

Study on Dairy Production and Processing in Afghanistan

**For the
Horticulture and Livestock Project/HLP
Ministry of Agriculture, Irrigation and Livestock/MAIL
Afghanistan**



**Mission Report
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ABBREVIATIONS AND ACRONYMS

AI	- Artificial Insemination
AHDP	- Animal Health Development Project
ASAP	- Acceleration Sustainable Agriculture Program
AVA	- Afghanistan Veterinary Association
DCA	- Dutch Committee for Afghanistan
EC	- European Commission
FAO	- Food and Agricultural Organization
GIRA	- The Government of the Islamic Republic of Afghanistan (GIRA)
HACCP	- Hazard Analysis and Critical Control Point
HF	- Holstein – Friesian
HLP	- Horticulture and Livestock Project
IMST	- Implementation Management Support Team
MAIL	- Ministry of Agriculture, Irrigation and Livestock
MCC	- Milk Collection Centre
MCP	- Milk Collection Point
MPA	- Milk Producers Association
MPD	- Mountain Pasture Dairy
MPU	- Milk Producers Union
NGO	- Non-Governmental Organization
RAMP	- Rebuilding Agricultural Marketing Program in Afghanistan
UHT	- Ultra-High Temperature
UMB	- Urea-Molasses Bloc
USAID	- United States Agency for International Development
VFU	- Veterinary Field Unit
WB	- The World Bank

This report was prepared at request and with financial support of the HLP/MAIL. The views expressed are those of the Consultant and do not necessarily reflect those of the Afghan Government or the HLP staff.

1 Introduction

At the invitation of the Ministry of Agriculture, Irrigation and Livestock (MAIL), John J.M. Bonnier, livestock specialist, conducted a short term mission for the Horticulture and Livestock Project (HLP) to study Milk Production and Processing in Afghanistan. The mission took place from 16 May – 5 June 2007, while report writing was done after return to the Netherlands.

The Terms of Reference for the mission are attached as Appendix 1, while the output of the mission is the present report, covering the following:

- Assessment of the present trends in milk production and marketing, management levels in milk production and the potential to increase income for farmers through dairy development;
- Assessment of the options for future sustainable development of the dairy sector through an integrated approach, covering production, collection, processing and marketing of milk and dairy products based on the establishment of farmers cooperatives;
- Draft the Terms of Reference for the HLP dairy sub-component and prepare an initial work plan for the Facilitating Partner to be contracted for implementation of this integrated dairy program (Appendix 4).

After arrival in Kabul, a first briefing took place at the MAIL and IMST and visits were paid to various organisations involved in dairy development, including the FAO supported dairy plants and collection centres in Kabul, Mazar-I-Shariff and Kunduz, as well as the cheese plant in Baghlan. Useful information and reports were received that formed the basis for an understanding of the conditions and opportunities to develop milk production and processing (see Appendix 3 - List of Literature and footnotes).

From Kabul, visits were paid to the provinces Nangarhar, Parwan, Ghazni and Wardak to discuss the proposed approach for dairy development directly with the stakeholders. The villages that were visited provided a very useful picture of the general conditions and the needs for structural dairy development. A list of persons met has been attached as Appendix 2.

In close cooperation with the MAIL the approach was agreed for the HLP dairy sub-component and based on this view the draft Terms of Reference were prepared for selecting the Facilitating Partner Dairy Sub-Component. The next pages describe the present conditions for dairy production, assess the options for sustainable development and provide suggestions to increase milk production in Afghanistan and thus reduce the imports of dairy products and improve the standards of living of the farming communities.

I would like to thank all the persons that made this mission possible and who were very helpful to provide information, to have open discussions on development issues and who tried to make my stay as pleasant as could be. I met too many nice and competent people to name them here individually. However, special thanks go to Dr Shah Mohd Kakar, the IMST Livestock Coordinator, who contributed greatly to the results of this mission.

2 Trends in Milk Production and Marketing

2.1 Introduction

According to the FAO census of 2002/03 there are some 3.7 million heads of cattle in Afghanistan, with an average of 0.7 cows >2 years of age per household. This gives an estimated total of 2.1 million cows. The number of cows per household varied from 1.8 cows in the Eastern region to 0.2 cows in the Northern region. However, the actual number of milking cows is even lower, as only 60% of the cows reportedly produced milk in the years of the census.

