure 7. Sharecroppers' contribution of agricultural inputs under recorded sharecropping agreements (100% for each category given as dotted lines)





Farm plots, Herat

4. Irrigation Water Management

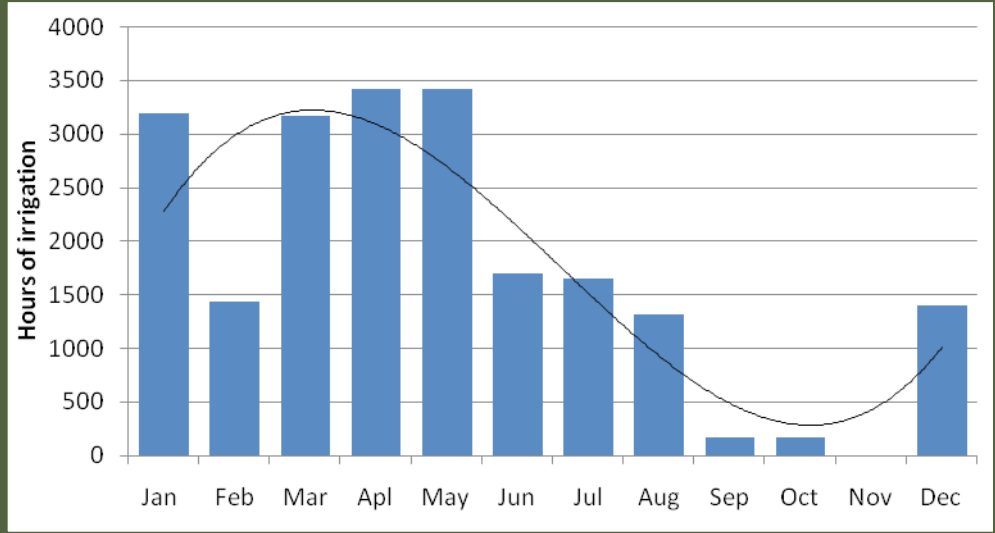
Studies of irrigation systems during the first year of the WOL project confirmed that at most locations in Afghanistan surface water irrigation is subject to community management. Although water is often scarce in upper catchment systems its management is not highly politicised and so it is often subject to the control of traditional leadership structures. By contrast, in lower catchment areas, hydraulic boundaries often encompassed the lands of multiple communities and so management is politically more complex, usually involving a hierarchy of specialist *mirabs* (water masters).

Although first-year WOL data showed that social water management is practiced at most research sites, there was anecdotal evidence (particularly in lower catchment areas) of shortcomings in terms of water management performance and the equity of water allocation.

Given the Government's stated policy goal of delegating responsibility for water management to community-based institutions, second-year WOL studies focused more closely on how effectively these institutions perform in managing water.⁴⁷ Studies reviewed the links between community management of water and the pro-poor rural policy agenda, building directly on first year WOL findings by assessing the relative effectiveness of irrigation management and the implications for rural livelihoods.

⁴⁷ WOL research focusing on the infrastructural aspects of irrigation has been published as Bob Rout, *How the Water Flows: A Typology of Irrigation Systems in Afghanistan* (Kabul: Afghanistan Research and Evaluation Unit, 2008).

Figure 8. Total reported monthly irrigation 2006 (n=171)



4.1 Farmer access to irrigation water

During the first year of WOL research it was not possible to enumerate access to water or accurately determine where irrigation waters were being sourced from, which is essential in understanding how effectively and equitably irrigation systems are performing. However, WOL monitoring data collected from irrigated and semi-irrigated farms now reveal distinct patterns in how farmers access water.⁴⁸

Data was collected to calculate the duration of irrigation water flow received by each farmer each month,⁴⁹ enabling researchers to characterise how water was being accessed through time at different types of farming sites. Overall, these findings were consistent with the expected cycle of water availability (Figure 8).

⁴⁸ For a more comprehensive presentation of data and discussion, see Roe, *WOL: Farming Systems and Rural Livelihoods*.

⁴⁹ Irrigation allocations are traditionally measured by time, not the absolute quantity of water received. The latter measure would require knowledge of the unit or volume rate of flow.

In 2006, the early peak in irrigation followed the early winter rains of late 2005, which fell as rain rather than snow and so entered river systems. The period of major irrigation occurred during the spring months of March, April and May as winter snow melted. During the summer and autumn seasons, water became increasingly scarce (particularly due to the drought conditions) before the cycle began again with early winter rains. The differences between water access at upper catchment (semi-irrigated) farms and lower catchment (canal irrigated) farms are masked within the aggregate data.

WOL data from 2006 shows that during the peak irrigation months, there was little difference between the mean duration of irrigation flows received by farmers at semi-irrigated and irrigated sites. However, differences in irrigation water access became more apparent in the summer. Farmers of semi-irrigated upper catchment lands faced severe water scarcity, while in the lower catchments, irrigation flows continued longer into the summer, supporting a second (summer) crop in some areas. Nonetheless, standard deviations (as measures of dispersion) suggest that large differences in access to irrigation water occur, particularly among lower catchment irrigated sites (Table 7).

Examining the use of different categories of water source through the year, data shows that farmers may use water from multiple types of sources simultaneously, or even multiple sources of the same type (e.g. irrigating land from separate canals). The largest number of different water sources in use occurs during the spring in both the upper and lower catchment areas, possibly because

of the relative abundance of water at that time. The number of irrigation sources used later in the year decreases as water becomes scarcer in summer and autumn.

Farmers of upper catchment sites use a variety of available water sources to meet their irrigation needs, including long and short *karez* (underground aqueducts), wells, surface springs, tertiary canals, water harvesting and snow pits. By contrast, lower catchment farmers are more heavily reliant upon a single source of irrigation water (tertiary canals), and can only occasionally tap additional sources. This may reflect the relative permanence and reliability of canal flows in river valleys. However, despite the flexibility and opportunism practiced by farmers in upper catchments, none of the monitored farmers of semi-irrigated land could access water for irrigation during the autumn of 2006. The findings confirm first-year WOL observations that farmers in upper and lower catchments face different types of problems in accessing water, and therefore employ different types of strategies.

In summary, upper catchments are characterised by high irrigation flow variability, leading farmers to use a wider range of water sources during the year to maximise their access to water, but few (if any) farmers achieve a summer crop. By contrast, flows in lower catchments are more permanent and reliable, lessening the need for diversification. Nevertheless, there appears to be greater overall variation in hours of access to water among farmers of lower catchment farms. These different conditions give rise to the distinct forms of irrigation management identified through the first year of WOL studies.⁵⁰

Table 7. Contrasting access to irrigation water through the year (n=171)

	Winter months			Spring months			Summer months			Autumn months		
	Sources (#)	Water (hrs)	Std dev	Sources (#)	Water (hrs)	Std dev	Sources (#)	Water (hrs)	Std dev	Sources (#)	Water (hrs)	Std dev
Irrigated (n=126)	3	13.2	55.9	4	18.6	33.8	3	11.9	19.7	2	0.8	4.4
Semi-irrigated (n=45)	5	7.2	10.7	4	18.7	29.3	3	1.07	2.9	0	0	0

50 Johnathan Lee, "Water Management, Livestock and the Opium Economy: Social Water Management" (Kabul: Afghanistan Research and Evaluation Unit, 2006).

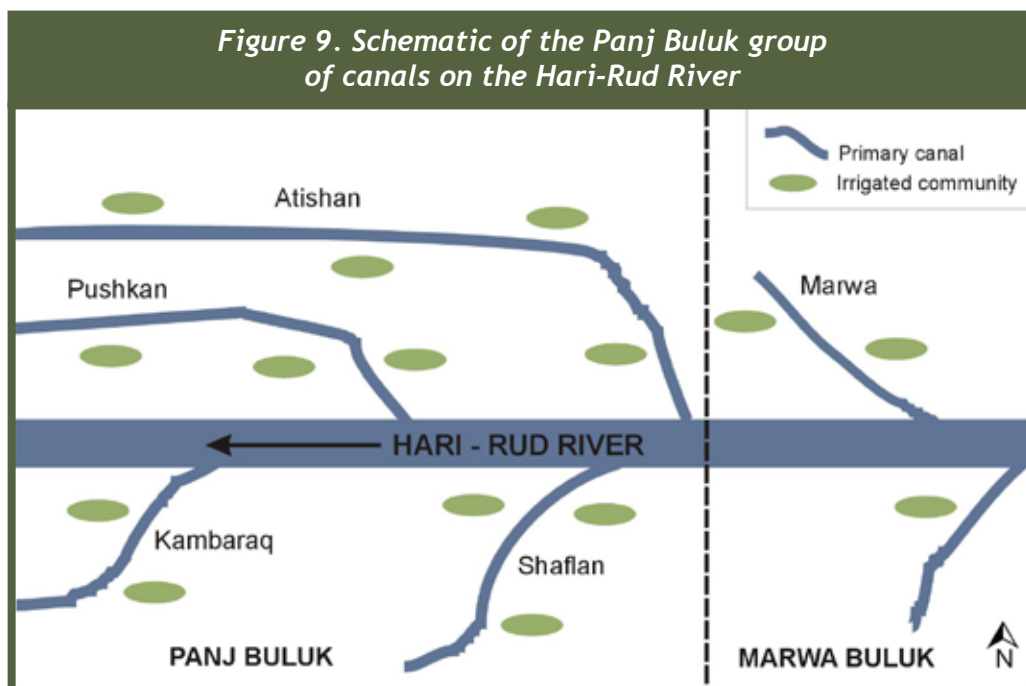
4.2 The structural context of irrigation water management

The organisation and terminology of community-based irrigation management was discussed in first-year reporting, drawing on examples from WOL research sites in four provinces. These studies described how in lower catchments, water is diverted from rivers into primary canals and thereafter shared between secondary canals according to local units of measure (e.g. the *juftgaw*). The function of these systems is usually supervised by a hierarchy of water masters, variously titled *wakil* (senior water master), *mirab* or *kok bashi* (secondary canal water master), according to duty status and local terminology.⁵¹ The management of these lower catchment water resources is highly political and complex. The structural complexity of water sharing arrangements in these lower catchments directly affects how water management is organised.

In the second year of research, studies focused upon two lower catchment sites, one usually well supplied with water (Dana Haji on the Aqtepa canal in Kunduz) and one experiencing chronic water scarcity (Tunian on the Atishan canal in Herat).⁵² Both communities are situated at the end of their respective canals. In each case, water users manage relationships with both upstream and downstream

51 Lee, "WOL: Social Water Management," see also Roe, *WOL: Farming Systems and Rural Livelihoods*.

52 For a full account and discussion of this comparative study, see Johnathan Lee, "Water Management, Livestock and the Opium Economy: The Performance of Community Water Management Systems" (Kabul: Afghanistan Research and Evaluation Unit, 2007).



water users, both individually and collectively (as members of a canal-based institution). These structural relationships are clearly illustrated in Tunian, on the Atishan canal.

The 60 km Atishan primary canal is one of the longest canals in Afghanistan, and is one of a group of primary canals on the lower Hari-Rud River, known collectively as the *Panj Buluk* (see Figure 9). Communities on each of these canals are party to a water sharing agreement (*hasher ab*) that determines the allocation of water between them. The allocation reflects the recognised irrigated land entitlement (*juftgaw*) for each canal.⁵³ In aggregate, the *Panj Buluk* are entitled to divert water sufficient to irrigate 420 *juftgaw* from the Hari-Rud River, this being the sum of the individual water entitlements for each canal. For example, the Atishan canal is entitled to irrigate 120 *juftgaw* of land, accounting for 28.5 percent of the *Panj Buluk's* water allocation (see Table 8).

53 Lee, "WOL: Social Water Management."

Table 8. Water entitlements under the Panj Buluk hashar ab agreement

Canal	Juftgaw	Bank	Allocation (percent)
<i>Shaflan</i>	170	Left	40.5
<i>Atishan</i>	120	Right	28.5
<i>Pushkan</i>	40	Right	9.5
<i>Kambaraq</i>	90	Left	21.5
<i>Total</i>	420		100

Along the Atishan primary canal itself, each irrigating community is entitled to divert a proportion of the flow into their own secondary canals. As with the primary canal entitlement, these secondary canal allocations are based on the recognised *juftgaw* entitlements of each community. The recorded water rights along the Atishan canal are set out in Table 9.

On the Atishan, a senior water master (*wakil*) holds responsibility for ensuring the primary canal receives its full allocation: He is entitled to divert 28 percent of the river's flow to supply the irrigation entitlements of his constituents. Under him, the *kok bashi* of the Tunian canal knows he is entitled to divert about 16 percent of the Atishan flow into his canal.

Table 9. Water entitlements of Atishan canal communities

Settlement (from head to tail)	Juftgaw entitlement	Allocation (%) canal water
<i>Gawashk</i>	6	5
<i>Postin</i>	6	5
<i>Turan</i>	12	10
<i>Aliabad</i>	14	11.67
<i>Qala-i-Nawak</i>	4	3.33
<i>Qala-i-Haji Jahangir</i>	2	1.66
<i>Qala-i-Zawar Khan</i>	2	1.66
<i>Tunian</i>	20	16.67
<i>Khalisa</i>	20	16.67
<i>Ali Afghan</i>	14	11.67
<i>Jinda Khan</i>	20	16.67
<i>Total</i>	120	100

This complex system of entitlements depends on sufficient water reaching the *Panj Buluk* from upstream, which is in turn dependent on both

the river's flow level and the quantity of water extracted by irrigators upstream. Another group of canals (the *Marwa Buluk*) is located along the Hari-Rud River above the *Panj Buluk*. Consequently, representatives of the *Panj Buluk* must maintain a relationship with the *wakils* of the *Marwa Buluk* to try to ensure that sufficient water flows down the river to meet *Panj Buluk* irrigation entitlements. Evidence from Herat, therefore indicates a water management institutional structure, as described in Figure 10 (over page).

Research conducted in Kunduz reveals a similar general organisation of water management (albeit using different terminology), but with one important difference: in Kunduz, there appears to be little regular coordination between primary canals at the *Buluk* level, apparently because of the relatively abundant supply of water in the Kunduz River.

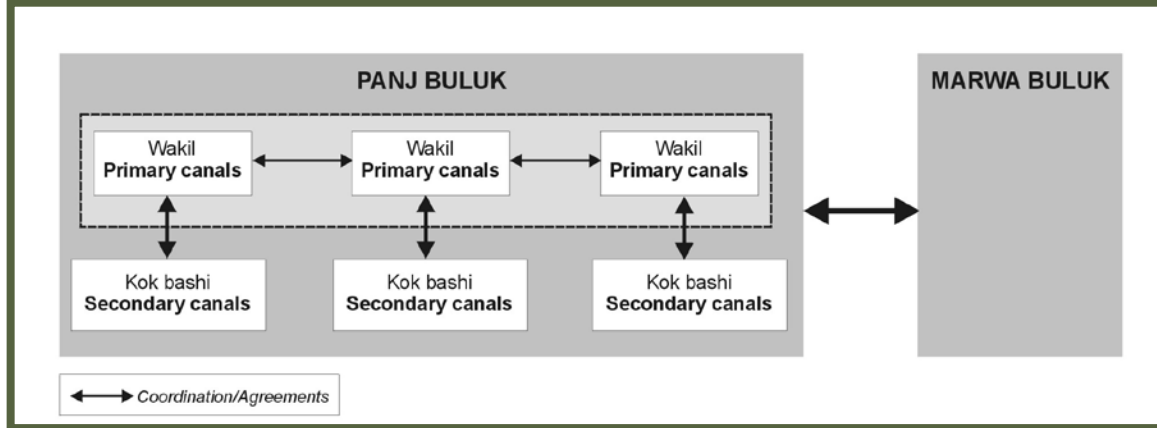
4.3 The performance of water management institutions

Participants in consensus-based social water management frameworks theoretically hold recognised entitlements to irrigation water. By participating in the system, individual irrigators enter into social contracts with other water users (both upstream and downstream), whereby the irrigator assumes certain responsibilities in exchange for his entitlement. However, to what extent do social water management institutions actually deliver farmer expectations?

Case study 1: Kunduz

Research was undertaken at the village of Dana Haji, approximately 11 km from the intake of the Aqtepa canal on the Kunduz River. Although it is situated at the end of the canal, in normal years Dana Haji is well supplied with water. Indeed, the strength and duration of meltwater flows along the Kunduz River and into the Aqtepa canal are often sufficient to allow unrestricted irrigation during the early summer months, with no water use limits imposed by community leaders or *kok bashis*. Accordingly,

Figure 10. Observed organisation of irrigation management on the Hari-Rud River, Herat



during the summer all but a small proportion of the village land is usually cultivated. Even when falling water levels along the Aqtepa canal necessitate the introduction of rotational allocation to secondary canals, water is conveyed into the Dana Haji canal on a relatively short rotation period of six to seven days (although some farmers claim that their irrigation interval was actually eight days).

Under normal irrigation conditions, the work of *kok bashi* involves ensuring the Dana Haji canal is conveying water effectively to village lands, and managing on-farm water distribution by opening and closing dykes (*bands*) to ensure water delivery down tertiary canals to farmers. In the latter part of the year, the *kok bashi* must enforce *shab-o-roz* (hourly water allocations) entitlements, and in consultation with village elders apply any changes to water allocation. The Dana Haji *kok bashi* also works with the *mirab* of the Aqtepa canal to annually mobilise *hashar* (labour obligations) for the annual cleaning of the primary canal.

However, in drought years the Aqtepa canal may be faced with water scarcity, forcing local institutions to intervene to mitigate problems. In addition to fine-tuning physical infrastructure to improve conveyance, communities may decide to temporarily modify individual *shab-o-roz* by decreasing water hours or increasing the irrigation interval. These decisions are undertaken by the community *shura*

(community council) in consultation with the *kok bashi*, and may also include universal prohibitions on the planting of specific water-intensive crops (such as rice), or enforced reductions in the area of summer cultivation.

In Kunduz (as elsewhere around the country), 2006 threatened to be a drought year and river floodwaters began receding early in the summer. Anticipating water scarcity, a delegation of *mirabs* from Kunduz was sent to approach *mirabs* and irrigation officials in upstream Baghlan province to request an increase in flow downstream. As a result of this negotiation, upstream water users agreed to release additional waters down the river by regulating intake into their own primary canals. Although farmers in Kunduz were forced to switch to lower-value, less water-intensive crops, they still achieved reasonable harvests.

Case study 2: Herat

The experience of farmers at Tunian along the Atishan canal in Herat has been very different. The Hari-Rud discharge is much lower than the Kunduz and consequently water scarcity is a chronic problem along the river's length. As previously reported,⁵⁴ under the pressure of this scarcity the water sharing arrangement between the *Marwa Buluk* and the *Panj Buluk* has broken

54 Lee, "WOL: Social Water Management" and Roe, WOL: Farming Systems and Rural Livelihoods.



Mirab, Aqtepa canal, Kunduz

down. Originally, this agreement stipulated that the *Marwa Buluk* canals were entitled to divert the waters of the Hari-Rud River for five days out of ten (a 5/5 rotation). However, during the summer of 2006 drought, the *Marwa Buluk* began diverting the flow into their own canals seven days and allowing only three days flow down to the *Panj Buluk* (a 7/3 rotation).

When negotiations failed to relieve the water crisis, *Panj Buluk* representatives took the dispute to the Provincial Governor. He went as far as briefly imprisoning the *wakil* of the *Marwa* canal, but these efforts failed to resolve the problem.

The reduction of river flow to the *Panj Buluk* intakes meant that *Juftgaw* entitlements (Table 9) could not be met. With the *Panj Buluk* receiving only three days of water out of ten, the *Atishan* canal received less than one day's water (20 hours, and 52 minutes) every ten days. The only option for the *Atishan wakil* was to manage conveyance as

effectively as possible and to do his best to inform communities when (or if) flows were likely to reach them along the primary canal.

