

Afghanistan Research and Evaluation Unit
Case Study Series

WATER MANAGEMENT, LIVESTOCK
AND THE OPIUM ECONOMY

Research and Development for
Better Livestock Productivity



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

Euan F. Thomson



Funding for this research
was provided by the
European Commission.

April 2009

Editor: Amanda Morgan for AREU

Layout: AREU Publications Team

Photos: Euan Thomson

© 2009 Afghanistan Research and Evaluation Unit. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, recording or otherwise without prior written permission of the publisher, the Afghanistan Research and Evaluation Unit. Permission can be obtained by emailing publications@areu.org.af or by calling (+93)(0)799 608 548.

About the Author

After completing a doctorate in ruminant nutrition and growth, Euan Thomson worked for 18 years as a small-ruminant scientist for the International Center for Agricultural Research in the Dry Areas (ICARDA), which is based in Aleppo, Syria. During that time he gained considerable experience working with national scientists on interventions to improve the productivity of agro-pastoral systems in West Asia and North Africa. Since 1998 he has worked as a private consultant in several countries in Central Asia, and since 2002 he has undertaken many missions to Afghanistan for different agencies.

About the Afghanistan Research and Evaluation Unit

The Afghanistan Research and Evaluation Unit (AREU) is an independent research organisation based in Kabul. AREU's mission is to conduct high-quality research that informs and influences policy and practice. AREU also actively promotes a culture of research and learning by strengthening analytical capacity in Afghanistan and facilitating reflection and debate. Fundamental to AREU's vision is that its work should improve Afghan lives.

AREU was established in 2002 by the assistance community working in Afghanistan. Its board of directors includes representatives from donors, the UN and other multilateral agencies, and NGOs. AREU has recently received funding from: the European Commission; the governments of Denmark (DANIDA), the United Kingdom (DFID), Switzerland (SDC), Norway and Sweden (SIDA); the United Nations High Commissioner for Refugees (UNHCR); the Government of Afghanistan's Ministry of Agriculture, Irrigation and Livestock; the World Bank; UNICEF; the Aga Khan Foundation; and the United Nations Development Fund for Women (UNIFEM).

Acknowledgements

The author acknowledges with gratitude the valuable information provided by farmers, market traders and officials in the Ministry of Agriculture, Irrigation and Livestock, which made possible this case study. Thanks are extended to the many representatives in NGOs and development agencies who were interviewed. Special gratitude is owed to the field staff of the Afghanistan Research and Evaluation Unit, Danish Committee for Aid to Afghan Refugees and German Agro-Action, who conducted the on-herd monitoring work and collected the livestock prices in difficult circumstances, and to Colin Deschamps, who coordinated the fieldwork. Lenard Milich and Michael Jacobs made valuable comments about early drafts of the case study and the editors were most helpful when preparing the final manuscript.

The Dutch Committee for Afghanistan is thanked for permission to use the results from their animal health and fertility surveys.

Euan F. Thomson
April 2009

Table of Contents

Acronyms, Glossary and Exchange Rate	ii
Executive Summary	1
1. Introduction	6
2. Research on Livestock Productivity and Prices	8
2.1 Introduction	8
2.2 Rationale, approach and difficulties.....	8
2.3 Milk yields	9
2.4 Progeny histories	13
2.5 Growth rates	15
2.6 Livestock prices.....	17
2.7 Drought and the purchasing power of livestock	20
2.8 Drought and red meat prices	22
2.9 Changes in red meat prices since 2007.....	24
3. Research and Development Issues	26
3.1 On-herd versus on-station research	26
3.2 Imported breeds	26
3.3 Breed characterisation	28
3.4 Increasing feed production.....	30
3.5 Strategic use of anthelminitics.....	33
3.6 Herd productivity and rural livelihoods	33
3.7 Promoting a market information service.....	34
3.8 Quantifying margins along value chains.....	35
3.9 Establishing long-term monitoring sites.....	36
3.10 Participatory decision-support tools.....	36
4. Key Points, Recommendations and Conclusions	38
4.1 Key points.....	38
4.2 Programmatic recommendations.....	39
4.3 Policy recommendations.....	40
4.4 Conclusions	41
Annex 1. Livestock Development Projects Before 2002.....	42
Annex 2. Livestock Development Projects Since 2002	46
Annex 3. Livestock projects during the 1970s.....	48
Annex 4. Livestock Priorities in the 2007 MAIL Strategy	56
References	57
Recent Publications from AREU	61

Acronyms, Glossary and Exchange Rate

Acronyms

AADP	Afghanistan Agriculture Development Program
ADB	Asian Development Bank
ADP	Alternative Development Program
AFSA	Afghanistan Farm Service Alliance
AHDP	Animal Health Development Programme
AI	Artificial insemination
AKF	Aga Khan Foundation
ANDS	Afghanistan National Development Strategy
AREU	Afghanistan Research and Evaluation Unit
ASAP	Accelerated Sustainable Agriculture Program
AVA	Afghanistan Veterinary Association
BRAC	Bangladesh Rural Advancement Committee
BVW	Basic veterinary worker
CADP	Commercial Agriculture Development Project
CNFA	Citizens Network for Foreign Affairs
CordAid	Catholic Organization for Relief and Development Aid
CRS	Catholic Relief Services
CVDL	Central Veterinary Diagnostic Laboratory
DACAAR	Danish Committee for Aid to Afghan Refugees
DAI	Development Alternatives Inc.
DCA	Dutch Committee for Afghanistan
FAAHM	Food, Agriculture and Animal Husbandry Information Management Policy Unit (part of MAIL)
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field Schools
GDAHP	General Directorate of Animal Health and Production (part of MAIL)
HLP	Horticulture Livestock Project
I-ANDS	Interim Afghanistan National Development Strategy
ICARDA	International Center for Agricultural Research in the Dry Areas
MADERA	Mission d'Aide du Developpement des Economies Rurales en Afghanistan
MAIL	Ministry of Agriculture, Irrigation and Livestock (formerly known as the Ministry of Agriculture, Animal Husbandry and Food (MAAHF))
MC	Mercy Corps
MEW	Ministry of Energy and Water
MoWA	Ministry of Women's Affairs

MRRD	Ministry of Rehabilitation and Rural Development
NRVA	National Risk and Vulnerability Assessment (located in the MRRD)
NSP	National Solidarity Program
NSS	National Surveillance System (located in the MRRD)
OPIC	Overseas Private Investment Corporation
PADCO	Planning and Development Collaborative International
PEACE	Pastoral Engagement, Adaptation and Capacity Enhancement
PRB	Partners in Revitalising and Building
PTD	Participatory Technology Development
RAMP	Rebuilding Agricultural Markets Program
SCA	Swedish Committee for Afghanistan
SMS	Short Messaging Service
USAID	United States Agency for International Development
US-ARC	United States-Afghan Reconstruction Council
USDA	United States Department of Agriculture
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VAM	Vulnerability Analysis and Mapping
VAU	Vulnerability Assessment Unit / World Food Programme
VFU	Veterinary Field Unit
WFP	World Food Programme of the United Nations
WOL	Applied Thematic Research into Water Management, Livestock and the Opium Economy

Glossary

Anthelmintics	Drugs used to treat internal parasites.
Clover	Persian clover (<i>Trifolium resupinatum</i>), called shaftal in Dari. Egyptian clover (<i>T. alexandrium</i>), also known as berseem, is also cultivated in Afghanistan.
Environment	In this case study, environment refers to all factors that livestock are exposed to, as distinct from the genotype of the animal. The factors include nutrition, health, management, topography and climate. Livestock productivity is a function of genetic and environmental factors.
Exotic breeds	Livestock breeds that were bred in Europe and North America, for example, for higher milk yield and growth rate, and were then imported to Afghanistan where the climate and the environment is usually different to the original country.
Expost	In the context of development projects this means the assessment of the impact of the project after it has ended.

Heifer	A female cow from birth until her second parturition.
Kuchi	Usually called “nomads”, they own mainly sheep and camels and practice transhumance by moving their herds to mountain pastures in summer and return to the lowlands for the winter. Many Kuchi families have settled and cultivate crops. (This is a much simplified definition.)
Nucleus flocks	Flocks established using female small stock identified in herds having a valuable trait such as above-average milk yield. Genetically superior male offspring identified among the progeny of the females are returned to private herds to improve herd performance.
Offtake	In general terms offtake is defined as the number of live animals sold annually from a herd of 10 head aged over one year, or the amount of milk, milk products, wool, etc. produced annually by these animals. It can also be defined per unit of land, water and labour, which is useful when looking at the efficient use of natural resources.
Urea-treated straw	Urea fertiliser dissolved in water is mixed with chopped wheat straw (4-5 kg urea per 100 kg straw) and left in a heap covered by a plastic sheet for a few weeks before feeding. During this period, in the presence of the enzyme urease, the urea dissociates to ammonia, which is an additional source of nitrogen that enhances the growth of rumen microbes. The higher microbial mass accelerates the degradation of fibre in wheat straw, reduces the residence time of fibre particles in the rumen and thereby enhances straw intake.
<i>Watani</i>	A term used across West Asia (waton is Arabic for nation or national) which is often misleadingly translated as breed. It is in fact a generic term referring to a local population of animals, not a distinct breed.
Zoonoses	These are diseases that can be transmitted from animals to humans, such as avian influenza and brucellosis.

Exchange Rate

Since Pakistani rupees are used to trade livestock in Batikot and Ghazni markets, the following exchange rates were used to convert them into Afghanis.

Currency conversion	2006	2007	2008
Pakistani rupees / US\$1	60	60	70
Afghanis / US\$1	50	50	50
Pakistani rupees / 1 Afghani	1.20	1.20	1.40

Executive Summary

Productivity lies at the centre of efforts to improve livestock production systems. As different prescriptions are needed for different circumstances, there is no convenient “one-size-fits-all” prescription for Afghanistan. Thus, the balance between better nutrition, health, management and genetics, and between improving livelihoods, microfinance and value chains, depends on the context. When determining this balance it is essential to understand the context in which livestock production takes place. The project entitled “Applied thematic research into water management, livestock and the opium economy in Afghanistan” (WOL project for short) studied this context and has already published the findings in several case studies.

Knowing the levels of production of livestock found in the main production systems, and also knowing livestock prices, is essential when taking decisions about the importance that should be given to nutrition, health, breeding and management. This final case study on livestock undertaken by the WOL project reports:

- The findings of on-herd monitoring and market prices from the WOL field work
- A discussion of the findings from, and the implications of, the field work on national research and development needs
- Programmatic and policy recommendations for revising livestock policy in Afghanistan
- A summary of the livestock projects conducted in Afghanistan since the mid-1990s.

The information and issues presented here could contribute to the ongoing debate preceding any revision of the current Ministry of Agriculture, Irrigation and Livestock (MAIL) Master Plan and Strategy.

Production levels

During the period 2006 to 2008 information was collected at the herd level on the milk yield of a small sample of cows and does (female goats), on the growth rate of lambs, and on the progeny histories of cows and does at the primary research sites used by the WOL project; information was also collected on the prices of livestock in several major markets. As expected, there were large differences in the milk yield of unimproved cows; these ranged from about 500-600 kg in 210 to 240-day lactations and up to 2,500-3,000 kg in nine-month lactations. The large disparity in milk yield was mainly due to differences in genotype and nutrition. Two does had remarkably high milk yields of 316 kg and 460 kg in lactations lasting 189 days and 224 days, respectively. At some sites, the daily growth rates of lambs were 200-300 g up to 100 days of age, but thereafter decreased considerably. These milk yields and growth rates show that there is considerable genetic variability in the livestock populations of Afghanistan, thus providing a good basis for genetic selection.

The researchers applied an innovative approach to determine the productivity of cows and does by interviewing women about the progeny histories of their animals. Between the various research sites, considerable differences were noted in the productivity of cows; these differences were expressed as calving interval, expected lactation length and peak daily milk yield. Progeny histories of does collected at one site showed that mortality in kids can seriously limit productivity. However, given the high potential milk

yields of does, it is suggested that there may be locations where owning two or three does might be a better option than owning one low-yielding cow.

Livestock prices showed some seasonal variations but these were neither as large nor as predictable as expected; this suggests that other factors play a more important role in determining prices of a particular species and class of livestock. Significantly, there was little if any evidence that producer prices were increasing over time. Drought in the north of Afghanistan in 2008 depressed livestock prices but retail red meat prices appeared to have changed very little.

Programmatic recommendations

Use better indicators of project impact: Quantitative indicators of project impact are needed; these include changes to livestock productivity (increased sales of milk or eggs), changes to income streams, and changes in husbandry or farming practices as a result of participation in farmer field schools (FFS), training courses, etc.

Expost project evaluations: Include in donors' development strategies evaluations of projects two-years after their completion in order to assess the sustainability of projects' impact.

Monitor changes in rural livelihoods: To quantify changes in rural livelihoods in a broad spectrum of farming systems, establish a long-term monitoring programme in clusters of villages to test practices that enhance livestock productivity.

Enhance efficiency of livestock marketing chains: Assess the opportunities to increase returns to livestock owners by quantifying marketing costs and improving access to markets and price information.

Promote higher forage output on farms: Increase the potential to grow more forage crops by researching the factors that farmers take into account when deciding how to allocate land between staple, cash and forage crops. Include current knowledge of changing climate patterns to estimate the short- to medium-term sustainability of any recommended changes.

Quantify farm enterprise budgets to inform agricultural policy: MAIL should set up and manage a database of input costs and output earnings for different farm commodities in different regions of Afghanistan; this database should be updated twice a year.

Carry out applied research at the herd level: Carry out most livestock research on farmers' and Kuchi herds, rather than on government or university research stations. Research would include the following topics:

- **Breed characterisation of cows:** Monitor the productivity (milk offtake, fertility) of local and crossbred cows under current and improved management.
- **Breed characterisation of sheep:** Assess the fertility, growth rate and wool quality of the major sheep breeds in herds under current and improved management before considering the need to import exotic breeds.
- **Importation of dairy goats:** Assess on-farm performance of adapted Pakistani dairy goats to replace small low-producing local cows.
- **Assessing the efficacy of anthelmintics:** To justify the heavy usage of anthelmintics,

seasonally quantify the internal parasite load in livestock in different regions.

Policy recommendations

Based on the information presented in the case study, a number of policy recommendations are made:

- **On-herd and on-farm research:** As well as strengthening its capacity for on-station research, the MAIL should implement on-herd research on private farms in order to ensure that new technologies and approaches are exposed to the critical judgement of beneficiaries.
- **Impact studies:** At a number of contrasting sites MAIL should establish long-term monitoring studies to assess the impact of more productive livestock on household incomes, herd sizes, and pasture quality.
- **Closer ties between ministries:** To better integrate the technical, social, and economic aspects of rural development, the MAIL and the Ministry for Rehabilitation and Rural Development (MRRD), together with the Ministry of Women's Affairs (MOWA), should, where appropriate, be involved in the same development projects and assessments.
- **Market flows:** To improve the breadth and quality of statistical information that is needed for policy planning and implementation, the MAIL should monitor the flows and prices of livestock and of primary and value-added livestock products within Afghanistan and across its borders with neighbouring states.
- **Payment of livestock according to finish:** To ensure that producer prices reflect the quality of livestock being sold, MAIL should introduce the pricing of livestock in secondary and terminal markets according to live weight and visually assessed readiness for slaughter.
- **Drought emergency feeding strategy:** The emergency feeding strategy to alleviate the effects of drought on livestock that is being prepared by MAIL should be completed and implemented; during this process lessons could perhaps be learned from the feed banks concept that is being tested by the Aga Khan Foundation (AKF).
- **Broaden teaching curricula:** Teaching curricula for livestock production and health at college or university level should include courses on rural development that cover social (livelihoods approaches, FFS) and economic (marketing, market-driven approaches) aspects.
- **Internships:** Where appropriate, short-term training of MAIL staff should be strengthened with six-month secondments with non-governmental organisations (NGOs) and development agencies.

Summary of previous livestock projects

The summary of livestock projects over the past two decades shows that many agencies have been implementing projects that included a livestock component. Initially, most of these focused on emergency relief but over time they evolved into development projects, often applying a community approach. Many of these projects continue to the present day. Indeed, at the time of writing some 30 ongoing projects that include a livestock component have been identified. And this excludes those with a specific focus on credit and microfinance.

Apart from a few major livestock projects implemented during the 1970s and 1980s, projects primarily focused on livestock started to appear in the mid-1990s, and numbers increased considerably after 2002. Projects can be fitted into three broad categories: community-based, private sector-oriented, and disciplinary-focused. The community and private sector-focused projects complement each other but start from opposite ends of the value chain. The former take as a starting point the enhancement of rural livelihoods, whereas the latter give priority to strengthening value chains that drive the demand for primary livestock products. This demand is a key driver in promoting ownership of productive livestock, which in turn would increase returns from land, water, and labour resources. It is possible, therefore, but not yet proven, that livestock could potentially serve as alternatives to growing opium poppies in some locations.

Even though many projects include activities that aim to improve livestock productivity, the shortage of quantitative information makes it difficult to analyse in depth the approaches used and the results achieved. In particular, even when there is evidence of impact, it is often reported using indicators of limited value, the impact is only evident if questionable assumptions are used, or both. Moreover, a shortage of trained staff, inadequate physical facilities, and severe budgetary constraints continue to hinder the implementation of most components of the MAIL Master Plan. For these various reasons it has proved difficult to quantify the impact of either government policy or donor and NGO programmes since 2002. To some extent, this is because changing livestock productivity is a slow process and many projects have only been running for three years.

Progress is being made to consolidate the network of private Veterinary Field Units (VFUs) and to strengthen both policy instruments and state institutions that support the animal health sector. Well-nourished livestock better express their genetic potential, lowering veterinary care costs as a proportion of total variable costs, which become less of a burden on livestock owners. Donors should therefore place more emphasis in their development strategies on improving on-farm feed production and use in Afghanistan, rather than depending on imports. The case study suggests how feed production can be enhanced.

Conclusions

This case study presents data that questions the emphasis given to animal health and breeding in many livestock development programmes in Afghanistan, even though animal health is one of three priority areas in the Afghanistan National Development Strategy (ANDS). The next update of the MAIL Master Plan should give higher priority to feed production and utilisation, and it should include a strategy to implement this new focus. Development initiatives should also give feeds and feeding higher priority as this will strengthen the contribution of livestock to rural livelihoods. There is clearly a close link between enhanced livelihoods and food security, which is one of the three priority themes of the MAIL Master Plan and the ANDS itself.

The case study indicates a need for even closer integration of crops and livestock, due to the fact that higher yields of wheat will produce more straw to maintain livestock, especially during droughts, which seem to be occurring with increased frequency, extent, and duration. More attention should be given to import substitution, an issue mentioned in the ANDS. Specifically, the upward trend in imports of milk powder, meat, and eggs needs to be stabilised and then reversed. This requires increased production of locally grown feeds, not reliance on imports. Overcoming the difficulties that limit the growing of these feeds is one of the greatest challenges that must be addressed.

Among the many other challenges facing the agricultural sector in Afghanistan is increasing staple, cash, and forage crop output per unit of land and water. Coupled with this is the ownership of *more productive* livestock, rather than simply *more* livestock. More productive land, water, and livestock resources would increase food security and income streams, and would also increase the production of milk, meat, and eggs – foods that have high dietary value. To succeed, a strategy that makes efficient use of natural resources would require a thorough understanding of the decision-making process used by farmers when they are allocating land to different crops. An annually updated database of farm enterprise budgets would also be required. An updated MAIL Master Plan should give more attention to crop and livestock integration as a significant driver of rural development.

A revision of the current MAIL Master Plan should start with a critical analysis of the achievements in the livestock subsector over the last ten years in Afghanistan. By responding to the lessons learned, a revised Master Plan will be better able to steer Afghanistan towards improved rural livelihoods, lower imports of milk, meat, and eggs, and higher exports of cashmere and carpets by 1392 (2013), at the end of the present implementation phase of the ANDS.

1. Introduction

The hardy livestock found across Afghanistan are the progeny of many generations that have survived the rigours of a harsh climate and rugged topography. Traditionally, they grazed mountain pastures in the summer and in the winter were moved to more favourable lowland locations (a practice known as transhumance) or remained in the mountain valleys or plains throughout the year and were stall-fed for several months in winter. The consequence of selection under these harsh conditions is a population with low outputs of milk, meat, cashmere and wool. In real terms the outputs are not high but in relative terms, compared to the modest inputs, the outputs are often remarkably good.¹ Thus, in the harsh environment found in Afghanistan the livestock systems are quite productive.

Productivity lies at the heart of efforts to improve livestock production systems, and different prescriptions are needed for different circumstances. There is no convenient one-size-fits-all prescription for Afghanistan. Thus, the balance between better nutrition, health, management and genetics, and between improving livelihoods, microfinance and value chains, depends on the context. However, it is argued in this case study that current efforts to raise livestock productivity may focus too much on animal health and breed improvement and not enough on nutrition. Even healthy, genetically improved female livestock are likely to produce well below their genetic potential unless they receive sufficient and balanced nutrition as a developing foetus, at critical stages during growth and during each breeding cycle.

The fieldwork for this case study was undertaken during a time when the Afghan population faced unprecedented increases in the prices of staple foods and fuel. Moreover, at “The Afghanistan Support Conference” in June 2008 in Paris, President Karzai stated that of the sectors roads, health, education, electricity and agriculture, the last two were the most pressing priorities:

.... our neglected agriculture sector needs urgent attention, particularly now that we are facing an unprecedented high food prices. For the majority of our population who live below the poverty line food prices are devastating.^{2,3}

The Afghanistan Research and Evaluation Unit (AREU) is undertaking applied thematic research into water management, livestock and the opium economy in Afghanistan, referred to as the WOL Project. This is the fifth case study that concerns livestock conducted by the project.⁴

1 This argument is based on a comparison between highly fossil-fuel-dependent systems and traditional low-output-low-input systems. This can be a contentious point since, as output falls, the proportion of the total nutrients required for maintenance increases.

2 By late 2008 global prices of staple foods had decreased considerably, after peaks in mid-2008. The price of wheat flour in Afghanistan decreased somewhat after May 2008 (Figure 8). The drought in the north of the country in 2008 destroyed much of the rainfed wheat crop, which accounts for about a third of the country's production, making the import needs of 2008-2009 higher.

3 Hamid Karzai, (The Afghanistan Support Conference, Paris, 12 June 2008, 10), <http://www.embassyofafghanistan.org/documents/parisconferencespeechjune11.pdf> (accessed 10 September 2008).