Not all farms have cattle and of these not all have cows. The survey showed that some 74% owned cattle, while only 50% had cows that could produce milk and offsprings. The other animals are oxen used for draught purposes.

The total milk production in Afghanistan is not enough to meet the demands for dairy products. Based on the FAO 2003 census the annual production figures in the Master Plan were estimated at:

- Cow milk 945,000 t
- Ewe milk 210,000 t
- Goat milk 180,000 t

The 2005 estimates based on predictions of animal population, production estimates and growth indicators, comes with a figure of 1,450,900 tons of milk total (cows, ewes and goats). An AADP report¹ calculated the total milk production from dairy cows at 1,260,000 tons/years, based on an average yield of 1 t/cow/year², but it is clear that all data are indicative as there is no specific recording. Other reports estimate the average production per cow at 750 kg/year, which would lead to the total production volume of 945.000 t/year, which corresponds with the figures in the FAO census of 2003 (60% of 2,1 * 750 kg/yr).

No detailed information on import of dairy products is available, but the Master Plan³ reports a 'rapid increase, mainly from Pakistan'. The total volume is estimated at 100,000 tons of liquid milk, mainly in the form of milk powder and the rest as UHT. Other estimates⁴ mention volumes of 50 tons of milk powder and up to 18 million liters of liquid milk per year. These large quantities of imported dairy products are a considerable drain on the country's resources and the Government is determined to make strong efforts to replace at least part of the imports by own production.

¹ Raphy Favre, Review of relevant surveys data in the livestock sector and their implications in programming, AADP, 2004.

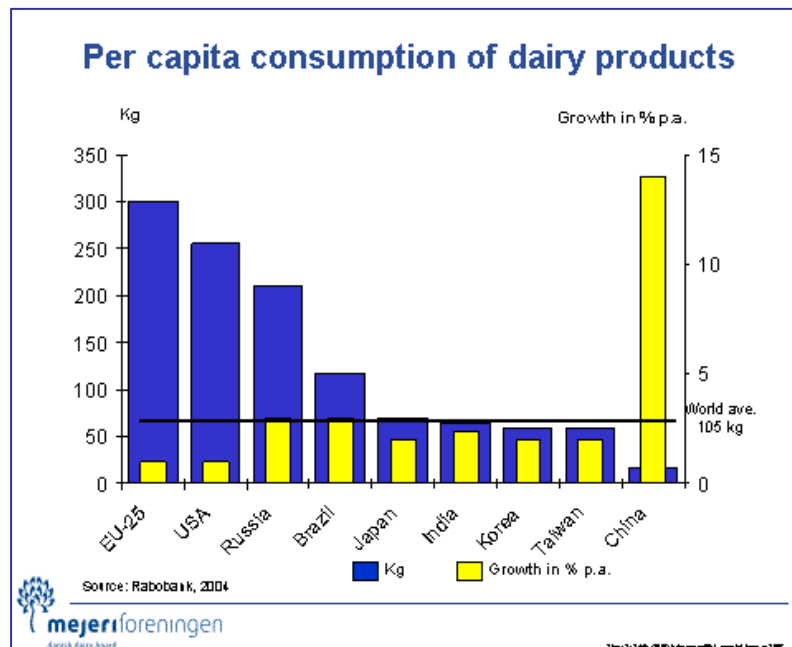
² Thieme, Olaf, Promotion of Agricultural Rehabilitation and Development Programmes, Livestock Production, FAO, 1996.

³ MAIL Master Plan for Agricultural Development

⁴ A. van Engelen, Phase 1 Report – Volume II Livestock Agribusiness Report, Preparing the Commercial Agricultural Development Project, ADB, 2006.

Milk and dairy product consumption is estimated at 66 kg/year per capita (180 g/day) which is much lower than in most countries, but more in the range of India and Japan as can be seen from the figure below.

Figure 1: Per Capita consumption of dairy products by selected countries.



As milk is a major source of protein for many people in Afghanistan, the Government has given high priority to the development of the dairy sector through initiating programs that will increase the yield per cow and facilitate the marketing and processing of milk. An integrated approach will be followed, as already practiced by FAO and supported by MAIL, to ensure lasting achievements.