At times of water stress in Tunian, the *arbab* (community leader) alone decides how much water (in hours or minutes) each individual landholder should receive on each irrigation event. His determination is then passed on to the *kok bashi* and temporarily appointed deputies for enforcement. During the summer of 2006, emergency water allocations were revised downwards on two occasions, but were even so they were meaningless in any case, because actual flows received by farmers were always less than that allocated by the *arbab*. This was due to over-extraction upstream. With some irrigators reporting receiving as little as 15 minutes flow in two months, formal water management virtually collapsed.

Water stress forced Tunian farmers to abandon their usual cropping patterns in summer 2006. Most field crops became desiccated and were lost through a lack of irrigation, and all available water was used to sustain the small orchards and vineyards in the village. Many individuals who did not own orchards allowed neighbours to use their water entitlements to keep these valuable trees alive. However, some were not so altruistic and there were many accounts of water theft and strife in the community. The economic effects of water scarcity were disastrous.

Summary

The two case-studies of Dana Haji (Kunduz) and Tunian (Herat) offer very different perspectives on the functionality of community water management in Afghanistan. During the drought summer of 2006, the farmers of Dana Haji were able to harvest a reasonable crop with only with relatively minor adjustments in cropping. By contrast, water scarcity in Tunian on the *Atishan* canal had a devastating impact. Yet irrigators at both sites could deploy a similar range of mechanisms to deal with water shortages (see Box 2).

Generalisations cannot be based on only two cases, but the most obvious differences between

the two sites and the effectiveness of their community water management was the relative abundance of water. Indeed, although irrigators had not previously developed river-scale water management arrangements along the Kunduz River (due to the abundance of water), water managers were able to achieve effective solutions to anticipated water scarcity. By

contrast, mounting pressure on water resources along the Hari-Rud River seems to have exceeded the mitigation capacity of water management institutions. These WOL case studies suggest that community water management can be effective where problems are relatively minor, but may be less effective in the face of severe scarcity and heavily contested water.

Box 3. Managing water scarcity

WOL research highlights some of the ways that informal institutions act to mitigate water scarcity.

1. Water managers can negotiate with upstream communities to release more water. This should be easiest where some form of structural relationship already exists between upstream and downstream users.
2. Water managers can try to improve the hydraulic performance of conveyance through management of gates and intakes or even repairs to infrastructure. At times of water stress, new temporary water management offices may be created to assist management.
3. Community leaders (*shura* or the *arbab*) can reduce the water allocation for each cultivator and back these restrictions up with prohibitions on specific water intensive crops or on the maximum cultivable area.
4. Either individually or directed by community leaders, water can be bought or loaned between irrigators.
5. Either individually or directed by community leaders, irrigators can pragmatically re-allocate water resources within the community on the basis of need (e.g. prioritising high-value crops) rather than proportional to individual entitlements.
6. Water managers can seek the intervention of provincial and district authorities outside of institutional water management arrangements.
7. Communities and water managers can break water-sharing arrangements and deliberately exceed their allocation, thus “stealing” from downstream communities.

4.4 How equitable is irrigation in rural Afghanistan?

The evidence from the Kunduz and Herat case studies again highlights systemic inequities in water access along irrigation systems. As with the first year of WOL investigations, this evidence was largely anecdotal, because little empirical data were available to describe the attributes and extent of inequities in water access along Afghan irrigation systems.

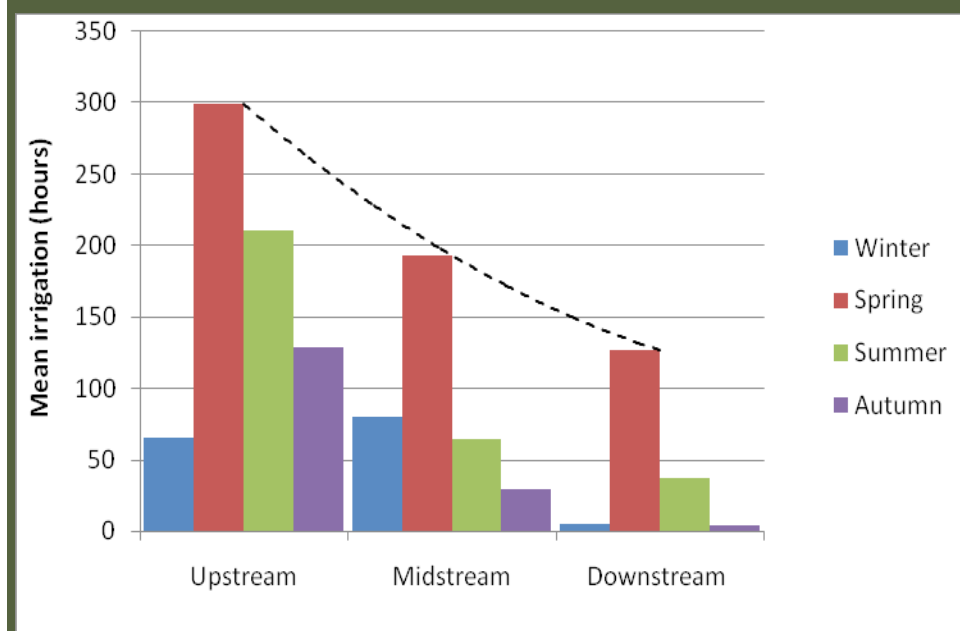
However, manipulation of data in the WOL database allows direct comparison of irrigation flows to land parcels categorised as upstream, midstream or downstream on respective irrigation systems.⁵⁵ If traditional water entitlements (e.g. *juftgaw*) were being observed, hours of flow should correspond to the areas of land under cultivation, regardless of position.

⁵⁵ Farmers' major and minor land parcels were categorised by their position relative to their irrigation infrastructure (primary canal or other source of irrigation water, not position within river catchment).



Irrigation outflow, Nangarhar

Figure 11. Mean monthly irrigation flow to land parcels at different positions on irrigation system (aggregate data for 2006 and 2007)



Aggregate data for 2006 and 2007⁵⁶ (see Figure 11) collected from 171 farming households over eight successive seasonal visits illustrate the consistent advantage held by upstream landholders in accessing irrigation water, except in winter. Among the WOL monitoring group (i.e. irrigating farms), the mean duration of flow received by upstream irrigators was more than twice that received by irrigators at the end of irrigation systems. A comparison of individual landholding size along irrigation systems shows no significant difference between the size of upstream (mean 1.28 ha, Std dev 1.172), and midstream landholdings (mean 1.1368, Std dev 1.162), while downstream landholdings were significantly larger (mean 2.2613, Std dev 2.431).

irrigated sites that access water from the same channel. Results were consistent with data from the wider monitoring group, with upstream farmers receiving approximately twice the duration of flow (mean 25.90, Std dev 27.42) as those irrigating 11 km downstream (mean 12.03, Std dev 11.24). Comparison of mean wheat yields at the three sites reveals clear differences, with midstream and downstream farms, respectively, achieving mean yields of only 62 percent and 56 percent of those upstream, despite higher seed rates (Table 10). A similar comparison between wheat yields at two sites irrigated from the Atishan canal in Herat also revealed higher yields from the upstream site. Collectively, these findings appear to corroborate

Consequently, in comparison to upstream farms, mean flows per unit of irrigable area were lower for midstream and substantially lower for downstream farms.⁵⁷ This empiricalevidenceforsystemic inequity led researchers to question how this might affect crop productivity (and, thus, farmers' capacity to engage with markets).

The impact of farm position on crop production was initially explored through a case study of wheat yields from sites irrigated along the Jaghatu Stream in Ghazni. The Jaghatu Valley was selected because it is the only monitored area where data are collected at three

Table 10. Mean 2006 wheat yields from sites along Jaghatu Stream, Ghazni

	n	Distance from source (km)	Mean wheat yield (kg/ha)	Std dev	Mean seed rate (kg/ha)
<i>C Gumbad</i>	6	3.91	2135	982.70	154
<i>Turmai</i>	11	8.81	1340.83	1465.77	216
<i>Qala-i-Naw</i>	27	15.05	1197.78	1092.02	232

⁵⁶ At the start of monitoring, there were problems categorising the position of land parcels and farms. These problems were resolved by 2007.

⁵⁷ These findings are broadly consistent with data collected through a case study of the Joy Naw canal in Herat see Rout, "How the Water Flows."

widely held assumptions (including those reached during the first year of WOL research) about the link between farm productivity and irrigation water availability.

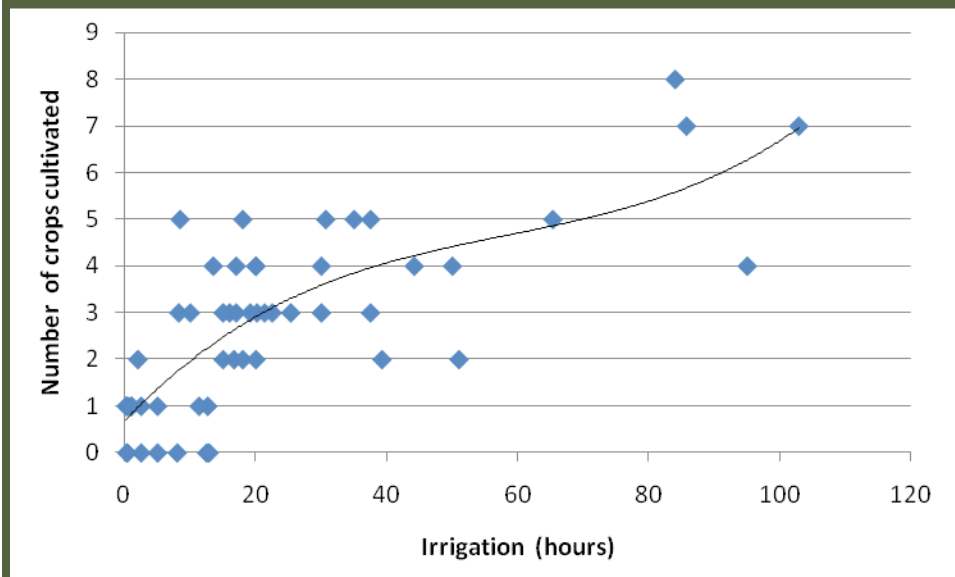
Given the current policy emphasis on building the horticultural subsector, it is important to consider the impact of irrigation water access on the cultivation of high-value crops for market supply. In the first year of the WOL project, researchers tentatively identified a relationship between irrigation water supply and crop diversity. Crop diversity was used as a proxy for high-value cropping,⁵⁸ as well as an indicator for agricultural resilience and livelihood security. Examination of the 2006 dataset using reported irrigation flows and crop patterns revealed a significant relationship between access to irrigation water and farm crop diversity, especially during the water scarce summer months (Pearson Coefficient $r=0.7395$, $n=51$, $p<0.005$, Figure 12). This finding is consistent with the view that opportunities for diversifying into high value crops are linked to access to irrigation water.

Table 11. Mean annual labour days contributed to community irrigation maintenance

	n	Mean days	Std dev
Upstream	37	13.92	23.24
Midstream	60	20.84	37.25
Downstream	20	30.48	43.87

First-year WOL case-studies also suggested there are widespread inequities in labour contributions to primary canal maintenance (*hashar*). Researchers reported that upstream communities (particularly at the canal head) have little incentive to participate in the communal cleaning and maintenance of canals downstream of their own irrigated areas. Researchers report that in many instances they were failing in their obligation to do so, with communities at the end of the canals forced to contribute disproportionately to annual canal maintenance to ensure that water was conveyed downstream to their own lands. Monitoring data from 117 farming households again provided empirical evidence to corroborate this observation (see Table 11).

Figure 12. Relationship between irrigation flows and crop diversity, summer 2006 (n=51)



WOL monitoring data from 2006 reveals that farmers of irrigated land contribute an average of about 20 days of labour annually to the maintenance and repair of irrigation systems. Although required labour inputs are partially determined by the specific structural and hydraulic attributes of canals,⁵⁹ significant differences were found between mean annual labour contributions of communities at different positions within the irrigation infrastructure (with $\alpha=0.05$, ANOVA $F=5.865$, $p=0.003$). These findings show that within the WOL monitoring sample, farms located at the

58 Research suggests that Afghan farmers tend to prioritise cultivation for domestic supply, so wide crop diversity often indicates the addition of higher-value cash crops to crop portfolios (see Roe, *WOL: Farming Systems and Rural Livelihoods*).

59 It has been observed that some infrastructures are more prone to damage and silting than others, thus requiring greater annual labour. Lee, "WOL: Social Water Management."

end of the irrigation infrastructure contribute, on average, 16 days more of labour annually than farmers upstream.

4.5 Challenges for community water management

While recognising that 2006 was an exceptional drought year, WOL data provides a considerable body of evidence corroborating reported inequities in the management of irrigation water. Specifically, WOL data shows that farmers irrigating upstream on canals receive more water than those downstream, while the latter communities must carry a disproportionately large share of the burden of infrastructure maintenance to try to ensure that water reaches their lands.

Infrastructural studies have suggested that some water loss is almost inevitable as it is conveyed along long, low gradient canals (characteristic of lower catchment irrigation),⁶⁰ but there is also strong evidence that under conditions of resource stress, social water management arrangements can become less effective. WOL research highlights some key issues relating to the equitable management of water resources, with specific application to lower catchment canal irrigation.

- Responsibilities and entitlements under water management arrangements theoretically apply equally to all participants, although in practice deviating from agreements has varying consequences. Under present conditions, there are few (if any) negative consequences for upstream communities that fail to honour their commitments, even though the impact of such failures will be felt throughout the downstream water management system.
- Studies show that social management has a limited ability to mitigate water scarcity. Ultimately, a community's capacity to meet the irrigation needs of farmers depends on

the flow entering into its secondary canals. Management adaptation through reductions and reassignment of allocations (which may be effective for fine-tuning water distribution under conditions of near-normal flow) can at best only spread the impact of shortages or export them further downstream.

- Incentives for stakeholders to participate in social water management are linked to the system's capacity to meet their needs. Where the system fails to deliver, support for it will weaken. A particular liability of the close vertical integration of water management is the likelihood that disruptions will be amplified as over-extraction filters down through the river catchment (see Figure 13).
- Unresolved accountability issues are present at all levels of water management. There are local variations in management, with decision-making rooted in community institutions in some cases, and centralised in individuals or elites in others. In some cases, decision-making may not include the full range of interests in water management, making it more likely that inequalities are perpetuated.

Ethnicity and other potentially divisive characteristics are often cited as contributing factors in the failure of water management arrangements.⁶¹ However, it is noteworthy that of the two WOL case-study sites, the breakdown of water management on the Hari-Rud River occurred among communities of a common ethnicity (Pashtun), while communities of diverse ethnicity (Pashtuns, Turkmen, Uzbeks) on the Aqtepa canal seem able to reach accommodations over water shortage within their broader water management framework. This suggests that the severity of water shortage, and not ethnicity, was the primary factor leading to the water management breakdown.

60 See Ian McAllister Anderson, "Water Management, Livestock and the Opium Economy: Irrigation Systems" (Kabul: Afghanistan Research and Evaluation Unit, 2006) and Rout, *How the Water Flows*.

61 See Lee, "WOL: Social Water Management" and Adam Pain, "Understanding Village Institutions: Case Studies on Water Management from Faryab and Saripul" (Kabul: Afghanistan Research and Evaluation Unit, 2004).

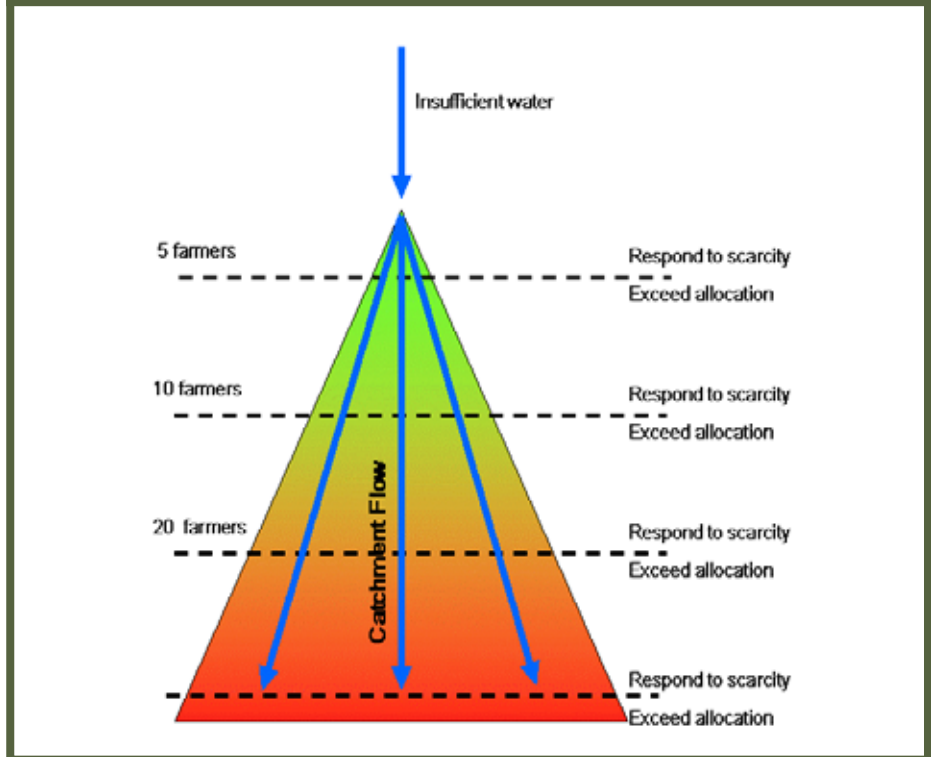
4.6 Inequity and implications for WUAs

Given the MEW's stated policy intention of delegating responsibility for water management to community water users associations (WUAs), through the River Basin Agencies (RBA), WOL research findings highlight several points with relevant policy and planning implications.

In the past, community peer pressure may have been sufficient to keep upstream use of water resources in check, but this is no longer the case in the current politically fragmented rural landscape, in which new power brokers have emerged. There is now a clear need for an overarching authority within river basins to help restore balance, where required, to upstream and downstream relations. This approach is being piloted through the establishment of RBAs. Institutions such as the proposed River Basin Councils could potentially be effective in restoring balance to asymmetric power relationships, but only if they are seen as legitimate in the eyes of the water using community, and can effectively engage with all stakeholders.

The initial focus of discussion and consideration in drafting the new Water Law and WUA charter has been establishing WUAs at the primary canal level.⁶² WOL research has identified systemic inequities in this primary irrigation infrastructure, but has also shown that some of the biggest and most intractable problems occur at the river basin scale. Unlike at the canal level, corporate decision-making at the river basin level has no clear precedent in customary water management and so the organisation of

Figure 13. Increasing impact of farmer deviation from water management agreements



proposed River Basin Councils and sub-councils will constitute a special challenge for fledgling RBAs.

The impact of upstream water management on downstream access (especially during periods of scarcity) constitutes a compelling rationale for agricultural planning at the catchment level. Crop planning within catchments is currently *ad hoc*, with community leaders and farmers determining what to plant opportunistically based on anticipated water availability. This lack of planning results in a preponderance of high-value cultivation in better-watered, upper catchment areas or in the upstream areas of primary canals. Such structural inequity tends to be self-reinforcing: when facing water shortages, cultivators of high-value crops will often exceed their irrigation water allocation to preserve the crop, thereby perpetuating scarcity downstream.

WOL studies show that current water management arrangements include complex and widely recognised entitlements to water at a range of different levels within the catchments. The major

⁶² Rebuilding Agricultural Markets Program (RAMP), "Water Users Associations in Afghanistan, Report" (Kabul: RAMP/USAID, 2006). available at http://pdf.usaid.gov/pdf_docs/PNADH209.pdf (accessed April 2009).

problem weakening customary water management has not been the operational structure of institutions or the equity of entitlements and responsibilities (which seem to be major foci of WUA planning), but instead the issue of enforcement of these entitlements and responsibilities. Unless WUAs incorporate effective mechanisms for achieving universal compliance with these entitlements and responsibilities, the system will fare little better than traditional institutions.