4 The others are: Fitzherbert, A. “Water Management, Livestock and the Opium Economy: Livestock Husbandry” (Kabul: AREU, 2006); E.F. Thomson, “Water Management, Livestock and the Opium Economy: Livestock Production and Health” (Kabul: AREU, 2006); Fitzherbert, A. “Water Management, Livestock and the Opium Economy: Livestock Feed and Products.” (Kabul: AREU, 2007); and E.F. Thomson, “Water Management, Livestock and the Opium Economy: Livestock Marketing” (Kabul: AREU, 2007).

Its key aims are to present:

- The findings of on-herd monitoring and market prices from the fieldwork.
- A discussion of the findings from the fieldwork and their implications for national research and development needs.
- Recommendations for revising livestock policy in Afghanistan.

Hopefully, the information and issues presented here will contribute to the debate about the potential revision of the current Master Plan of the Ministry of Agriculture, Irrigation and Livestock (MAIL).

The case study ends with a number of annexes. An overview of previous and ongoing efforts to develop the livestock subsector since the mid-1970s is presented in Annexes 1 and 2. Annex 3 outlines some of the projects involving livestock proposed during the 1970s and Annex 4 presents the livestock priorities found in the 2007 MAIL strategies paper.

2. Research on Livestock Productivity and Prices

2.1 Introduction

This section presents the rationale for the WOL Project monitoring studies on livestock productivity and prices, the approach the studies used and their results. Some additional information on the exchange rate of livestock to wheat flour, the effect of drought in 2008 in northern Afghanistan on meat prices, and changes in meat prices since 2007, is also added. Roe⁵ summarised the characteristics of the four primary research sites, composed of clusters of villages in Ghazni, Herat, Nangarhar and Kunduz Provinces, and the methods used to select the sample of households. Roe⁶ presented details about farming systems and rural livelihoods based on data collected by the WOL Project.

2.2 Rationale, approach and difficulties

Quantitative data on many aspects of the livestock subsector were unavailable at the time the MAIL Master Plan was written in 2004/05. Much of the quantitative data used concerned volumes and prices of commodities traded, but the precision of much of this information is doubtful (see Agricultural Yearbooks of the Central Statistical Office). In contrast, large amounts of qualitative data had already been collected by various agencies and NGOs; but much of it remains unpublished and is not widely available.

A major knowledge gap concerns the performance (such as milk yields and growth rates of young stock) of animals belonging to settled farmers and Kuchi.⁷ Because they are difficult to measure under farm conditions, the amounts of feeds ingested by animals to achieve the prevailing levels of output are unknown. This makes it difficult to examine offtake per unit of feed, an important point when comparing the milk yield potential of unimproved local (*watani*) cows and *watani* cows crossed with exotic breeds. There is also a poor understanding of the income generated from the sale of live animals and livestock products produced under a spectrum of agro-climatic and social conditions; some results are reported by Roe.⁸

To fill the gaps in knowledge of livestock performance, the WOL Project undertook pilot studies at the herd level to monitor the milk yield of cows and does, the growth rate of lambs and the progeny history of cows and does. The monitoring of livestock prices in several city markets aimed to identify regional price differences, the value of different categories of livestock and seasonal price variations. The prices, together with information collected in other marketing studies, are providing a better understanding of livestock markets and the baseline information needed to design efficient value chains.⁹

5 A. Roe, "Water Management, Livestock and the Opium Economy: Baseline Survey" (Kabul: Afghanistan Research and Evaluation Unit, 2006).

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

7 Many consultants' reports present estimates of animal performance, but these are often taken from earlier reports (Yalçin, B.C. *The Sheep Breeds of Afghanistan, Iran and Turkey* (Rome: Food and Agriculture Organization of the United Nations, 1979), which themselves do not cite the source of the information.

8 Roe, *Natural Resources Management*.

9 E.F. Thomson, P. Chabot and I.A. Wright, "Production and Marketing of Red Meat, Wool, Skins and Hides in Afghanistan: A Case Study from Kabul, Kandahar and Kunduz Provinces" (Aberdeen and Kabul: Macaulay Institute and Mercy Corps, 2005).; W. Pittroff, *Analysis of Red Meat Production Potential: Opportunities for Intensification in Afghanistan* (Kabul: Citizens Network for Foreign Affairs, 2006); Landell Mills Development Consultants, "Preparing the Commercial Agriculture Development Project: Draft Final Report, Volume III"

Some difficulties were faced during this on-farm monitoring. First, it was not possible to select animals at random. Second, because measurements take time and are costly to make, the sample size was small. This prevented rigorous comparisons being made across different production systems. Third, the quality of the data collected was variable, one reason being reduced access to sites at regular intervals due to poor security. Thus, only results that are known to be reasonably accurate are presented here.

2.3 Milk yields

Milk yields of up to four cows belonging to different owners were measured in one village in each of the primary research sites in 2007. The yields of eight cows in 2008 and four does in both 2006 and 2008 were also monitored. Cows and does were selected based on whether their owners, usually women, were willing to have the milk yield measured. Whenever possible, monitoring started when cows and does were in their first or second month of lactation. Yields were measured at the morning and evening milkings on three consecutive days at about two-week intervals until the end of lactation. Milk yields were also measured at midday for cows in early and mid-lactation. A field assistant measured the volume of milk collected at each milking using a measuring jug.

The yields of milk reported in this paper are after suckling. To ensure release of milk by cows, calves were allowed to suckle prior to the start of milking for a minute or so, sometimes for a second time after a few minutes and then after milking had finished to give it the benefit of any residual milk. Prior to milking, kids (young goats) were also allowed to suckle some milk from does. The amount consumed by calves and kids was unknown.¹⁰

Women were also asked about the components of the ration that they were feeding their cows and does on the day milk yields were recorded. Some cows were offered urea-treated straw (see below). As an incentive to allowing milk recording, women were given one multinutrient feed block for each animal once every six weeks.¹¹

Figure 1 shows the lactation curves for four *watani* cows located in an irrigated production system in Kunduz Province.¹² Noteworthy is the low milk yield of the cows, only 500-600 kg in a 210-240 day lactation. These are much lower than the yields of the four cows in Nangarhar Province (Table 1). Peak yields of 3-4 kg were also seen in the four cows monitored in a village in Herat Province. Because of delayed conception, some of the cows in the Kunduz and Herat villages were still being milked one year after parturition even though their daily yield was only about 300 ml. This again illustrates the importance given to milk in the family diet.

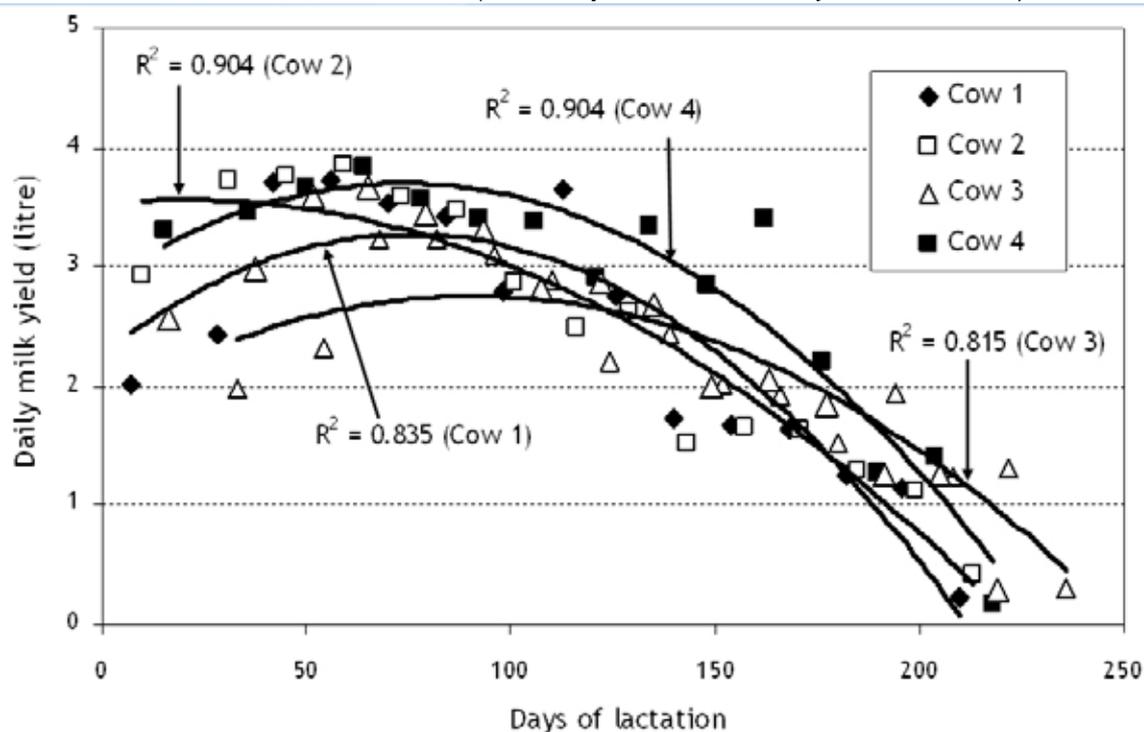
Livestock Value Chain Analysis Report (Kabul: Asian Development Bank, 2007).; E.F. Thomson, "Water Management, Livestock and the Opium Economy: Marketing of Livestock" (Kabul: Afghanistan Research and Evaluation Unit, 2007).

10 A procedure in which calves and kids are only allowed to suckle from one quarter or one half of the udder, respectively, and the milk then collected from the rest of the udder, was considered to be too difficult to supervise. It deserves to be tested on another occasion.

11 Each block weighed 3 kg. They were purchased in Pakistan.

12 A statistical procedure is applied to the volumes of milk measured at approximately two week intervals that fits a curve that best describes the data. A polynomial equation of the form $y = a + bx + bx^2$ is used to describe all the lactation curves.

Figure 1. Milk yields after suckling and lactation curves of cows in Kunduz Province in 2007 (the R-squared is shown for each curve).



Approximate lactation lengths and total milk yields of four cows in Nangarhar Province in 2008 are shown in Table 1. This amount would be available for consumption by the family and for giving to relatives and other families nearby who might not own a cow or goat. Lactation lengths varied between about nine months, which is typical if a cow has an optimal calving interval of one year, and nearly 19 months for a cow whose owner continued milking her because of delayed conception. This would result in a long calving interval, one of the main reasons for the low productivity of many cows.¹³ The average yield of these four cows was 7-10 kg daily, which suggests that they may have been improved to some extent. Although actual family consumption of milk was not determined, it is likely that some of the milk was given away and some of it was sold during the period when cows were yielding above 8-10 kg daily.

Table 1. Approximate lactation length and total milk yield after suckling, from four cows in Nangarhar Province (2008)

	Lactation length (days)	Milk yield after suckling (kg)
Cow 1	295	2,900
Cow 2	280	2,450
Cow 3	192	1,300
Cow 4	561	4,990

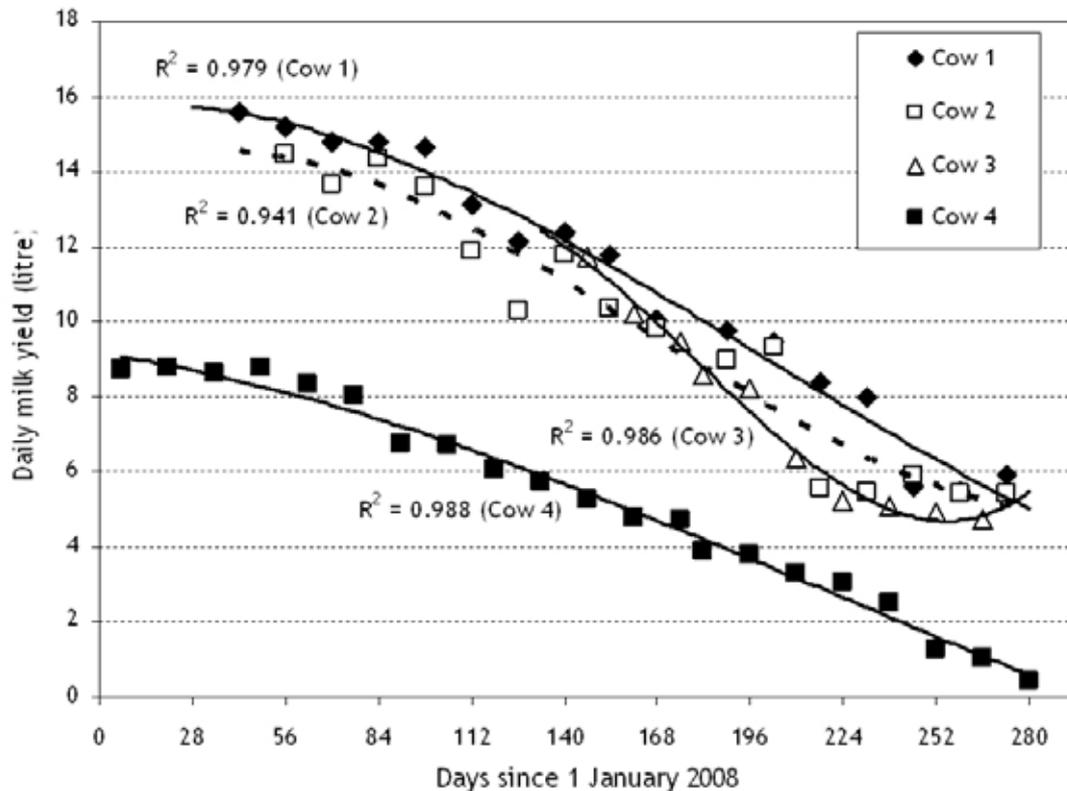
Note: When milk recording ended Cows 1, 2 and 3 were close to the end of lactation. Cow 4 had finished milking. Cows 1 and 4 were described as improved and Cows 2 and 3 as *watani*.

The lactation curves of the four cows in Nangarhar Province are shown in Figure 2. As the actual genetics of the cows is not known, a comparison according to breed is not possible, and the sample is very small. However, the decrease in the milk yield over time

¹³ A detailed discussion of the many reasons for infertility and long calving intervals is beyond the scope of this case study. Among them are disease, imbalanced nutrition, undernutrition, limited access to bulls and failure to detect oestrus.

(the slope of the regressions) is similar. Cow 4 (“improved”) is exceptional since she calved in March 2007 and since then had been inseminated using artificial insemination (AI) several times. Therefore the farmer continued milking her. By mid-November 2008, when her lactation ended since she was in late pregnancy, she would have produced over 5,000 kg of milk if the suckled milk were included. This is evidence that lactation in improved cows can continue for 19 months. Cows 1 and 2 were still yielding 4-5 kg daily after nine months of lactation. Indeed, during the last 12 weeks their milk yield only dropped by about 1.5 litres, suggesting that lactation could be extended but at a low yield. In the absence of another source, this milk would make a valuable contribution to the families’ diets, which is one reason why they were milked for a long as possible.

Figure 2. Milk yields after suckling and lactation curves of cows in Nangarhar Province in 2008. (The R-squared is shown for each curve.)



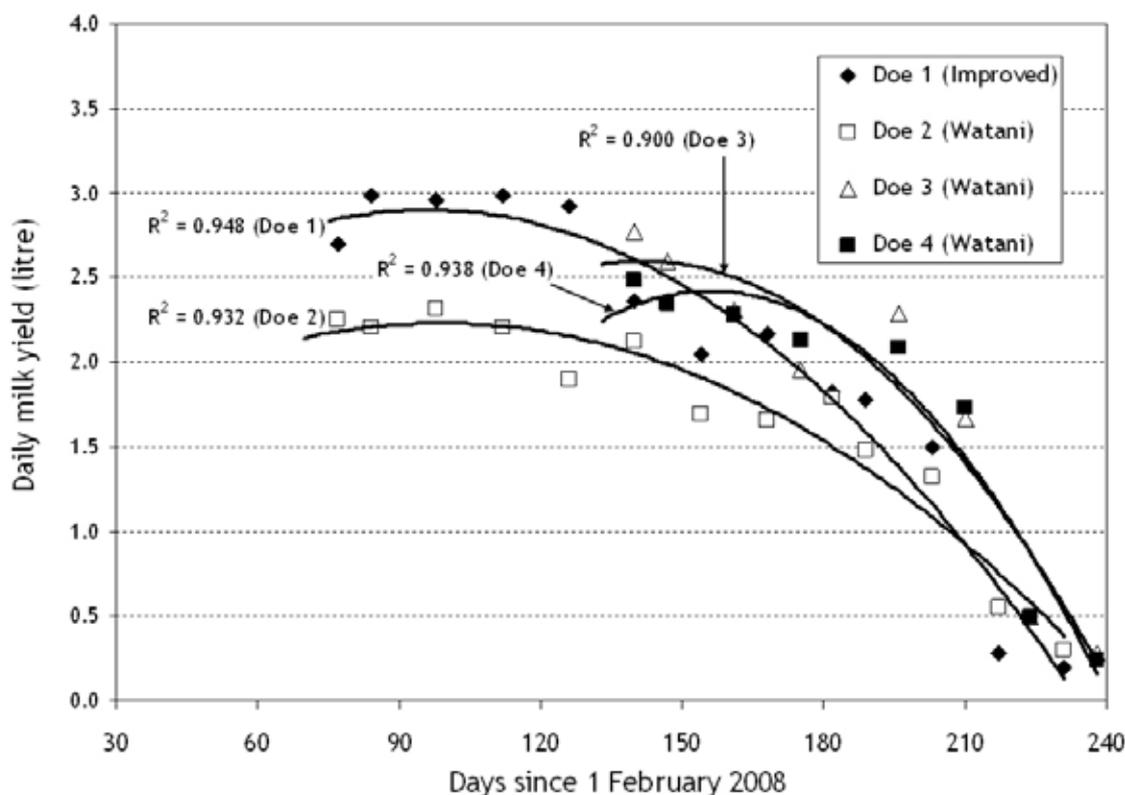
Cows in Nangarhar Province in 2008 were fed a mixed diet that varied according to the season and included different combinations of clover, alfalfa, maize leaves (fresh and dried), weeds (fresh and dried), dried bread, wheat straw and grazing near the village. For some of the time wheat straw treated with urea was fed.¹⁴

In early lactation the four does monitored in Nangarhar Province yielded 2.5 to 3.5 kg milk daily (Figure 3). Close to the end of lactation in late September 2008, does 1, 2, 3 and 4 had yielded, respectively, 460 kg in 224 days, 316 kg in 189 days, 201 kg in 112 days and 241 kg in 140 days. Thus, the “improved” doe was yielding far more than the *watani* does and nearly as much as the *watani* cows monitored at research sites in Herat

¹⁴ Cows were fed untreated and treated wheat straw in alternating periods lasting three or four weeks. Sufficient straw for one week was weighed out and a part of it offered each day. The amount not consumed at the end of each day was collected and weighed at the end of the week. Differences between the intake of untreated and treated straw were small, with daily consumption in the range of 4 to 6 kg.

and Kunduz Provinces.¹⁵ However, the yields of these four does were well below the peak yields of the cows in the same villages (Figure 2). In April, May and June does were fed on a combination of clover, weeds, wheat straw and dried bread, with daily grazing close to the village. From July onwards fresh maize leaves replaced clover but the other ingredients remained the same.¹⁶

Figure 3. Milk yields after suckling and lactation curves of does in Nangarhar Province in 2008 (the R-squared is shown for each curve).



The results show the relative milk yield potential of cows and does in one village in Afghanistan. The variability of the milk yields within species indicates genetic variability between animals, since the feeding and management regime was similar. A programme in this village to identify the best-yielding goats would select those does yielding one standard deviation (59 kg) above the mean of the three does (253 kg).¹⁷ These does would be the basis for a nucleus flock. If the shapes of the lactation curves were indeed fairly similar, just two or three milk yield measurements per doe in early lactation would be sufficient to identify the best milk producers. This would make a screening programme less labour intensive.

Differences in milk yield between cows across research sites are due to both genetic and environmental factors, which make them impossible to compare. The milk yields of the *watani* cows are low, but it is not known to what extent this is due to the genotype and to environmental factors.

15 The farmers call these “Teddy” goats, which they brought from Pakistan. However, it is unclear whether they really belong to this breed, since it is small and the milk yields recorded are far higher than would be expected (H.U. Hasnain, “Sheep and Goats in Pakistan” FAO Animal Production and Health Paper No. 56 (Rome: Food and Agriculture Organization of the United Nations, 1985)).

16 It is speculated that feeding fresh maize leaves instead of clover would lower the protein intake of cows and possibly reduce milk yield, particularly in cows in early lactation.

17 The milk yield of the improved doe is excluded from this mean.

2.4 Progeny histories

Grandin and Young¹⁸ cite their own earlier work, which showed that women have a good recall of the progeny history of their animals going back several generations. To test the approach, in a pilot trial in 2008, 12 women selected from the sample of households in each of four village clusters were interviewed using a structured questionnaire to generate the progeny history of their cows. Following the success of the pilot trial, 12 women in Nangarhar Province were interviewed regarding the progeny history of their does.

The progeny histories of the cows distributed across the three village clusters are shown in Table 2. On average, cows in the Nangarhar cluster were more productive than those at the other two locations. For example, they were younger at their first parturition (birth), they had had more parturitions, they had a shorter calving interval and a higher expected peak milk yield. The cattle in the Nangarhar villages were also different in other respects. For example, calves were younger on the day of the interview, which suggests cows calve later in spring. Moreover, despite being younger at sale, bulls were being sold at a price close to the prices at the other two locations. The differences between the three locations reached statistical significance ($P < 0.05$), apart from the age of the cows, the estimated number of parturitions and the sales price of calves (Table 2).

Table 2. Progeny histories of cows at three of the village clusters

	Ghazni (n=12)	Herat (n=12)	Nangarhar (n=12)	EMS ¹
<i>Age of cow (years)</i>	4.6	5.5	4.9	1.51
<i>Age at first parturition (years)</i>	3.1	3.7	2.6	0.15
<i>Estimated number of parturitions</i>	1.6	2.3	2.8	1.50
<i>Actual number of parturitions</i>	1.4	1.9	2.4	1.15
<i>Calving interval (months)</i>	28.0	15.1	11.8	14.80
<i>Expected lactation length (months)</i>	7.6	10.8	10.7	4.02
<i>Peak milk yield (litres/day)</i>	5.0	4.3	11.3	5.40
<i>Age of youngest calf² (months)</i>	3.1	3.5	0.8	3.12
<i>Age of bull calf at sale (months)</i>	21	26	14	40.5
<i>Price of calf at sale (Afs)</i>	13,285	10,000	10,853	-

Note: Data was collected in April 2008. Data from Kunduz were excluded due to errors.