2.2 Milk Production

In the introduction we already mentioned the estimated number of cows in Afghanistan and their total production volume. In this section we will go in more detail concerning the present conditions for milk production.

In most villages farmers rely heavily on cattle to enable crop production. Draught animals are extremely important as there are very few tractors. In addition, cattle provide dung for fertilising the land and as a source of fuel for cooking and heating. Often dung produced in summer is used for fuel in winter, while the winter dung is brought as fertiliser on the land. Meat and milk are additional products and first of all used for household consumption. Surpluses are either bartered or sold.

The regions of Afghanistan show a large variation of phenotypes in cattle. They either have a small or no hump, show a wide range of colours and vary in body weights. The smallest cattle are kept in the eastern and north-eastern

mountainous provinces (adult weights of about 190-200 kg), while larger framed cattle such as the Kandahari and Sistani are found in Herat, in the North and Kandahar area. The Kandahari and Kunari are known to be among the best dairy cattle with estimated lactation yields of 1,000-2,000 and 900-1,100 kg respectively. The average yield of local dairy cows is estimated at 750 kg per lactation. The influence of exotic breeds (e.g. Friesian, Brown Swiss and Jersey) is visible as a result of earlier and ongoing artificial insemination programs.

The most common type of animal is the so-called 'Watani' which means 'native' and is usually black with white spots, but can be multi-coloured. FAO reports an average height at the withers of 117 cm and an average adult body- weight of 225 kg for the Watani, while milk production is given as 3.5 kg/day with 3.5-4% fat.

There is much variation in phenotype and purebred indigenous cows are difficult to find.



An old survey⁵, carried out in 1969, gave some interesting data on milk yields for the various local breeds. The authors came to the following results:

Breed	No. of lactations	Predicted Annual Yield (kg)	Fat Content (%)
Kandahari	20	1,823	3.3
Kunari	10	1,085	-
Watani	75	1,031	4.1
Sistani	3	813	-
Overall average	108	1,176	3.9

The above yields include the milk for the calf, which means that the marketable milk would be about 25% less. This means that according to these data the available milk would be 780 kg/year (assuming that calving intervals are around one year, which may be too optimistic).

The survey also showed that the age of 1st calving was around 3 years and that the average number of replacement animals was 1.23. Most farmers indicated that they did not intend to increase herd size and almost 80% used the milk for the family needs as they had no excess milk to sell. Most cows only received

⁵ G.A. Kestiar et al, A dairy survey of 13 Provinces in Afghanistan, Technical Bulletin No. 13 , Kabul University, 1969.

maintenance rations of wheat- and rice straw, with some natural grazing. Not less than 74% of the farmers never provided any form of concentrates. Additional feeding might explain why five of the Kandahari cows in the survey reached an average annual yield of 3,530 kg milk. This could just be a matter of better feeding and farm management, showing the higher potential of this breed.

Production data from the Bolan farm mentioned in the 1969 survey, gave average yields of 1,040 kg and 1,092 kg for Kandahari and Sistani cows. The Brown Swiss cows on the farm produced 2,792 kg and their F1 cross gave 2,060 kg per lactation.

Mr. Emal reported in his dissertation⁶ 1st lactation yields of 1,148 kg with Kandahari cows, while all yields averaged 1,329 kg in Kandahari. Crossbred animals (15/32 Friesian) reached 3,296 kg in their 1st lactation and 3,500 kg overall.

Although the data from the surveys and studies are fairly old, we must conclude that on many farms in Afghanistan the production and farm management system has hardly changed. In those places where there has been no specific program for breed improvement and/or better feeding, we may assume that the reported yields are still valid and thus in line with the earlier mentioned figures in the Master Plan.

During the field visits in Nangarhar, Balkh and Laghman we saw substantial numbers of cross-breds, varying in quality and appearance, but certainly with a higher genetic potential than many of the local cows. Cows had also been brought in from surrounding countries, mainly Pakistan, and were kept for more intensive dairy farming.

More surprising even was to notice the high value of cross-breed cows. Prices of 800-1000 US \$ were no exception and even female calves were already fetching prices of around 400 US \$. The phenotype of the animal was said to be an important factor in determining this price: the cross-breed should look like a foreign breed and be clearly different from the mother. This might explain why HF bulls are more in demand than Jersey bulls. The French breeds and Brown Swiss also give calves that look much better than their dams.