Participation in planned WUAs will largely depend on the capacity of WUAs to deliver in response to farmers' water needs; failure to do will undermine their credibility and legitimacy in the eyes of irrigators. Therefore, implementation of RBAs should commence upstream and move downstream as improved management is introduced, with each newly formed WUA benefiting from the WUA above. Ideally, water management reforms should be accompanied by upstream infrastructural development (canal lining, intake improvement or storage construction), so that communities simultaneously benefit from improved water delivery.

Finally, although they irrigate a much smaller land area, and are currently of less importance economically, the development potential of upper catchment semi-permanent irrigation should not be overlooked. Upper catchment water sources are seasonally variable, but allocation tends to be less contentious and more equitable. Upper catchment sites generally face greater absolute water scarcity and are associated with poor socioeconomic conditions, meaning any improvement in water supply or conveyance efficiency will have a proportionately greater impact on farmers' livelihoods.

4.7 Inequity and implications for agricultural policy

WOL research has provided evidence of widespread inequities in access to irrigation water in lower catchment agricultural lands in Afghanistan. Drought and water scarcity further magnify these

inequities, as actions that contribute to the self-preservation of some communities increase the severity of water scarcity for others. Consequently, data collected during a drought year (e.g. 2006) will tend to overestimate the extent of the problem. Nevertheless, the findings presented here are broadly consistent with wider observations on the function of irrigation management.⁶³ This raises two questions: How will these inequities in irrigation management affect development goals for the agricultural sector? Which approaches would facilitate more equitable systems of irrigation management?

Systems of irrigation management currently disadvantage several distinct groups, including most obviously downstream communities: field observations show that the greatest disadvantage is experienced by communities farming at the end of very long, low-gradient canals in lower catchments. However, the extent of any inequity is also related to the relative annual flow of the source river. Where the rate of river discharge is high (such as the Kunduz River), even tail-end communities such as Dana Haji can cultivate high-value crops, and are therefore relatively advantaged compared with other communities located higher up on irrigation systems, but supplied by lower annual flows.

Inequitable water access is not exclusively associated with hydraulic variables. For example, researchers note that sharecroppers contracted at less than a fifty-fifty division of yields are not entitled to attend and vote at community irrigation meetings, and so are unable to promote their own irrigation needs when allocation decisions are taken. Women also comprise a major disenfranchised group. Female landholders (usually either widows or married women with a marriage gift of land) are excluded from meetings on community irrigation, even if they have water entitlements by virtue of their landholding. Consequently, the only practical option for female landholders is to rely on male

63 Systemic inequities in irrigation management have been noted in other parts of Afghanistan. See for example Pain, "Understanding Village Institutions" and Johnathan Lee, "Water resource management in the Balkh Ab River and Hazhda Nahr Canal Network; From Crisis to Collapse" (Report for UNAMA Northern Region, Central Asian Free Exchange 2003).

relatives to represent their irrigation interests, or alternatively engage a sharecropper at fifty-fifty terms.

Regardless of their position within the irrigation infrastructure, or their gender or land rights, all irrigators will be affected by the local distribution of power and influence, which may relate to ethnicity or political allegiance. The appointment of *mirabs* within water-using communities and the decision-making process itself are both highly political. Deliberations regarding water management made in community institutions such as *shura*, council of elders, or through public stakeholder meetings will be more inclusive and accountable than decision-making that is centralised in the hands of an individual or closed group. Powerful and influential groups often occupy the best rural lands and most advantageous positions within irrigation systems, and rose to their position of influence as a result, which tends to re-enforce structural inequities across systems.

WOL research shows that inequitable water management can directly impact the agricultural systems of disadvantaged farmers, by affecting crop diversity and yields, and in the opportunity costs of a disproportionate labour burden.

Crop diversity is affected in many parts of rural Afghanistan, with high-value and diverse cropping often visibly clustered around the upper end of primary canals, while water-scarce communities at the lower ends of canals are largely restricted to cultivation of low-value cereal. Although cereal crops can be cultivated with limited irrigation, WOL data shows that yields on downstream farms may be half of those on farms upstream. Poor returns associated with downstream cultivation may lead farmers to maximise the area under cultivation, leading to land degradation. WOL studies have also recorded over-application of chemical fertilisers in an effort to improve cereal yields.⁶⁴

Downstream communities also contribute disproportionately to canal repair and maintenance, providing twice as many labour days as farmers at

the head of canals. If a downstream household provides an additional 16 days of labour, this carries the opportunity cost of US\$48 in lost income from off-farm casual labour, or more if the household has the potential for higher off-farm earnings, or higher-value on-farm work.

Collectively, these factors contribute to the general impoverishment at the lower end of primary canals that has been observed at several WOL research sites. Rural prosperity stems from the interaction of numerous socioeconomic, political and biophysical factors, and farm access to irrigation water constitutes an important gradient within this milieu. Studies undertaken in Balkh, Nangarhar and elsewhere have also shown that inequitable access to water resources may, under certain conditions, act as a stimulus for opium poppy cultivation.⁶⁵ Agricultural policy that prioritises the cultivation and marketing of high-value and horticultural crops will be of greatest direct benefit to farmers with preferential access to irrigation water, due to the irrigation needs of these crops. The policy therefore risks reinforcing uneven development, inequitable economic growth and the concentration of rural power at the head of canals. These outcomes appear inconsistent with the goals of pro-poor growth and reducing farmer dependency on poppy cultivation in resource-scarce areas.

Integrated Water Resources Management aims to increase both the overall amount of water available for irrigators (through infrastructural works) and the equity of distribution (through institutional reform), and all large-scale water sector programmes are now working within this framework.⁶⁶ Improved equity in water management has the potential to widen entry to markets for high-value horticultural crops, which are now dominated by upstream farms; even those downstream irrigators suffering the greatest water deficits would be able to increase cereal yields, which is an important goal of agricultural policy following the 2006 wheat price prices.

65 Adam Pain, "Water Management Livestock and the Opium Economy: Opium Cultivation in Kunduz and Balkh" (Kabul: Afghanistan Research and Evaluation Unit, 2007).

66 A summary of ongoing and planned irrigation programs is given in Rout, *How the Water Flows*.

64 Roe, WOL: Farm and Household Monitoring."

However, policymakers should consider that efforts to increase water allocation equity along primary canals might have a detrimental initial impact on high value cropping in upstream areas. This highlights the need to carefully consider the sequencing of (i) infrastructure improvements that increase water flows, (ii) institutional interventions that increase equity in water management, and (iii) programmes to stimulate agricultural growth by establishing value chains for high-value crops. Likewise, in establishing WUAs at the primary canal level, development facilitators will need to make special efforts to engage upstream communities, as these communities benefit most from the status quo, and will have the least incentive to support a change in the management arrangements.

Finally, previous efforts to increase agricultural productivity through improved irrigation have focused on lower catchment systems. However, WOL research findings highlight the opportunity to better manage water supply variability in upper catchment systems. Data indicates that mean on-farm flows in upper catchments actually exceed those received in lower catchments during peak flow months. WOL studies suggest that at some sites relatively minor interventions to improve storage and conveyance of water might allow a second (high-value) crop.⁶⁷ This would be consistent with pro-poor agricultural policy and the strengthening of licit agricultural livelihoods in otherwise resource-scarce areas.

67 McAllister Anderson, "WOL: Irrigation systems."

5. Livestock Production and Marketing

During the first year of the WOL project, studies described the major features of rural livestock production. Cattle ownership was characterised as primarily serving subsistence functions (dairy production for domestic consumption and farm traction in the case of bullocks). This form of management was usually farm-based and relied heavily on cultivated feeds. By contrast, sheep and goat herding was found to combine production for domestic supply with supply to markets, and made greater use of pastures and extensive off-farm grazing. However, researchers found that livestock production at most research sites appeared to be below potential for the breeds, and that access to winter fodder was a key constraint across all production systems.

In addition to focusing on horticulture, the I-ANDS agriculture strategy prioritises interventions in the livestock sub-sector through expansion of production, productivity and establishment of value chains.⁶⁸ Accordingly, the second year of WOL research builds directly on first-year results by exploring the opportunities for and constraints on the production and supply of animals and their products. Studies investigated how farmers access and use feed resources for livestock production, what is produced,⁶⁹ and how effectively livestock are marketed,⁷⁰ and have sought to determine how interventions supporting market-orientated livestock production can be most effectively targeted.

5.1 Herd structures

68 MAIL, "Agriculture Strategy," Section 2.2.2.

69 For a full description and discussion of livestock feed and production regimes, see Anthony Fitzherbert, "Water Management, Livestock and the Opium Economy: Livestock Feeds and Products" (Kabul: Afghanistan Research and Evaluation Unit, 2007).

70 For a wider study of livestock marketing see Euan Thomson, "Water Management, Livestock and the Opium Economy: Livestock Marketing" (Kabul: Afghanistan Research and Evaluation Unit, 2007).

Farm monitoring allows herd constitution and structure to be examined in greater detail than was possible during the first year of research. An understanding of Afghan herd structure gives insights into the management objectives of livestock owners.

In autumn 2006, 409 cattle were recorded as owned by the monitored sedentary farmers (mean 1.9 per HH, Std dev 2.06), an increase of 0.4 since the WOL baseline survey was completed in autumn 2005. The ratio of male to female adult cattle was found to be quite high (approximately 1:4), and is probably an indication of the continuing importance of oxen for farm traction. Indeed, the male to female ratio among adult cattle was highest at remote rainfed sites where animal traction remains most important. The number of male and female cattle under the age of two years is approximately equal, indicating male calves are sold when they are older than two years.

In 2006, monitored sedentary farms owned 1,463 sheep and goats, while nomadic *Khomari Khel* and *Kutub Khel* households reported 1,173 sheep and goats. The data points to differences in the structure of small ruminant herds across production systems (these are summarised in Table 12).

The smallest sheep and goat herds are managed at irrigated and semi-irrigated farming sites; the small numbers of animals suggest that they are kept primarily to supply households with milk, and the high proportion of goats (which have lower sale values than sheep) is consistent with this hypothesis. Likewise, the relatively high ratio of males to females of both sheep and goats in irrigated and semi-irrigated systems indicates a focus on subsistence and security, rather than optimal production for markets, although the ratio may also reflect male lambs bought to fatten for market.

As noted in the first year of WOL research, farmers at rainfed sites manage considerably larger herds

Table 12. Recorded herd structures by production type

	N	Mean ownership	(Std dev)	Sheep: goat ratio	Ram (percent)	Buck (percent)
<i>Irrigated</i>	126	4.3	8.91	1.1	30	10
<i>Semi-irrigated</i>	45	5.4	3.91	0.89	0	18
<i>Rainfed</i>	33	20.3	8.31	1.66	8.2	7.6
<i>Nomadic</i>	22	53.3	31.8	5.78	1.5	2.6

than those at irrigated sites; they also run more high-value sheep than goats in their flocks, and have a lower proportion of adult males. This appears to confirm first-year observations that the management of flocks at rainfed sites is more orientated to market supply than at irrigated or semi-irrigated sites. However, of all management types, the small ruminant flocks of nomadic pastoralists appear to be best structured for market production, with large herd sizes and a high proportion of sheep and low proportion of males.

Monitoring data on flock entries and exits at sedentary research sites shows that births account for the most entries into flocks, overwhelmingly during the late winter and spring seasons. Purchase of new stock, mainly lambs for fattening or herd growth, is most common in spring (to utilise pastures and crop residues in irrigated lands), but can occur at any time except autumn (probably to avoid the cost of winter feeding). Deaths are spread evenly through the year with slight peaks in winter (due

to weather or feed scarcity) and spring (neo-natal deaths during lambing or kidding). The majority of exits occur as sales of young males but include older females culled during the summer (see Figure 14).

Data collected on herd inventories through farm monitoring during 2006-07 was more detailed than data collection during the first year of WOL research. Nevertheless, general findings on herd sizes, and management goals under different production systems appears consistent with initial observations made in 2005-06.

5.2 Livestock feeds

A deficit of nutritious feeds (particularly during the winter months) has been identified as one of the major difficulties facing Afghan livestock producers, and is therefore a constraint on the development of this subsector. Studies conducted during the second

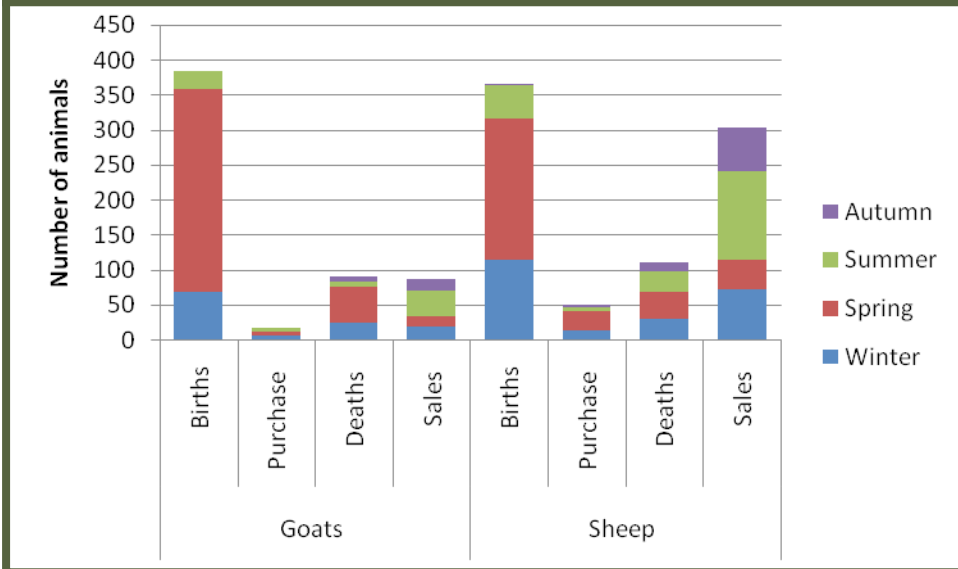
Box 4. Sheep and goats

In Afghanistan and in many developing countries, goats are valued for their robustness and subsistence values. They can survive on a non-specialised diet, reproduce and restock quickly after losses, and normally have longer lactation periods than sheep. However, sheep command higher monetary values at markets and so are species of choice for commercial production.

In the early 1980s, the Afghan national flock consisted of less than 20 percent goats. During the intervening years of conflict and drought, with livestock populations decimated, this proportion appears to have risen. The FAO national survey suggests that goats may now constitute over 45 percent of the national herd.

If correct, this data implies a significant qualitative change in the composition of the national herd. A focus on recovery of the aggregated number of small ruminants might overlook this.

Figure 14. Summary of entries and exits from monitored sedentary sheep and goat herds



parcels, and post-harvest residue grazing. Cattle are entirely stall-housed during the harsh winter months; there are no opportunities for supplementary grazing, and cattle are given the maximum daily forage ration. Hand-feeding decreases when animals can be taken out to graze spring pastures. During the summer months, cattle are given reduced rations as they have access to post-harvest residues and are taken to graze cereal stubble and other forage around cultivated lands. Mean recorded stall-fed rations for sedentary cattle within the WOL monitoring

year of WOL research contrasted farmer access to fodder under different production systems.⁷¹

Researchers found acquisition of livestock feeds to be highly opportunistic, responding to availability of seasonal and local crops, forage, and pasture. Nevertheless, it was found that feeding of cattle across all farm types tends to be closely integrated within the cropping system, confirming first-year observations. Cattle are valuable monetarily and in terms of rural household subsistence. Consequently, many farmers use small areas of cultivable land specifically to cultivate fodder, and in some areas fodder is intercropped under fruit trees, or dual-use crops (e.g. field peas, mung beans, lentils) are cultivated. When allocating land resources, farmers carefully balance the need for cash and food crops against the subsistence or market values of livestock.

Cattle are usually kept in close proximity to their home villages, but during spring, summer and autumn, owners are usually able to supplement stall feeding with opportunistic grazing on pastures, foraging for weeds on or between cultivated land

group are summarised in Table 13.

Monitoring data allows comparisons of hand-fed cattle rations across production systems. Cattle in all systems are offered a wide diversity of feeds, combining farm-cultivated, hand-gathered and purchased feeds, but the data suggests that at lower catchment irrigated farms, approximately half of the feed for stall-fed cattle consists of cultivated green fodder. In contrast, the majority of fodder offered to cattle in rainfed areas is straw, supplemented with a little purchased green fodder: there is limited diversity in rations because cattle at these sites can make greater use of natural pastures. At semi-irrigated sites, very little green fodder is cultivated and hand-fed cattle rations include a high proportion of grasses collected as winter fodder (see Figure 15 over page). This data describes only what is hand-fed to animals as rations, not material grazed on-farm or elsewhere. It is likely that cultivated green fodder is allocated primarily to productive (lactating cows).

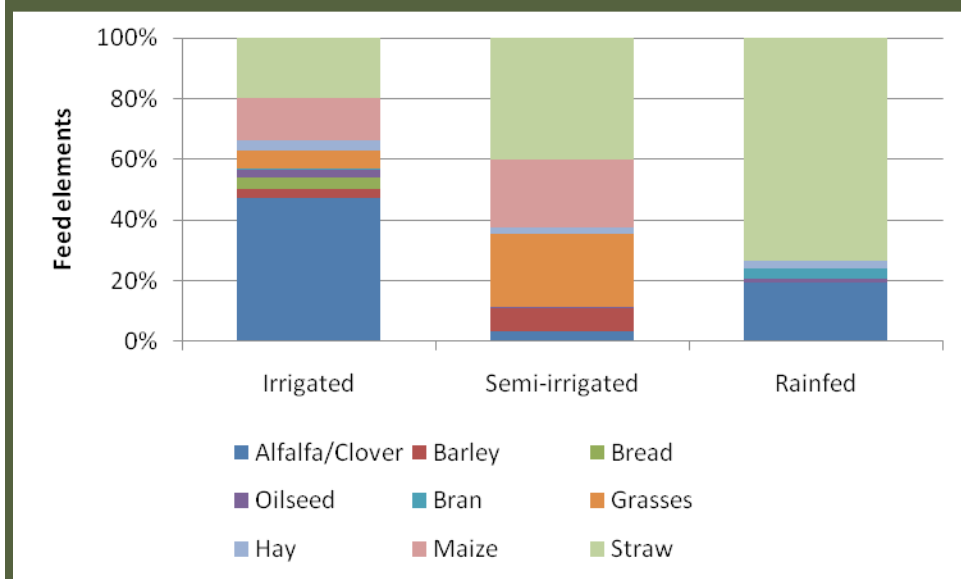
Under most forms of sheep and goat management, herders combine extensive grazing with supplemental feed, but sheep and goats generally make greater use of natural forage than do cattle, and depend less on purposely cultivated fodders. However, farmers at some densely populated river

⁷¹ For a narrative discussion see Fitzherbert, "WOL: Livestock Feeds and Products," for data see Roe, *WOL: Farm and Household Monitoring*.

Table 13. Mean daily hand-fed rations per head in sedentary cattle herds (kg) (n=409)

Season	Alfalfa & Clover	Grasses	Hay	Bread	Oil seeds (& cakes)	Barley	Bran	Maize seed/ straw	Straw
Autumn	1.62			0.73	0.52	0.06	0.06		2.72
Winter	5.83	1.55		0.01	0.01	0.15		0.05	1.99
Spring	2.66	0.25	0.78		0.06	0.50	0.01	2.4	2.21
Summer	0.07				0.03	0.01	0.17	0.40	1.32

Figure 15. Comparison between rations for cattle under different production systems



sheep and goat feeding reflect differences in both the feeds available and the particular management goals. Supplementary feeding in irrigated lands is again most diverse, with inclusion of cultivated green fodder, while feed supplementation at rainfed sites is mainly straw based, reflecting the dominance of cereal agriculture (Figure 16).

Although they own the largest flocks, *Khomari Khel* and *Kutub Khel* migratory pastoralists are least dependent on supplementary feeds for sheep and goats.

valley sites may have poor access to rangelands, and this is reflected in the amount of supplemental feed that is offered. Like cattle, sheep and goats at most research sites are sheltered in stalls through the winter, but when the weather conditions are good they will be herded out to graze and browse around the village or adjacent rangeland. The lack of grazing and pregnancy in ewes and does results in sedentary sheep and goats receiving the most feed supplementation through the winter. They receive the least in the spring and summer when they first move away from villages to graze on pastures and then return to graze harvest residue and stubble (see Table 14). Access to spring pasture is particularly important in restoring animal condition after the winter and in improving the quantity and quality of lactation and lamb growth.