¹ Error mean square comes from analysis of variance. It can be used to compare differences between clusters. ² On day of interview.

The higher productivity of cows in the Nangarhar villages may be due to the local *watani* type of cow being more productive. However, in Nangarhar Province, because of the mild winters, there is a wider range of green feeds available for a longer period than in the villages in Ghazni and Herat provinces, which have a colder and longer winter. The peak milk yields at the three village clusters also reflect the results from the milk monitoring studies (Figures 1 and 2). The reasonable agreement between the estimated number of parturitions and the actual number is further evidence that the recall of owners was good. These two questions were applied at different times in the interview to triangulate the information.

18 B.E. Grandin and J. Young, "Ethnoveterinary Question List," *RRA Notes Number 20, Special Issue on Livestock*, 39-46 (London: International Institute for Environment and Development, 1994).

The questionnaire used to examine doe progeny histories included many triangulated questions, which helped identify inconsistencies in some answers. Only reliable results from ten does in Nangarhar Province are shown in Table 3, since the larger herd sizes (seven to 23 head) in Herat Province made it difficult for respondents to recall the progeny history of individual does. Most of the does were three to four years old on the day of the interview, and the mean age at first parturition was about 21 months. This suggests that the first conception took place at about 16 months, which is quite possible. Women claimed that the improved does that they owned could give birth when they were 12 months old, whereas *watani* does were 20 to 22 months old. A parturition interval of one year was common, and 2.5 actual parturitions out of a possible 2.7 were reported, which is evidence of good fertility. Two parturitions in one year were never reported, which is somewhat surprising. Estimated prolificacy, which is not shown in Table 3, was about 1.5.¹⁹

Owners estimated lactation lengths of nearly six months and peak daily milk yields (net of the amount suckled) were lower than those found in monitoring studies (Figure 3). Since the milk recording was quite precise, this is evidence that household surveys tended to underestimate the peak milk yields of does. All the does' milk was consumed by kids during the first seven days after birth. Between the second week and two months old, when weaning took place, it is unclear how much milk kids consumed and how much was kept for family consumption.

Table 3. Progeny histories of does belonging to different families in a village in Nangarhar Province

	Mean \pm SD ¹ (max - min)	Range	n ²
Number of does owned per family	1.3 \pm 0.48	1 - 2	10
Mean age of doe in August 2008 (years)	3.4 \pm 1.25	1.5 - 6.0	10
Age of doe at first parturition (months)	1.7 \pm 0.19	1.5 - 2.0	7
Actual number of parturitions	2.5 \pm 1.35	1 - 5	10
Estimated lactation length (months)	5.5 \pm 1.9	2.5 - 8.0	10
Estimated peak daily milk yield (litres)	1.8 \pm 0.42	1 - 2	10
Kid mortality to 2 months old (%)	22 \pm 18.6	0 - 50	10
Mean age of kids at death (months)	3.5 \pm 2.4	0 - 6	4
Age of last doe to be sold (years)	13.9 \pm 14.0	6.0 - 48.0	8
Price of doe at sale (Afs)	1,682 \pm 354.9	1,000 - 2,250	8
Mean age of kids at sale (months)	8.5 \pm 2.7	6 - 12	23
Price of kids at sales (Afs)	1,656 \pm 312	708 - 2,167	23

¹ Standard deviation.

² Number of observations contributing to each mean.

Information on the health of the herds was difficult to interpret but pointed to extremely high (57 percent) mortality in does from the six herds that provided the most accurate data. Though possible for one year, this mortality would destroy a herd if it continued over two or three consecutive years as the owner struggled to buy replacements (see Annex 1, Figure A1). In three of these six herds, owners stated that foot-and-mouth disease (*tabak*) and enterotoxaemia (*reshak*) were the cause of death.²⁰ Significantly, none of the six owners vaccinated their does against any disease. If confirmed on a large

19 Prolificacy is defined as the number of offspring born at one parturition.

20 Veterinarians advised that owners can identify these diseases but not necessarily others.

sample, this high mortality would be a serious loss to the family, and certainly special efforts are needed to convince owners of the value of vaccination. High mortality would also help to explain the low average age of the does in this small sample (Table 3).

An estimate of kid mortality (22 percent) was derived by asking owners how many kids had been born in the last five years and how many of them had died. High mortality in kids was also reported by Schreuder et al.²¹ However, more detailed questioning of owners about the progeny of each doe suggested a mortality of 11 percent. The actual mortality is probably somewhere between these two extremes, since the first is an exaggeration and the second an underestimate since owners may have had problems recalling past events. This finding indicates the pitfalls associated with estimating mortality at one-off interviews. The detailed herd recording that was undertaken by Mission d'Aide du Developpement des Economies Rurales en Afghanistan (MADERA) using tagged animals gave the most precise information.

The mean age of the last doe to be sold was 13.9 months, a surprisingly young age, the main reason being a need for cash. Kids ranged in age from six to 12 months at sale, and they had an average sales price similar to that of the last doe sold (Table 3). It is speculated that owners that sold young does were buying older does to replace the one that died. About half of the kids sold were female, evidence that families were not retaining young does to increase herd size.

Though some difficulties were faced, mainly due to inadequate training of field staff and the recall of owners, progeny histories provided a useful tool for collecting information about the productivity of female livestock.

2.5 Growth rates

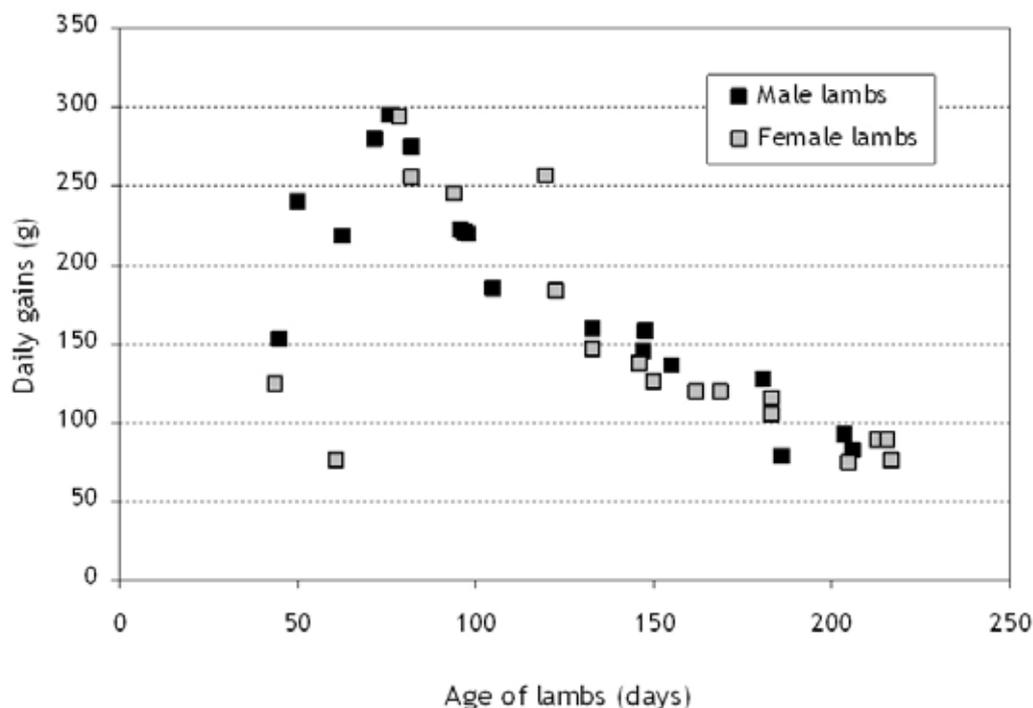
Between two and five lambs were selected from the herds of several farmers and Kuchi in the sample at some primary research sites. They were weighed at about 15-day intervals until they were sold or had reached 25 kg. Lambs were identified using a plastic collar with a number on it since owners were reluctant to have them ear-tagged. Weighing started in March 2007 and continued until August in some herds.

Both male and female lambs that were sold before reaching three months of age gained between 200 and 300 g each day (Figure 4). To purchase essential items such as wheat flour in late winter, Kuchi typically sell young male lambs to generate cash at a time when they have few other items for sale.²² Even though selling such young lambs might appear to lower the potential added value, it creates the opportunity to convert ewes' milk into yoghurt, which adds much-needed protein to the family diet. Any surplus yoghurt is converted into butter (*roghan*) and air-dried yoghurt (*kurut*), which can be stored for use in winter, sold when cash is needed, or both.

21 B.E.C. Schreuder, H.A.J. Moll, N. Noorman, M. Halimi, A.H. Kroese and G. Wassink, "A Benefit-Cost Analysis of Veterinary Interventions in Afghanistan Based on a Livestock Mortality Study," *Preventive Veterinary Medicine* 26, 1996). See Figure A1 in Annex 1.

22 Thomson, "Marketing of Livestock."

Figure 4. Daily gains averaged between the first and last weighing of lambs belonging to Kuchi and settled farmers



There was a steep decrease in the daily live weight gains as the lambs got older. This is typical for growing farm animals since the proportions of the main body components change as an animal matures. Thus, in young animals most of the gain is lean-body mass (muscle), composed mainly of protein and water. As they age the gain includes an increasing proportion of fat, which has a much higher energy density than lean-body mass. The low daily gains of three lambs sold at about 50 days old may have been due to sickness, which would be a reason to sell them.

Table 4. Daily gains of female lambs belonging to four Kuchi families

Family (n)	Gain (g)	SD (g)
1 (5)	203	51.6
2 (2)	118	—
3 (4)	114	15.7
4 (4)	110	9.6

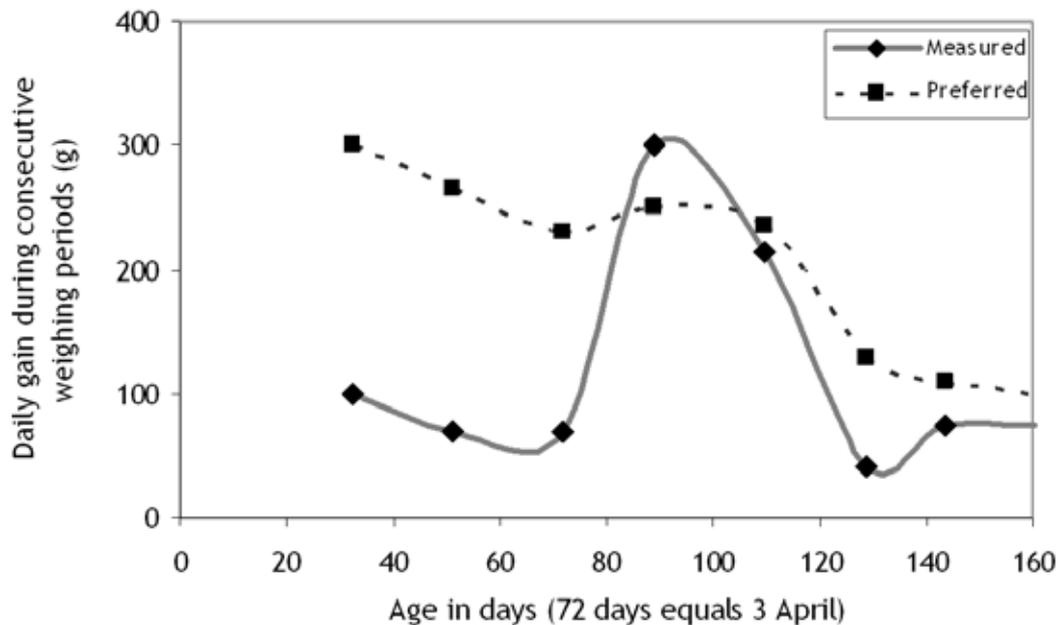
The sample is too small to show that the production system affected lamb growth rate. In any case, comparisons between production systems are confounded by breed differences, which are large enough to mask effects of production systems. However, there was evidence that daily gains were higher in the Kunduz cluster, where the meat-type Turki breed is found, than in the Ghazni cluster, where wool breeds such as the Kandahari predominate.

There was evidence of statistically significant ($P < 0.01$) differences in the daily gains of female lambs belonging to four different Kuchi families (Table 4). Since the sheep breed was the same, the higher gains in one herd are evidence of differences in feeding, health and management practices in this herd.

There were no deaths among the sample of 20 lambs that belonged to the Kuchi, but two of them went missing. Nor were there any deaths among the 37 lambs in the sample belonging to settled farmers. Since the health programme applied to the lambs and their dams was not recorded, it is unwise to infer that this is a typical mortality rate for lambs aged ten days old and above.

The daily gains averaged over nine lambs in the Ghazni cluster showed a distinct pattern (Figure 5). It may indicate that between birth and about 70 days of age lambs were receiving inadequate milk to grow at their full potential, whereas in April they gained rapidly for about six weeks. The rapid gains coincided with the spring growth of pasture, which allowed lambs to recover some of the growth lost earlier. Thereafter daily gains were low, since the pastures had dried out. The "preferred" daily gains shown in Figure 5 are those for an improved production system in which the higher milk yields of ewes in early lactation result in higher gains of young lambs similar to those of family 1 in Table 4.

Figure 5. Daily gains of lambs in villages in Ghazni Province. The area between the measured and preferred curves shows the additional daily gains that could be expected in an improved production system.



2.6 Livestock prices

Starting in April 2006 prices of livestock were monitored in three regional markets: Ghazni, Kunduz and Bakikot (20 km east of Jalalabad). In March 2007, monitoring started in Robat-i Sangi and Marabad, two district markets in Herat Province. Because of worsening security, monitoring ended in March 2008 in Ghazni and Kunduz markets, but it continued until October 2008 in Batikot, Robat-i Sangi and Marabad markets. Since the price differences between the two latter markets were small, they were combined when analysing the data. At each monthly visit the prices of 12 cattle, 12 sheep and 12 goats were collected, in principle with each animal selected at random. There were six male and six female animals in each group of 12, and within each group of six, two were tall, two were medium height and two were short. Most of the males were intact, but a few were castrates. Females could be nonpregnant, apparently pregnant, accompanied by offspring or lactating (offspring were weaned).²³ The proportions of female animals in each of these categories tended to vary according to season. As well as asking the price of the animal, a researcher measured its height at the withers (shoulder). Height was measured rather than girth since it was simpler for field staff. The sellers were also

²³ Livestock owners were asked whether females were nonpregnant or pregnant, but it was impossible to verify their answers unless a female was obviously pregnant.

asked the age of the animal, where it originated from and whether it was fat, medium or thin. The interviewee was asked whether he was a farmer selling the animal or a trader who had purchased it. This made it possible to record the price as an expected or actual price; the latter might be lower. In April 2008 a single visit was made to eight butchers in each of the following cities, Jalalabad, Kabul, Kunduz and Herat, to see how red meat prices had changed over the past 12 months.

Prices of bulls, rams and bucks in the four livestock markets are shown in Figure 6.²⁴ Differences within and between species, between markets and over time are evident. Prices of bulls varied considerably between the four markets. Initially the highest prices were in Ghazni market, where they decreased until December 2007, after which they increased rapidly over three months. At this time prices of bucks and rams also increased in Ghazni market. No explanation can be offered for these increases, or for the differences in prices between markets and species, since collection of prices was not accompanied by interviews, which would have been needed to get a better understanding of the reasons for sudden changes in prices and price differences. This is a case where some informal questions to accompany the structured questionnaire would have generated valuable additional information.

After increasing over the summer of 2006, prices of bulls in Batikot market were fairly stable and then increased again; bull prices in Robat-i Sangi were lower than those in Batikot. The rapid decrease in bull prices after March 2008 in the two western districts is difficult to explain but could be associated with the drought in the North and northwest of the country (see Mazar bull prices in Figure 7). Bull prices in Kunduz market were

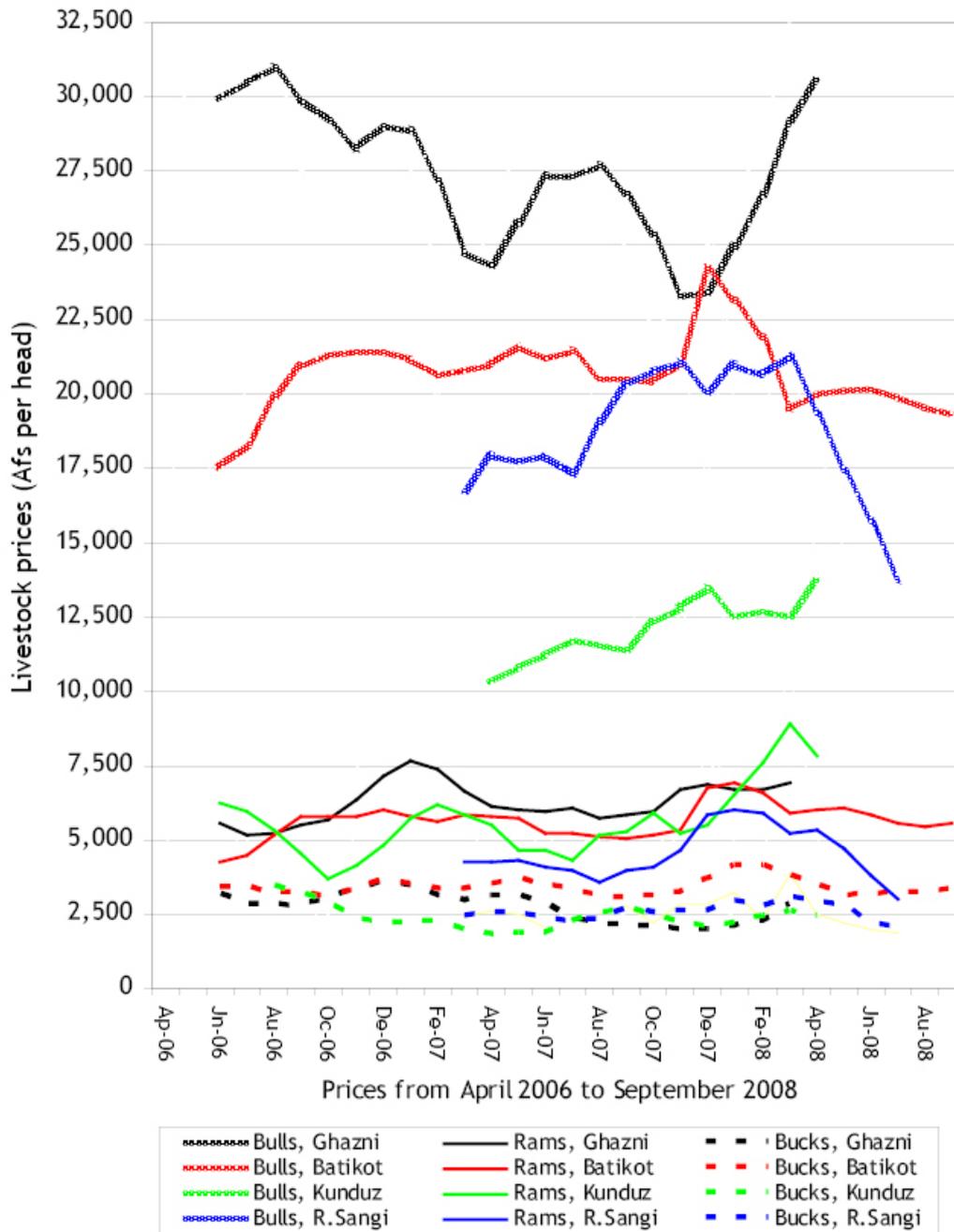


Measuring the shoulder height of a sheep

²⁴ Results illustrating price differences between the three species of livestock and different categories within them in each market were presented in Thomson, "Marketing of Livestock."

much lower than in the other three markets but gradually increased over time. These lower prices are mainly due to bulls in the North being smaller than those sold in the other three markets. The higher prices in Batikot and Ghazni markets are also explained by the presence of bulls imported from Pakistan, which are often larger than the Afghan breeds.²⁵ Rams are in general more valuable than bucks (Figure 6). Price changes of bulls

Figure 6. Prices (as 3-month moving averages) of bulls, rams and bucks in Ghazni, Batikot, Kunduz and Robot-i Sangi livestock markets, April 2006 to September 2008



Note: A constant exchange rate of 50 Afghanis per 60 Pakistani rupees was used to convert prices in Ghazni and Batikot markets to Afghanis.

Price collections started in March 2007 for Robot-i Sangi market and ended in April 2008 in Ghazni and Kunduz. Robot-i Sangi prices include those from Marabat market in Pashtun Zargun District, east of Herat City.

25 Thomson, "Marketing of Livestock."

in the four markets were not consistent over time but prices of rams were somewhat higher between January and March in both 2007 and 2008.

Prices in three livestock markets from the DCA price data set, which were collected over a longer period, are shown in Figure 7. Although it is difficult to compare these with the prices in Figure 6, mainly because the two data sets were collected by different agencies, some similarities are apparent. For example, they show some evidence of seasonality but no general upward trend over time. The effect of the 2008 drought is also evident, as will be discussed below.

The drought in the North and its effect on livestock prices is evident in Figure 7; it also affected prices in Robat-i Sangi in the West (Figure 6). Most dramatic is the fall in bull prices in Mazar by about 13,500 Afs over the four months to August 2008. During the same period in Mazar market the price of rams and bucks halved. Presenting prices for each individual market is important, since each region has unique circumstances and these differences are masked when aggregating data.

This preliminary analysis of the data suggests that there is some seasonality in livestock prices, which is more evident in small ruminants. However, other factors such as drought can have a greater influence on prices than seasonality. The behaviour of traders in response to market conditions is a significant driver of rapid changes in market prices. The reasons for the patterns merit further research to get a better understanding of how prices are derived. This understanding is needed when formulating and implementing policies that aim to protect producers from some of the massive price changes seen during drought.

A visual analysis suggests that prices in both data sets were similar in spring 2008 to prices two years before, although a positive trend in bull prices in Kabul is evident. If this rather general interpretation is correct, prices adjusted for inflation were decreasing over time, which suggests that the purchasing power of livestock was also decreasing. In this case selling one head of livestock would purchase a farmer fewer sacks of wheat flour, even if flour prices remained constant. This topic is discussed in the next section.