Cow imported from Pakistan, with Montbeliarde bull calf at a farm in Nangarhar.



⁶ Mohd J. Emal, Performance evaluation of crossbred (Bos taurus – Kandahari) dairy cattle in Afghanistan, 1982.

During the visit to Balkh province, however, we also noticed that the demand for AI services to obtain more productive cows is closely linked to the market for dairy products. For many farmers cross-breeds, which need better feeding and management than local cows, are only useful when they generate additional income through the sales of milk. A similar response can be seen in attempts to improve fodder production: extra investments in feed and fodder have to result in higher incomes through marketable products.

A survey conducted for the ICARDA report⁷ showed that in 183 villages surveyed, 38% of the households had no arable land, while about one third had no livestock. It seemed common that families without land would be involved in livestock production and within the villages agricultural products were exchanged, mainly as barter trade. The interviews during the field trip showed that 'poor' farmers often work the land belonging to 'rich' farmers in exchange of part of the harvest. Draft animals were also 'rented' if a farmer did not have his own. In other cases two farmers with one ox each would co-operate without having extra costs.

The aridity and rainfall pattern in Afghanistan make irrigation systems necessary to obtain acceptable yields of grains, fruits and vegetables from the small plots of land. Cropping intensity varies, depending on location, from one to even two crops in the best places. In most places visited the irrigated arable land was not enough to grow fodder crops and sometimes barely enough to meet the subsistence needs of the household. Thus livestock production depends largely on natural grassland.

Sheep and goats are taken to the rangelands for almost 9 months per year (March – December) and most farmers indicated that the rangeland provided enough feed for their flocks. Living conditions and water supply were considered more of a problem. Cattle is only grazed for 6 months per year, often closer to the villages. These animals not only require conserved feed for the winter period, but also some additional feeds during the times of field work (oxen) or lactation (cows). With only one exception all cattle were fed wheat straw, most of the time without any extra alfalfa hay (or similar product). Farmers confirmed that animals fed on wheat straw would loose condition, while those fed with hay from the rangeland would gain condition.

The low growth rates and production levels are directly related to the feeding standards and without changing animal nutrition no production improvement can be achieved. Efforts to improve the genetic potential and to develop markets will fail without addressing the problems in animal feeding.

The FAO concluded⁸ that the efforts of the FAO and NGOs to improve fodder production and animal nutrition showed good results with individual farmers, but the overall impact was limited. Another observation made by the FAO⁹ was that

⁷ ICARDA, Needs Assessment on Feeds, Livestock and rangelands in Afghanistan, August 2002

⁸ FAO 'Livestock Development for Food Security – Final Technical Report on Livestock & Fodder Production Activities'

⁹ Final Technical Report on Livestock & Fodder Production Activities, January 2003

efforts to improve animal nutrition should be integrated in a holistic approach for livestock development.

The FAO introduced new varieties and conducted a large number of feed trials. In total 3,000 demonstration and field trials were carried out with oats (922), Berseem (738), Lucerne (490) and Hybrid Sorghum (961). A smaller number of trials was conducted with millets, fodder beets, elephant grass, sainfoin (*Onobrychis vicifolia*), red clover and ordinary sorghum. The main findings of these trials are briefly described below.

Fodder oats was newly introduced and became a popular crop as it provides a real alternative to barley and wheat. Yields of oats as green fodder varied from 22 t/ha to 115 t/ha, which was strongly related to the number of cuts (with average yields of 65-80 t/ha). The new varieties of oats on warmer locations (Nangarhar, Kandahar, Farah) and autumn cultivation gave higher yields than in the highlands (double). In highlands other cultivars or crops will be needed.

With Berseem the growing season and the number of cuts also strongly influenced yields. Mixed cultivation with cereal (wheat, barley) appeared effective (less frost damage, less weeds and less insect damage). It was found that Shaftal (Persian clover) was about as good as Berseem, while for Lucerne a good choice of varieties proved to be important. More information is needed to make firm recommendation on Lucerne varieties. With Sorghum and Millet the results were strongly influenced by the availability of water. Under good conditions high yields are possible.