As with cattle, variations in supplementary

During the spring and summer months they offer no supplementation at all as flocks graze in Panjshir and Ghazni pastures. In autumn, just 0.1 kg is fed daily per animal and 0.2 kg in winter, while flocks forage in the Nangarhar and Laghman lowlands. Nomads also regularly rent stubble and post-harvest residues from farmers in the summer and autumn months. Although this migratory herding involves the least feed supplementation of all production systems studied, nomadic groups are encountering increasing problems in accessing their traditional grazing lands. Competition with other land-using groups now threatens the sustainability of this form of livestock production.⁷²

⁷² For further details on pasture disputes afflicting WOL participating nomad groups see Fitzherbert, "WOL: Livestock Feeds and Products" and Euan Thomson, "Water Management, Livestock and the Opium Economy: Livestock Production and Health" (Kabul: Afghanistan Research and Evaluation Unit, 2006).

Table 14. Mean daily hand-fed rations per animal in sedentary sheep and goat herds (kg) (n=1463)

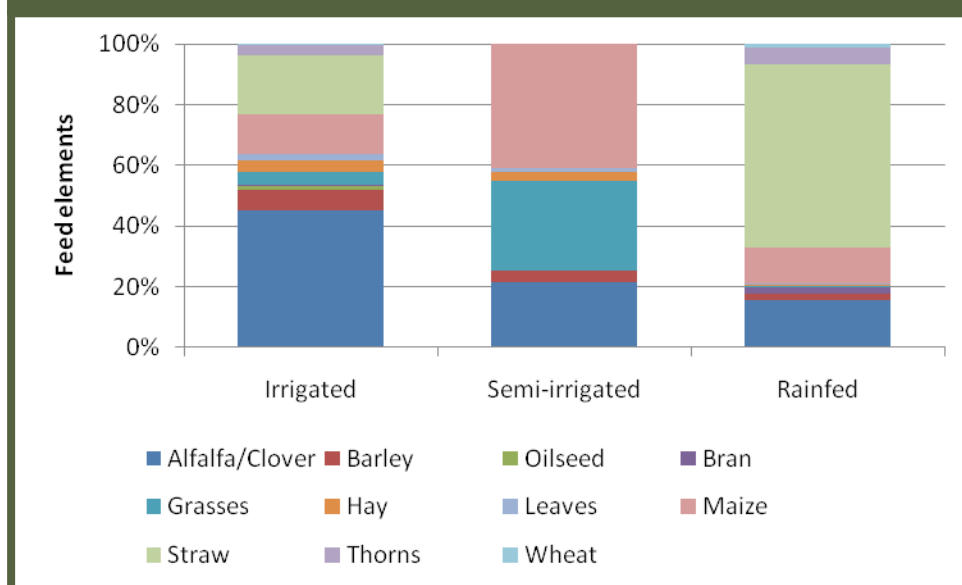
Season	Alfalfa/Clover	Grasses	Hay	Bread	Thorns/Leaves	Barley	Bran	Maize Seed/straw	Straw
Autumn	0.31				0.03	0.07			0.56
Winter	0.39	0.28						0.27	0.02
Spring	0.21		0.07			0.06		0.21	0.09
Summer	0.01				0.05	0.01	0.01		0.28

Research confirms that the key feed constraint on sedentary livestock production is a farmer's ability to sustain livestock through the winter months. At current levels of livestock holdings, sedentary farmers are offering winter rations of about 9.5 kg per day for cattle and just under 1 kg per day for sheep and goats. This is probably close to the maintenance nutritional requirements. Even so, WOL data suggests that few if any farmers cultivate sufficient fodder to meet all their livestock needs, and remain dependent on purchases to varying extents. Data shows that in 2006, irrigated farms

on average produced about 70 percent of the green fodder and straw that is fed to livestock (primarily in summer and winter, respectively). Semi-irrigated farms had to purchase more than half of the straw they needed, and 40 percent of green fodder. By contrast, rainfed farms produced all of the straw, but needed to purchase 100 percent of any green fodder they offered to livestock.

Fodder production on-farm is affected by the land type, available area and land tenure status. Under sharecropping agreements, absentee landowners do not share in the production from farm livestock, and therefore see little benefit in the cultivation of fodder crops on land they sharecrop out. This acts as a disincentive for the cultivation of fodder on sharecropped land. Likewise, farm capacity

Figure 16. Rations for sheep and goats under different production systems



to cultivate fodder is linked to irrigation water access, particularly with respect to green fodder crops, and so allocation of irrigated land to fodder carries opportunity costs. Therefore, most farmers (and especially those in land-scarce irrigated and semi-irrigated areas) allocate a minimum of land to fodder cultivation, often cultivating just enough for household livestock production.

WOL studies suggest that production systems that can use extensive grazing for several months each year (as in rainfed areas or nomadic pastoralism) have some advantages over systems that are more reliant on fodder. However, all herds rely to some extent on supplementary feeds in winter, and both nomads and rainfed farmers are relatively disadvantaged in terms of accessing these feeds.

Deteriorating rangeland conditions and threats to access constitute a growing challenge, and nomads are increasingly relying on waged labour to sustain their livelihoods.⁷³

5.3 Livestock products

Studies show that cattle are owned for the production of milk, farm traction, and meat (in that order of importance), while sheep and goats produce meat, milk, fibres and skins.

As noted during the first year of WOL research, cattle are nearly always owned to supply the household with milk and dairy products. Field observations and data suggest that the majority of farms have just one cow, and daily lactation provides enough

for household needs, with no marketable surplus. Any available milk surplus is often shared between households through informal reciprocity networks. Farmers' only real opportunity to sell milk occurs when they live in peri-urban areas and have the resources to integrate the management of two or more cows into their cropping system. Women who are responsible for milking both cattle and small ruminants usually convert milk into a range of durable and fresh milk products.⁷⁴ Nevertheless, men rather than women are usually responsible for the sale of any surplus.

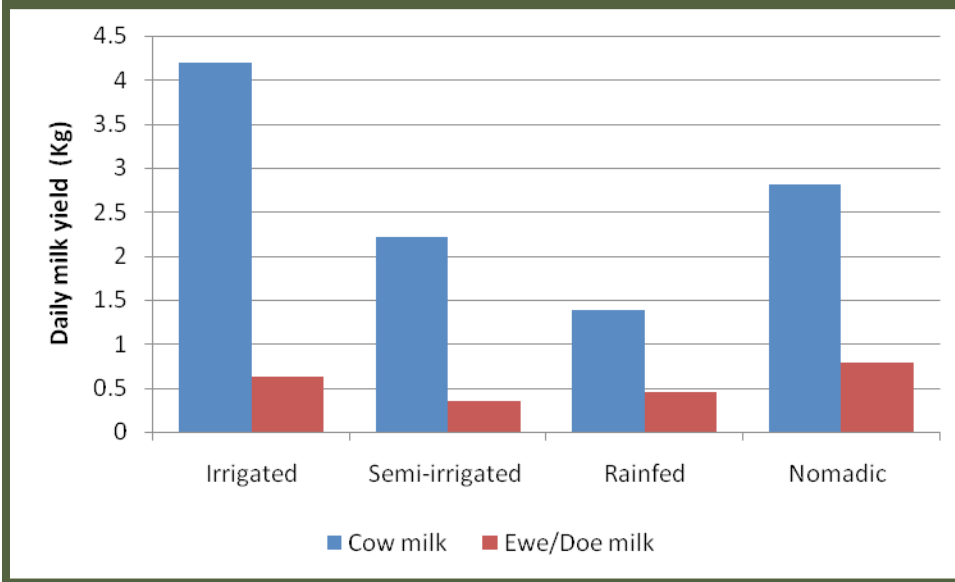
Feedback from farmers was used to assess milk yields across all participating households. These reports were corroborated by physical measurements of lactation undertaken among a small group of cows and milking does at sample research sites. Under



Bringing home the flock, Nangarhar

73 Roe, WOL: Farming Systems and Rural Livelihoods.

74 A fuller description of milk products and their preparation is given in Fitzherbert, "WOL: Livestock Feeds and Products" (Appendix 2).

Figure 17. Reported daily lactation across management groups

Afghan farming conditions yields for cows average 3 to 4 kg milk over a 35-week lactation period ($n=12$ mean 882 kg, Std dev 996.5). Reported data suggest that the highest mean yields are achieved at irrigated farming sites, perhaps reflecting the quality of the feed rations and larger animals. Lower yields were reported at semi-irrigated sites, and the lowest at rainfed sites (see Figure 17).

Researchers found that, as with cattle, milk production from sheep and goats was often for domestic supply, especially when only a few animals were kept. Farmers of irrigated land estimated that approximately 20 to 30 breeding ewes or does are required to produce a marketable surplus of milk; the regular sale of milk products was undertaken only by nomadic *Khomari Khel* and *Kutub Khel* and some rainfed farmers (with larger herds), after lambs were weaned. Sheep and doe milk is always processed into durable products before sale. As sheep and goats are more reliant on grazing than cattle (especially during the spring milking season), it is not surprising that the highest mean yields were reported for rangeland-based flocks.

Livestock are generally slaughtered for food only on rare ceremonial occasions; the only exception is that sick animals are slaughtered before they die, so the meat is *halal* and not wasted. Although some male calves may be retained as breeding stock or

as oxen, it is more common for male calves, lambs and kids to be sold. Other animals sold include old females and rams. Even where livestock are managed for subsistence production, occasional and forced sales provide valuable supplementary income, particularly during periods of cash scarcity.

Farm monitoring during 2006 shows sales of cattle at around 15 percent and sheep and goats overall at about 30 percent, with the highest rates of sale reported from irrigated lower catchment

farms. Assuming the data is accurate; this higher rate could be attributed to the observed practice of some lower catchment farmers buying weaned lambs and kids to fatten for market.

The majority of farming households report selling some animal fibres (wool and goat hair) and hides; some wool is also kept for household use. Sales of these products to markets and traders were recorded, with the highest number coming from the largest herds.

The use of animal traction (mainly oxen for land ploughing) was also recorded. Animal traction is most often used on the livestock owner's own land, or that of their extended family, but about a quarter of reported plough days are hired out. Data confirms WOL first-year observations that animal traction is most used in rainfed areas.

5.4 Livestock gross margins

WOL farm monitoring collected data on livestock production during 2006-07, included major inputs (such as feeds, labour, and veterinary expenses) and outputs (such as animal sales, milk production, hides and fibres and farm traction). Prices for inputs and animal products were established seasonally at the

farm gate, while farmers reported the sale price of animals. This data were then used to estimate gross margins for production under different systems (see Table 15).

Table 15. Estimated annual gross margins for livestock in \$US (2006-07)

	Mean income	Mean expense	Gross margin
Cattle (390)			
<i>Irrigated</i>	420.0	381.4	38.6
<i>Semi-irrigated</i>	235.3	232.5	2.8
<i>Rainfed</i>	152.2	106.3	45.8
Sheep/goat (1463)			
<i>Irrigated</i>	44.2	39.9	4.2
<i>Semi-irrigated</i>	36.7	42.4	-5.7
<i>Rainfed</i>	44.5	29.7	14.8
Sheep/goat (1174)			
<i>Nomadic</i>	27.6	7.1	20.5

These gross margins should be considered as indicative rather than absolute.⁷⁵ They reflect production conditions during 2006, a year of poor pasture when many traders recall market prices were deflated by widespread animal sales during spring and summer. Nevertheless, there appear to be some marked differences between production systems.

Overall, low-input systems seem to have an economic advantage, because differences in productivity-related income show less variation between production systems than do differences in input-related expenditures. Therefore, among the WOL monitoring group of farms, production systems with the lowest inputs appear to achieve the best gross margins. These findings help in understanding farmers' production strategies observed during the first year of WOL research. Researchers found that under the conditions and resource constraints of rural Afghanistan, farmers and pastoralists usually attempted to maximise net livestock returns by

minimising expenditures.⁷⁶ This clearly differs from western development approaches, which tend to emphasise increasing productivity through greater investment and intensified management inputs. It further explains why so few Afghan animals seem to achieve their genetic potential for growth and production.

5.5 Livestock sales and prices

According to interviews, livestock producers in Kunduz and Herat make sales decisions with reference to the seasonal price cycle, which is driven by the relationship between the types and availability of animals for sale, feed and grazing availability, competition from other types of meat and consumer demand. The availability of animals for sale is determined by the reproductive cycle in small ruminants. Most lambs and kids are born in late winter and spring, with weaned lambs coming onto the market in May; when combined with growing (seasonal) feed scarcity, this results in depressed prices. Livestock prices begin to recover at the end of the autumn as fewer animals come onto the market and urban demand for meat rises.

This general cycle (see Figure 18) can be subject to short-term variations, related to rainfall and pasture conditions, local demand and imports.

As noted previously, cash scarcity or emergency conditions sometimes compel livestock producers to sell animals to generate income outside of this established cycle of sales. Both farmers and pastoralists report forced sales of weaned lambs, fertile ewes and even highly valued cows with calves when they need to raise money.

However, even apparently irrational sales decisions may actually reflect informed calculation on the part of owners, who sell early because they suspect they are likely to lose an animal to disease, or because their pastures will fail.

⁷⁵ Gross margins presented here assume that milk is sold.

⁷⁶ Roe, "WOL: Farming Systems and Rural Livelihoods."

WOL researchers have noted that an important factor in the livestock production cycle is the emerging practice of peri-urban finishing of livestock in village areas dominated by irrigated cropping. Under this practice, farmers living in proximity to towns or other population centres buy a few sheep, goats or calves after weaning, and fatten them using farm crop residues. The practice creates income by adding value to animals, adds value to crop residues and helps supply meat to urban consumers. Overall, this strategy is profitable for farmers, who buy in spring and summer when prices are low, fatten, and later sell as prices rise. There are significant risks, however, due to uncertainties with respect to livestock prices, the availability of farm-grown feeds, and the possibility of disease or loss.

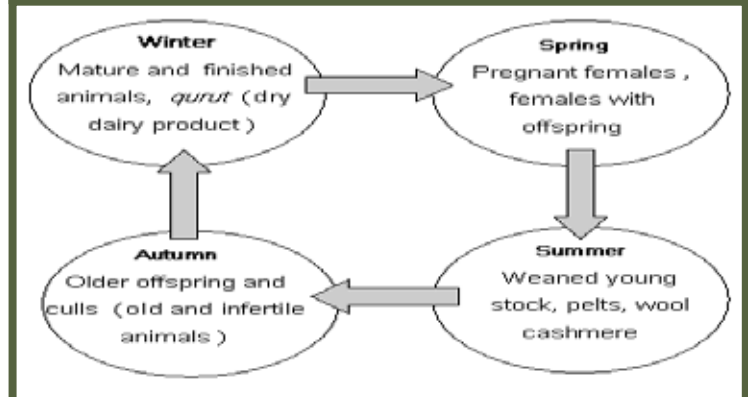
A number of factors affect marketplace price negotiations between buyers and sellers. Livestock producers who live in remote locations and move animals to market on foot are under pressure to sell, and are undoubtedly disadvantaged. However, some traders move through rural areas buying animals, which works to the seller's advantage, even if prices received are slightly lower to cover transport. Nevertheless, farmers with good quality animals who are in no hurry to sell are usually in the strongest bargaining position.

Researchers found that awareness of price is a factor in successfully navigating livestock markets (Box 4), informing farmers whether and where to sell (although most producers sell at local markets), and traders where to buy and whether and where to sell. To explore livestock pricing in Afghanistan, the WOL project team began monitoring livestock prices at three regional livestock markets (Kunduz town, Batikot in Nangarhar and Ghazni town) from April 2006. Preliminary data from this study has been presented in full and discussed elsewhere.⁷⁷

A preliminary review of market data collected during 2006-07 reveals considerable differences in the prices of animals, both within and between species and between different markets (Table 16). It is expected that price variations within species relate to variations in the attributes of animals (e.g.

77 Thomson, "WOL: Livestock Marketing."

Figure 18. Sale of livestock and their products through the seasonal cycle



Box 5. Price information and sales negotiation

It is often speculated that livestock traders and dealers are able to exploit livestock owners because they are better informed on current prices. Does WOL research substantiate this? Interviewed farmers thought that this may be true for a minority of farmers living in very remote areas (without mobile phone coverage), but felt the majority were already well informed through use of mobile phones which allow them to check prices in different parts of the country. The extent to which farmers are themselves already spreading market information around the country through their own communications and commercial networks may be underestimated by development planners.

age, weight, condition). However, the relationship between shoulder heights and animal price reveals differences between each market site.⁷⁸ While non-pregnant female animals constitute the cheapest category of animal at all markets, there are differences in how the values of other animals are ranked (e.g. bulls are the highest priced category in Ghazni, but castrates are highest priced in Kunduz and Batikot). It may be that this reflects differences in local demand for draught oxen. Furthermore, only at Kunduz did price trends during 2006-07 correspond to the seasonal price cycle described by farmers and traders in interviews. There was greater stability in livestock prices in Batikot and

78 Thomson, "WOL: Livestock Marketing."

Table 16. Livestock prices (\$US) at three major provincial markets. Mean for the period April 2006 to April 2007

Species, sex and state	Kunduz			Batikot			Ghazni		
	Mean	n	Std dev	Mean	n	Std dev	Mean	n	Std dev
Cattle									
<i>Castrates (oxen)</i>	468	20	88.5	486	6	60.9	417	3	57.7
<i>Bulls</i>	276	34	80.7	395	64	149.3	555	59	124.4
<i>Cow (non-pregnant)</i>	255	25	55.3	389	19	113.2	399	2	116.6
<i>Cow (pregnant)</i>	383	38	108.9	479	17	166.8	400	29	80.7
<i>Cow with calf</i>	386	39	143.7	451	34	129.9	398	27	50.8
Goats									
<i>Castrates</i>	63	10	24.4	66	9	19.5	-		-
<i>Bucks</i>	46	51	18.7	69	61	28.8	63	60	16.6
<i>Doe (non-pregnant)</i>	46	57	11.8	54	29	18.9	46	29	15.7
<i>Doe (pregnant)</i>	62	15	10.4	76	11	31.4	42	2	4.7
<i>Doe with kid</i>	70	23	15.9	92	30	33.7	49	29	13.3
Sheep									
<i>Castrates</i>	109	23	34.6	-		-	-		-
<i>Rams</i>	107	49	43.7	107	70	42.2	130	54	38.1
<i>Ewe (non-pregnant)</i>	92	52	24.6	74	24	19.6	121	4	35.3
<i>Ewe (pregnant)</i>	99	15	-	92	8	21.9	85	32	12.1
<i>Ewe with lamb</i>	114	15	-	104	38	36.3	86.6	24	14.8

Ghazni, and prices for some categories of animal even fell during the winter.

These price disruptions may be explained by the drought conditions experienced in Nangarhar and Ghazni (but to a lesser degree in Kunduz) in 2006, and data collected through 2007 and 2008 may show price trends returning to follow the “seasonal cycle.” Alternatively, the proximity to the Pakistan border and resultant cross-border trade may somehow influence local livestock supply and demand.

In overview, the first year of price monitoring at livestock markets in Afghanistan demonstrates the complexity of price determination at these markets, clarifying that they do not function according to uniform, countrywide rules and patterns, and highlighting the need to link prices to animal condition as an incentive to improve animal condition.