2.7 Drought and the purchasing power of livestock

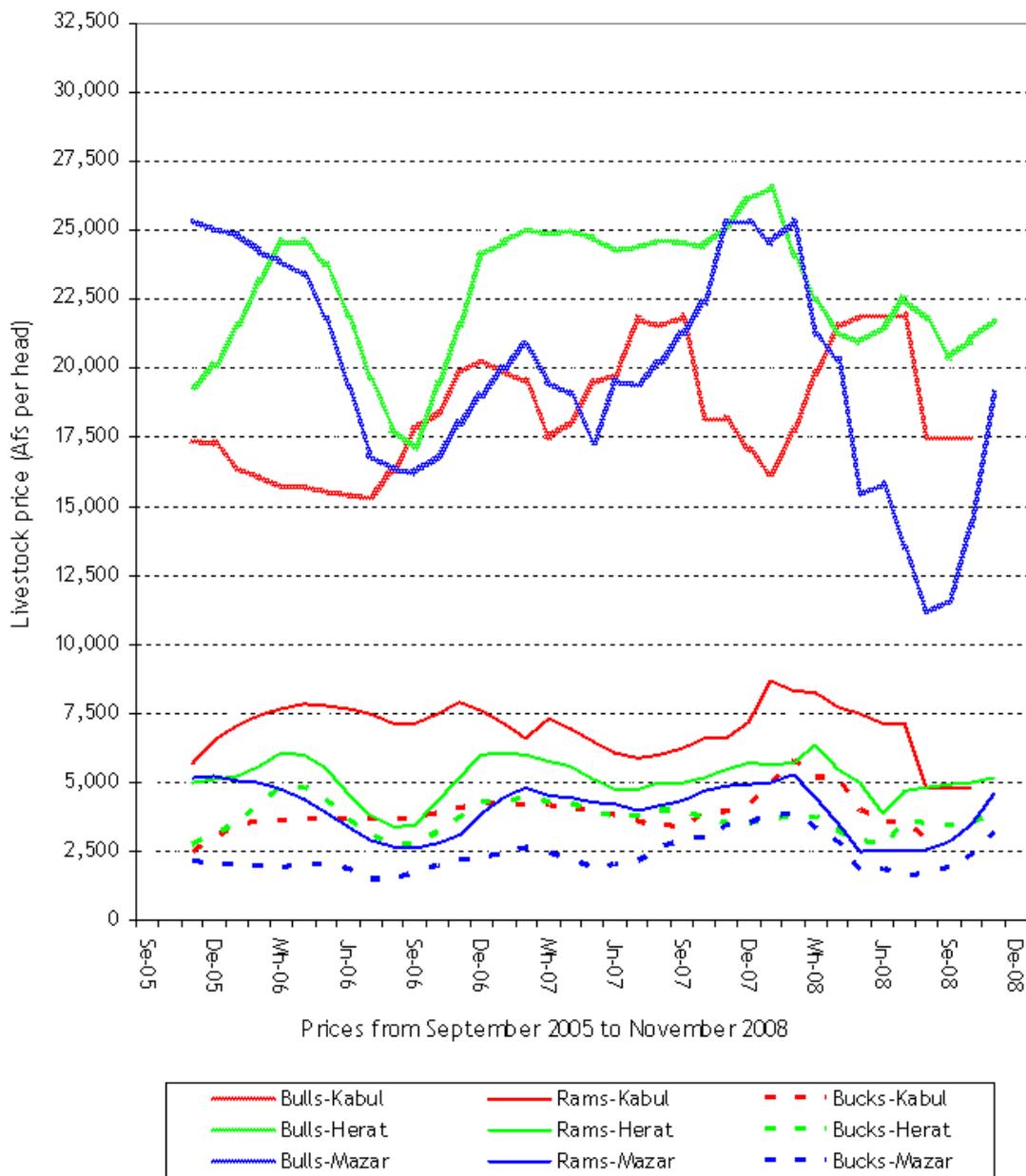
Bread is the most widely consumed cereal-based food in Afghanistan, and since domestic production of wheat is barely sufficient to supply national needs when the harvest is good, a variable portion of the need for wheat flour is met with imports, much of them from or via Pakistan. Hence, the large global changes in wheat grain prices over the past year have also affected prices of wheat flour in Afghanistan. Since one role of livestock is to serve as a ready source of cash, farmers often sell animals when they need cash to buy essential items such as wheat flour, sugar, tea and vegetable oil. This is particularly true for those Kuchi who have no other sources of income. It is therefore important to show the changing purchasing power of livestock since the last serious drought ended in 2003 (and in some parts of the country in 2004 or 2005). The price data set collected by the Vulnerability Analysis and Mapping (VAM) branch of the World Food Programme (WFP) was used for the analysis.²⁶ Since May 2000 this unit has been tracking the prices of essential items each month, among them wheat flour and one-year-old sheep, in six key markets in Afghanistan. The purchasing power of livestock was estimated as the

²⁶ World Food Programme Vulnerability Analysis and Mapping Branch, "VAM-SIE Afghanistan." See <http://125.213.201.164/geonetwork/srv/en/vamsie.main> (some further navigation required, accessed 25 January 2009.) Prices for Gardez, Nili, Ghor and Maimana are not included as the series started later.

number of 50 kg sacks of wheat flour that could be purchased with the income earned when a one-year-old sheep was sold.

The purchasing power of livestock, wheat flour and sheep has changed dramatically since 2000 (Figure 8). The price of a one-year-old sheep was about US\$12 per head in the midst of the 1998-2003 drought. It then gradually recovered to about US\$90 in mid-2005 and stayed in the US\$85-90 range. This moving average price, however, masks a decrease in livestock prices in northern Afghanistan since early 2008. For example, during the six months to July 2008 sheep prices in Mazar and Maimana markets had decreased by 29 and 41 percent, respectively.²⁷ Price decreases of rams were also seen in Robot-i Sangi (Figure 6) and Mazar (Figure 7) markets.

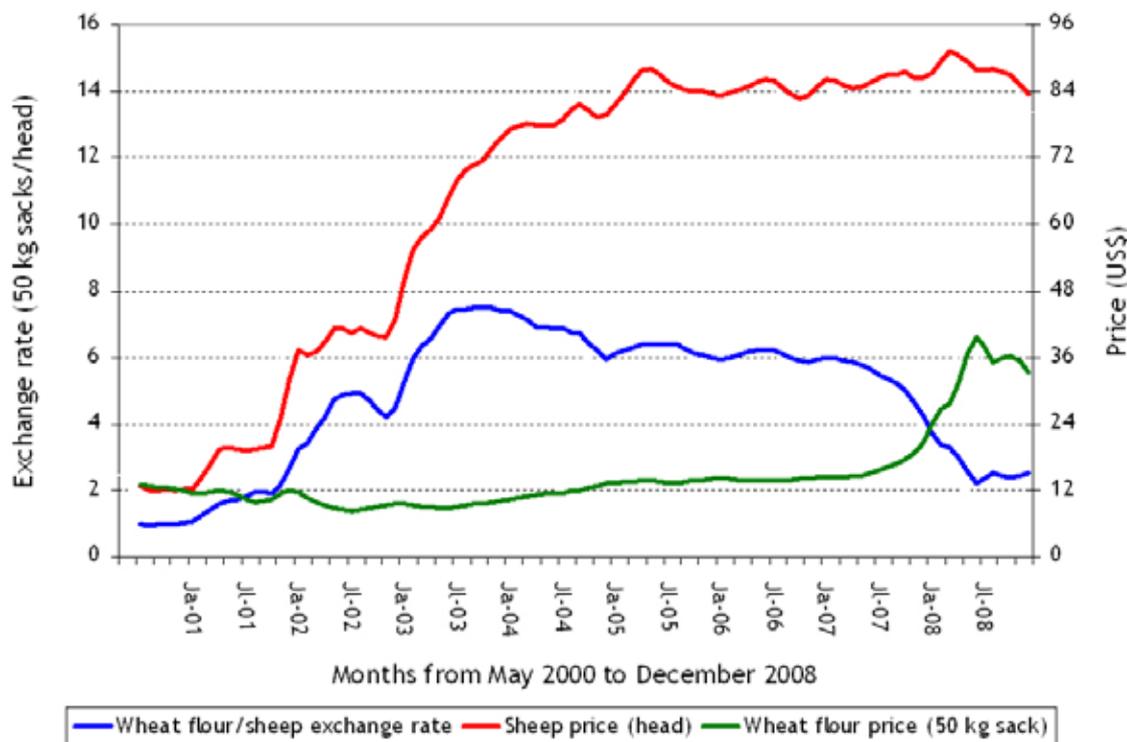
Figure 7. Prices (as 3-month moving averages) of bulls, rams and bucks in Kabul, Herat and Mazar livestock markets, September 2005 to November 2008



Source: DCA price data; published with permission.

²⁷ World Food Programme Vulnerability Analysis and Mapping Branch, "VAM-SIE Afghanistan." Use URL above to access.

Figure 8. Exchange rate of sacks of wheat flour for a sheep and changes in the prices of these two commodities since May 2000. (Prices are for Herat, Kabul, Jalalabad, Faizabad, Mazar and Kandahar using 3-month moving averages.)



Source: WFP-VAM, modified by this author.

In 2000 and 2001 wheat flour cost about US\$12 per 50 kg sack. This price decreased to US\$8 before gradually increasing to US\$15 in mid-2007. It then increased steeply in concert with the massive rises in global cereal grain prices and peaked at about US\$40 a sack in mid-2008. Since then it has shown a modest decrease. As a result of these changes in sheep and wheat flour prices, the exchange rate of sheep (one 1-year-old) to wheat flour (50 kg sack) recovered from a low of 1:1 in 2000 during the drought to a peak of 7.5:1 in late 2003 before gradually decreasing to 6:1 in mid-2007 as wheat flour prices increased. This exchange rate then fell quickly to about 2 sacks per sheep by mid-2008 and then stabilised. In Maimana market, which is within the area affected by the 2008 drought, the exchange rate in August and September 2008 fell close to parity, since sheep prices were as low as US\$43 each.

These dramatic changes in the purchasing power of sheep since 2000 are further evidence of the vulnerability of livestock owners to shocks such as drought, particularly Kuchi households, for whom livestock are the main source of income.

2.8 Drought and red meat prices

In arid areas, drought is one of the greatest shocks that livestock owners have to cope with and the previous sections illustrated how drought can markedly reduce the purchasing power of livestock at sale. Indeed, as the losses during the period 1998-2003 showed, drought can cause far greater reductions to inventories than disease. Just five years after that drought ended, much of northern Afghanistan was again affected by well-below-average precipitation in spring 2008.²⁸ It resulted in the failure of most rainfed

²⁸ Drought followed severe cold and heavy snow in the west and northwest of the country that resulted in

crops (mainly wheat) in this area, and poor pastures at a time when many females were suckling young. As a result, some herders and farmers started selling animals as early as March 2008. Monitoring in Mazar-i-Sharif by DCA (Figure 7) confirmed anecdotal reports that prices, especially for bulls, were depressed due to emergency sales. It was unclear to what extent red meat prices decreased as well. A pilot study was therefore conducted to examine the effect of drought on prices by interviewing owners, traders and butchers in Puli-Khumri (in Baghlan Province) and Kabul Company Market in June 2008.

The 12 livestock owners interviewed had walked their animals for about four hours to get to market at Puli-Khumri, which is located in the southern part of the area affected by drought. They said their herd had still not recovered from the last drought, which they said lasted from 1996-2000.²⁹ Instead of selling animals at the start of the drought in March 2008 the same 12 owners had deferred selling them until late April or early May, hoping that there would be late rains. In normal years they would sell animals in June since they gained weight on summer pastures in the foothills. By mid-June 2008 owners had already sold about half of their herd. The small ruminants remaining represented about half of the 11 to 12 head that farmers felt they needed to own per family member to sustain a minimum livelihood for their family.³⁰ Owners estimated that cattle, sheep and goats would currently sell for 18,500, 3,688 and 1,588 Afs per head respectively, down 42, 40 and 50 percent from prices in June 2007. With the price of a 50 kg bag of wheat flour increasing from about 690 to 1,883 Afs over the previous 12 months, selling a goat or a sheep would only enable the seller to purchase one to two bags of flour in June 2008. This compares well with the values shown in Figure 8.

Interviews with three livestock traders in Puli-Khumri market in June 2008 confirmed that prices were depressed since more livestock were being marketed than in June 2007 when grazing was good. Significantly, these buyers were purchasing thin sheep for export to Peshawar (in Pakistan), where prices were high enough to cover the considerable transport and informal costs such as bribes, and still leave a profit margin. This export trade was a consequence of the drought, which reversed the more usual import of animals from Pakistan. Traders reported good margins of 1,500-2,000, 500-1,000 and 300-500 Afs per head, respectively, for cattle, sheep and goats sold in Kabul, and said these margins were higher than in 2007. The higher margins during drought suggest that traders were buying at a significantly lower price but selling the animals at only a marginally reduced price.

Although red meat prices for 2007 were not available for Puli-Khumri city for comparison, the six butchers interviewed there reported that, due to drought, red meat prices in June 2008 were lower than a year before. In June 2008 they priced beef at 140-150 Afs per kg and mutton (with bone) at 150-160 Afs per kg, whereas the three butchers and three traders interviewed in the Company Market in Kabul reported beef prices of 160-170 Afs per kg and mutton and goat meat prices of 180-200 Afs per kg. For Kabul these beef prices were the same, but for mutton they were somewhat lower than those shown in Table 5, which are from a different sample of butchers.

high mortality in small ruminants, mainly due to starvation. A similar episode in winter 2003/04 contributed to the high kid and lamb mortality that year (see Figure A1b).

29 It is generally reported that drought took place from early 1999 to late 2002.

30 The livestock owners were not asked about the contribution of crops, vegetables, fruits, wage labour and remittances to their livelihoods. Therefore, the range of 11-12 head per family member would not necessarily apply in a mixed farming system. The values are shown because they agree quite well with values for Kuchi. F. de Weijer, *National Multi-sectoral Assessment on Kuchi*. Kabul: Ministry of Rural Rehabilitation and Development/World Food Programme, 2005.; E.F. Thomson, "Livestock Production and Health."

The same butchers and traders in the Company Market also reported that meat prices in June 2008 were lower than a year before. This is contrary to the findings shown in Table 5, which suggest that beef and mutton retail prices in Kabul have increased by ten to 15 percent over the last year. This increase, if real, may be evidence that supplies of better finished animals are barely sufficient to satisfy the firm demand for red meat from the largest concentration of wealthier consumers in Afghanistan. It may also be evidence that butchers and traders interviewed in the Company Market wished to convey that prices had decreased when this was not the case. The cattle and buffalo imported to Kabul certainly make a significant contribution to stabilising red meat prices, as does imported frozen chicken.

With such a small sample it would be unwise to conclude that butchers in Kabul have increased their margins as the result of drought. However, those traders in Puli-Khumri market who buy thin sheep and transport them to Pakistan may be increasing their margins at the expense of livestock owners, who have little choice but to sell their animals because of the drought. Indeed, three out of the four livestock owners selling sheep said they would accept a low price rather than take their animals away from the market and bring them back to sell on another day.

The outcome of this pilot study is the hypothesis that during drought in Afghanistan, the reductions in producer prices are not passed on to consumers of red meat, in other words, that during drought producer prices decrease disproportionately compared to retail prices for red meat, which remain fairly stable. This hypothesis needs to be tested in different cities since the outcomes may be different according to the circumstances in each market. Follow-up studies are also needed to get a better understanding of the reported export of thin sheep during drought to Pakistan, and whether after fattening and finishing they are reimported to Afghanistan.³¹

2.9 Changes in red meat prices since 2007

Prices of red meat were compared in four markets for 2007 and 2008.³² The ranking of prices generally confirmed that found in other studies, with mutton being the most expensive meat except in Herat, where beef was more expensive (Table 5).³³ The high price of fat from the fat-tailed sheep in Kunduz is difficult to explain other than by consumers' particular liking for fat from the Turki breed, common in northeastern Afghanistan. Prices of mutton and beef were consistently higher in 2008 than in 2007, although 2007 prices should be viewed with caution since they are based on butchers' recollections of prices 12 months previously.

The prices in Table 5 are not always consistent with those reported for April 2007 by Thomson.³⁴ In that study mutton prices were higher (200-240 Afs per kg), and beef prices

31 In 2007 this author met Afghan traders in the Company market who were based near Peshawar and were selling cull Merino-type ewes bought in the northern areas of Pakistan. This is quite possible since there are thousands of Rambouillet sheep (a close relative of the Merino) in these areas as a result of an introduction scheme going back to the late 1950s.

32 Most of the differences in meat prices between the four markets and between 2007 and 2008 are statistically highly significant ($P < 0.001$). This is mainly because price variations within cities are small and often the same for several butchers. In Jalalabad meat prices are set by the municipality and therefore not included in the analysis of variance. Prices are also set in Kunduz, but butchers ignore them (Thomson, "Livestock Marketing").

33 Mutton is the term used in Afghanistan and Pakistan for meat from sheep of different ages, whereas in most developed countries the term lamb has long been used for meat from young sheep.

34 Thomson, "Marketing of Livestock."

were similar to those found during the interviews in 2008. This could be due to errors in the recollection of prices by butchers visited in April 2008 and to the “foreigner” effect, which could have inflated prices quoted by traders and butchers the author visited in April 2007.

Table 5. Prices of red meat in four cities in 2007 and 2008

	Mean (4 cities)	Herat (n=8)	Jalalabad ¹ (n=8)	Kabul (n=8)	Kunduz (n=8)	EMS ² (3 cities)
2008 prices (Afs/kg):						
<i>Beef (no bone)</i>	167	198	138	166	166	79.6
<i>Buffalo (no bone)</i>	153	176	120	163	-. ³	40.1
<i>Mutton (with bone)</i>	198	190	193	216	193	82.7
<i>Goat (with bone)</i>	192	188	193	215	171	87.5
<i>Fat from fat tail</i>	190	143	195	175	247	128.4
2007 prices (Afs/kg):						
<i>Beef (no bone)</i>	150	164	125	164	149	107.7
<i>Mutton (with bone)</i>	173	178	185	161	166	96.4

¹Prices for Jalalabad are not included in the statistical analysis since they are decided by the municipality.

²Error mean square; can be used to compare price differences between cities.

³No buffalo meat was sold in Kunduz.

It is difficult to compare the prices reported above with those reported each month by the Food, Agriculture and Animal Husbandry Information Management Unit (FAAHM),³⁵ mainly because the methods used were not the same and FAAHM collects prices from more markets. However, there is some agreement between the two data sets, with red meat prices monitored by FAAHM showing increases until March 2008 and then decreasing.³⁶

These inconsistencies across years and different types of meats highlight the difficulties of collecting prices of edible livestock commodities and using them to inform and interpret policy. Certainly prices collected over several years are useful for showing trends. However, the FAAHM and WFP/VAM price patterns are noticeably “flatter,” that is, they show smaller month-to-month price changes, rather than the “jagged” price variations seen in the WOL Project and DCA price sets. It is unclear which of these two data sets comes closest to the real situation. Differences in results could be partly related to differences in the dedication of price collectors, who often find their task rather monotonous.

³⁵ Food, Agriculture and Animal Husbandry Information Management Unit, *Agriculture Commodity Price Bulletin, Volume 5, Year 4* (Kabul: General Department of Policy and Planning, Marketing, Economics and Statistics Division, Ministry of Agriculture, Irrigation and Livestock, 2008).

³⁶ FAAHM data show mutton prices peaking at 194 Afs per kg in March 2008 before falling to 161 Afs per kg in April 2008, similar to the April 2007 price (164 Afs per kg). Similarly, beef prices peaked at 140 Afs per kg in March 2008 and in April 2008 were 138 Afs per kg, compared to 130 Afs per kg in April 2007.

3. Research and Development Issues

Section 2 presented findings from the livestock fieldwork of the WOL Project. It serves as a basis for discussion of the research and development issues presented in the coming section. The aim is to contribute ideas rather than present an exhaustive list, for consideration when revising the MAIL Master Plan.

3.1 On-herd versus on-station research

A thorough understanding of the livestock subsector is needed to prepare an effective rural development strategy. Moreover, the MAIL has limited research capacity. With donor support, considerable efforts are being made to strengthen it through projects such as the Horticulture and Livestock Project (HLP), the Accelerated Sustainable Agriculture Program (ASAP), the Animal Health Development Programme (AHDP) and French Cooperation (Annex 2). However, due to a shortage of government funds it is unlikely that the MAIL will have the resources in the medium term to establish a comprehensive agricultural research system like those found elsewhere in the Central Asia region. Rebuilding and sustaining this system in Afghanistan is likely to depend on external funding for many years to come.

In fact, an extensive national network of research stations and laboratories is unnecessary to investigate many research topics on livestock. The alternative is to conduct applied and participatory research at the farm or herd level supported by agencies that provide analytical services.³⁷ This would require some modifications to the Farmer Field Schools (FFS) and Participatory Technology Development (PTD) approaches being applied by Agha Khan Foundation (AKF) and Oxfam. Applying on-herd approaches gives the practices under test a better prospect of being adopted, since farmers and herders participate in identifying problems, implementing solutions and evaluating results rather than being prescribed which practices to apply. Despite the difficulties encountered in the pilot studies presented in Section 2, most of which were solved, the detailed herd monitoring studies conducted by the WOL Project and NGOs such as MADERA show that herd-level research and monitoring are possible and yield valuable insights.

3.2 Imported breeds

Importing exotic breeds to improve livestock productivity remains a highly debated issue worldwide, and Afghanistan is no exception. Indeed, they have been imported and successfully used in many developing countries. Proponents of this approach argue that it is the fastest way to upgrade local breeds. But the high cost of importing and keeping elite breeding stock is one problem facing such an approach. The animals require good management, particularly when kept in climatic conditions to which they are poorly adapted, and face diseases to which they have limited resistance. Moreover, fresh imports are needed periodically to maintain genetic merit in the breeding stock. A privatized AI service may seem to be a cost effective alternative to importing elite bulls but it too is a technology associated with many problems, such as achieving high conception rates at first insemination at a price that farmers can afford.

³⁷ Examples are animal health laboratories and analysis of feedstuffs and edible and nonedible livestock products, which could all be contracted to the private sector.