The remarks on the other crops were that all have potential, especially in highlands (fodder beet and red clover!). Farmers were seen to show interest and the FOA experts recommended more testing and promotion. The FAO 'Livestock Development for Food Security – Final Technical Report on Livestock and Fodder Production Activities' provides the detailed results on fodder trials and gives recommendations for further trials.

Besides the introduction of new fodder varieties on irrigated land, the inputs of minerals and concentrates, as well as fodder production on rainfed land had good effect. Supplementary feeding included urea-molasses blocks (UMBs) and mineral mixes. The UMBs were distributed as emergency feeding, but commercial production might still take place. Manufactured concentrates are not available, but farmers sometimes feed grains (barley, maize) to productive animals. The results of the fodder tree trials are currently being assessed.

Although the reports on the higher rangelands seem positive, there is concern about the rangelands in the lower areas and closer to the villages. Much rangeland is being cultivated (rainfed crops) with risks of erosion and disappointing yields if rainfall is not sufficient. Overgrazing of the remaining rangeland is taking place and there would be a need for rehabilitation, improved rangeland management and better information (extension). A government policy to protect the rangelands would be needed.

We may conclude that the present level of milk production can be increased through better feeding, management and expansion of the artificial insemination services. Available data do not indicate the number of cows that already have a higher genetic potential for milk production, but we may assume that with the limited scale of AI services in relation to the total cow population, the number of cross-breeds is less than 10%. That means that the production level of the cows will show a gradual increase, in line with the improvements made in farm management, feeding, calf rearing, health care, housing and last but not least genetic quality. In formulating development programs we have to take all these aspects into account and at the same time provide an attractive outlet for the increased volumes of marketable milk.

2.3 Milk Collection and Processing

We have seen that most households keep 1-2 cows and most of the milk is used for family consumption. With the reported production levels this milk does not allow for many sales and in some regions trading in milk was even considered shameful.

The traditional way of processing surplus milk in remote areas and higher mountains is the production of 'quroot', a dried product on the basis of sour yoghurt and wheat flour, and 'maska' (ghee) which both are non-perishable products. The Livestock Business Report¹⁰ calculates the price a farmer receives for these products at 9.45 Afs/kg milk (based on 3.5 kg maska and 8.5 quroot from 100 l raw milk). This is much lower than what farmers receive from the FAO supported dairies, that pay average prices of 13 Afs/kg raw milk. Other traditional products are 'dogh', a drink-yoghurt, 'kaimak', a cream, 'chaka' a yoghurt based product similar to quark and 'paneer', a soft white cheese.

In many villages there is some form of small-scale milk processing by farmers and traders. Here milk is bought from neighboring farms and the processing capacity rarely exceeds 500 liters/day. The main products are the above mentioned traditional products. This form of processing is already one step up from the household processing of surplus milk.

Direct sales of raw milk and yoghurt are common in the larger cities, where farmers living in the vicinity find an attractive market. It is especially here that we find the most productive cows. Without proper quality control and hardly any form of packaging, this is the cheapest source of dairy products for the urban population.

Milk collection schemes were developed by FAO, in combination with simple processing facilities. The first place was Kandahar (1998), followed by Kabul (2000), Mazar-I-Shariff (2002) and Kunduz (2005). These schemes have generated considerable interest among the farmers but have remained quite limited in scale, reportedly because of late provision of needed equipment and insufficient financing. Recently investments have been made in new processing

¹⁰ A. van Engelen, Phase 1 Report – Volume II Livestock Agribusiness Report, Preparing the Commercial Agricultural Development Project, ADB, 2006.

equipment for Kabul, and in Mazar-I-Shariff a new dairy plant will be operational as from July 2007. The Kandahar collection scheme had to be discontinued for security reasons.

In Kabul the Guzargha dairy plant collected milk from 550 producers with a total of 580 cows. The collection centres are located in Logar, Wardak and Kabul. Over the past years (2003-2006) the quantities of milk supplied per farmer have increased from 3.4 kg/day to 4.7 kg/day as shown in the table below. We can also see that after the increase from 3.1 to 4.3 kg/day, the average milk production per cow as well as the daily supply per farmer remained very stable. The number of farmers delivering milk increased gradually, showing a growing interest in dairy production.