5.6 The structure and operation of livestock markets

Livestock often pass through the hands of several market players on their way along market chains from producers in rural areas to consumers in urban areas. Although many animals pass through one or more regional markets to reach consumers, some traders or butchers buy finished animals directly from producers and so bypass livestock markets completely. However, the main participants in market chains are (see Figure 19):

- producers;
- traders, who buy livestock from producers or at primary or secondary markets and transport them for sale at other markets or to butchers;

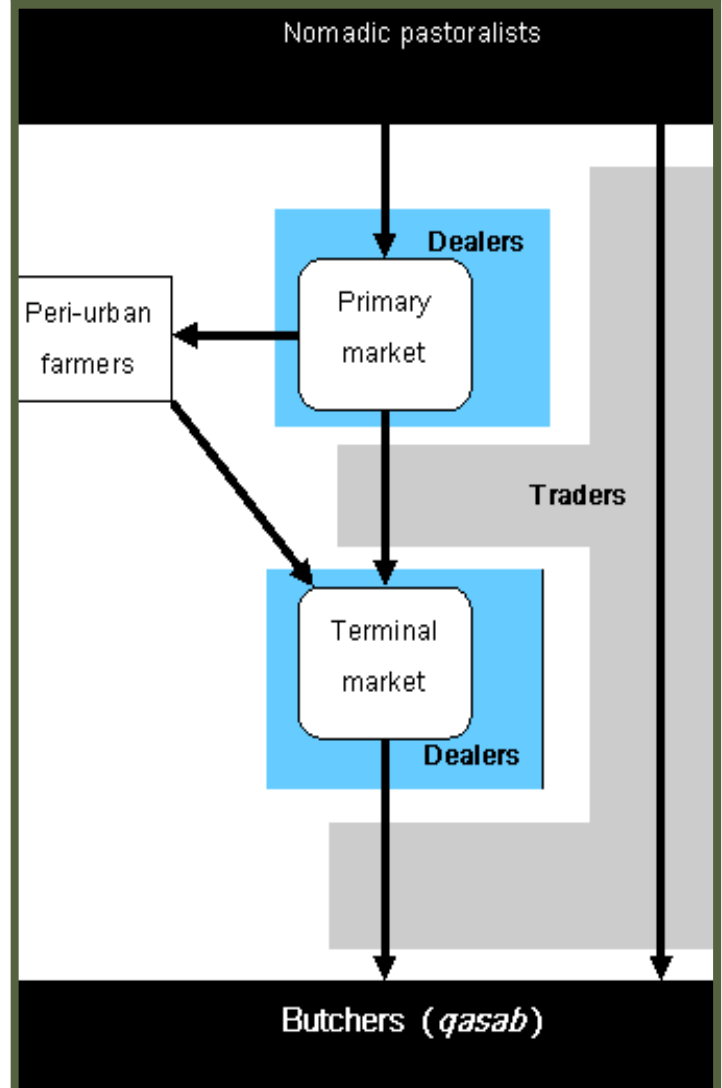
- dealers, who are market-based intermediaries or middlemen that buy and sell between other market chain participants;
- commission agents, who operate at large markets and facilitate transactions between buyers and sellers for a commission; and
- butchers, who purchase finished livestock from other market players.

Livestock may be purchased and resold several times within these market chains before reaching the butcher. Each market player hopes to make a small profit on every transaction, and thus each subsequent transfer adds to the final price of animals. This raises the question of how these price increases are manifest within the value chain, and who benefits.

In the year prior to April 2007, the Afghan market for red meat was very competitive, with foreign imports and falling demand placing pressure on prices.⁷⁹ In order to maintain their sales volumes and margins, butchers resisted paying more than certain wholesale prices, which dealers and traders knew; dealers and traders would in turn buy only at low prices to protect their own margins. Participants in the market chain are able to transfer price pressure backwards towards the producer; livestock producers have diminished bargaining power, because they ultimately have to sell their animals. Consequently, WOL findings suggest that producers tend to bear the cost of the presence of multiple intermediaries in market chains in the form of lower prices for animals.

As livestock progress along market chains they are physically transported by traders; movements include short transfers from production areas to primary (or regional) markets, and the long-distance transport between regional markets and to Kabul. Interviews with traders in Herat, Kunduz and Kabul suggest that the local movement of animals in the north and west of Afghanistan is

Figure 19. Schematic of livestock



relatively unhindered. However, trafficking animals across long distances through southern and eastern parts of the country can incur many informal costs. Anecdotal accounts suggest that police and officials may extract between \$10 and \$20 per truckload of livestock at multiple checkpoints along major routes. One trader's report in early 2007 indicated that accumulated informal costs between Torkham and Kabul totalled 7.5 percent of the wholesale value of the livestock.

The informal costs associated with the movement of livestock either erode traders' margins, or are otherwise passed on to producers (as lower purchase

79 Thomson, "WOL: Livestock Marketing."

prices) and to consumers (as higher sales prices).

WOL project researchers found that livestock markets are often poorly resourced. While small village markets generally utilise open areas of land between buildings, larger regional market sites are formally leased from municipalities and run by leaseholders. Although traders and dealers must pay market fees there are few or no facilities at the sites (e.g. adequate livestock housing, perimeter fences, and veterinary facilities). High additional fees are charged for overnight accommodation and feeds.

5.7 Livestock policies and opportunities for pro-poor growth

Given the import substitution opportunities, agricultural strategy under the I-ANDS highlights the livestock subsector as a priority for growth. Livestock ownership is widespread throughout the rural population, and it is assumed that improving the efficiency value chains for livestock and their products will generate economic opportunities that can potentially benefit the poor. Strategies emphasise diversification of production systems by farmers to provide more homegrown fodder and forage, especially for more intensive dairy production.⁸⁰ However, the findings of this research suggest some opportunities and priorities for achieving these developmental goals.

WOL research shows that cattle are predominantly kept or owned for their subsistence value, and under current farm management and stocking levels, few households produce more milk than they need for their own subsistence. Given the green fodder requirements of cows (especially to improve milk production), ownership of multiple cows is usually possible only in irrigated river valleys, where farmers are able to grow enough green fodder. However, there is a high opportunity cost in dedicating good irrigated land to fodder, and the best examples of successful small-scale dairying have been observed

where fodder can be intercropped with other high-value crops such as stone fruit, or otherwise integrated into a cropping regime. Small-scale dairying most frequently emerges in peri-urban areas with good market access; otherwise, surplus milk tends to be absorbed through non-monetary exchanges.

Ownership of a single cow for subsistence production is widespread in rural Afghanistan, but this does not mean that many of these farmers will be able to produce a milk surplus in response to the development of milk markets. WOL studies suggest that only those farmers with several cows (i.e. those who already enjoy preferential access to land and water resources and are able to integrate fodder cultivation into other forms of cropping) are likely to be able to respond directly to market demand for milk. Accordingly, the establishment of dairy and milk processing centres may not initially benefit the poorest farmers.

WOL data shows that production systems maximising the use of rangelands appear to offer the best gross margins from sheep and goat production. Having access to grazing resources (and post-harvest stubbles and winter cereal straw on rainfed farms) for six months or more per year minimises supplementary feed expenses. Furthermore, farmers of rainfed lands and pastoralists tend to structure their herds most effectively for market supply. Nevertheless, several factors act to limit the potential for these types of extensive livestock production.

First, rangeland-based producers (nomads and rainfed farms) are relatively disadvantaged in their ability to produce green fodder that can be stored to help sustain ewes and does through the winter, as they have no irrigated land to cultivate. Large rangeland-based herds are comparatively efficient producers of weaned lambs and kids in terms of offtake, but because they lack easy access to agricultural credit for fodder purchases, rangeland producers find it difficult to “finish” animals to optimal size for marketing. They thereby fail to realise the earnings potential from their animals compared with producers who finish them in irrigated areas.

80 MAIL, “Agricultural Strategy.”

As a result, peri-urban growing and finishing seems to be emerging as a major complementary activity to livestock production in outlying areas. This provides farmers of appropriately situated irrigated lands the opportunity to participate in livestock value chains, using feed resources available to them and allowing rangeland producers to specialise in production of weaned young stock. Livestock development strategies should recognise and support the development of this activity, and seek other opportunities for the further integration of rangeland and farm based-production.

Second, producers of livestock in rangeland areas remain disadvantaged by lack of access to credit and veterinary and extension services. For logistical reasons, these development programmes remain focused on the more populated river valleys, but policymakers should realise that the majority of small ruminants are produced and sold from herds under extensive management, and align services to support livestock value chains accordingly.

Third, the comparative advantage of rangeland producers is now threatened by increasing disputes over access to pasture land. In some cases these disputes arise owing to appropriation of traditional grazing lands by neighbouring communities or powerful individuals for cultivation or other purposes. Livestock subsector development strategies must be closely linked to clarification and enforcement of grazing landuser entitlements,

and to systems of management to avoid grazing land degradation.

Fourth, in some parts of the country widespread informal charges on the transport of animals between markets are affecting production margins. Likewise, the fees that are charged to market participants result in little apparent improvement in market services. These poor facilities and services hinder rather than enhance the trade in livestock to the detriment of all players in the value chain. In order to make value chains more efficient, the Government of Afghanistan must ensure that all market transactions can be accomplished as cheaply and effectively as possible. This will increase returns to producers and keep retail prices for red meat competitive.

In contrast to strategies promoting value chains for high-value horticultural crops, which will be of primary benefit to farmers with preferential access to resources, the development of value chains around livestock production from rangeland areas has the potential to target a relatively resource-poor and otherwise marginal group of agricultural producers. Strengthening links between rangeland producers and smallholders that “finish” small stock would in particular serve as a basis for subsector development that could benefit some of the most vulnerable communities in rural Afghanistan, and achieve growth that is genuinely pro-poor.



Following the plough, Laghman



Nomad herding camp, Wardak

6. Opium: Sustaining Opium-Free Livelihoods

The first year of WOL research into opium cultivation was structured by a comparative investigation of opium cultivation in four provinces (Balkh, Kunduz, Ghor, and Nangarhar), each of which has a different history of opium cultivation and a distinct production environment. Multi-site comparisons were used to explore the factors driving poppy cultivation. Opium was found to be deeply embedded in the rural economy and closely related, both positively and inversely, to access to natural resources, and thus to the fabric of rural institutions and power relationships. Farmers were found to be very flexible and responsive to these dynamic environments, with the capacity to quickly move into or out of the crop as production conditions and livelihood opportunities changed.⁸¹

By 2006, there was clear evidence that while the exercise of political influence and pressure might achieve substantial reductions in opium cultivation at the provincial level, these reductions were not sustainable in all cases. WOL research in 2005-06 had already highlighted the slow return of the poppy to Nangarhar after the initial “success” of the 2004-05 poppy ban. This raised important questions about the sustainability of transitions to licit farming and livelihoods, if the requisite conditions were not first established. Building directly on the 2005-06 findings, WOL researchers returned to the provinces of Nangarhar, Balkh and Ghor in 2006-07 to review changes (compared with the preceding year) in opium cultivation patterns, factors influencing farmer cultivation choices, and the implications in terms of requirements for sustainable reductions in poppy cultivation.

6.1 Three provinces: Change in opium poppy cultivation

The second year of WOL research was also the fifth

⁸¹ See Pain, “WOL: Opium Cultivation in Kunduz and Balkh” (Kabul: Afghanistan Research and Evaluation Unit, 2006), and David Mansfield, “Water Management, Livestock and the Opium Economy: Opium Poppy Cultivation in Nangarhar and Ghor” (Kabul: Afghanistan Research and Evaluation Unit, 2006).

year of post-Taliban governance in Afghanistan. Between 2001 and 2007, United Nations Office on Drugs and Crime (UNODC) data revealed successive annual increases in total land under opium poppy cultivation. However, as discussed in previous WOL studies, data describing the aggregate area of poppy cultivation obscures considerable provincial and local variation in whether (or how) different farming communities engage with the crop.

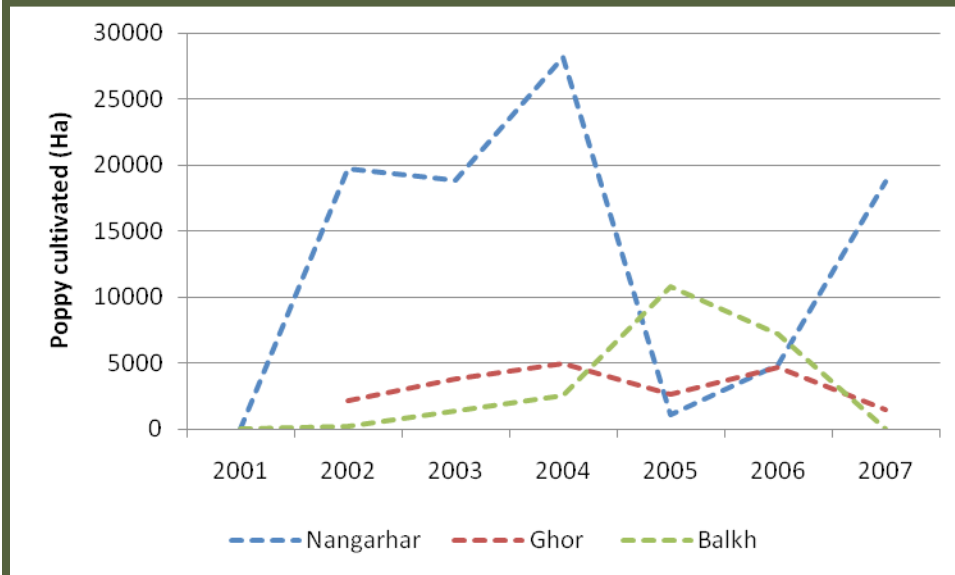
Aggregate data on poppy cultivation in the three provinces selected for WOL study reveal very different trends in cultivation since 2001 (see Figure 20 over page). The cultivated area in all three provinces has both increased and decreased over time, reflecting changes in farmer cropping decisions.

After 2001, poppy cultivation underwent the greatest expansion in Nangarhar and high levels of cultivation were sustained until the much lauded 2004-05 poppy ban. However, by 2007, poppy cultivation had increased again, clearly indicating that farmers were unable to sustain the ban. By contrast, Balkh Province underwent a gradual but sustained expansion of poppy cultivation until 2005, after which reductions in cultivation occurred, with Balkh declared “poppy free” in 2007. Owing to marginal conditions, poppy cultivation was never entrenched in Ghor in the same way as in Nangarhar, and the cultivated area remained quite limited.

Opium poppy cultivation in Nangarhar

The Nangarhar opium ban of 2004-05 initially achieved a 96 percent reduction in cultivated area, but in 2005-06, WOL studies found that poppy was gradually returning to Nangarhar. Researchers found that farmers differed in their ability to sustain the ban into its second year. Those with sufficient access to land, water, markets, security and other assets were able to mitigate opium losses by cultivating licit high-value crops, as well as by relying on off-farm income sources. In contrast,

Figure 20. Area of opium poppy cultivation in three study provinces since 2001 (source: UNODC)



asset-poor farmers in remote, resource-scarce areas could only substitute poppy with wheat, which was typically insufficient to meet household food requirements. This differential access to resources revealed a clear socioeconomic and geographic gradient in farmer cropping choices. In 2005-06, poppy cultivation resumed in outlying, resource and asset-poor communities that had incurred heavy debt the previous year, while the more resource-secure households in irrigated river valleys were able to sustain the ban into a second year, although they still incurred losses.⁸²

In 2006-07, researchers returned to Nangarhar to find opium poppy being cultivated through much of the province.⁸³ Examining how and why farmers developed their respective livelihood or farming strategies for the third year of the ban confirmed the differences between farmers in terms of asset and resource status. Outlying upper catchment areas of Nangarhar (such as the upper Achin

⁸² A wider discussion of this (and data) is offered in Mansfield, "WOL: Opium Poppy cultivation in Nangarhar and Ghor" and Roe, *WOL: Farming Systems and Rural Livelihoods*.

⁸³ Full discussion of fieldwork results from Nangarhar is given in David Mansfield, "Water Management, Livestock and the Opium Economy: Resurgence and Reduction; Explanations for Changing Levels in Opium Poppy Cultivation in Nangarhar and Ghor" (Kabul: Afghanistan Research and Evaluation Unit, 2007).

District) are characterised by very small cultivated areas per person, limited and irregular irrigation, and poor access to labour opportunities and markets. These farmers—who were unable to sustain their livelihoods through cultivation of cereals and low-value crops, and lacked access to off-farm labour opportunities—led the poppy re-introduction in 2005-06. High prices but comparatively low yields for opium resin in 2006 encouraged an expansion in cultivated area the following year. By 2006-07, nearly all cultivable land in the upper Achin was back under poppy

cultivation. Nevertheless, falling prices for opium drove all households to seek supplementary waged incomes, with household members often working in other provinces as skilled poppy harvesters.

In 2006-2007, the greatest overall increase in poppy cultivation occurred among farmers in the most peripheral and resource-scarce parts of the lower catchments (including lower Shinwar, and some secondary canals off the Nangarhar canal). These farming communities had sufficient resources, assets and market access to survive for two successive years by cultivating wheat, supplemented by a little vegetable cultivation and some off-farm waged labour. However, although better resourced than upper catchment farmers, this group still lacked the resources to shift to a sustainable licit livelihood. There is evidence that poppy cultivation began returning to peripheral lower catchment areas during 2005-06, but in the following year, facing mounting debts and unsustainable economic pressures, a high proportion of farmers returned to opium cultivation.

During the winter of 2006-07, the only studied areas remaining free of opium were districts adjoining Jalalabad (Surkhrud and Besud). While these areas were clearly the most visible and accessible to local authorities, they also tended to be upstream

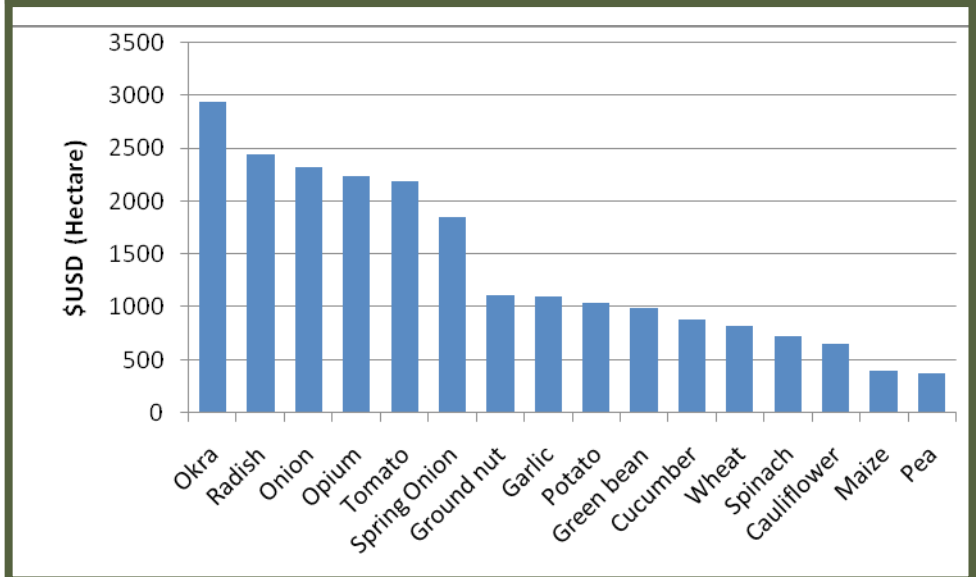
farms with access to the best water and the largest cultivable areas. Furthermore, they had easy access to urban markets to obtain waged labour and sell agricultural products. Typically, these farms and households had not planted poppy since the ban began three years before, and appeared to have shifted to a reliance on high-value vegetable production. This transition was facilitated by the emergence of specialist traders and brokers who purchased at the farm gate, and offered credit and advance purchase against future crops.

Given access to good irrigation flows and superior quality land, the subtropical climate of Nangarhar allows cultivation of a wide range of high-value summer crops. The winter of 2006-2007 brought good rains, and plentiful water resulted in a good agricultural season. Data suggests that under these favourable conditions farms with preferential access to natural resources and markets could achieve gross margins from crops such as okra, radish and onion that surpass margins from opium (see Figure 21).

Data on poppy cultivation from WOL farm monitoring provides a clear overview of these trends in a comparison of five village sites. These sites are situated along a transect up the side of the Kabul river valley through Bati Kot and Achin districts and are accordingly differentiated by resource access. The data shows the return of the crop through the second and third years of the poppy ban, first into those areas with the poorest resources and lowest livelihood opportunities, and then advancing into better-resourced lower catchment areas (see Table 16 over page).