Cattle breeding

Opponents of exotic cattle importation argue that Afghanistan has several excellent breeds, such as the Kunari and Kandahari, that are adapted to many parts of the country, and that these could be used to improve herd performance. Mean milk yields of these breeds are quite good under the prevailing conditions, and there is likely to be considerable genetic variability in the populations which is the basis for selection programmes. The problem with upgrading local breeds is the difficulty of funding a long-term programme to identify and progeny-test good breeding stock in large enough numbers to have a widespread impact. Securing long-term external funding to establish and sustain several government-run breeding farms to conserve Afghan animal genetic resources seems unlikely when the MAIL has more pressing research priorities such as selecting and releasing better wheat varieties. Alternatively, a consortium of entrepreneurs could finance breeding farms by charging fees for AI and other services.

Importing exotic cattle of a number of breeds therefore seems to be the only option at the moment with the caveat that the animals and the AI service are well managed. Several projects, among them AKF and French Cooperation, plan to or already import cows and bulls of several dairy and dual-purpose breeds to provide both natural mating and AI, or they import frozen semen.

Sheep breeding

Afghanistan has several sheep breeds producing coarse wool that is hardwearing and therefore suitable for use in traditional hand-knotted carpets. The meat-type breeds, such as the Turki, produce lambs that initially grow well and provide a succulent meat that is said to be favoured by Afghan consumers. Some would argue that leaner, faster-growing breeds should be imported to replace the local fat-tailed breeds.³⁸ Such proposals to import mutton-type sheep are ill conceived, however, since the exotics are likely to be poorly adapted to local conditions. Moreover, to make an impact over a wide area by distributing large numbers of elite rams would require a huge, costly and sustained programme that is difficult to justify and unlikely to be supported by donors long enough to be effective.

Goat breeding

AKF assessed the quality of cashmere from goats in northeast Afghanistan and identified individual animals that produced excellent quality fibre. It has also trained women to comb, sort and market the fibre. The excellent quality of cashmere from goats in the central and eastern areas of Afghanistan was confirmed in another study.³⁹ A recent nationwide study by ASAP confirmed that many of the *watani* goats produce good-quality fibre, and the project is now implementing a training and extension programme for goat owners.⁴⁰ Despite the presence of goats with excellent cashmere quality that could establish nucleus herds of improved local genotypes, the HLP is importing goats from Mongolia with high fibre quality and establishing a breeding unit for them on a

38 Government of Afghanistan, *Afghanistan National Development Strategy 1387-1391 (2008-2013): A Strategy for Security, Governance, Economic Growth and Poverty Reduction* (Kabul: Islamic Republic of Afghanistan, 2008), 90.

39 K. Kerven and The Fibre Lab, *Cashmere in Afghanistan: Quality Assessment, Comparative Advantage and Development Options* (London: GRM International, 2006). Of the 622 samples collected in that study, 84 percent had a fibre diameter less than 16.5 µm, which is considered to be in the fine to very fine range.

40 F. de Weijer, "Cashmere Value Chains Analysis", *Accelerated Sustainable Agriculture Program* (Kabul: Chemonics International, 2007).

government farm.

The issue of upgrading of goats for milk production is different, since breeds from Pakistan are already being imported into Nangarhar Province because farmers know they yield more milk than *watani* goats. The Beetal goat, a native of the Punjab area of Pakistan, has a high milk yield and could also be imported, since it is likely to be well adapted to lowland areas in Nangarhar Province.⁴¹ It needs to be confirmed that these breeds would thrive in the other lowland areas of Afghanistan.

3.3 Breed characterisation

Breed characterisation gathers key information about the genetic traits and phenotypes of different breeds and their population sizes, distributions and changes over time.⁴² Afghan livestock breeds were not included in this review, but such information can be found elsewhere.⁴³ However, it is not known how and by whom the measurements were made in these studies, since the sources of the information are usually not given. In any case, the work needs to be updated and the many gaps filled. Some topics on breed characterisation that deserve attention are presented in the following paragraphs.

Milk yield response to better feeding

There is likely to be considerable genetic variability in the cattle population. For example, the monitoring of milk yields by the WOL Project showed considerable differences in peak daily milk yield of *watani* cows (3-4 kg), to 10-15 kg a day in cows that probably carried an unknown proportion of exotic genes. Lactation yields of does appear to range from 200 to 300 kg. More extensive on-herd monitoring of milk yields of both traditionally managed and well-managed cows, does and ewes than was possible by the WOL Project would confirm peak lactation yields and yields net of the amount suckled by offspring. Well-managed animals would be provided with a health package and, in cases where females were pregnant and lactating in late winter and spring, supplements to balance the diet. The results would help determine in which production systems economic improvements in milk yield could be achieved using better nutrition and health inputs alone and in which systems better genetics is needed as well.

The positive relationship between the level of feeding of young stock and their mature body size and potential milk yield is well known. However, in traditional rearing systems young stock, particularly calves, are usually undernourished during the preruminant phase of development, since the family's demand for milk takes priority. Even when rumen function is fully established, imbalanced feeding and undernutrition often continue, especially during the winter months, when highly fibrous diets that are deficient in protein and minerals are offered. Undernutrition often leaves calves permanently stunted, a common sight in Afghanistan. Poor nutrition during lactation results in the small local cows yielding well below their genetic potential. On the other hand, the cow might be quite a large, crossbred animal that is also yielding well below its potential. This would result in its maintenance needs for nutrients, that is the nutrients needed for its essential bodily functions, accounting for a large part of the total nutrients consumed.

41 Hasnain, *Sheep and Goats in Pakistan*.

42 L. Iniguez, *Characterisation of Small Ruminant Breeds in West Asia and North Africa, Volumes I and II* (Aleppo, Syria: International Center for Agricultural Research in the Dry Areas, 2005).

43 B.C. Yalçin, *The Sheep Breeds of Afghanistan, Iran and Turkey* (Rome: Food and Agriculture Organization of the United Nations, 1979); Food and Agriculture Organization of the United Nations, "Domestic Animal Diversity Information System" (Food and Agriculture Organization of the United Nations, 2008, <http://dad.fao.org>).



A woman milking her watani cow

On-farm feeding trials are needed to show the benefits of adequate and balanced diets, through pregnancy to maturity across a range of breeds, on the milk yields of heifers and the growth rates of bull calves. Such trials should be an integral part of breed improvement programmes to ensure that the full genetic potential of the cattle is expressed. The information gathered would be used to test the hypothesis that, in terms of lifetime productivity, a smaller, well-nourished *watani* cow can produce as much milk and calves per unit of feed as a larger crossbred cow.⁴⁴

Milk yields and ambient temperature

Feed intake and therefore milk yield in dairy cows tends to decrease when shade temperatures increase above 30°C. These are common in summer in many parts of Afghanistan, when most cows are in mid-lactation. The effect of ambient temperatures on the relationship between feed intake and milk yield is likely to differ somewhat for *watani*, crossbred and purebred cows, due to the higher milk yields of cows with a significant percentage of exotic blood. On-herd monitoring is needed to quantify whether the milk yield of crossbreds with over 50 percent exotic blood is more limited by high ambient temperature than that of *watani* cows. On-herd monitoring during the WOL Project indicated that such monitoring is quite possible.

Goats instead of cows?

Daily peak milk yields in cows of 3-4 kg net of the amount suckled were measured during the WOL Project's pilot studies. The question therefore arises whether to replace a low-yielding *watani* cow with two or three improved dairy goats, each yielding two to three litres a day at peak lactation. Answering the question is not a simple matter. Would the amount of feed given to one cow sustain the milk production of two or three dairy goats?

⁴⁴ Crossbreds are not necessarily half *watani* and half exotics but various combinations of the two. However, a large framed crossbred cow would tend to contain a high proportion of exotic blood.

Here it is assumed the cow and goats would be handfed in a yard or tethered in a field to graze alfalfa or clover. Would the management of the goats allow them to kid twice a year and thereby yield as much milk as a cow in 300 days? Would goats be more prolific? Would the male kids sold earn as much as a bull calf sold once every three years? Do productive goats require higher health care inputs than *watani* cows? Replacing low-yielding cows with dairy goats beyond the periurban areas certainly deserves further consideration, especially in places where high-yielding goats are already found, such as parts of Nangarhar Province.

Lamb growth rates

Monitoring the growth rate of a larger sample of lambs is necessary to confirm the preliminary findings from the pilot studies reported above (Section 2.5). These studies should be linked to assessments of milk yields to test the hypothesis that the growth rate of lambs is limited by the milk yield of ewes. The outcome of the tests is likely to vary depending on the production system and breed being considered. If the hypothesis is correct, a large sample of ewes in several flocks could be screened to determine the variability in milk yield. This would provide the basis for a selection programme. In the North, where male Karakul lambs are slaughtered for their pelts, the milk yield of their dams could be screened on one or two occasions during early lactation. The milk yields of dams of male lambs that were sold when one to two months old could also be screened.

Fertility potential of ewes and does

Even though prolificacy is often low, low fertility is seldom a characteristic of the region's livestock breeds.⁴⁵ It is more the consequence of poor nutrition and disease. Detailed on-herd studies with tagged animals, such as those being conducted by MADERA in eastern Afghanistan, can establish baseline fertility levels in relation to body condition of cows and ewes. Follow-up studies could determine how fertility responds to better body condition achieved through supplementary feeding starting two months before the entry of males.

3.4 Increasing feed production

Most experts agree that the full benefits of animal health interventions and genetic improvement are only realised in well-nourished animals. Better nutrition of healthy local breeds fed with balanced diets based on locally available ingredients is often the most suitable approach to increase herd income. Many development projects include animal health and genetic improvement activities but give too little attention to nutrition. One reason relates to livestock owners' perceptions of the benefits of better health, genetics and nutrition. They are well aware that treatment, vaccination and better males are desirable, even if they are not always willing to pay for the services.

Owners are also aware of the value of better feeding. But unlike vaccination, medication or AI, it has to be sustained daily over a long period to be beneficial, and the cost of either growing or purchasing the feed can be prohibitive. For these reasons less attention is often given to good feeding. Moreover, there is a high opportunity cost to using scarce land, labour and water resources to grow feed crops rather than staples or cash crops.

⁴⁵ Fertility is defined as the percentage of females exposed to males that bear offspring in a 12-month period. Prolificacy, defined as the number of offspring born at one parturition, would need to be determined, especially in goats, since it too responds to better feeding.



Chopped straw being loaded on a truck

It varies depending on each farmer's resource endowment and desire to achieve food security and the prevailing prices of inputs and outputs. The large changes in prices of cereal staples in 2008 demonstrate how dynamic the situation is. Global price variability increases the risks involved in constructing feed mills since, though a simple technical option, they are often heavily dependent on imported feeds. They do, however, have a place in areas with semi-intensive market-oriented production systems.

Promoting home-grown feed production is a complex task that warrants research at both the farm and the research station level. Many projects included the testing of better varieties of forage crops already grown by farmers and of novel crops such as soya beans, oats and forage sorghum (unpublished FAO reports).⁴⁶ The challenge is to understand farmers' attitudes towards the cultivation of these crops and whether they derive a high enough economic return from them, and to ensure that good-quality seed is readily available rather than merely identifying better varieties.

At the national level, rangelands supply five to 90 percent of herds' annual nutrient needs,⁴⁷ although the amount may be decreasing as rangelands gradually degrade.⁴⁸

⁴⁶ Thieme, "Livestock Development for Food Security", (Food and Agriculture Organization of the United Nations, unpublished data). This author of the paper you are reading cautions against the introduction of annual and perennial grasses (such as rye grasses, *Lolium spp.*), since they could become a serious weed affecting wheat crops. They also need nitrogenous fertiliser to yield well, which leguminous crops do not.

⁴⁷ Roe, *Natural Resources Management, Farming Systems and Rural Livelihoods*.

⁴⁸ This wide range covers, at the one end, cows that seldom graze outside villages apart from roadsides and canal banks, and on the other end Kuchi herds that depend totally on grazing except for short periods in winter when straw and some supplements are fed. It is better to use this range than to give a mean value for the contribution of rangelands, which would be difficult, if not impossible, to quantify over a large area. O. Thieme, *Afghanistan: Promotion of Agricultural Rehabilitation and Development Programmes: Livestock Production, Project TCP/AFG/4552* (Rome: Food and Agriculture Organization of the United

Increasing the contribution of rangelands to the annual nutrition of livestock is technically possible, provided that conflicts over access are resolved. Extending better rangeland management practices to a significant part of the national area would take decades, and it is arguably not likely to happen in any case. However, pilot studies should be continued to show that the social issues can be resolved and range productivity can be improved.⁴⁹

This author estimates that crop residues, mainly wheat straw, provide between five and 90 percent of herds' nutrients in winter, a range that reflects the wide spectrum of production systems found in Afghanistan. The treatment of wheat straw with a solution of urea, which is being tested by AKF and DACAAR, is one approach to enhancing the straw intake of ruminants. Despite its controversial history, the technology deserves wider testing, since wheat straw is the most abundant feed in the country after range vegetation. As urea fertiliser is being produced in Afghanistan, using it as an indirect nitrogen source for ruminants reduces the need to import protein feeds.⁵⁰ Urea is also used to enhance the nitrogen content in the feed blocks that were used as an incentive in the milk monitoring studies of the WOL Project (Section 2.3).

Agricultural statistics suggest that there are about 10 million ha of potentially cultivable land in Afghanistan. Of that, 2.5 to 3.5 million ha are cropped each year whereas the rest is left fallow for various reasons, including a shortage of water or damaged irrigation infrastructure. Disputes over access to land and shortages of labour, oxen and farm machinery are also constraints. In any case, since food security is such a high priority,⁵¹ rehabilitated areas are likely to be used primarily to cultivate irrigated staple and cash crops.

Increased cultivation of forage crops on rainfed land may therefore be an option. However, if droughts in Afghanistan start to be more frequent and severe than in the past then it may be too risky to envisage using more of the 1.5 million ha of rainfed land to produce the additional feed.⁵² Indeed, only a part of this area where the risk of crop failure is low could be used for this purpose. This area could grow crops that produce the protein and energy needed to balance crop residues, in particular wheat straw, which is the only feed resource that is becoming more available as yields of irrigated cereal crops gradually improve.⁵³

At the national level, therefore, at least three research issues deserve attention:

1. Define the area of rainfed land where the risk of crop failure is not more frequent than one year in three.
2. Assess whether the additional feed produced on these rainfed lands would make a

Nations, 1996);

49 Efforts to define boundaries of grazing areas and resolve conflicts over access to pastures, which are prerequisites to applying technical solutions that increase productivity of range vegetation across large areas, are underway in Afghanistan by agencies such as FAO, PEACE, and UNDP. Extending improved range management to large areas depends on generous and sustained donor support, which seems doubtful.

50 The urea production facility in Balkh Province, which was damaged during the fighting in the 1980s and 1990s, has been modernized and is producing again.

51 Government of Afghanistan, *Afghanistan National Development Strategy 1387-1391 (2008-2013)*

52 *Afghanistan Statistical Yearbook 2007/08 [1386]* (Kabul: Central Statistical Office, 2008). The severe drought that affected central northern Afghanistan during the critical spring and early summer period of 2008 is reported to have all but destroyed the rainfed wheat crop, which contributes up to a third of the total wheat production of the country.

53 The record wheat crop of 5.5 million MT harvested in 2005 would have yielded possibly 15 million MT of straw. This is double the amount harvested in 2002 when yields were low.

significant contribution to the feed deficit in these areas.

3. Since it is known that the yield of existing forage crops can be increased, use the PTD approach to identify constraints and implement solutions that result in both larger areas of forage crops and better yields.

3.5 Strategic use of anthelmintics

Since most livestock are infected with several species of internal parasites, anthelmintics are widely used in preventive health care programmes.⁵⁴ However, no studies conducted in Afghanistan that are known to this author show the prevalence of infection and the faecal egg and larval counts of parasitic worms in livestock. Indeed, the widespread and indiscriminate use of anthelmintics increases the risk that resistant forms of the parasites will appear. Moreover, although poor body condition in animals is often ascribed to parasitic infections, the real problem is undernutrition, starting during pregnancy and continuing through the phase of skeletal growth, which leaves animals looking stunted and emaciated. Such animals are less resistant to parasites. A monitoring study would quantify the parasitic loads in samples of untreated livestock in different parts of the country in different seasons to establish baseline values, which are needed when defining optimal treatment programmes.⁵⁵ A parallel study would define parasite loads each month in treated livestock.

3.6 Herd productivity and rural livelihoods

The difficulties of evaluating the impact of higher herd productivity on rural livelihoods are well known; some of them are summarised here. First, projects often last just three or four years (and sometimes less), too short a time to measure impact. It takes only a few weeks to show the impact of vaccinating chicks for Newcastle disease and just a few months to conduct a lamb fattening trial. However, several years are needed to show the impact on household income of a higher yielding cow, since at least four years pass from the time a cow is inseminated to the time her calf completes its first lactation. Second, when impact takes more than one year to become apparent, measuring it is complicated by the fact that climatic variability, changes in prices of inputs and outputs, and closing of borders can also affect income and costs. Third, the cost of an effective evaluation programme is high, and even though most projects include monitoring and evaluation activities, these are often not given the attention they deserve.

Monitoring and evaluating impact is arguably the most important component of a project, and for this reason it should be given higher priority. Particularly important are the indicators used to measure impact. Many projects define impact in terms of easily measured indicators such as the number of animals vaccinated, cows inseminated, women trained, seed produced or demonstration plots established. These indicators have limited value, since they monitor what has been implemented rather than evaluate whether the interventions have resulted in measurable changes to rural livelihoods. More useful in this respect, though more costly and complex to measure, are impact indicators such as the following:

⁵⁴ A second reason for the widespread use of anthelmintics is that livestock owners are often more willing to pay for drugs for a sick animal than for vaccination of an animal that shows no symptoms, and they may seek advice from unscrupulous pharmacists. Since many brands of anthelmintics have inferior quality, livestock owners often pay for an ineffective medication. Staff running VFUs are also known to prescribe anthelmintics more often than may be necessary since this increases their earnings.

⁵⁵ As it is now difficult to find untreated flocks in Afghanistan, a placebo instead of an anthelmintic could be used.

1. Reductions in mortality due to animal health interventions
2. Improvements in fertility due to better nutrition
3. Proportion of livestock owners who change their management practices as a result of a training course
4. Reductions in tick infections in livestock overwintered in improved sheds
5. Sustained ownership of livestock by widows involved in restocking schemes
6. Changes in the volume of sales of small and medium enterprises
7. Changes in livelihoods, such as higher disposable incomes, resulting from higher sales of livestock and livestock products
8. Wider diversity in household diets
9. Changes in land allocated to different crops in alternative livelihoods projects

A rigorous evaluation of a project's impact is obtained from an independent audit carried out two and five years after a project has ended. However, no examples of ex post audits are known about in Afghanistan. Donors should give this serious consideration at a time when aid effectiveness is being increasingly questioned.

3.7 Promoting a market information service

A number of studies have provided a general understanding of livestock markets and marketing in Afghanistan.⁵⁶ However, some gaps remain, such as the extent to which traders use mobile phones to take decisions about where and when to buy and sell livestock of different categories and grades. Differences in livestock prices between markets, though often quite small, are undoubtedly taken into account when traders take decisions about where to sell animals. What is still unclear is whether producers could increase their earnings from livestock sales if they were better informed about prices in local and more distant markets. To some extent this depends on the slope of marketing cost functions, a topic that deserves more research (see Section 3.8).

It is also not known to what extent producers could exploit market opportunities even if they identified them. For example, the additional cost of transport might remove the benefits of selling in a distant market where prices are higher, but where producers could also face additional risks in a marketplace controlled by local intermediaries (Box 1).

As part of efforts to increase prices received by producers, the PEACE project plans to test the use of Short Messaging Service (SMS) to inform producers about prices in local and more distant markets. Market prices would be collected in major markets each week and fed into a database that sellers could access by mobile phone to enable them to take decisions about where and when to sell. This approach has been applied in Kenya.⁵⁷

56 M.Y. Hakimi, *The Nature of Livestock Marketing and Meat Consumption per Capita in Afghanistan* (Kabul: United States Agency for International Development, 1978); Thomson et al., "Production and Marketing"; Pittroff, *Analysis of Red Meat Production Potential*; Landell Mills, *Preparing the Commercial Agriculture Development Project: Phase 2 Report*; Landell Mills, "Preparing the Commercial Agriculture Development Project: Draft Final Report"; Thomson, "Marketing of Livestock."

57 J. Stuth, A. Jama, R. Kaitho, J. Wu, A. Ali, G. Kariuki and M. Kingamkono, "Livestock Market Information Systems in East Africa: The Case of LINKS/GL-CRSP," in *Pastoral Livestock Marketing in Eastern Africa: Research and Policy Challenges*, ed. J.G. McPeak and P.L. Little, 203-226 (Rugby, UK: Intermediate Technology Group, 2006).

Box 1. Advantages and risks of entrepreneurship

“A farmer in Kunduz Province demonstrated his awareness of prices in different parts of eastern Afghanistan. In 2004 he hired two trucks and transported about 40 sheep several hundred kilometres to Kabul. The better prices there gave him a higher profit than selling in the local market, even after paying the transport costs. However, the buyer in Kabul defaulted on the 80,000 Afs debt that he owed the farmer who was unable to recover it, even though he took the trader to court. He said the court was biased in favour of the trader.”

Source: Thomson et al., 2005. page 16.

The spread of the mobile phone network in Afghanistan increases the justification for introducing a livestock market information service. However, for such a service to be effective, certain questions need to be answered. Would the database be managed by MAIL or by a private service provider financed by a small levy on each animal sold? Would traders use the service or continue to rely on their own network of contacts? Given the difficulties with collecting prices highlighted earlier (Section 2.6), would the database contain accurate information less than a week old? Since the bargaining power of producers is often limited, especially if they have to sell because they urgently need the cash, how often would they refuse to sell when they knew a trader's offer was too low?

The MAIL needs to define a number of livestock grades that would be displayed in livestock markets. These grades, live weights of animals and information about current prices in major terminal markets would be the basis for determining producer prices. An immediate step in this direction would be to place scales in a number of terminal markets to add some objectivity to the derivation of prices. It is likely that scales would be popular with producers and butchers but less so with traders and market intermediaries.

3.8 Quantifying margins along value chains

Previous rapid appraisals on livestock marketing in Afghanistan left several gaps in the knowledge about the topic. One gap concerns the notion that producer prices are an unreasonably low proportion of retail prices.