The outcomes of the Nangarhar poppy ban between 2004 and 2007 suggest that while it may be possible to politically impose a prohibition on poppy cultivation, farmers' behaviour is determined

Figure 21. Gross margins for a range of crops on irrigated farms in Nangarhar (2007)



Box 6. Organised opposition to the poppy ban

In 2006, members of the *Shinwari* and *Khogiani* tribes in Nangarhar collectively decided that they could not comply with a third year of the poppy ban, due to its impact on their livelihoods.

This hallmarked a growing popular resentment against the ban and the institutions viewed as responsible for it. Growing tensions surrounding the impact of the ban coincided with an appreciable deterioration in security in outlying areas.

Thereafter, to avoid escalating tensions, provincial authorities were forced to adopt a pragmatic approach in the way that counter narcotics actions were targeted and implemented.

by their immediate livelihood concerns. Those households that can secure livelihoods in the licit rural economy (through preferential access to resources, markets and income opportunities) are able to refrain from poppy cultivation, but households that cannot sustain their livelihoods through licit activities will ultimately return to poppy cultivation.

Table 17. Land under poppy at WOL Nangarhar research sites (2005-07)

	Distance from road (km)	Site type	Land cultivated with poppy (%)	
			2005-06	2006-07
<i>Jani Khel</i>	7.6	Well irrigated lower catchment site on Nangarhar canal. High crop diversity and some access to regional markets.	0	15
<i>Maruf China</i>	15.3	Water scarcity and heavy debts from installation of tube wells. Low crop diversity. Few opportunities for labour incomes.	21	45
<i>Sra Qala</i>	21.8	District capital, limited irrigation water but small local market.	14	85
<i>Othar Khel</i>	30.7	Remote upper catchment site with land/water scarcity and poor access to markets and labour incomes.	36	89
<i>Khawaji</i>	36.7	Remote upper catchment site with land/water scarcity and poor access to markets and labour incomes.	20	100

Opium poppy cultivation in Balkh

Research in Balkh during 2005-06 also revealed that opium cultivation was highly differentiated between localities and groups. Agriculture in the province is structured around irrigation from the Balkh River, and there are upstream and downstream gradients in access to water that have an important influence on poppy cultivation. However, the complex settlement history of Balkh has resulted in a patchwork of ethnicities and power asymmetries that roughly align with resource-access gradients. Initial WOL studies suggested that these power relationships were very significant in the expansion of poppy cultivation in Balkh, where members of the dominant ethnic group held kinship links to opium trading networks, and had strong political influence with the provincial authorities.⁸⁴ Initial expansion of poppy cultivation occurred in upstream areas where the best land resources were located, even though downstream communities faced growing water scarcity and economic distress.

Poppy cultivation among more resource-poor downstream communities emerged later, when

these communities gained access to opium markets and supply networks. Even then, the 2005-06 research suggested that poppy cultivation among upstream communities was driven by a desire to maximise incomes, while resource-poor and marginal communities cultivated poppies due to a lack of alternatives, and for very little profit beyond survival.

Cultivation of opium poppy in Balkh began declining in 2005, with a ban imposed in 2006; by 2007, the province was declared poppy-free. This sharp decline in cultivation initially raised comparisons with the experience of Nangarhar and led researchers to question how this had been achieved.

The reduction in poppy cultivation in 2006-07 occurred during a period of falling opium prices and was universal across all production environments, suggesting that the falling price was not the sole driver of change in farming strategies, as some farmers had no crop alternatives. Research suggests that the same privileged and powerful groups that initially drove the expansion of cultivation led the reduction in cultivation. As opium cultivation returns declined, the politically connected and well-resourced groups that were prime movers within the opium economy decided to stop cultivating poppy

⁸⁴ For fuller discussion, see Pain, "Understanding Village Institutions."

and use their acquired resources in other ways. With the possibility of double cropping, they could diversify into other high-value crops, including marijuana, or invest their opium profits into off-farm activities. The exit of these key brokers from the Balkh opium economy effectively drove out the small farmers, sharecroppers and vulnerable communities who cultivated opium out of necessity, as a result of the structural inequities they faced.

The decline in poppy cultivation had an immediate impact on the wider rural economy of Balkh, with anecdotal evidence suggesting a decline in bride prices, diminishing access to rural credit, and increased migration as labourers sought opportunities elsewhere.

Opium poppy cultivation in Ghor

Ghor is one of the most remote and resource-scarce provinces in Afghanistan, with little irrigated farmland, very harsh climatic conditions and a population that is highly vulnerable economically. Ghor farmers traditionally specialised in the production of livestock on mountain pastures, in combination with rainfed cereal crops on the hill slopes, and some cultivation of fodder and subsistence food crops in the valleys. WOL research in 2005-06 ascertained that poppy cultivation had become established in Ghor after the major drought of 1998-2002 decimated livestock herds. High opium prices offered an alternative to the sale of livestock for generating cash incomes.

In the first two years of poppy cultivation in Ghor, some farmers achieved yields of 35 kg of resin per hectare. Yields then declined and traders from Helmand stopped visiting Ghor, resulting in a decline in local opium prices. A series of increasingly poor harvests followed, due either to disease or the intrinsic unsuitability of poppy to local conditions. By 2006-07, few farmers reported receiving more than 7.5 kg of resin per hectare from their blighted crops, and local opium prices had fallen to about US\$70 per kilo. As in other provinces, researchers found that in Ghor the response of farmers to this decline in opium yields and income differed by access to resources and assets.

Farmers who managed to retain livestock through the drought years were inclined to abandon poppy cultivation sometime between 2004 and 2007, and many chose to reallocate land previously under poppy to fodder and wheat. Following the good winter rains of 2006-07, much of the land left fallow during 2006 due to lack of water could be brought back under cultivation, and farmers in drier valleys were able to switch from barley to wheat. Collectively, these changes improved prospects for restocking herds and made livestock production appear more profitable than opium. Farmers returning to livestock production in Ghor sought to maximise their incomes through the production and sale of animal by-products (hides, fibres and dairy products).

However, by 2007 many Ghor farmers had insufficient livestock to shift back to an agro-pastoral economy. They incurred heavy losses during the drought years, and mounting debts through successive years of poor opium yields led to forced sales of the remaining animals. Some farmers' accounts describe gradual depletion of their herds down to just two or three sheep and goats. Under these conditions, persisting with opium cultivation was the only option to generate cash, on-farm income, even if returns were minimal. To reduce the high costs associated with poppy cultivation and increase margins, households depended increasingly on family labour for production, with young children participating in opium harvests. Where poppy cultivation persisted into 2007, cultivated areas were very small (typically less than one-fifth of a hectare), because the farmers still compelled to grow the crop were those with very poor land and other resources.

As in other provinces, off-farm incomes in Ghor are an important part of farm livelihood strategies. There are few labour opportunities in Ghor, however, resulting in labour migration and the division of households. Evidence from Ghor appears to link declining poppy incomes, economic stresses and vulnerability with deteriorating local security, both in the form of armed banditry and a growing and potentially destabilising disillusionment with the Government.



Poppy in flower, Badakhshan

6.2 General points arising from case study evidence

Field studies undertaken during 2006-07 are largely consistent with the findings of research undertaken during the previous year. Indeed, in all provinces, the general trends in cultivation observed during 2006 persisted or were reinforced the following year.

WOL studies reveal that farmers engage in the opium economy to address differing livelihood objectives. Poppy cultivation can serve a range of functions, including maximising monetary incomes to landowners, or serving as a means for the landless to access land and agricultural credit.

Farmers' decisions about poppy cultivation occur within the broader context of their livelihood strategies, and household dependency on the crop is directly related to other opportunities and income sources that are available. Consequently, the range of assets, resources and opportunities available to individual households is important in shaping their engagement with the opium economy. WOL findings clearly demonstrate how changes in assets and access to resources and opportunities may lead to changes in levels of opium cultivation (for example the loss of livestock in Ghor, or the emergence of new markets for vegetables in Nangarhar).

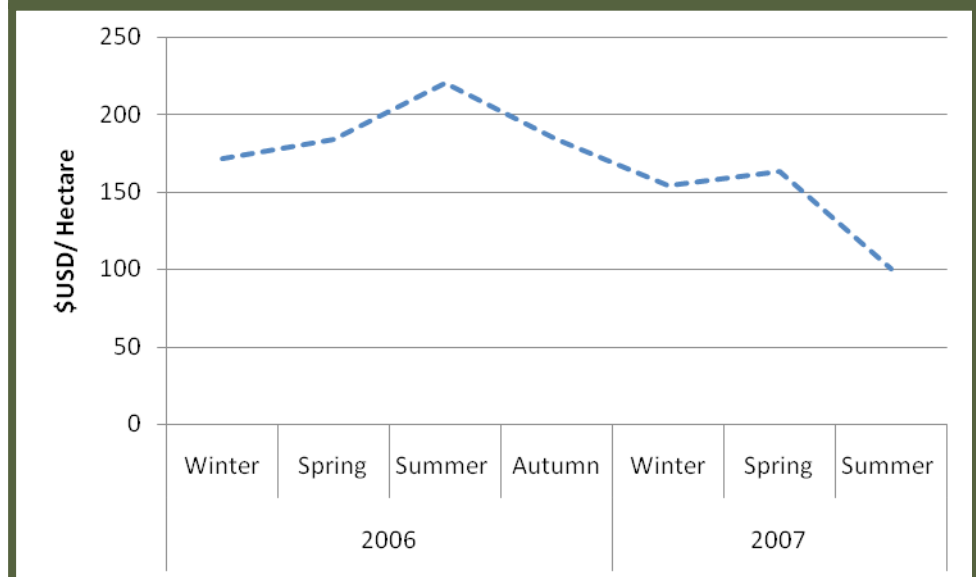
Furthermore, evidence from Nangarhar, Balkh and Ghor suggests that the most secure farmers (in terms of assets and resources) are in the best position to move out of the opium economy, if that becomes desirable. Ironically, of all farmers, they would have profited most from their participation in the opium economy, either as cultivators, landlords or patrons. Findings in all three provinces show that given the right economic conditions and preferential

access to resources, some licit crops or combination of crops and off-farm activities may offer better returns than opium.

The replacement of opium by horticulture in certain parts of Nangarhar (and comparable livelihood choices by some farmers in other parts of Afghanistan), can be related in part to the general downward trend in opium prices between the summer of 2005 and the summer of 2007. Price data collected from local bazaars in major opium-producing areas of Nangarhar indicates that prices for raw opium fell by 50 percent over this period (see Figure 22), which provided a compelling incentive for farmers to realign their livelihood strategies, if they were able.

Researchers found that dependence on the opium economy tends to be most firmly entrenched in the most resource-poor, disadvantaged and vulnerable communities, which lack the means to respond to new economic opportunities. In the provinces studied these included communities in remote, resource-scarce upper catchment districts of Nangarhar, downstream communities and politically marginal ethnic groups in Balkh and farmers without livestock in Ghor. Opium cultivation helps minimise the risks faced by these marginal groups by offering secure access to land and credit, as

Figure 22. Mean price for opium resin recorded from bazaar traders, Achin, Nangarhar



well as a guaranteed market and income. Under conditions of limited irrigation water, high person-to-land ratios and limited access to off-farm incomes, the decision to cultivate poppy is not a choice but rather a livelihood necessity. The lack of viable alternatives was illustrated by the situation in Ghor, where the poorest farmers persisted in cultivating poppy despite extremely low yields and low opium prices.

Case studies clearly highlight the importance of dealers, brokers and informal networks in facilitating the function of the opium economy. As in other crop systems, these can help mitigate farmers' exposure to risk by offering credit, guaranteeing markets and assuming transport risks. In the case of opium, these market agents can also assist the landless to secure access to land. Evidence shows that when dealers' visits to Ghor became infrequent and then ceased, the local opium economy was stricken by falling prices. Likewise, when powerful individuals and groups (including landowners and patrons) who formerly dominated the opium economy in Balkh moved out of opium production in 2006-07, the result was a widespread suppression of opium production. Finally, data from Nangarhar shows that the emergence of comparable trade networks for high-value crops can substitute some of the functions of opium networks, but indicates these will probably only emerge under specific conditions.

Finally, studies in Nangarhar, Balkh and Ghor caution that severe socioeconomic pressure on rural communities (either as a consequence of the poppy cultivation ban, or a general decline in opium incomes from other causes) may be very destabilising, and can result either in general rural insecurity (as in Ghor), or in more organised social dissent (as occurred in Nangarhar).

6.3 Contextualising sustainable reductions in poppy cultivation

The findings of WOL research during 2006-07 highlight important issues relevant to understanding the conditions under which farmers can sustainably

move away from poppy cultivation.

WOL studies show that farmer behaviour is ultimately determined by the need to manage risk and construct a sustainable livelihood. The capacity of even the best-intentioned farmer to respond to government incentives or threats to reduce poppy cultivation depends on their ability to build a livelihood outside the opium economy. Efforts to prohibit poppy cultivation in the absence of viable livelihood options are unlikely to succeed, and their main impact will be to undermine the welfare of vulnerable Afghan farmers. Indeed, field observations suggest that threatening the vital interests of communities may contribute to social instability and stimulate resentment against the authorities.

Evidence from the first two years of WOL research has highlighted a range of agricultural, social and economic factors that play a role in shaping farmers' livelihood options, including the cultivation of poppy (Table 18). Most of these elements are integral to wider rural development. It is clearly not possible for policymakers and planners to easily affect change in factors such as the agro-ecological context of farm production, but through planning it may be possible to recognise the systemic inequities and asymmetries that can result from farm location.

6.4 Policy implications: Supporting rural livelihoods

As of 2007, the Government of Afghanistan's strategy for facilitating "Alternative Livelihoods" has recognised the need to incorporate counter-narcotics goals in all aspects of development planning. This section considers how WOL research findings and observations contribute to this policy position, and to the furtherance of sustainable reductions in poppy cultivation in Afghanistan.

WOL studies support the argument that opium cultivation and its associated economy must be understood in context. Diverse communities around Afghanistan have engaged with the opium economy in different ways, and for different reasons,

Table 18. Observed conditions enhancing and/or reducing prospects for sustainable reductions in poppy cultivation

	Conditions improving chances of sustainability	Conditions reducing chances of sustainability
Agro-ecology	Good soil conditions, mild winters, extensive cultivable areas (usually lower catchment areas advantaged for crop production)	Poor soil conditions, heavy frosts, limited cultivable area (upper catchments often disadvantaged for crop production)
Land	High levels of land ownership, large cultivable areas (more than 0.1 hectare per person)	High levels of landlessness, much land held under subordinate terms (sharecropping), and small cultivable areas (less than one 0.1 hectare per person)
Irrigation water	Good seasonal flows allowing short irrigation interval and sufficient to irrigate two or more crops annually	Poor or irregular flows, long irrigation interval and only sufficient for one annual crop
Livestock	Livestock supplying the household with dairy products and with a marketable surplus of animals and products	No or few livestock, insufficient to supply household needs.
Agricultural diversity	High crop diversity, spreading risks and including high-value crops for income generation	Low crop diversity, primarily cereals and subsistence crops
Credit	Access to agricultural credit enabling investment in high value crops or to retain agricultural products to get the best seasonal prices	Poor access to credit
Access to markets	Direct access to markets (or traders purchasing products at the farm gate, absorbing transport costs and risks)	Poor access to markets, high informal costs and risks associated with moving products to market
Off-farm incomes	Multiple and secure long term off-farm incomes. Diverse types of employment (including household members outside of Afghanistan)	No or limited access to waged labour other than temporary agricultural work
Food security	Good food security	High levels of food insecurity
Governance and physical security	Close to provincial administrative centres. Good security and weak tribal institutions with primary allegiances to state instead	Remote from centres of governance, poor physical security and strong local power structures and tribal elites

reflecting local capacity, resource availability and opportunity. Both local conditions and the context of farmers' decisions regarding poppy cultivation change over time, which helps explain the divergent trends in poppy cultivation, not only between provinces, but between neighbouring districts and communities, and even within communities on the basis of individual household circumstance. It also explains why simplistic interpretations (such as "income maximisation") fail to account for the complex dynamics of cultivation in Afghanistan. The diversity of contexts suggests that it is unlikely

a single "one size fits all" strategy for reducing poppy cultivation can be found.

It is particularly important that counter-narcotics policy and strategy address the root causes of the opium economy, rather than target its symptoms. Counter-narcotics efforts in Afghanistan have largely sought to suppress the areal extent of poppy cultivation, which has been adopted as a key measure of success in the "war against drugs." A primary policy goal of rapid cessation of cultivation, regardless of how this is achieved,

runs the risk of encouraging the return of the crop (as occurred in Nangarhar), or exposing farming households to severe economic stresses, and exacerbating livelihood insecurity. While short-term reductions in cultivated acreage may be politically expedient, sustainable reductions will depend on the more complex task of addressing the structures of inequality that underlie individual household choices and behaviour.

Broad-focus development initiatives are needed to address the factors contributing to chronic poverty and insecurity in opium cultivating households. In this respect, the notion of incorporating counter-narcotics goals into sector strategies is laudable, but care is needed to ensure that the political imperative for achieving short-term reductions in cultivated areas do not undermine these longer-term development goals. This is a potential risk if provincial and district authorities (who may be eager for recognition) lead counter-narcotics efforts, while line ministries deliver integrated rural development programmes. These two types of activities must instead be highly coordinated.

A sustainable, opium-free rural economy will take many years to achieve in Afghanistan. Policymakers should appreciate that not all provinces, districts or

socioeconomic groups can make progress towards this goal at the same rate. However, there may be some geographic or socioeconomic locations where households already have the option to move out of the opium economy, and where these transitions can occur relatively quickly.

While WOL findings question the value of imposing enforced prohibitions on poppy cultivation where livelihood alternatives do not exist, they also highlight the importance of wealthy and influential brokers, traders and landed patrons in controlling resources, extending opium networks and absorbing much of the profit. Evidence from the field shows how the removal of these key individuals and networks can have a far-reaching impact on the function of the opium economy. It also suggests that groups that have the resources and opportunities to exit the opium economy but remain engaged within it, either directly or through patronage of others, are seeking to maximise their incomes. There are therefore strong reasons to focus counter-narcotics interventions on these principal instigators and beneficiaries of the opium economy. Counter-narcotics interventions must be better informed and sensitive to livelihood opportunities in order to specifically target those parts of the opium economy where the greatest value lies.

7. Labour, Agricultural Livelihoods and Food Security

The final section of this report draws together many of the findings from previous sections by placing agricultural production and farming systems within the wider context of rural livelihoods. The ultimate goal of agricultural and rural development policy is not simply to develop an economic sector, but to also achieve pro-poor growth to enhance the livelihood security and welfare of an important proportion of the national population. Development strategies⁸⁵ are currently based on the assumption that sector growth will offer rural communities enhanced livelihood security through improved access to markets and opportunities for waged incomes.

The first year of WOL research confirmed that Afghan rural livelihoods are highly dynamic and comprise a changing combination of on- and off-farm activities.⁸⁶ Data shows that a high proportion of Afghan households benefit from off-farm incomes, and that there are observable differences in household nutrition between different farm types. These differences are assumed to reflect both farming conditions and off-farm incomes. Second-year WOL studies sought to explore these differences more fully in order to better understand the respective roles of on- and off-farm production in constructing livelihoods. Drawing on the findings from WOL farm monitoring, this section considers the principal constraints on and opportunities for strengthening rural livelihoods, with particular emphasis on labour and food security. These indicators are particularly relevant in understanding how rural livelihoods may develop in the future.