The cost function along a marketing chain is a useful indicator when examining producer prices as a proportion of retail prices.⁵⁸ A gradual slope suggests an efficient marketing chain and a steep slope an inefficient chain with high transaction and informal costs. The latter is not always the case; the slope might be steep merely because the animals travelled a long distance and transport costs were high. Such is the case of buffaloes transported about 750 km from Quetta (in the Pakistani province of Baluchistan), where the purchase price is low, to Herat, where the sales price is high.⁵⁹

The slope of these cost functions along different value chains in Afghanistan is not known. For example, is a farmer selling a two-year-old bull in a district market in Takhar Province receiving an unreasonably small proportion of the retail value that bull will have when it is sold by a butcher in Kabul after it passes through secondary markets in Taloqan and Kunduz? Given the distance that the bull travelled, it would not be surprising if the cost function were steep. Some prices collected by Planning and Development Collaborative International (PADCO) confirm that prices of cattle in the northeast of Afghanistan are

58 Thomson et al., “Production and Marketing”.

59 Thomson, “Marketing of Livestock.”

much lower than in Kabul. Although this difference in prices could be partly due to differences in size, live animal prices are expected to be highest in Kabul resulting in steeper cost functions for animals that come from far away. Indeed, the prices collected by PADCO were highest in Kabul for rams, and to a lesser extent for bucks, but not for bulls, probably because there was more competition from imported cattle. Lack of competition from imported animals may also explain why prices of bulls were sometimes higher in Herat market (Figure 6).

The still incomplete picture presented in the last two paragraphs suggests that cost differences between farmers and butchers are not necessarily unreasonably high after adjusting for the distance travelled and for competition effects. Farmers are not necessarily being exploited by middlemen. However, detailed monitoring studies are needed to reveal the true situation. This would involve tracking animals from producer to butcher and recording the transaction costs and profit margins at each step along the chain.

Also missing are statistics about the volume of livestock moving through the main secondary and terminal markets. Such information is needed to assess whether Afghan livestock are starting to replace imported meat, and how their contribution to agricultural GDP compares to that of dried fruits, nuts, pelts and carpets. The information would also help derive estimates of red meat consumption and the income and price elasticity of different types of meat.

3.9 Establishing long-term monitoring sites

As discussed in Section 3.5, indicators of impact, such as the number of farmers trained or the numbers of animals vaccinated, have limited value. This is because it is not known to what extent farmers changed their practices and whether a project's activities actually improved livestock health and the livelihoods of the target beneficiaries. Moreover, few projects continue for more than four years, which is too short a time to show impact on livestock productivity and livelihoods, particularly if a shock such as drought occurs during the project. To address such limitations, long-term monitoring sites need to be established representing distinctive production systems in Afghanistan. They could be clusters of villages, such as those established by the WOL Project, and could be visited once every three years to collect information on changes in the livelihoods of the families over time. One such indicator might be higher farm income from more intensive livestock production, which employs more family members and reduces the number of off-farm wage seekers. Testing technical interventions that are important drivers of change could be integrated into these longitudinal studies. The information generated could be used in participatory decision-support tools (see Section 3.10), both to continuously monitor the impact of the interventions tested and to design modifications. In opium poppy growing areas, the long-term monitoring studies would generate data to assess whether any of the modified production systems actually reduced farmers' economic dependency on poppy cultivation.

3.10 Participatory decision-support tools

Technical solutions to constraints that limit livestock productivity are often known, having been tested many times in other countries. However, the adoption rates of these technical solutions are often low or short-term, lasting scarcely beyond the duration of the project. Usually this occurs because farmers' attitudes are poorly understood, and not enough importance is given to why farmers decide to allocate their land, water and

labour resources in a particular way. An example discussed in Section 3.4 is the need to encourage farmers to use a greater proportion of their land to grow forage crops to feed their animals better and make them more productive. The likely effects on outputs and income of changing a farm's allocation of land, water and labour resources to different crops can be estimated using simple participatory decision-support tools.

Decision-support tools use farm enterprise budgets to estimate margins for different crops and livestock. They require input and output costs provided by individual farmers, each of whom has a unique combination of resources and circumstances that has to be taken into account. The margins for individual crops would provide the basis for farmers taking decisions about changes to the allocation of land to different crops. During the participatory decision-making sessions, the goals of the farming household members (both men and women) would emerge. Reasons for not changing their resource allocation could then be identified, such as lack of improved seeds, high costs of fertiliser, shortages of labour, lack of marketing opportunities, and low prices at harvest time. The same approach could be applied to livestock enterprises, such as feeding cows according to their genetic potential and calving date, and rations using locally available feeds for lamb fattening.

The FFS approach could be applied to train farmers to prepare simple enterprise budgets themselves. One farmer would be nominated as the village facilitator to help farmers prepare the budgets and to gather the reasons why each farmer allocated land to crops in a particular way. Similarly, budgets for livestock enterprises would also be collected and the information assembled in a database managed by the MAIL. The information outputs could then be used to understand farmers' behaviour regarding resource allocation and to inform government policy.

4. Key Points, Recommendations and Conclusions

The last two sections of this case study presented findings regarding livestock productivity and market prices and discussed the implications of the findings for research and development policy in Afghanistan. This section reviews some of the key findings, lists the main recommendations based on the findings, and makes some concluding remarks. It is hoped that the information and ideas presented here will contribute to the debate on the revision of the current MAIL Master Plan, which ends in 2010.

4.1 Key points

The review of livestock projects showed that many agencies have been implementing projects with a livestock component since the mid-1980s (Annexes 1 and 2). At first most of them focused on emergency relief. With time they evolved into development projects, often applying a community approach. Many of these projects continue to the present. Indeed, at the time of writing some 30 projects implemented since 2002 with a livestock component had been identified (Table A1). This does not include those with a specific focus on credit and microfinance.

Apart from a few major livestock projects implemented during the 1970s, projects primarily focused on livestock started to appear in the mid-1990s, and numbers increased considerably after 2002. They fit broadly into three categories: community-based, private-sector-oriented, and disciplinary-focused projects. The community- and private-sector-focused projects complement each other but start from opposite ends of the value chain. The former take as a starting point the enhancement of rural livelihoods, whereas the latter give priority to strengthening value chains that drive the demand for primary livestock products. This demand is a key driver in efforts to promote ownership of productive livestock, which in turn would increase returns from land, water and labour resources. Thus, even though raising livestock could potentially serve as an alternative to growing opium poppies in some locations, this remains to be shown. The third category—disciplinary focused projects—concern topics such as strengthening the animal health services and AI. The first of these topics has received a huge, arguably disproportionate, amount of support and the second topic is being promoted by several projects, sometimes in locations where it is not likely to succeed due to the remoteness and the extreme climatic conditions.

While efforts to consolidate the network of private VFUs, backed by effective policy instruments and state institutions, are important, donors should give more weight in their development strategies to improving feed production on farms in Afghanistan. Well-nourished livestock better express their genetic potential, reducing veterinary care costs as a proportion of total variable costs and making them less of a burden to owners. Section 3.4 suggests ways in which feed production might be enhanced.

Even though many projects include activities that aim to improve livestock productivity, the shortage of quantitative information makes it difficult to analyse the approaches used and the results achieved. In particular, even when there is evidence of impact, it is often reported using indicators of limited value, it is based on questionable assumptions, or both. Moreover, a shortage of trained staff, inadequate physical facilities and severe budgetary constraints continue to hinder the implementation of most components of the MAIL Master Plan. Changing livestock productivity is also a slow process, and many projects have only been running for three years. For these reasons it is difficult to quantify the impact of donor and NGO programmes and government policy since 2002.

4.2 Programmatic recommendations

The programmatic recommendations shown below address some of the issues raised previously. These recommendations and the recommendations on policy (see below) should be read in conjunction with the outcomes of the Afghan Livestock Sector Workshop held in May 2008, which was supported by the Global Livestock Collaborative Research Support Program.⁶⁰

- **Use better indicators of project impact:** More rigorous and quantitative indicators of project impact are needed, such as changes to livestock productivity (milk or eggs), income streams and farming practices.
- **Make ex post project evaluations:** Include in donors' development strategies evaluations two years after the completion of projects to assess sustainability of project impact.
- **Monitor changes in rural livelihoods:** To quantify changes in rural livelihoods in a spectrum of farming systems, establish a long-term monitoring programme in clusters of villages where practices are tested that enhance livestock productivity.
- **Enhance efficiency of livestock value chains:** Assess the opportunities to increase the returns of livestock owners by quantifying marketing costs and improving access to markets and price information.
- **Promote higher forage output on farms:** Increase the area of forage crops grown by researching the factors farmers take into account when they decide how to allocate land to staple, cash and forage crops. Include current knowledge of changing climate patterns to estimate the short- to medium-term sustainability of any recommended changes.
- **Quantify farm enterprise budgets to inform agricultural policy:** Create a database of input costs and output earnings for different farm commodities in different regions of Afghanistan, and update it twice yearly.
- **Conduct applied research at the herd level:** Conduct most livestock research on farmers' and Kuchi's herds, rather than on government or university research stations. Research should include the following topics:
 1. **Breed characterisation of cows:** Monitor the productivity (milk offtake, fertility) of local and crossbred cows under current and improved management.
 2. **Breed characterisation of sheep:** Assess the fertility, growth rate and wool quality of the major sheep breeds in herds under current and improved management before considering the need to import exotic breeds.
 3. **Importation of dairy goats:** Assess on-farm performance of adapted Pakistani dairy goats to replace small, low-producing *watani* cows.
 4. **Assessing the efficacy of anthelmintics:** To determine whether the heavy use of anthelmintics is justified, quantify the internal parasite load in livestock in different regions during different seasons.

⁶⁰ See Purdue University and the Advancing Afghan Agriculture Alliance, "Livestock Workshop Summary Report" <http://afghanlivestock.blogspot.com>, 17-19 May 2008. (accessed on 10 October 2008).

4.3 Policy recommendations

Based on the information presented above, a number of policy recommendations can be made:

1. **Promote on-herd and on-farm research:** As well as strengthening its capacity for on-station research, MAIL should implement on-herd and on-farm research on private farms to ensure that new technologies and approaches are exposed to the input of beneficiaries.
2. **Monitor market volumes:** To improve the breadth and quality of statistical information that is needed for policy planning and implementation, MAIL, with the involvement of the Ministry of Commerce, should monitor the volumes and prices of livestock and of primary and value-added livestock products traded within Afghanistan and at its borders.
3. **Better coordinate the collection of price data:** Under the leadership of MAIL, the collection of price data should be coordinated by the different NGOs and agencies using a standard methodology.
4. **Promote payment of livestock according to finish:** To ensure that producer prices reflect the quality of livestock being sold, MAIL should introduce the pricing of livestock in secondary and terminal markets according to live weight and visual readiness for slaughter.
5. **Carry out impact studies:** At a number of contrasting sites the MAIL should establish long-term monitoring studies to determine the impact of more productive livestock on household incomes.
6. **Implement a drought emergency feeding strategy:** The emergency feeding strategy to alleviate the effects of drought on livestock that is being prepared by MAIL should be completed and implemented, taking account of the feed banks concept that is being tested by AKF.
7. **Broaden livestock-related curricula:** College and university curricula for livestock production studies and veterinary science should include courses on rural development that cover social issues (livelihoods approaches, FFS) and economic issues (marketing, market-driven approaches).
8. **Promote closer ties between ministries:** To better integrate the technical, social and economic aspects of rural development, where appropriate the MAIL and the Ministry of Rehabilitation and Rural Development (MRRD) should be involved in the same development projects and in the National Risk and Vulnerability Assessment (NRVA) which was repeated in 2008.⁶¹
9. **Establish internships:** Where appropriate, short-term training of MAIL staff should be strengthened with six-month internships with NGOs and development agencies.

⁶¹ *National Risk and Vulnerability Assessment 2005*, (Kabul: Ministry of Rural Reconstruction and Development and Central Statistical Office, 2007).

4.4 Conclusions

This case study presents data that questions the emphasis given to animal health and breeding in many livestock development programmes in Afghanistan, even though animal health is one of three priority areas in the ANDS. Therefore, the next version of the MAIL Master Plan should give higher priority to feed production and utilisation and include a strategy to implement this new focus. Development programmes should also give feed production and feeding practices higher priority, as this will strengthen the contribution of livestock to rural livelihoods. This is closely linked to food security, which is one of the three priority themes of the Master Plan and ANDS itself.

The case study indicates a need for even closer integration of crops and livestock, due to the fact that higher yields of wheat will produce more straw to maintain livestock, especially during the droughts that seem to be occurring more frequently. More attention should be given to import substitution, an issue raised in the ANDS. Specifically, the upward trend in imports of milk powder, meat and eggs needs to be halted, if not reversed. This requires increased production of locally grown feeds, not reliance on imports. Overcoming the difficulties that limit the growing of these feeds is one of the greatest challenges that must be addressed.

Among the many other challenges facing the agriculture sector in Afghanistan is increasing staple, cash and forage crop output per unit of land and water. Coupled with this is the ownership of *more productive* livestock rather than simply *more* livestock. More productive land, water and livestock would increase food security, income streams and production of milk, meat and eggs, which have a high dietary value. To succeed, a strategy is needed to make efficient use of natural resources. It must be based on a thorough understanding of the decision process that farmers apply when they allocate land to different crops, and on a twice annually updated database of farm enterprise budgets. The updated Master Plan should give more attention to crop and livestock integration as a significant driver of rural development, complemented by a strong private sector.

In conclusion, a revised Master Plan should start with a critical analysis of achievements in the livestock subsector in Afghanistan over the last ten years. By responding to the lessons learnt, the revised version should increase the prospects of seeing improved rural livelihoods, lower milk, meat and eggs imports, and higher cashmere and carpet exports by 2013 at the end of the present phase of the ANDS.

Annex 1. Livestock Development Projects Before 2002

In addition to crop and fruit production, livestock production has been practiced for centuries by sedentary and transhumant families in Afghanistan. The main livestock production systems have been described in several papers.⁶² As part of the National Surveillance System (NSS) which is located in the MRRD, National Risk and Vulnerability Assessments were conducted in 2003 and 2005. The reports contain useful information about the importance of livestock in rural livelihoods, but the information needs updating.⁶³ This annex gives an overview of significant projects that included a livestock component and were implemented before 2002. Many were emergency relief projects, while others aimed to improve rural livelihoods or develop specific aspects of the livestock subsector. Khan and Iqbal⁶⁴ presented information about agencies implementing projects with a livestock component during the 1990s.

During the 1970s, particular attention was given to the Karakul herd because the pelts were a valuable export, along with dried fruits, nuts and cotton. The export value of pelts was similar to raw wool exports, but just a quarter of the value of carpet exports.⁶⁵

A major livestock project during the late 1970s was implemented by the Herat Livestock Development Corporation with funding from the World Bank (Annex 3). With a budget of US\$4 million (at 1975 prices), it had several components. One of these was to construct fattening yards and a slaughterhouse near Herat city, where sheep from the west of the country would be finished and the refrigerated carcasses exported to Iran, which at that time was importing considerable quantities of meat. Project implementation stopped when Soviet forces invaded Afghanistan in December 1979.

The people of Afghanistan, among them millions of livestock owners, suffered terrible hardship during the war with the Soviet Union between 1980 and 1988. By the end of the 1980s, however, livestock numbers appeared to have recovered, since there were no serious droughts and the low reproductive rates were still high enough to replace losses due to sales, local consumption, injuries, deaths and theft. The upheavals of the 1980s prompted many NGOs to start relief programmes, most of which included livestock components such as training, income generation from product sales, restocking, veterinary care and poultry production.⁶⁶ Many of these NGOs have continued livestock activities to the present. The Swedish Committee for Afghanistan (SCA) conducted an extensive series of surveys during 1987-89 that included estimates of the national livestock population. They compared numbers in 1979 and 1988 but, as the authors admit, “the validity of such comparisons is tenuous”.⁶⁷

Starting in 1988, the DCA launched a programme on animal health that continues to the present day. Among its most significant contributions has been the notion that

62 Thieme, *Afghanistan: Promotion of Agricultural Rehabilitation and Development Programmes*; F. de Weijer, *National Multi-sectoral Assessment on Kuchi; Afghanistan National Livestock Census 2003, Final Report (OSRO/AFG/212/IITA)* (Rome: Food and Agriculture Organization of the United Nations, 2008).

63 The NRVA field work was repeated in 2008 and the report is due in 2009.

64 Ulfat-un-Nabi Khan and M. Iqbal, *Role and the Size of the Livestock Sector in Afghanistan: Draft Report* (Islamabad: The World Bank, 1999).

65 F. Nyrop, and D.M. Seekins, eds., *Afghanistan: A Country Study* (Washington, DC: Foreign Area Studies, The American University, 1986).

66 Khan and Iqbal, *Livestock Sector in Afghanistan*, 65.

67 *The Agricultural Survey of Afghanistan—Livestock, Tenth Report* (Kabul and Peshawar: Swedish Committee for Afghanistan, 1990), 1.

paraveterinarians (paravets) and basic veterinary workers (BVW) could perform many routine animal health tasks in remote areas where veterinary doctors are less willing to live. It took a considerable effort to convince the state-run veterinary service of the value of this concept. At the same time the first steps were taken to privatize the state-run veterinary service. A major pillar of the privatised service would be Veterinary Field Units (VFUs) staffed by paravets with six months of training. However, to this day there is reluctance in the state veterinary service to support a nationwide network of fully privatised VFUs. In another significant contribution, the DCA conducted the only known study in Afghanistan that showed the benefit-cost ratio of veterinary interventions.⁶⁸

During the early 1990s, the civil war raging in Afghanistan disrupted development programmes, but in the mid-1990s a major new project started, aimed at strengthening the livestock subsector. Funded mainly by the United Nations Development Programme (UNDP), it was implemented by the FAO and several subcontracted NGOs, and continued until 2003.⁶⁹ Project components included artificial insemination, integrated dairy development, management and feeding of cattle, fodder production, feed blocks and nomadic livestock and poultry development. The project also expanded the network of privatised VFUs and provided training and basic equipment. The MADERA had also projects with livestock components in the eastern provinces. MC used feed blocks as a component of its restocking programme in the mid-1990s.

Given the considerable emphasis on animal health in development programmes since 2002 and the effect of poor fertility and health on offtake, it is useful to present the published studies from the 1990s on these topics (Figure A1).⁷⁰ Results from surveys conducted by DCA in 2003/04 and 2004/05 are also included for completeness.⁷¹

Herd monitoring by FAO included 1998/99, 1999/00 and 2000/01, the first three years of the most serious drought since the early 1970s. Surprisingly, the drought had little impact on fertility, which ranged from 62 to 87 percent in cows, 67 to 87 percent in ewes, and 67 to 104 percent in does (Figure A1a).⁷² Surveys conducted in 2003/04 and 2004/05 by DCA found fertility to be in the same range.

The DCA study in 1990-1992, and in the one in 2003/04 when severe cold and snow affected the northwest of Afghanistan at lambing time, reported high neonatal mortalities in all three livestock species compared with the other two surveys (Figure A1b). In the other years neonatal mortality of calves was up to 4 percent, in lambs it reached 7 percent

68 B.E.C. Schreuder, et al, "A Benefit-Cost Analysis of Veterinary Interventions in Afghanistan Based on a Livestock Mortality Study" 303-314.

69 T. Barker, *Animal Health and Production Programme in Afghanistan, Final Report, September 1994 to June 2000, Projects AFG/93/004 and AFG/96/007* (Kabul: Food and Agriculture Organization of the United Nations and United Nations Development Programme, 2000); O. Thieme, *Livestock Development for Food Security: Food Security Through Sustainable Crop Production and Livestock Development. Final Technical Report: Livestock and Fodder Production, Projects AFG/96/007 and AFG/00/015* (Kabul: Food and Agriculture Organization of the United Nations and United Nations Development Programme, 2003); A. Majok, *Livestock Development for Food Security in Afghanistan (AFG/96/007)* (Kabul: Food and Agriculture Organization of the United Nations, 2003) and A. Majok, *Food Security through Crop and Livestock Development (AFG/00/015)* (Kabul: Food and Agriculture Organization of the United Nations, 2003).

70 See Schreuder et al., "A Benefit-Cost Analysis of Veterinary Interventions," Majok, *Livestock Development* and Majok, *Food Security*.

71 E.F. Thomson, M. Halimi and S. Agha, "Fertility and Mortality of Livestock in Afghanistan Monitored Over Three Years and Livestock Prices in Eight Markets" (unpublished report, Dutch Committee for Afghanistan, 2006). Data for 2005/06 are not included since monitoring only covered 9 months of that year. Most kids and lambs had been born by mid-April 2006. Till then ewe and doe fertility were 93 and 98 percent, and lamb and kid neonatal mortality were 2 and 1 percent, respectively.

72 Fertility can exceed 100 percent when twins are born, which is common in does.

and in kids up to 8 percent.

Mortality in adults and immature animals (1-2 years old) was higher in the study of Schreuder et al.⁷³ than during the first three years of the FAO study (Figure A1c). However, in 1999/2000, one year into the drought, it peaked in sheep and goats and then decreased in 2000/01. It was high again in 2003/04, but in 2004/05 it was as low as it was in 1996/97 and 1997/98.

As always, caution is required when comparing results across surveys for many reasons, such as differences in survey methods, locations and years and the motivation of field monitors. Thus, it is not known why the neonatal mortalities in 1990-1992 are so high and those from the FAO study are so low during 1996-98. The results from progeny histories (see Section 3.4) suggest that both these neonatal mortalities are possible and depend on the way the interviews were conducted.