7.1 On-farm labour

First and second-year WOL studies highlight the importance of on-farm labour, and how households farming under different conditions manage labour allocations. All households must balance the need

85 MAIL, “Agricultural Strategy.”

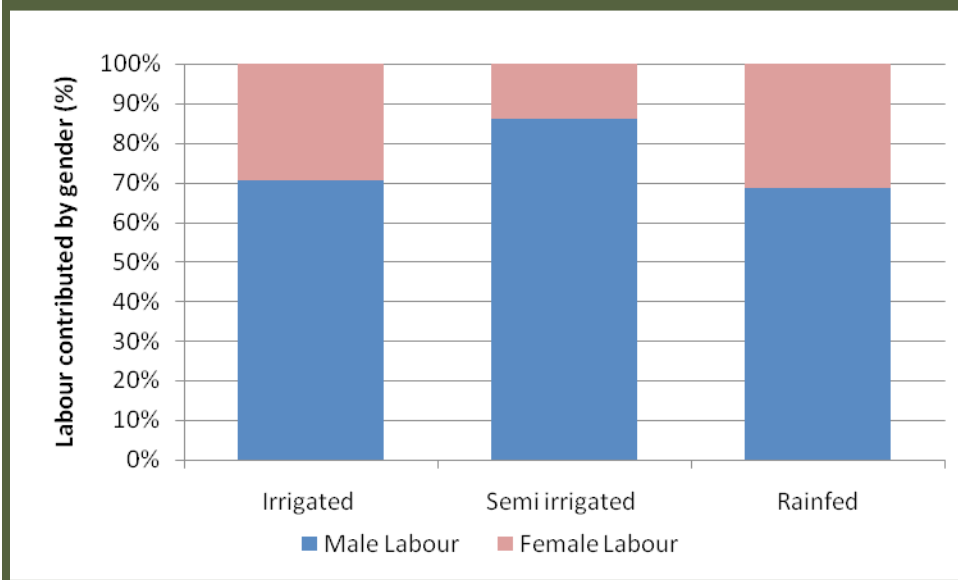
86 Roe, WOL: Farming Systems and Rural Livelihoods.

for on-farm labour with available labour resources and the potential to earn supplementary off-farm income. Farm labour needs and the opportunities for waged labour differ by type of farm, location and production system.

Sedentary households participating in WOL research were found to vary in size from a minimum of two to a maximum of 33 members⁸⁷ (mean 9.12, Std dev 4.604). The size of households did not significantly differ between different farm types. However, the population size of nomadic *Khomari Khel* and *Kutub Khel* pastoral households were found to be smaller than sedentary households (mean 7.82, Std dev 4.452), ranging from two to 20 members. Approximately half of all household members are reported to be under the age of 15 years.

These family units constitute the core labour resource for Afghan farming households, although labour from outside the household may be used under some circumstances. WOL field observations suggest that male, female and even juvenile members of households contribute farm labour, with women possibly contributing up to 30 percent of all farm labour. These initial findings clearly challenge preconceptions about gender roles in agriculture, and within rural households generally. However, patterns of labour contributions by gender differ slightly between farming systems, with women contributing the highest proportion of labour at rainfed and lower catchment farms (Figure 23). Women from households at semi-irrigated sites contribute a smaller proportion of farm labour, possibly because smaller agricultural holdings at semi-irrigated sites have less overall demand for farm labour.

87 The definition of “household” used here is much the same as that used in the first year of WOL research, namely, a socioeconomic entity that centrally pools and reallocates resources (income, assets and labour) and is usually (but not always) co-resident and normally eats meals together.

Figure 23. Reported contributions to farm labour days by gender

The main focus of women's labour activity throughout the year is livestock and poultry care, notably feeding animals, cleaning out stalls, tending to weak or young animals, collecting eggs, and other aspects of animal care (see Table 18). Women's involvement in animal care declines in the summer when animals are often taken from their stalls to the fields to graze stubbles and residues. Women are also heavily involved in transport (mainly the transfer of harvested crops or livestock feeds and products between the farm and home) and dairy processing. Women also contribute seasonally to weeding and harvesting activities.

In addition to contributing labour to farm production, women are responsible for running the household and caring for children. Some women also reported providing unpaid labour to help other households at times of labour shortage (through informal reciprocity and support networks), while others also generate monetary incomes for the household through the sale of woven products.

The role of women in generating monetary incomes for farming households is often overlooked. The first year of WOL research identified the role of women in manufacturing and selling value-added textiles in the form of rugs, carpets and ropes. Data from monitoring during 2006-07 shows that nearly half of all households at irrigated and rainfed farming sites

reported producing woven products for sale during the year. Researchers found that although productivity (in terms of the number of items produced) was highest at rainfed sites, mean annual income from weaving was much higher at irrigated sites (about \$35 at irrigated sites compared with \$6 at rainfed sites), due to differences in the types of items being produced. At rainfed sites, functional items such as shepherds' clothes, blankets for donkeys, ropes and tent fabrics are most commonly produced, and these are sold

to neighbours within the community. At river valley farms, especially in Kunduz, women weave carpets for specialist buyers who place orders and supply national and international markets.⁸⁸ A woman in Kunduz producing four "made to order" carpets per year reported generating \$800 in income. Women at rainfed farming sites and in nomadic households have access to the largest quantities of animal fibres, but lack access to carpet traders, and thus cannot convert this resource into cash income.

Data shows that most farms allocate the equivalent of two adult males from within the household to regular on-farm labour. However, there is considerable flux in the makeup of this standard labour force, with full-time labourers being supplemented and replaced with part-time workers throughout the agricultural calendar. Most workers are adults over 15 years of age, but during peak labour demand, young males (under 15 years old) provide up to 30 percent of farm labour. Demand for boys' (and women's) on-farm labour reflects the reallocation of adult male labour to off-farm, wage-earning pursuits. Monitoring during 2006 revealed that overall, male labour allocations were relatively constant during the winter, spring and

⁸⁸ An analysis of how markets and supply chains for carpets operate is given in Alan Pain and Moharram Ali, "Understanding Value Chains in Afghanistan: A Case Study of Carpets and the Andkhoy Carpet Market" (Kabul: Afghanistan Research and Evaluation Unit, 2004).

summer, and decreased in the autumn.

Even with two male workers allocated to farm duties, many monitored households need to supplement the household labour pool with external labour.⁸⁹ While part of this externally recruited labour is paid, some is provided freely by friends and neighbours through reciprocity networks. Nevertheless, the number of paid, externally recruited labour days ($n=190$, mean 12.38, Std dev 15.455) exceeded unpaid days ($n=99$, mean 9.21, Std dev 14.288). Farmer reports show that external unpaid labour is used primarily for harvesting and land preparation; paid external labour is also used most often for land preparation and harvesting, but also for shepherding.

Among the WOL monitoring group, farmers of irrigated and semi-irrigated lands appear able to meet almost half of their external labour requirements with unpaid labour from within social and economic networks. By contrast, rainfed sites are characterised by greater land area, larger herds and a lower population density, and farmers pay for the majority of additional labour they need (see Table 20). These findings highlight the relative scarcity of labour in rainfed areas and the operation of markets for seasonal (albeit low-paid) agricultural labour.

Table 20. Use of external male on-farm labour (exclusive of labour on poppy) in number of days

	Unpaid labour		Paid labour	
	Mean	Std dev	Mean	Std dev
<i>Irrigated</i>	10.7	15.75	10.9	10.79
<i>Semi-irrigated</i>	8.5	7.85	8.2	18.61
<i>Rainfed</i>	4	5.91	14.9	18.14

Moreover, the complex way that farm labour demand is met—by men, women, children, and through paid and unpaid external workers—points to the delicate balance between farm labour demand,

Table 19. Women's reported contributions to on-farm labour (by number of households)

	Winter	Spring	Summer	Autumn
<i>Irrigation management</i>	7	12	32	12
<i>Land preparation</i>	84	67	112	122
<i>Weeding</i>	83	111	146	160
<i>Harvest</i>	16	90	95	126
<i>Transport</i>	21	122	550	139
<i>Livestock and poultry care</i>	411	479	198	504
<i>Dairy processing</i>	115	250	94	164
<i>Crop processing/storage</i>	13	79	94	81
<i>Marketing farm products</i>	29	9	9	10

the household labour pool, and the importance of off-farm waged labour in constructing livelihoods.

7.2 Off-farm sources of income

The first year of WOL research found that about 83 percent of farming households received off-farm incomes during 2005 with a mean monthly value of about \$85 (ranging from \$0 to over \$1000 per month). These supplementary incomes were particularly important to resource-poor households and for “income smoothing” through periods of scarcity.⁹⁰

During 2006, an even higher proportion of farming households (96 percent) reported receiving off-farm incomes, with a slightly higher mean monthly value (\$93.82). Off-farm incomes differed by farm type, with higher incomes received at irrigated farms (mean \$96.72, Std dev 130.60) than at semi-irrigated farms (mean \$83.87, Std dev 130.2) or rainfed farms, which had the lowest incomes (mean \$69.72, Std dev 45.03). With $\alpha = 0.05$, these differences were found to be statistically significant (ANOVA $F=4.373$, $p=0.013$). The reported number of waged incomes per household was similar across all farm types, leading to the question: what accounted for the recorded income variations?

⁸⁹ Data on farm labour does not include daily labour used for poppy cultivation, which could only be estimated in aggregate.

⁹⁰ Roe, “WOL: Farming Systems and Rural Livelihoods.”

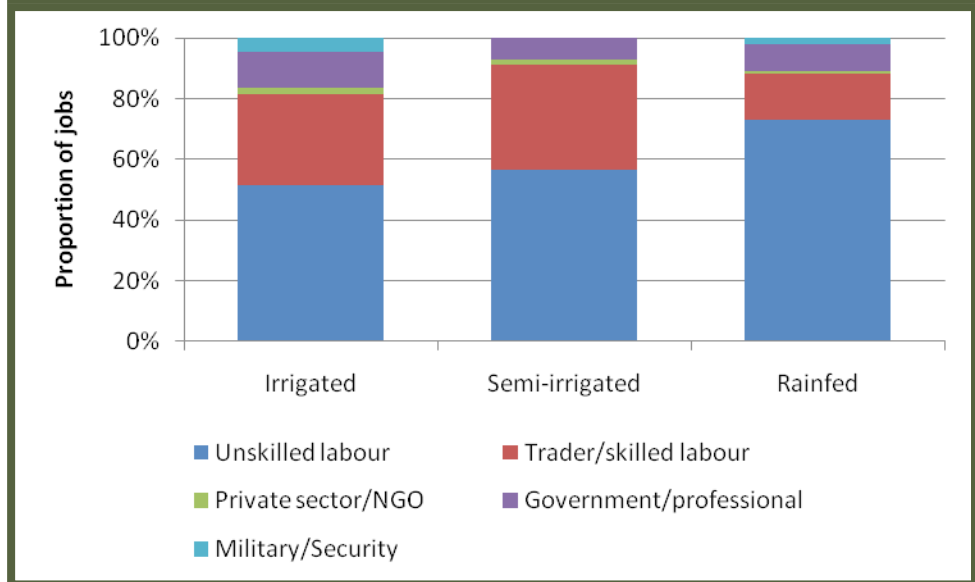
Reported income sources were organised into five general categories: unskilled labour, trader or skilled labour, private sector or NGO, government or professional, and military or security. Comparison between types of income accessed by farming households revealed some clear differences (see Figure 24). Households at irrigated river valley sites report the highest proportion of professional categories of employment (which are presumably better paying), while households at rainfed sites derive the highest proportion of incomes from unskilled, temporary and agricultural labour. Consequently, while there may be little difference quantitatively between the number of off-farm incomes received at different farming sites, there appear to be qualitative differences in the types of paid work households have access to, and thus in their incomes.

These findings demonstrate the unequal access to labour markets, which may have various causes. In addition to their geographic proximity to centres of economic activity, the superior employment portfolio of river valley communities may reflect their better human capital (e.g. health and education) or access to political or economic networks, while the weaker employment portfolio of rainfed farming households could reflect the high demand for on-farm manual labour. In order to understand the net livelihood outcomes, WOL researchers considered on- and off-farm labour allocation within the broader context of household production, consumption and nutrition.

7.3 Household food production, consumption and nutrition

The first year of WOL studies used household

Figure 24. Sources of waged income by employment category (n=205)



nutrition (specifically nutritional diversity⁹¹) as an indicator for well-being. Although demonstrating differences in the structure of the household diet under different farming conditions, the data revealed little about why these differences existed. Preliminary studies were thus unable to address key questions about food security in farming communities: namely, what proportion of farm production is consumed, and how much do communities purchase? Given the evidence of considerable off-farm incomes, how important is on-farm production to rural Afghan livelihoods? Why is farming considered important and deserving of the allocation of labour resources? Given that some models for pro-poor growth assume the transition of smallholder farmers into rural labourers, these questions deserve attention.

To understand farm strategies for achieving food security, the following section provides an overview of dietary structures under different agricultural production systems (see Figure 25).

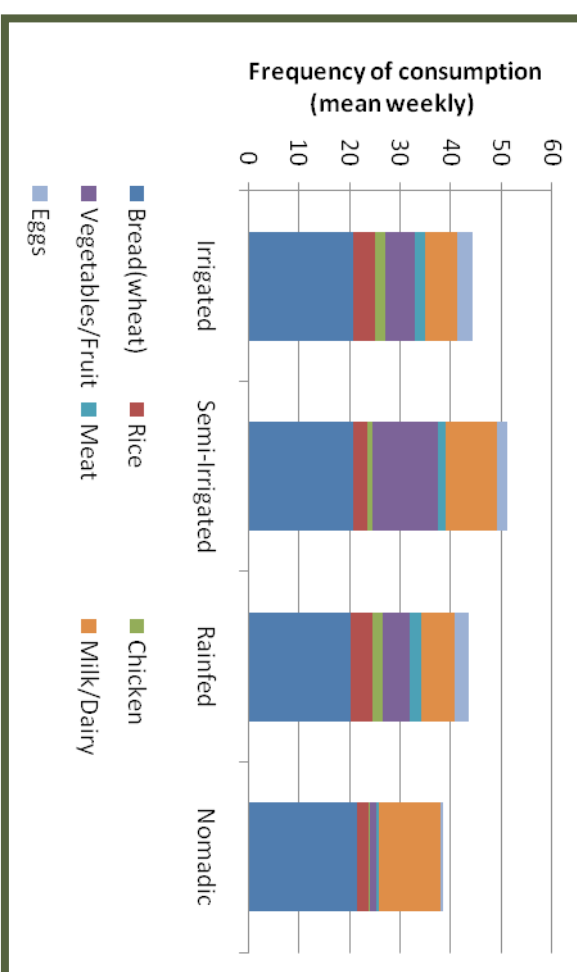
The reported dietary structures at irrigated and

91 Dietary diversity: see Marie Ruel, "Is Dietary Diversity an Indicator of Food Security or Dietary Quality?" Discussion paper no. 140 for International Food Policy Research Institute, Food Consumption and Nutrition Division. (Washington: IFPRI, 2002). Available at <http://www.ifpri.org/divs/fcnd/dp/papers/fcndp140.pdf>. November 2002. (accessed April 2009).

Table 21. Reported weekly acquisition and use of key food types* by production system (n = 214)**

	Irrigated				Semi-irrigated				Rainfed			
	Farm (kg)	Purchase (kg)	Total (kg)	Per capita	Farm (kg)	Purchase (kg)	Total (kg)	Per capita	Farm (kg)	Purchase (kg)	Total (kg)	Per capita
Wheat	25.00	39.82	64.82	6.93	29.76	32.59	62.35	6.89	35.88	24.74	60.62	7.32
Rice	23.78	7.43	31.21	3.34		9.12	9.12	1.01		11.07	11.07	1.34
Vegetables	11.14	8.21	19.35	2.07	9.5	22.5	32.02	3.54	3.19	5.13	8.32	1.00
Fruit	8.46	3.66	12.12	1.30	4.93	21.93	26.86	2.97	2	7.05	9.05	1.09
Milk/dairy	6.83	2.92	9.75	1.04	5.49	4.63	10.12	1.12	14.69	1.43	16.12	1.95
Meat	3.57	1.83	5.4	0.58	6	2.78	8.78	0.97	5.15	2.56	7.71	0.93
Oil	1.94	3.28	5.22	0.56	2.25	2.93	5.18	0.57	0.75	3.74	4.49	0.54
Chicken	2.38	2.01	4.39	0.47	2.5	2.05	4.55	0.50	1.78	2.08	3.86	0.47
Eggs (units)	11.68	13.17	24.85	2.66	20.11	15.5	35.61	3.93	5.07	3.6	8.67	1.05

*Data describes total quantities reported available at point of food preparation, and thus includes any wastage, scraps fed to animals and food consumed by visitors from outside the household. Estimated per capita values should therefore only be considered as indicative, not the actual quantity consumed. Children under age seven years are estimated at 0.5 adult level of consumption. ** Insufficient data available to represent nomad food acquisition and utilisation in detail

Figure 25. Reported frequency of consumption of different food types

rainfed sites are quite similar, although households on irrigated farm lands eat more vegetables and eggs than household rainfed lands, which in turn consume slightly more meat and dairy products. In contrast, households at semi-irrigated sites report consuming a higher proportion of vegetables and milk products and fewer protein-rich foods. Nomadic households report a very basic diet, largely consisting of bread and dairy products with very few vegetables or protein-rich foods. These results are broadly consistent with the findings of the 2005 WOL baseline survey, which also indicated that the most diverse and balanced diets are eaten at semi-irrigated sites. Nomadic diets are composed largely of carbohydrates and fats, and feature very few vegetables or fruit; perhaps more surprisingly, given that animal husbandry is the primary income source, meat is consumed less frequently than at any of the monitored production systems.

To investigate the reasons for these reported differences, WOL monitoring also tracked the origin of consumed foods through four seasons to ascertain whether it was domestically produced or purchased off-farm; the results reveal surprising diversity and challenge notions of widespread self-sufficiency in farming.

Data shows that most of the wheat consumed at irrigated and semi-irrigated farms is purchased rather than grown on-farm. Of the three monitored farm types, only rainfed farms consume more farm-grown wheat than purchased wheat. Conversely, semi-irrigated farms, on average, report consuming much more fruit and vegetables than irrigated or rainfed farming households, but the majority of these foods are purchased rather than cultivated on-farm. The only farm-produced product that semi-irrigated farming households consume more of than other farm sites is eggs. Rainfed farms are also heavily reliant on farm production of eggs, while irrigated farms buy the majority of eggs they consume (see Table 21). Nomads reported purchasing all food except dairy products.

These findings clarify that households at semi-irrigated farms (with the smallest irrigable land area, limited water access and low off-take from livestock) appear to enjoy the most diverse nutrition

because they buy a larger proportion of foodstuffs than those at other types of farms.

Examining the overall balance between the monetary value of food products that are produced and consumed on-farm and those that are purchased is equally instructive. In monetary terms, the average irrigated farm produces 59 percent of the value of food consumed by the farming household. Farm production accounts for 45 percent of the value of food consumed at semi-irrigated sites and 52 percent of the value at rainfed sites. Thus, in monetary terms, irrigated farms appear to achieve the highest value of self-sufficiency. However, analysis by monetary values is weighted towards expensive products such as fruit and vegetables, which are not prominent in most rural diets. Considering quantities of wheat consumed (wheat is the staple food in all farming households), dairy products (the main source of fats) and eggs (the main source of protein), rainfed farms are clearly the most self-sufficient in terms of food.

Consumption of farm-produced and purchased foods are linked to agricultural seasonality, with purchases of wheat (in the form of flour) increasing through the winter and spring as household stocks are depleted before the new harvest.

7.4 A model farm budget

WOL monitoring during 2006 collected data from 236 farming households on all aspects of natural resource access, agricultural inputs and outputs, household consumption and off-farm incomes. This data was used to develop a simple farm household budget that describes household cash flows through the year, and illustrates overall margins.

This model farm household budget is based on a “typical” lower catchment farm that is managed under conditions of relative livelihood security. The main attributes of this household and the productive performance of the farming system are averages derived from 2006 monitoring data. The attributes of the farming household are set out in Table 19. The two major assumptions underlying

this budget model are that the household starts the winter season with a “zero” cash balance, and that the value of non-monetary costs and transactions (such as the uncompensated transfer of farm products) is overlooked. Based on these attributes and assumptions, the model budget projects that the household unit generates a low net annual income of \$529.55. This is the margin outside of the farm budget, and constitutes the sum available to cover necessary household expenditures such as healthcare, clothing, travel, special occasions, payment of loans or other purchases.