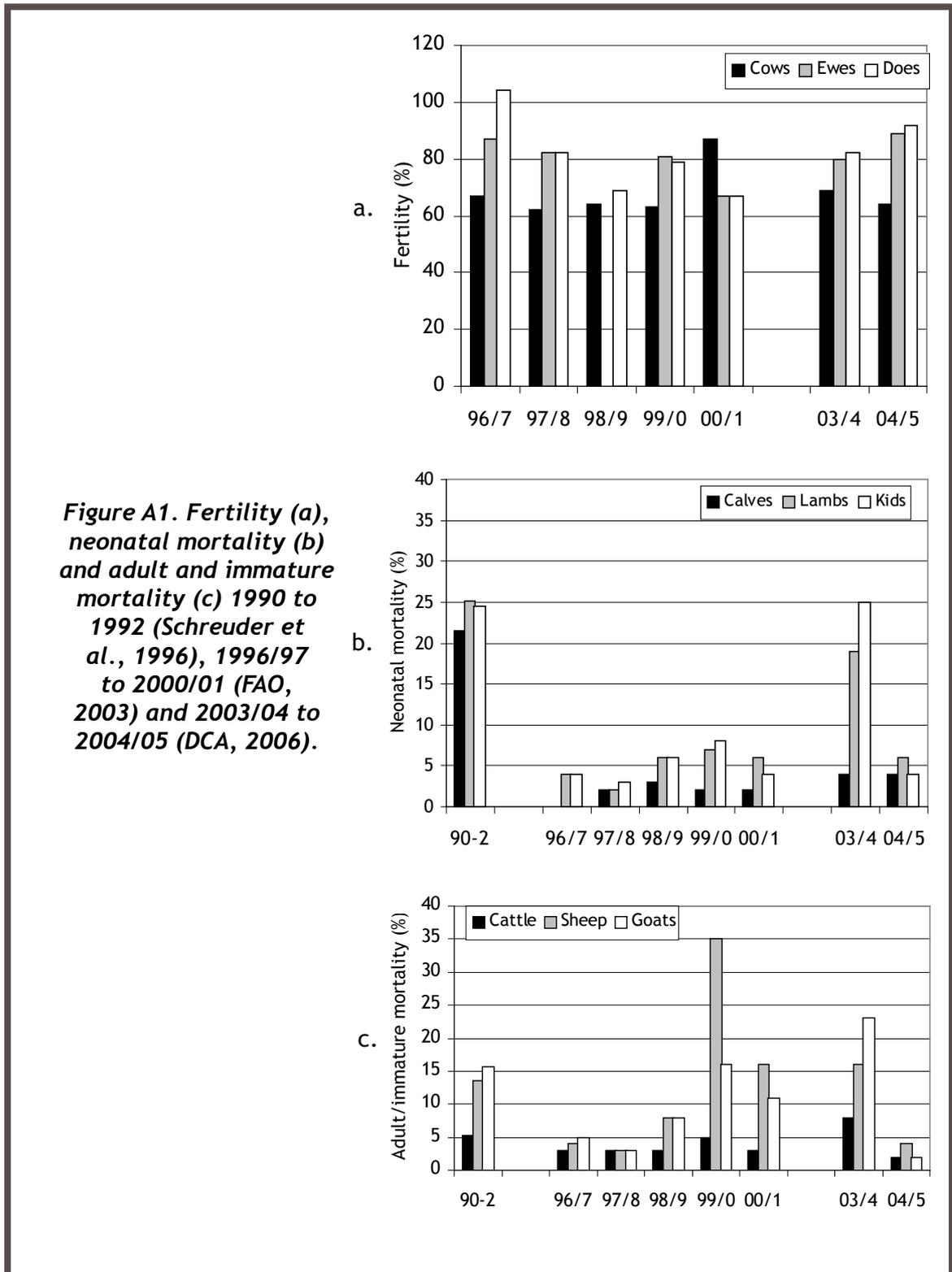
Afghanistan had already suffered 15 years of war by the mid-1990s, when the Taliban extended their control across the country. They gave little attention to rebuilding the economy, although security improved. The winter of 1998/99 was the first year of the severe drought that continued for four to six years depending on the area of the country. It aggravated the difficulties faced by the people and resulted in substantial losses of livestock.⁷⁴

Estimates of the impact of animal production and health interventions on livestock productivity are needed to evaluate the efficacy of development efforts. Unfortunately, such impact studies are difficult and seldom made, and if they are made, the results are usually not available for scrutiny. In the only rigorous study conducted to date, Schreuder et al.⁷⁵ estimated that the benefit in terms of additional livestock output from animal health interventions was US\$4.8 for each US\$1.0 spent. The authors concluded (page 303) that “veterinary intervention programs under these and comparable circumstances can be highly cost effective.”

73 Schreuder et al., “A Benefit-Cost Analysis of Veterinary Interventions.”

74 *Afghanistan National Livestock Census 2003—Interim Report (OSRO/AFG/212/ITA)*. (Rome: Food and Agriculture Organization of the United Nations, 2003); *Afghanistan National Livestock Census 2002-2003 - Final Report*. OSRO/AFG/212/ITA (Rome: Food and Agriculture Organization of the United Nations, 2008).

75 Schreuder et al., “A Benefit-Cost Analysis of Veterinary Interventions.”



Annex 2. Livestock Development Projects Since 2002

The ousting of the Taliban regime in late 2001 saw the start of a major effort to rebuild Afghanistan, which was then still in the grip of a devastating drought. At the Bonn Conference late in 2001, representatives from Afghanistan and from governments of major donors established the Afghan Interim Authority. Major benchmarks were agreed to, including the drafting and approval of a new constitution and the holding of presidential elections in October 2004 and elections for the National Assembly and Provincial Councils in September 2005.

The February 2006 meeting of the Afghanistan Compact in London launched the Interim Afghanistan National Development Strategy (I-ANDS). The final draft of the Afghanistan National Development Strategy (ANDS) was approved by the Cabinet and signed by the President in April 2008 (ANDS, 2008).⁷⁶ One of the three pillars of the ANDS is Economic and Social Development.⁷⁷ Within this pillar are 13 sectors; one is Agriculture and Rural Development and includes a section headed “Agriculture and Livestock.” In this section, Benchmark 6.1 states:

*The necessary institutional, regulatory and incentive framework to increase production and productivity will be established to create an enabling environment for legal agriculture and agriculture-based rural industries. Public investment in agriculture will increase by 30 percent. ... Particular consideration will be given to perennial horticulture, animal health and food security by instituting specialised support agencies and financial service delivery mechanisms, supporting farmers' associations, branding national products, disseminating timely price and weather-related information and statistics, providing strategic research and technical assistance and securing access to irrigation and water management systems.*⁷⁸

This benchmark provides the justification for the rural development strategies of several major donors such as the World Bank, the ADB, the European Commission and the United States Agency for International Development (USAID).

The statement “particular consideration will be given to perennial horticulture, animal health and food security” in Benchmark 6.1 is a consequence of the priority given to these topics in the Master Plan of the Ministry of Agriculture, Animal Husbandry and Food (MAAHF), which was approved by Cabinet in December 2005.⁷⁹ The rationale for the emphasis on perennial horticulture is based on this subsector’s past export earnings, which are optimistically projected to reach US\$1 billion by 2010. The Master Plan was revised in 2007 as part of the ANDS process. The outcome was a strategy paper that contained seven prioritised programmes, including “Expand Livestock and Livestock Productivity.”⁸⁰ An extract from this is reproduced verbatim in Annex 4. Just before the Master Plan was drafted, the results of the Food and Agriculture Organization of the United Nations (FAO)-implemented 2003 countrywide livestock census were published, showing huge losses of livestock due to the recent drought.⁸¹ Rapid appraisals generally

76 Government of Afghanistan, *Afghanistan National Development Strategy 1387-1391 (2008-2013)*.

77 The other two pillars are (1) Security and (2) Governance, Rule of Law and Human Rights.

78 Afghanistan National Development Strategy, 87.

79 *The Ministry Master Plan 2005* (Kabul: Ministry of Agriculture, Animal Husbandry and Food, 2005).

80 *The Ministry Strategy Paper with Focus on Prioritization* (Kabul: Ministry of Agriculture, Irrigation and Livestock, 2007).

81 *Afghanistan National Livestock Census 2003—Interim Report*. The results from this census are cited in

confirmed these losses.⁸² They partly justify the considerable emphasis given to animal health in the Master Plan and the ANDS. This is also justified by the need to protect consumers from contaminated edible livestock products, zoonoses including avian influenza, transboundary diseases and many other health risks. As argued earlier, the priority given in the Master Plan to food security is justified, and enhancing food security through efforts to improve yields of staple crops could result in more farm land becoming available for forage crop production.

The Master Plan addresses the livestock subsector in terms of extensive and intensive production. A few of the salient points are repeated here as they pertain to what was presented earlier in this case study. The “complementarity of extensive grazing, through providing stock for fattening, with intensive livestock production is noted along with the importance of sound watershed management.”⁸³ The benefit of this linkage is reduced grazing pressure on rangelands brought about by the removal of young animals in summer to areas where feed resources are available for fattening, which generates income for owners.

The Master Plan acknowledges that the livestock subsector “will *eventually* need major efforts to improve the nutritional status of animals including [a] large increase in the area planted to high value fodder crops.”⁸⁴ However, it gives no details about how this could be accomplished or what difficulties would be faced. Certainly the development of private feed mills is a desirable goal provided the balanced rations produced use mainly Afghan rather than imported ingredients, which have shown unprecedented price fluctuations since mid-2008.

Provided urban incomes in Afghanistan continue to grow as they have done over the past few years, there should be steady growth in the demand for fresh milk and dairy products; ideally, this should be met from domestic supplies as much as possible. Owners of cows in periurban areas are well positioned to benefit from this demand, but in more remote areas owners would generate more income from fattening if they could produce the feed needed on their own farms. Promoting the domestic production of milk, eggs and meat will help reduce the growing dependency on imported milk, eggs, frozen chicken and live animals, mainly cattle and buffalo from Pakistan.⁸⁵ The challenge is to find ways to produce feed on the limited area of cultivable land, most of which is now used to grow food staples and cash crops.

The considerable attention that development projects are giving to strengthening the private sector concurs with the statement in the Master Plan that “expanding agribusiness not only for meat and milk processing but also to provide high quality feeds

many strategy documents without critically examining the sample of farmers and Kuchi. The FAO census only reported on 23,949 Kuchi families, whereas the 2005 MRRD assessment (de Weijer, *National Multi-sectoral Assessment on Kuchi*) reported on 255,915 Kuchi households. Thus, the FAO study included possibly 10 percent of the Kuchis’ sheep and goats, which suggests that the reported population of 8.77 million sheep and 7.28 million goats was well below the true population. Indeed, it is questionable whether the FAO figure should be quoted without using the caveat that it excludes most of the small ruminants owned by Kuchi. It is tempting to use the data of MRRD (de Weijer, *National Multi-sectoral Assessment on Kuchi* page 45), which stated that “98% of the Kuchi own livestock, and on average they own 50 shoats (sheep and goats)” to estimate the number of sheep and goats owned by 255,915 Kuchi households.

82 E.F. Thomson, T. Barker and J. Mueller, *Needs Assessment on Feeds, Livestock and Rangelands in Afghanistan* (Aleppo, Syria: International Center for Agricultural Research in the Dry Areas, 2002).

83 *Master Plan 2005* (MAAHF), 8.

84 *Master Plan 2005* (MAAHF), 9; italics added.

85 From 2001/02 to 2006/07, imports of milk powder alone increased in value from zero to about US\$14.0 million, then dropped to US\$8.8 million in 2007/08 (*Afghanistan Statistical Yearbook 2007/08*).

to intensive livestock”⁸⁶ is needed. This effort is justified by the notion that exploiting the demand for livestock products is an essential driver of development. However, the focus on the agribusiness sector has to be complemented by efforts to enhance livestock productivity.

Current livestock projects

Starting in 2002, the number of rural development projects that included a livestock component rapidly expanded (see Table A2).⁸⁷ More details can be found in the MAIL Strategy.⁸⁸ Livestock are a minor aspect of some projects and the main focus of others. The approach and activities of each project are often dictated by the aid policy of the donor. For example, the United Kingdom’s Department for International Development supports projects with a livelihoods focus, while USAID promotes private-sector-oriented approaches to development.

Attempting to group projects according to the approach that they use has obvious limitations, since approaches overlap rather than fit into discrete categories. However, for convenience this section assigns projects to three groups. The first uses a community approach, and its projects are often holistic in nature; the second applies an enterprise or value-chain approach; the third has a disciplinary focus. The projects in all three groups give varying importance to capacity building and have different levels of involvement by government ministries.⁸⁹ Though these aspects are extremely important, it was beyond the scope of this case study to discuss them. Also, this case study does not discuss projects that specifically focused on credit programmes to restock the poorest rural families’ herds, establishment of rural financing institutions or efforts to resolve conflicts over access to rangeland.⁹⁰ However, these topics are key elements in efforts to develop the rural economy, and they are receiving considerable attention from many agencies.

The rest of this annex presents a brief overview of key aspects of recently completed and ongoing projects known to the author, as summarised in Table A2. Reports on many of them are not readily available, which makes it difficult to provide a critical assessment of their strengths and weaknesses.

Community-based projects

Projects in this category use community- or village-based approaches and their goal statements often explicitly mention improving the livelihoods of families targeted by their activities. Many are being implemented in remote rural areas where the most vulnerable and food-insecure families are found. A key element of the approach is to empower communities to identify, implement and evaluate their own projects. The most noteworthy example is the National Solidarity Programme (NSP), which is funded by a consortium of donors led by the World Bank. Its activities include building and rebuilding

86 *Master Plan 2005* (MAAHF), 9.

87 Khan and Iqbal, *Livestock Sector in Afghanistan*, and Thomson et al., *Needs Assessment*, mention agencies conducting projects including a livestock component until 1999 and until 2002, respectively.

88 *The Ministry Strategy Paper* (MAIL).

89 In addition to the MAIL, other ministries involved include the MRRD, the Ministry of Women’s Affairs (MoWA), the Ministry of Energy and Water (MEW) and the Department for Kuchi Affairs.

90 Several projects are concerned with this and other aspects of rangeland conflict, access and production: the United Nations Environment Programme (UNEP), Sustainable Agricultural Livelihoods in Eastern Hazarajat (SALEH), Afghanistan Research and Evaluation Unit (AREU), and Pastoral Engagement, Adaptation and Capacity Enhancement (PEACE).

Table A2. Major projects implemented since 2002 that include livestock components. (Excludes projects with a specific focus on credit and microfinance.)

Agency	Cattle (mainly cows)								Sheep/goats								Poultry								
	H	B	N	M	V	I	E	F	H	B	N	M	W	C	V	I	E	F	H	B	N	M	V	I	E
AADP	X			X					X		X	X							X						
Afghan AID	X					X			X								X		X					X	
AHDP	O					O			O							O			O			O			
AKF	O	O	O			O	O		O	O	O			O	O	O	O		O		O		O	O	
AREU	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X								X
ASAP																									
* ADP-east					X		X												X	X			X	X	X
* ADP-north	X				X	X	X		X	X					X	X	X		X		X	X	X	X	X
* ADP-south	X				X		X		X	X					X	X	X		X	X			X	X	X
* Chemonics														X											
DCA	O					O			O								O		O					O	
AVA	O	O	O			O	O		O	O	O					O	O		O	O	O			O	O
BRAC	X	X		X	X	X		X	X			X			X	X	X	X	X					X	X
CADP						X	X									X	X							X	X
CARE						X		X															X		
CNFA							X										X							X	
CordAid									X	X								X							
CRS			X		X						X														
DCA/cheese					O		X																		
DCA/RAMP	O					O			O							O			O					O	
DACAAR	X	X	X	X			X	X	X		X	X	X					X		X	X				
FAO		O	O	X	O	O	X																		
French Cooperation		O				O										X								X	
Helvetas					X										X								X		
HLP	O	O	O	O	O	O	O			O				O		O				O	O			O	O
Land O'Lakes	X			X	X																				
MADERA	O	O	O	O					O		O	O				O			O					O	
MC	O					O			O							O			O					O	
NSP					X	X		X							X	X		X					X	X	
Oxfam	X	X	X	X		X	X		X		X	X	X			X	X	X	X					X	
PEACE			O			O					O					O									
PRB	X								X										X						
Solidarités	X	X		X	X													X							

Note: "O" shows agencies implementing a large livestock project. Many agencies also have other projects with no livestock component, for example, the AKF, HLP, FAO, MC and MADERA.

The letters in the column headings stand for the following:

H = health: training (paravets, BVWs), establishing sustainable private VFUs, procuring and supplying good quality medicines and vaccines (see also institutional strengthening)

B = breeding and artificial insemination (AI): importing live animals and frozen semen, establishing breeding stations

N = nutrition: forage production, feed and mineral blocks, fattening, feed mills, silage making

M = management: improved barns, rearing methods

W = wool from producer to carpet-maker

C = cashmere from producer to exporter

V = value added: marketing, processing, branding, quality control, exports

I = institutional strengthening: capacity building (at the ministry, provincial, district, and community levels), FFS, PTD, extension (both men and women), demonstrations, farm fairs

E = enterprise establishment (small and medium-sized), loans, farm stores

F = microfinance, credit, grants, cattle or goat lending programmes

infrastructure such as schools, clinics, bridges, electricity generators and irrigation canals, but it also has some activities involving livestock husbandry.

The AKF is implementing a comprehensive network of interdisciplinary village-based projects centred on village organisations, with activities spread across six provinces in central and northeastern Afghanistan. They have components on livestock and poultry that include feeding, breed improvement and animal health activities coordinated through Livestock Development Centres. An innovative component of the livestock (and cropping) activities is the use of Farmer Field Schools (FFS). This is a farmer-led participatory extension methodology that empowers farmers to take their own decisions rather than instructing them on what to do. Oxfam also applies FFS as a component of its project activities. The AKF also established the Afghanistan Rural Microcredit Programme, which provides loans to help vulnerable families, often headed by widows, restock with livestock.

Livestock and poultry components were, and continue to be, included in many projects implemented by NGOs such as Afghan Aid, the Bangladesh Rural Advancement Committee (BRAC), Catholic Relief Services (CRS), Oxfam and Solidarités. Most of the projects include activities on microfinance, better housing, restocking and animal health. Animal health activities often include establishing and supporting clinics and training paravet and BVWs including women, in animal health care. Many of these projects and those of AKF promote income generation by establishing home-based and small-scale enterprises that add value to primary livestock products such as milk, wool and cashmere.

Land O'Lakes, together with the United States-Afghan Reconstruction Council (US-ARC) and initially in a partnership with AKF, implemented a 2-year dairy sector revitalisation project in Parwan Province with funding from USAID. It organised cattle owners in producer groups and established milk collection points from which the milk was transported to a plant for pasteurisation and packaging. Members received advice and training on milk production and were helped with the purchase of inputs. The project also helped finance the construction of a dairy processing plant managed by Mountain Pastures Dairy, a US/Kazakh joint venture, located north of Kunduz. The Overseas Private Investment Corporation (OPIC) provided a loan of US\$5.5 million for the construction of the plant.

Value-chain-oriented projects

Value-chain-oriented projects cover the entire range from producer to consumer and give particular attention to establishing or strengthening specific private-sector enterprises. Several projects in this category are being implemented; most of them funded by USAID and the United States Department of Agriculture (USDA), and many of them include livestock components. They often provide grants to support enterprise development along the value chain for upgrading and constructing existing and new processing facilities and farm stores.

The Afghanistan Agriculture Development Program (AADP), funded by the USDA and implemented by the Citizens Network for Foreign Affairs (CNFA), conducted market assessments of the hides, wool and carpet sectors to identify constraints in the value chain⁹¹ and supported the financing of two wool-processing enterprises. As part of the

91 M. Ali Haideri, *Hide Industry Assessment in Quetta*, Afghanistan Agriculture Development Program (Kabul: Citizens Network for Foreign Affairs, 2004); M. Ali Haideri, *Wool Market and Processing Assessment in Afghanistan (Kabul, Ghazni, Nangarhar, Maimana) and Pakistan (Quetta, Peshawar)*, Afghanistan Agriculture Development Program (Kabul: Citizens Network for Foreign Affairs, 2005); R. Favre, *Market Research on Afghan Carpet Industry and Identification of Opportunities for High Value Wool Processing*,

Box A2. Income generation from lamb fattening in spring 2008

Margins of US\$28.5 per head for lambs fattened in a 60-day trial conducted in Helmand Province confirmed the income-generating potential of this activity. Lambs offered 2 kg daily of imported concentrate costing US\$240 per MT gained 236 g each day, whereas lambs fed a more traditional diet of alfalfa and maize stalks with some grazing gained 96 g daily. When the trial ended, however, the cost of the ration had increased by 41 percent. This would reduce the margin to US\$17 per lamb fattened, showing how sensitive margins are to changes in feed prices.

Source: Chemonics (ADP-S)

Afghanistan Farm Service Alliance (AFSA), CNFA is currently implementing a USAID-funded project that includes the construction of farm stores and the training of entrepreneurs to manage them. The Alternative Development Program (ADP), funded by USAID and implemented by the PADCO, Development Alternatives Inc. (DAI), Chemonics and their subcontractors in different parts of the country, includes activities with producer groups to fatten lambs, construction of feed mills to supply dairy, poultry and fattening enterprises, the processing and marketing of milk, and animal health.

Box A2 includes some results from a lamb fattening trial conducted by Chemonics in Helmand Province. The margin of

US\$28.5 per head is close to that estimated by farmers interviewed in 2005 who were fattening lambs near Kandahar.⁹² Despite these margins, other farmers interviewed in 2005 declined to borrow cash to finance the purchase of lambs and feed due to the risks of lamb mortality and changing feed prices during the fattening period of about two months. The rapid feed price increases in 2007/08 illustrate why some farmers might be unwilling to risk borrowing to finance lamb fattening.⁹³

Given potential exports of 2,000 metric tonnes of cashmere, the USAID-funded Accelerated Sustainable Agriculture Project (ASAP) is implementing a project to expand the collection, grading and export of high quality cashmere.⁹⁴ This includes establishing a privately run cashmere processing facility.⁹⁵ The OPIC has recently provided a US\$10 million loan to American-Wool Cashmere Inc. to support the establishment of the cashmere industry in Afghanistan.⁹⁶

Currently at an advanced stage of preparation is the Commercial Agriculture Development Project (CADP), which will support value-chain strengthening from farm-gate to consumer.⁹⁷ Largely financed by a loan from the Asian Development Bank (ADB), it will focus on developing competitive and sustainable agribusinesses and includes components

Afghanistan Agriculture Development Program (Kabul: Citizens Network for Foreign Affairs, 2005).

92 E.F. Thomson, P. Chabot and I.A. Wright, *Production and Marketing of Red Meat, Wool, Skins and Hides in Afghanistan*.

93 Until mid-2007 global prices of feed ingredients had increased gradually. Within Afghanistan, quite large seasonal price variations were noted, which farmers who were willing to speculate in lamb fattening were taking into account (E.F. Thomson, "Water Management, Livestock and the Opium Economy: Livestock Production and Health" [Kabul: Afghanistan Research and Evaluation Unit, 2006]).