Table 22. Attributes of farming household used in the model farm budget

<i>Household Constitution</i>	10 (five adults over 15 years, three children over 7 and two children under 7)
<i>Land type</i>	1.7 hectares irrigated
<i>Land tenure</i>	1 hectare owned, 0.7 hectare sharecropped (at 50percent division)
<i>Irrigation access</i>	Midstream along canal system (1.7 hours flow of 24)
<i>Winter/perennial crop</i>	0.25 ha plum orchard 0.7 ha wheat 0.25 ha onion 0.5 ha potato
<i>Summer crop</i>	0.5 ha alfalfa (intercropped in orchard) 0.5 ha maize 0.5 ha cotton
<i>Livestock</i>	1 dairy cow 4 sheep and goats
<i>Off-farm incomes</i>	1 professional employee (school teacher) 0.25 casual daily agricultural labour

The 2006 monitoring year was one of drought conditions in many parts of the country, and farm performance captured through WOL monitoring reflects this. Even so, it should be remembered that half of all households in the WOL monitoring group are less resource-secure than the farm used for the model household budget. The low projected farm margin of the model budget is also an indicator that farming households will have few capital reserves to buffer against shocks, losses or market fluctuations through the year. Even the loss of a single animal

or protracted illness of a family member can tip the balance from a positive to a negative margin. Low farm margins further indicate the lack of investment capital available to households for farming improvements. Against a background of low farm margins it is easy to understand why many farmers seek to minimise farm inputs to reduce production costs, which result in a low-input, low-output production system.

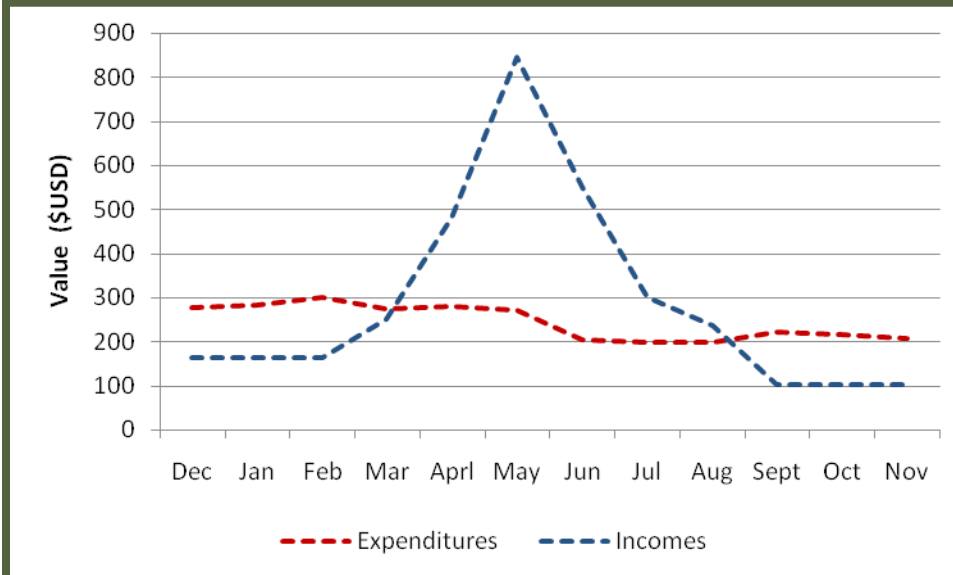
In addition to evaluating annual farm margins, the model budget also provides a useful characterisation of farm or household cash flow through the year (see Figure 26). This highlights the clear seasonality associated with smallholder cash flows, confirming that households receive their peak incomes from farm production during the late spring and summer. Farm margins are positive only during the spring and summer months; in other months the household operates at a net deficit, and is supported by savings or other mechanisms. The cash flow model suggests that this type of farming household is at its most vulnerable at the end of the winter season.

Although the model budget cash flow is atypical because of the drought, it indicates that to keep farming, the household must produce a proportion of its own food, use a proportion of the household on-farm labour, and receive off-farm income. All of these economic activities are integral to sustaining farm production and securing livelihoods.

7.5 Strengthening farm livelihoods: Creating options and choices

Findings from the second year of WOL research provide clear evidence that most farm livelihoods involve both on- and off-farm economic activities. Farm livelihoods are constructed in this way for complex reasons that relate to the resources, assets and options available to individual households. In addition to mitigating exposure to risks, diversified household economies widen the scope of choice available to farmers and so enhance possibilities for wealth accumulation and capital growth. This raises several questions: In what ways do diversified household economies enhance livelihoods and how

Figure 26. Projected annual cash flow for the model farming household



is diversification currently constrained? How might rural development policy most effectively target opportunities for income diversification?

Off-farm incomes appear to play diverse roles in farming livelihoods. Where agricultural production is less important to livelihoods, the relative importance of off-farm incomes is obviously greater than in situations where agriculture dominates. However, preferential access to employment in agriculturally productive areas can also attract household members to work off farm, even if the opportunity cost of this is high. WOL studies therefore challenge the assumption that off-farm diversification is driven by only one of two factors: either by push (necessity) or by pull (opportunity).

Off-farm incomes perform an important income smoothing function by tempering the cycle of seasonal cash flow associated with agricultural production. Although most unskilled and agricultural labour tends to be seasonal, some types of employment generate year-round incomes, which are of particular importance to farmers when they face major cash expenditures (i.e. preparing and planting land for winter crops) at a point in the annual agricultural cycle when cash is most scarce. It is farmers' capacity to financially invest in crops at

this time that will determine the household's livelihood outlook for the following year. There is similar evidence from nomadic pastoralists that off-farm incomes help subsidise the maintenance of herds through periods of scarcity, and under some circumstances provide capital for speculative investments aimed at capital growth.

Although off-farm incomes can make important contributions to both household livelihood security and farm growth, research findings reiterate that on-farm production remains central to the farming

household. Even where farming households receive multiple off-farm incomes, the agricultural portion of the household economy remains key to household food security.

WOL data shows that farm production can account for more than half of the food consumed by farming households. Among the WOL monitoring group of households, the mean monthly value of on-farm products consumed reached \$200.⁹² This constitutes a very important resource for rural households (especially those with limited cash incomes) and confers a large degree of independence from food markets. This has been particularly important to farmers who have faced rising prices for wheat and other agricultural products since the drought of 2006. Following many years of disruption to regional markets, and continuing logistical problems of supply and fluctuating commodity prices, Afghan farmers understandably show little confidence in the capacity of markets to deliver their basic food needs. This food independence is of particular importance to farmers in remote parts of Afghanistan with limited or seasonally constrained access to food markets. For example, rainfed livestock or wheat farming at remote sites and the seasonal exploitation of pastures through migratory

92 Roe, *WOL: Farm and Household*.

pastoralism are both facilitated by the ability of households to produce the wheat that they consume. It is therefore essential that agricultural policy recognises the value of agricultural production for domestic consumption.

Aside from food production, on-farm production of textiles by women at rainfed farm sites was highlighted by WOL studies as an important on-farm labour activity and income. These farms have good access to animal fibres and the potential to produce for national and international markets, but are currently excluded from such markets. Future livestock development programmes should consider mechanisms for extending value chains for textiles and woven products into rainfed farming areas.

As discussed, several factors constrain diversification of farming livelihoods to include off-farm incomes. WOL monitoring shows that while there is almost universal access to waged labour opportunities, the best opportunities and

highest incomes are associated with households in lower catchment river valleys. Households in irrigated river valleys receive approximately 30 percent more income from employment than rainfed farms. In more marginal and remote areas, income opportunities are dominated by irregular, low-paying and unskilled agricultural jobs with related implications for household security. More remote farming households are faced with heavy on-farm labour demands, and limited capacity to engage substitute labour. These inequalities are doubtless related in part to physical location and access, but they probably also reflect underlying differences in education and either political or economic connections. As economic growth begins to generate employment opportunities in some parts of the agricultural economy, policymakers must address fundamental inequities in economic opportunity through targeted policy and planning. Failure to do so may exclude the poorest and most vulnerable in rural Afghanistan from the benefits of economic growth.



Packing fruit for market, Ghazni

8. Implications and Recommendations for Policy

This paper constitutes the second synthesis of findings from the three-year European Commission-funded WOL project, drawing together the key results from research conducted during the second year of the project (2006-07). These do not represent the project's final conclusions but reflect the evolving state of knowledge during its second year. During this stage of research, the project addressed some of the fundamental questions raised at the outset of the project. It therefore builds directly on first-year findings; on the whole, there has been little repetition of content.

The major objective of the WOL project is to enhance the sustainability of Afghan rural livelihoods and reduce dependency on illicit crops by providing policymakers with clear and accurate information on the use, management and role of natural resources in farming systems. To achieve this goal, the project has undertaken an ambitious programme of field research spanning eight Afghan provinces and many rural communities. From this broad geographic and thematic scope, studies have been integrated using a farming systems approach, and are grounded in strong empirical evidence.

The second year of project research was undertaken during an important period of policy development in Afghanistan's history, namely the formulation of the sector strategies under the ANDS. While the I-ANDS document stipulated overarching goals of "poverty reduction" and "equitable economic growth"⁹³ the individual water and agriculture and rural development sector strategies set out implementation approaches and programmes to achieve these. Both of these strategies emphasise fostering enabling environments in which either community or market-based institutions assume key responsibilities within the respective sectors.

This final section draws together some of the key findings of the research and considers these with respect to stated policy objectives. Interim

recommendations suggest how evolving strategies might best address these policy goals.

8.1 General findings

A major finding emerging from the second year of WOL research is empirical evidence of systemic inequities that shape access to resources and livelihood opportunities in rural Afghanistan, which has important implications for how agricultural and rural development policy could best be formulated and implemented.

The reasons for these inequalities are complex. Households and communities may be disadvantaged by their physical location and agro-ecological context, or marginalised by their ethnicity, political affiliations or socioeconomic status. Of particular significance is the role of customary and informal rural institutions, which serve to mediate access to important natural resources. WOL research suggests that these institutions tend to reflect local structures of power and wealth, and so perpetuate or even exacerbate inequality of opportunity. This is well illustrated by the function of customary mechanisms regulating access to both land and water. Although they are cause for concern in their own right, these inequalities also suggest how different sections of the rural population will be able to respond at different levels to opportunities for agricultural growth, and how the benefits of that growth may be distributed. Nevertheless, it should also be recognised that traditional institutions can play a stabilising and harmonising role in communities, despite these inherent inequities.

Evidence from both land and irrigation case studies further show that community systems of resource management may be least effective where resources are scarce and highly contested, and vital interests are at stake. This raises the issue of whether community-based management can be initiated universally, or whether it is more relevant to some management situations. Nevertheless,

93 GoA, *Interim Afghanistan National Development Strategy*.

given the observed performance of informal institutions in natural resources management, it is clear that the delegation of resource management responsibilities will need to occur within a framework of strengthened governance, accountability and oversight. A starting point might be to strengthen institutions to become more inclusive in decision-making, using participatory structures similar to, or perhaps linked to, CDCs, where these have been proven effective. Reform and empowerment of community natural resource management institutions must be a key strategy for addressing the structural inequities that perpetuate rural poverty and insecurity.

Externally imposed solutions or mechanisms for the management of resources that are not viewed as legitimate may have a destabilising impact on rural communities, which is an outcome that the Government of Afghanistan will wish to avoid in the current political climate.

The I-ANDS agricultural sector strategy prioritises stimulating growth by building value chains for horticultural and livestock products to supply markets. However, WOL research suggests that growth in horticultural production will primarily benefit farmers with preferential access to irrigation water, and so economic growth will initially be spatially clustered in areas that are already comparatively prosperous. Even where horticultural production is stimulated outside of prime irrigated lands, policymakers should be aware that a significant proportion of the benefits will be directed back to landowners and patrons because of the high incidence of sharecropping in those areas.

If the growth of agribusiness is solely focused on populated river valleys, there is a strong possibility that communities in marginalised outlying areas may not share the same level of access to employment opportunities that are generated. Although labour is mobile in accessing off-farm opportunities, this has been shown to incur opportunity costs. Furthermore, the concentration of agricultural development efforts and improved economic opportunities in areas that already have preferential opportunities and resources will contribute little to the goal of

reducing poppy cultivation where farmers have few livelihood alternatives.

While this research highlights challenges for the implementation of policies that are equally pro-growth and pro-poor, it also suggests some important opportunities for achieving these goals.

While prioritising the horticultural subsector will almost certainly provide greater benefits to resource-secure than resource-poor farmers, WOL research has demonstrated the comparative advantage enjoyed by livestock production under rangeland conditions. Livestock is another subsector prioritised under the agricultural sector strategy, and there are incentives for building value chains in these marginal, unirrigated areas where farmers and pastoralists have few other livelihood options and are highly vulnerable to risk. This would constitute a form of development that is essentially pro-poor, while also representing the most rational economic approach to achieving subsector growth. This dual approach to stimulating the two priority subsectors of the agriculture strategy offers a real opportunity to reconcile the twin goals of sector growth with poverty reduction.

Finally, research findings emphasise the complex relationship between the function of Afghan farming systems and the construction of livelihoods. In particular, data challenges the assumption that on-farm production to supply the household with food represents an economically inefficient allocation of resources. It shows that farm-produced food represents a value (in savings) that may be the equivalent of considerable (and possibly inaccessible) incomes to households. Furthermore, a high level of food self-sufficiency is an important factor allowing natural resources to be used for agriculture in remote areas. It is therefore important that policy should recognise the contribution of production outside the monetary economy, and take a more holistic view of agriculture as both a form of livelihood and a means of production.

Specific findings and interim recommendations to support strategy and implementation of policy in the thematic areas of WOL research are set out in the following sections.

8.2 Findings on land tenure systems

Major challenges exist in establishing the formal registration of land title in Afghanistan. There is little usable information on land holdings and capacity to gather information is limited; in many cases the prevailing uncertainties and ambiguities surrounding land ownership make it inopportune to try to determine final title. Afghanistan can learn much from other countries that have confronted the problem of land registration in post-conflict situations.

Up to one-third of all cultivated land in Afghanistan may be held under subordinate forms of tenure, and these forms of tenure (particularly sharecropping agreements) tend to be concentrated in areas with potential for the cultivation of high-value cash crops. While sharecropping terms seem to favour farmers on low-value land, sharecropping on high-value land directs the largest proportion of the income back to landowners. This finding is of particular importance in understanding how benefits from growth in the horticulture subsector may be spread. The following recommendations are made.

A simple community-based deeds registry

Given the major problems involved in establishing a formal, cadastral-based land registry, it would be more cost-efficient, effective and achievable to set the intermediate goal of establishing a system of deeds registration. This will achieve many of the benefits of registering land title, and can be started immediately.

Take account of prevalent subordinate rights

In planning for equitable development, policymakers and practitioners must take into account the extent to which crop incomes are redistributed through the rural economy, from landless labourers and sharecroppers to landowners. This has important implications for the achievement of pro-poor development objectives, particularly in areas where sharecropping is widespread. Income generation initiatives not subject to sharecropping terms (such as livestock production or waged labour) may have

more potential to benefit the landless.

8.3 Findings on water management

There are systemic inequities in the availability of water and necessary contributions of labour along lower catchment irrigation systems that are related to both the hydraulic attributes of irrigation structures and the way in which water resources are managed. These limit the possibilities for high crop diversity and cash crops at the lower end of canals, result in reduced yields for other crop types, and produce gradients of agricultural opportunity and livelihood security that run the length of irrigation systems and river basins.

Water management in Afghanistan is highly organised and regulated by traditional institutions, but the consequences of deviating from the rules are passed on in one direction (downstream), posing an underlying challenge to this management. It is difficult to achieve compliance in the absence of an overarching authority that holds all water users accountable. Finally, observations suggest that while social water management is effective in regulating water use under conditions of normal water availability, it has limited capacity to actually redress severe scarcity. The following recommendations are made.

Build governance and inclusivity in water management

Charters for WUAs must recognise the stakeholder status of all water users. Greater accountability and empowerment of marginal groups within the decision-making process may help redress the allocations inequities at the community level. Water management could potentially be linked to other community development initiatives.

Need for an overarching basin level authority

There is the clear need for RBAs to help restore balance to upstream and downstream relations. Some of the most intractable problems occur at the river-basin scale, where—unlike at the canal level—

corporate decision-making has no institutional precedent in customary water management, and thus will require careful planning and fostering.

Sequencing interventions

Water resources management programmes should seek to build on success by being implemented after new infrastructure is in place. They should be first introduced at the top of the river basin, and move successively downstream, so that programmes are introduced into communities that are already receiving the benefits of improved upstream water management.

8.4 Findings on livestock production and marketing

Extensive sheep and goat production by rangeland-based communities is the most market-orientated and offers superior economic margins over irrigated and semi-irrigated farm systems. Consequently, it should be the focus of subsector development. However, the comparative advantages enjoyed through rangeland-based production are being threatened by loss of access to (and degradation of) traditional pastures. Resolving this problem will be crucial to achieving livestock sector growth. Similarly, transaction costs and problems with the function of markets and value chains (notably in transport and pricing systems) appear to depress prices and returns to producers. Lambs and kids cannot be easily fattened to optimal sale conditions under extensive low-input management, but fattening could be undertaken through the emerging value-chain niche of on-farm, peri-urban finishing. There are opportunities to build market chains linking rangelands, which are prime livestock production areas, with irrigated farms, where stock finishing represents an opportunity for small investments and diversification. The following recommendations are made.

Establish mechanisms to ensure the protection of grazing lands

There are good economic reasons to protect Afghanistan's rangelands from agricultural

encroachment, land appropriation, degradation and other forms of loss. Policymakers must recognise that grazing land resources constitute an integral part of the livestock value chain, and focus on the need to secure the rights of use and entitlements of livestock producers. This could be achieved through appropriate legislation with enforcement, or community-based land use agreements.

Foster linkages between producer and finishing areas

While rangelands offer comparative advantages as livestock producer areas, irrigated farms are better suited to provide supplemental feeds to finish animals for supply to market. Strengthening market chains based on these productive specialties will add value to production, diversify livelihoods and spread incomes.

Address problems in livestock value chains

Considerable value could be added to livestock value chains by reducing transaction costs during transport, and various costs associated with markets. Furthermore, mandatory weighing of animals at point of sale might introduce incentives for producers to improve the quality of their finished stock.

8.5 Findings on the opium economy

Farmers' decisions on whether to cultivate opium are made within the context of the broader farm and household economy and reflect resource access, assets and livelihood options. Consequently, many farmers cultivating opium do so as a strategy to mitigate risk and gain access to resources. They include many of the most vulnerable and economically marginalised farming households. Accordingly, sustainable reductions in opium will only be achieved where the factors that produce this vulnerability are removed.

Policymakers should be wary of reductions in cultivation imposed under counter-narcotics initiatives. In order to increase opportunities for sustainable diversification, strategies must

recognise and redress underlying inequities in resource access and economic opportunity through comprehensive rural development. They must also recognise that reductions in cultivation of opium will occur at different rates in different areas and according to individual household circumstances. Banning poppy cultivation where other livelihood options do not exist will decrease livelihood security. The following recommendations are made.

Address the root causes of the opium economy rather than its symptoms

Policy must directly address the vulnerabilities and livelihood insecurity that fosters dependency on opium cultivation. These include unequal access to resources and opportunities.

Improve coordination between counter-narcotics and rural development agencies

The coercive (eradication) arm of the counter-narcotics effort is overseen by provincial governors, with rural development programs delivered through line-ministry departments, producing a clear need for on-the-ground coordination to ensure that pressure on opium cultivators to cease cultivation is combined with other livelihood opportunities.

Target agents, dealers, patrons and networks

Networks of agents, dealers and patrons have been shown to be prime movers leading both the expansion and contraction of the opium economy provincially. Pressuring these influential elites to move out of opium cultivation will directly impact the functioning of the broader opium economy.

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