94 This optimistic projected export potential comes from a goat population of about 8 to 10 million. Cleaned cashmere has a potential farm-gate value of US\$6 per goat yielding 350 grams.

95 F. de Weijer and R. Schultz, "Developing the Cashmere Value Chains in Afghanistan: A Collaborative Effort: Accelerated Sustainable Agriculture Program" (presentation on 25 March 2008, Chemonics, Kabul).

96 This follows a US\$3 million loan in 2003 to American-Wool Cashmere Inc., which was fully repaid.

97 Landell Mills Development Consultants, *Preparing the Commercial Agriculture Development Project: Phase 2 Report, Volume 1 Main Report, ADB TA 4696-AFG* (Kabul: Asian Development Bank, 2007); Landell Mills Development Consultants, *Preparing the Commercial Agriculture Development Project: Draft Final Report, Volume III, Livestock Value Chain Analysis Report* (Kabul: Asian Development Bank, 2007).

on wool, silk, carpets and slaughterhouse construction, the last using private-public partnerships. In situations where there are no projects to support the development of the commodity base, the CADP proposes to support on-farm demonstrations that aim to enhance improvements in livestock productivity.

Since 2003, the Dairy Development Project, funded by Germany and implemented by FAO, has been promoting the periurban dairy sector based near Kabul, Mazar and Herat. The project is the continuation of an earlier FAO-implemented project that started in 1996 (see Annex 1). The core of the current project consists of establishing new dairy cooperatives, and strengthening existing ones, to manage the collection of milk and the processing, hygienic packaging and marketing of milk and dairy products. Training and extension advice are given to members of the cooperatives, and there is an AI service and feed mill, the latter to produce balanced rations.

Discipline-focused projects

Projects included in this category generally focus on one particular topic, such as strengthening animal health and AI services.

As mentioned already, support to strengthen the provision of animal health services started in the late 1980s, continued through the 1990s and expanded after 2004. As part of the USAID-funded Rebuilding Agricultural Markets Program (RAMP), the DCA implemented a project to rebuild the privatised national network of VFUs established by the earlier FAO project, and expanded this network in collaboration with Partners in Revitalising and Building (PRB) and the Afghanistan Veterinary Association (AVA). Key elements of the project are constructing regional training centres, training paravets and BVWs, and importing and distributing good-quality vaccines and medicines, which are sold at market rates through the VFUs. These activities are being consolidated as part of the ASAP and additional funding is being provided under the HLP (see below).

One desk study that evaluated the impact of the animal production and health interventions implemented by the RAMP found an overall benefit in livestock productivity of US\$16 for each US\$1 spent.⁹⁸ This optimistic return on investment is not comparable with the estimate of Schreuder et al.,⁹⁹ since it used a different methodology. It included poultry, and many assumptions were made, due to the absence of information on herd structure and livestock productivity in Afghanistan. It would be useful to reassess the impact of the animal health component of the RAMP project using information that has become available more recently.

The AHDP is part of a major multi-donor effort that focuses on animal health in Afghanistan, in line with the priorities of the MAIL Strategy and the ANDS. The preparation of a follow-up phase of the AHDP, which is funded by the EC, is evidence of the commitment of the EC to strengthening the state and privatised animal health service.

The current phase of the AHDP is expected to have four outputs:

1. A restructured Animal Health and Production Department
2. An operational Central Veterinary Diagnostic Laboratory (CVDL) and regional and provincial laboratories

⁹⁸ *RAMP Impact Assessment No. 3: Assistance to the Livestock Sector*, Rebuilding Agricultural Markets Program (Kabul: Chemonics International, 2006).

⁹⁹ Schreuder et al., "A Benefit-Cost Analysis of Veterinary Interventions."

3. An established epidemiological surveillance network
4. Quality assurance tests, performed at the CVDL, for vaccines against priority livestock diseases

Two other EC-funded projects have animal health components. One is being implemented by MC and focuses on establishing VFUs in several provinces in southern and southeastern Afghanistan. The other, coordinated by MADERA, is supporting a cluster of VFUs in the east of the country and the Hazarajat and building the capacity of the provincial and district veterinary services. It is also implementing several livestock activities, including a natural insemination service for local cows, making of mineral blocks and monitoring the performance of a number of sheep and goat herds. In 2006 and 2007 MADERA also conducted a baseline survey involving a large sample of livestock owners in Behsud I and II, two districts in Wardak Province, and in three provinces in the East, namely Laghman, Kunar and Nuristan. The survey collected valuable information on herd composition and showed that since 2004, soon after the severe drought ended, rebuilding of herds had been taking place. A report about the baseline surveys was being prepared as this case study went to press.

The livestock component of the mainly World Bank-financed HLP started in March 2006 and is expected to continue for at least ten years. The livestock component aims to increase livestock populations and productivity and acknowledges that “In contrast to animal health, farmers have had little support for improving animal production since the 1970s.”¹⁰⁰

The HLP has three components:

- Strengthening the Animal Husbandry department within the General Directorate of Animal Health and Production (GDAHP).
- Livestock production and marketing initiatives, including dairy development, strengthening the poultry sector and cashmere production and marketing.
- Animal health services, including regulatory and policy aspects, creating a sanitary mandate and support to VFUs and the AVA.

Institutional support to the MAIL has been a component of the ongoing support financed by French Cooperation since 2002. One aspect concerns animal husbandry with a focus on importing bulls and frozen semen, establishing regional AI stations, strengthening the extension services and providing equipment. One goal of these efforts is to establish a network of AI stations in all 34 provinces by 2010.

¹⁰⁰ *Emergency Horticulture and Livestock Project: Technical Annex*, Report No. T7671-AF (Washington, DC: World Bank, 2006).

Annex 3. Livestock Projects during the 1970s

The following text is taken verbatim from the 1975 World Bank report *Afghanistan: Opportunities for Agricultural and Rural Development*.¹⁰¹

5.01 In the field of animal health, FAO experts under a UNDP program are helping to upgrade clinical and diagnostic facilities at MA's [Ministry of Agriculture's] veterinary laboratories in Kabul. Vaccine production is also receiving special assistance under this program. It is planned to extend the program by setting up Regional Animal Health Centres in 4 selected provinces.

5.02 Russian aid and technical assistance is being provided for the establishment of clinical and diagnostic centres in Mazar-i-Sharif, Herat and Jalalabad. At this stage, no attempt is being made to study the specific effects of disease outbreaks on overall flock mortality and production.

5.03 The rinderpest control project has another 6 months to run. This has been the most successful campaign of its type carried out in Afghanistan, and has demonstrated that mass vaccination programs are possible despite the severe limitations of technical manpower, transport facilities, and inexperienced administration.

5.04 A wool handling and grading project is being carried out in Kandahar with FAO technical assistance, in close cooperation with the wool mills and merchants of the region. Results clearly demonstrate the many advantages of proper grading and sorting.

5.05 One of the most ambitious livestock projects undertaken in the Middle East is the IDA-assisted Livestock Development Project in Herat, which commenced in April 1974 and is the responsibility of the Herat Livestock Development Corporation together with AgBank. The project provides for: (a) loans to some 1,200 farmers to develop groundwater resources for alfalfa and other fodder crop production, and to increase the yields of grain and other commercial crops; (b) construction of a slaughterhouse with a capacity of 500,000 sheep a year, to begin operations in 1976; (c) refrigerated vehicles to transport a large proportion of the meat from the slaughterhouse to Tehran; (d) a 300-ha ancillary facility to the slaughterhouse, consisting of a central fattening area and a demonstration farm; and (f) an Experimental Range Improvement Center to conduct research and demonstrations on agricultural and livestock improvement methods on the ranges.

5.06 The broad aim of this project is to take the surplus male sheep from the range at 6-9 months of age and fatten them for slaughter. This would relieve the pressure of numbers on denuded pastures, since it is customary to run these surplus animals for another 12 to 18 months; and would also enhance the value of these cull sheep. Alfalfa (principally green chop) and some hay are to be the major feed components.

5.07 This pioneering program, which could result in a significant breakthrough in animal production in the area, is now beset by two major limitations which were not present during the planning phase. The severe drought of 1970-72 has reduced sheep numbers in the supply area by at least 50%. Recent increases in producer prices of cotton and fruit as well as the possibility of a sugar factory could create incentives to use the extra water to increase production of these crops at the expense of alfalfa. Thus, despite the fact that meat prices have also shown significant gains, the tendency of a farmer to

¹⁰¹ *Afghanistan: Opportunities for Agricultural and Rural Development Sector Report*, Report 484a-AF, Volume II (Washington, DC: World Bank, 1975), Annex 2, 11-13.

persist with and improve the technology of cash crop production, rather than to embark on a new enterprise requiring different skills such as sheep fattening, may be a major constraint even if the profitability of the latter can be shown to be higher.

Annex 4. Livestock Priorities in the 2007 MAIL Strategy

The following text is extracted from MAIL's *Ministry Strategy with Focus on Prioritization*.¹⁰²

It has been estimated that 60-70% of the beef slaughtered in Kabul is imported. A smaller, but significant percentage of small ruminants also come from Pakistan to be slaughtered on the local market. Almost 90% of poultry meat, eggs and processed milk is imported. Although there is sufficient land available for increasing cattle and small ruminant production there is a need for farmers to diversify their production systems to provide more home grown fodder and forage, especially for more intensive dairy production. There is also the need for investment in the animal feed industries, especially for supplementary feeding of dairy animals and for poultry feeds. The existing private sector animal health and production services are gradually being strengthened and expanded to reach more farmers in outlying areas through the training and deployment of paraveterinary service providers. Alongside the private sector delivery network the government is reorganizing itself to create a public/private partnership, whereby many public functions at the District level and below will be performed by private veterinarians working under contract to the state veterinary service. Investment in value chains will help farmers and traders to maximize their income from livestock and its by-products (wool, hides & skins, casings, etc.).

- Increased livestock production and productivity through improved nutrition and management
- By 2010, a significant level of import substitution for meat, poultry, and dairy products will have started to take place
- Most livestock keepers will have access to a sustainable privatised animal health and production service by 2010
- The state veterinary service will be performing most of its core functions, including the enforcement of rules and regulations provided under new and revised legislation by 2010

¹⁰² Ministry of Agriculture, Irrigation and Livestock, *Ministry Strategy with Focus on Prioritization* (Kabul: 2007), 5.

References

Afghanistan Statistical Yearbook 2007/08 (1386). Kabul: Central Statistical Office, 2008.

Barker, T. *Animal Health and Production Programme in Afghanistan, Final Report, September 1994 to June 2000, Projects AFG/93/004 and AFG/96/007*. Kabul: Food and Agriculture Organization of the United Nations and United Nations Development Programme, 2000.

Favre, R. "Market Research on Afghan Carpet Industry and Identification of Opportunities for High Value Wool Processing." *Afghanistan Agriculture Development Program*. Kabul: Citizens Network for Foreign Affairs, 2005.

Fitzherbert, A. "Water Management, Livestock and the Opium Economy: Livestock Husbandry." Kabul: Afghanistan Research and Evaluation Unit, 2006.

Fitzherbert, A. "Water Management, Livestock and the Opium Economy: Livestock Feed and Products." Kabul: Afghanistan Research and Evaluation Unit, 2007.

Food, Agriculture and Animal Husbandry Information Management Unit. *Agriculture Commodity Price Bulletin, Volume 5, Year 4*. Kabul: General Department of Policy and Planning, Marketing, Economics and Statistics Division, Ministry of Agriculture, Irrigation and Livestock, 2008.

Food and Agriculture Organization of the United Nations. *Afghanistan National Livestock Census 2002-2003, Final Report (OSRO/AFG/212/ITA)*. Rome: Food and Agriculture Organization of the United Nations, 2008.

Food and Agriculture Organization of the United Nations. *Afghanistan National Livestock Census 2003—Interim Report (OSRO/AFG/212/ITA)*. Rome: Food and Agriculture Organization of the United Nations, 2003.

Food and Agriculture Organization of the United Nations, 2008 "Domestic Animal Diversity Information System." Food and Agriculture Organization of the United Nations, 2008. <http://dad.fao.org>

Global Livestock Collaborative Research Support Program. "Afghan Livestock Sector Workshop, Kabul. May 2008." Various reports. <http://afghanlivestock.blogspot.com>

Government of Afghanistan. *Afghanistan National Development Strategy 1387-1391 (2008-2013): A Strategy for Security, Governance, Economic Growth and Poverty Reduction*. Kabul: Islamic Republic of Afghanistan, 2008.

Grandin, B.E. and J. Young. "Ethnoveterinary Question List." *RRA Notes Number 20, Special Issue on Livestock*, 39-46. London: International Institute for Environment and Development, 1994.

Haideri, M. Ali. *Hide Industry Assessment in Quetta*. Afghanistan Agriculture Development Program. Kabul: Citizens Network for Foreign Affairs, 2004.

Haideri, M. Ali. *Wool Market and Processing Assessment in Afghanistan (Kabul, Ghazni, Nangarhar, Maimana) and Pakistan (Quetta, Peshawar)*. Afghanistan Agriculture

Development Program. Kabul: Citizens Network for Foreign Affairs, 2005.

Hakimi, M.Y. *The Nature of Livestock Marketing and Meat Consumption per Capita in Afghanistan*. Kabul: United States Agency for International Development, 1978.

Hasnain, H.U. "Sheep and Goats in Pakistan." FAO Animal Production and Health Paper No. 56. Rome: Food and Agriculture Organization of the United Nations, 1985.

Iniguez, L. *Characterisation of Small Ruminant Breeds in West Asia and North Africa, Volumes I and II*. Aleppo, Syria: International Center for Agricultural Research in the Dry Areas, 2005.

Karzai, H. Afghanistan Support Conference, Paris, 12 June 2008. <http://www.embassyofafghanistan.org/documents/parisconferencespeechjune11.pdf> (accessed 10 September 2008).

Kerven, K. and The Fibre Lab. *Cashmere in Afghanistan: Quality Assessment, Comparative Advantage and Development Options*. London: GRM International, 2006.

Khan, Ulfat-un-Nabi and M. Iqbal. "Role and the Size of the Livestock Sector in Afghanistan (Draft Report)." Islamabad: The World Bank, 1999.

Landell Mills Development Consultants. *Preparing the Commercial Agriculture Development Project: Phase 2 Report, Volume 1 Main Report, ADB TA 4696-AFG*. Kabul: Asian Development Bank, 2007.

Landell Mills Development Consultants. *Preparing the Commercial Agriculture Development Project: Draft Final Report, Volume III, Livestock Value Chain Analysis Report*. Kabul: Asian Development Bank, 2007.

Majok, A. *Livestock Development for Food Security in Afghanistan (AFG/96/007)*. Kabul: Food and Agriculture Organization of the United Nations, 2003.

Majok, A. *Food Security through Crop and Livestock Development (AFG/00/015)*. Kabul: Food and Agriculture Organization of the United Nations, 2003.

Ministry of Agriculture, Animal Husbandry and Food, *Master Plan 2005*. Kabul: Ministry of Agriculture, Animal Husbandry and Food, 2005.

Ministry of Rural Reconstruction and Development and Central Statistical Office *National Risk and Vulnerability Assessment 2005*. Kabul: Ministry of Rural Reconstruction and Development and Central Statistical Office, 2007.

Nyrop, F. and D.M. Seekins, eds. *Afghanistan: A Country Study*. Washington, DC: Foreign Area Studies, The American University, 1986.

Pittroff, W. *Analysis of Red Meat Production Potential: Opportunities for Intensification in Afghanistan*. Kabul: Citizens Network for Foreign Affairs, 2006.

RAMP Impact Assessment No. 3: Assistance to the Livestock Sector. Rebuilding Agricultural Markets Program. Kabul: Chemonics International, 2006.

Roe, A. "Water Management, Livestock and the Opium Economy: Baseline Survey". Kabul:

Afghanistan Research and Evaluation Unit, 2006.

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

Schreuder, B.E.C., H.A.J. Moll, N. Noorman, M. Halimi, A.H. Kroese and G. Wassink. "A Benefit-Cost Analysis of Veterinary Interventions in Afghanistan Based on a Livestock Mortality Study." *Preventive Veterinary Medicine* 26 (1996): 303-314.

Stuth, J., A. Jama, R. Kaitho, J. Wu, A. Ali, G. Kariuki and M. Kingamkono. "Livestock Market Information Systems in East Africa: The Case of LINKS/GL-CRSP." In *Pastoral Livestock Marketing in Eastern Africa: Research and Policy Challenges*, ed J.G. McPeak and P.L. Little, 203-226. Rugby, UK: Intermediate Technology Group, 2006.

The Agricultural Survey of Afghanistan—Livestock, Tenth Report. Kabul and Peshawar: Swedish Committee for Afghanistan, 1990.

Ministry Strategy Paper with Focus on Prioritization. Kabul: Ministry of Agriculture, Irrigation and Livestock, 2007.

Thieme, O. *Afghanistan: Promotion of Agricultural Rehabilitation and Development Programmes: Livestock Production, Project TCP/AFG/4552*. Rome: Food and Agriculture Organization of the United Nations, 1996.

Thieme, O. *Livestock Development for Food Security: Food Security Through Sustainable Crop Production and Livestock Development. Final Technical Report: Livestock and Fodder Production, Projects AFG/96/007 and AFG/00/015*. Kabul: Food and Agriculture Organization of the United Nations and United Nations Development Programme, 2003.

Thomson, E.F. "Water Management, Livestock and the Opium Economy: Livestock Production and Health." Kabul: Afghanistan Research and Evaluation Unit, 2006.

Thomson, E.F. "Water Management, Livestock and the Opium Economy: Marketing of Livestock." Kabul: Afghanistan Research and Evaluation Unit, 2007.

Thomson, E.F., M. Halimi and S. Agha. "Fertility and Mortality of Livestock in Afghanistan Monitored Over Three Years and Livestock Prices in Eight Markets." Unpublished report, Dutch Committee for Afghanistan, 2006.

Thomson, E.F., P. Chabot and I.A. Wright. "Production and Marketing of Red Meat, Wool, Skins and Hides in Afghanistan: A Case Study from Kabul, Kandahar and Kunduz Provinces." Aberdeen and Kabul: Macaulay Institute and Mercy Corps, 2005.

Thomson, E.F., T. Barker and J. Mueller. *Needs Assessment on Feeds, Livestock and Rangelands in Afghanistan*. Aleppo, Syria: International Center for Agricultural Research in the Dry Areas, 2002.

Weijer de, F. *Cashmere Value Chains Analysis*. Accelerated Sustainable Agriculture Program. Kabul: Chemonics International, 2007.

Weijer de, F. *National Multi-sectoral Assessment on Kuchi*. Kabul: Ministry of Rural Rehabilitation and Development/World Food Programme, 2005.

Weijer de, F., and R. Schultz. "Developing the Cashmere Value Chains in Afghanistan: A Collaborative Effort: Accelerated Sustainable Agriculture Program." Presentation, Kabul, 25 March 2008.

World Food Programme Vulnerability Analysis and Mapping Branch. "VAM-SIE Afghanistan." <http://125.213.201.164/geonetwork/srv/en/vamsie.main> (accessed 2 May 2009)

World Bank. *Afghanistan: Opportunities for Agricultural and Rural Development Sector Report*. Report 484a-AF, Volume I and II. Washington, DC: World Bank, 1975.

World Bank. *Emergency Horticulture and Livestock Project: Technical Annex*. Report No. T7671-AF. Washington, DC: World Bank, 2006.

Yalçin, B.C. *The Sheep Breeds of Afghanistan, Iran and Turkey*. Rome: Food and Agriculture Organization of the United Nations, 1979.

Recent Publications from AREU

All publications are available for download at www.areu.org.af and in hardcopy from the AREU office in Kabul.

- May 2009 Between Discipline and Discretion: Policies Surrounding Senior Subnational Appointments, by Martine van Bijlert
- April 2009 Water Management, Livestock and the Opium Economy: Challenges and Opportunities for Strengthening Licit Agricultural Livelihoods, by Alan Roe
- April 2009 Interrogating Irrigation Inequalities: Canal Irrigation Systems in Injil District, Heart, by Srinivas Chokkakula
- April 2009 Water, Opium and Livestock: Findings from the First Year of Farm and Household Monitoring, by Alan Roe
- April 2009 Afghanistan Research Newsletter 21
- April 2009 Water Strategy Meets Local Reality, by Kai Wegerich
- April 2009 Land Conflict in Afghanistan: Building Capacity to Address Vulnerability, by Colin Deschamps and Alan Roe
- April 2009 Reflections on the Paris Declaration and Aid Effectiveness in Afghanistan, by Rebecca Roberts
- April 2009 Policymaking in Agriculture and Rural Development in Afghanistan, by Adam Pain and Sayed Mohammad Shah
- April 2009 Mutual Accountability in Afghanistan: Promoting Partnerships in Development Aid?, by Marieke Denissen
- April 2009 A Historical Perspective on the Mirab System: A Case Study of the Jangharok Canal, Baghlan, by Vincent Thomas and Mujeeb Ahmad
- March 2009 Afghanistan's New Political Parties: A Means to Organise Democratisation? by Anna Larson
- Feb. 2009 Decisions, Desires and Diversity: Marriage Practices in Afghanistan, by Deborah J. Smith
- Feb. 2009 Afghanistan National Development Strategy (ANDS) Formulation Process: Influencing Factors and Challenges, by Sayed Mohammed Shah
- Feb. 2009 Afghanistan Research Newsletter 20
- Jan. 2009 The A to Z Guide to Afghanistan Assistance 2009 (Seventh Edition)
- Jan. 2009 Delivering on Poverty Reduction: Focusing ANDS Implementation on Pro-Poor Outcomes, by Paula Kantor, Adam Pain, et al.
- Dec. 2008 Microcredit, Informal Credit and Rural Livelihoods: A Village Case Study in Balkh Province, by Erna Andersen and Amanda Sim

The Afghanistan Research and Evaluation Unit (AREU) is an independent research organisation based in Kabul. AREU's mission is to conduct high-quality research that informs and influences policy and practice. AREU also actively promotes a culture of research and learning by strengthening analytical capacity in Afghanistan and facilitating reflection and debate. Fundamental to AREU's vision is that its work should improve Afghan lives.

All AREU publications are available for download at www.areu.org.af and in hard copy from the AREU office:

Flower Street (corner of Street 2), Shahr-i-Naw, Kabul

phone: +93 (0)799 608 548 website: www.areu.org.af email: publications@areu.org.af