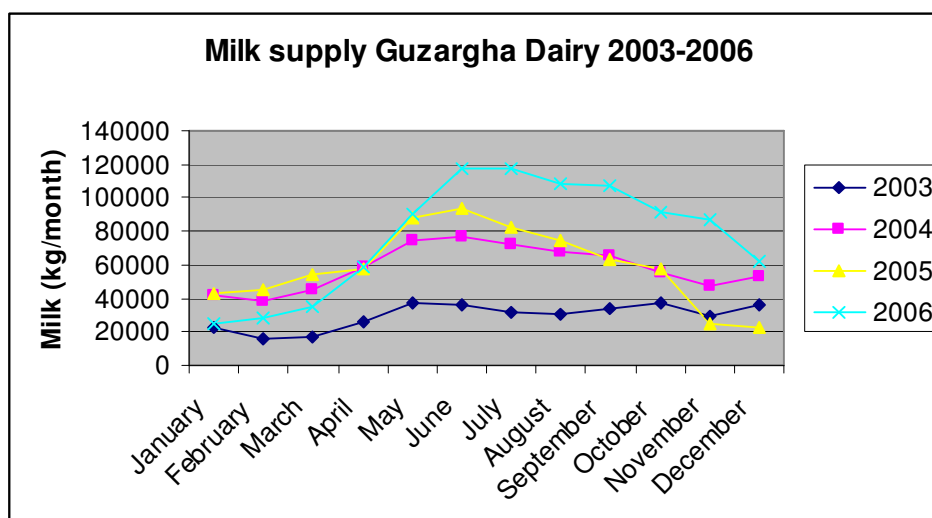
Table 1: Milk Collection Development at Guzargha Dairy Plant (2003-2006)

Year	2003	2004	2005	2006
Average kg milk/day	986	1,935	1,962	2,599
Average kg milk/farmer	3.4	4.7	4.8	4.7
Average kg milk/cow	3.1	4.3	4.2	4.5
Number of farmer	287	416	412	550
Number of milking cows	315	447	472	580

Milk is collected once a day (only morning milk) as there is no cold chain and the loss of quality would be too high if evening milk was kept overnight without proper cooling. Milk quantity and fat content are the basic parameters for milk payment. Simple quality testing is done at the milk collection centre (although it would be better to talk about collection points) with the purpose of either accepting or rejecting the milk. The tests (organoleptic, alcohol and/or density) have no influence on price.

The total quantity of milk collected shows strong fluctuations according to season. In spring and summer, during the traditional calving period which coincides with the better availability of fresh fodder, more milk can be collected than the plant can manage. In winter there is a shortage of milk as many cows are dry and feed is scarce. This is a serious concern, as farmers are eager to sell their milk at all times of the year, while on the other hand the dairy plant should be able to use its processing capacity efficiently and have enough dairy products to meet the demand of its customers. Moreover, the growing production levels through improved feeding and higher genetics will make it necessary to start collecting milk twice per day or at least assure that all surplus milk can be collected through proper cooling and storage.

Figure 2: Milk supply to the Guzargha Dairy Plant, averages 2003 – 2006 by month.



In Mazar-I-Shariff four farmer cooperatives formed the Balkh Livestock Development Association (BLDA), which was formally registered in June 2004. The BLDA has 292 members, who supply milk to the Balkh Dairy. There are five milk collection centres, all located in the two villages Sherabad and Chilgazi in Dedadi District. In addition to the members of the BLDA there are more than 150 farmers that also supply milk to the Balkh Dairy. The current dairy has the facilities to collect, process and market some 2,500 kg milk/day in a simple way. A new dairy plant has been established with support from Land o' Lakes. A detailed description of technical, financial and organisational planning is provided in the Balkh Dairy Business Plan¹¹. The new dairy plant will be able to process 5,000 l/shift. The main products will be pasteurized milk and yoghurt. The design of the building and the supply of processing equipment is from India. The total investments in building and equipment amount to \$525,000. FAO will continue its support services till March 2008. The development of milk supply in Balkh is shown in the table below. Here we see a steady increase in milk supply per cow as well as per farmer.

Table 2: Milk Collection Development at Balkh Dairy Plant (2003-2006)

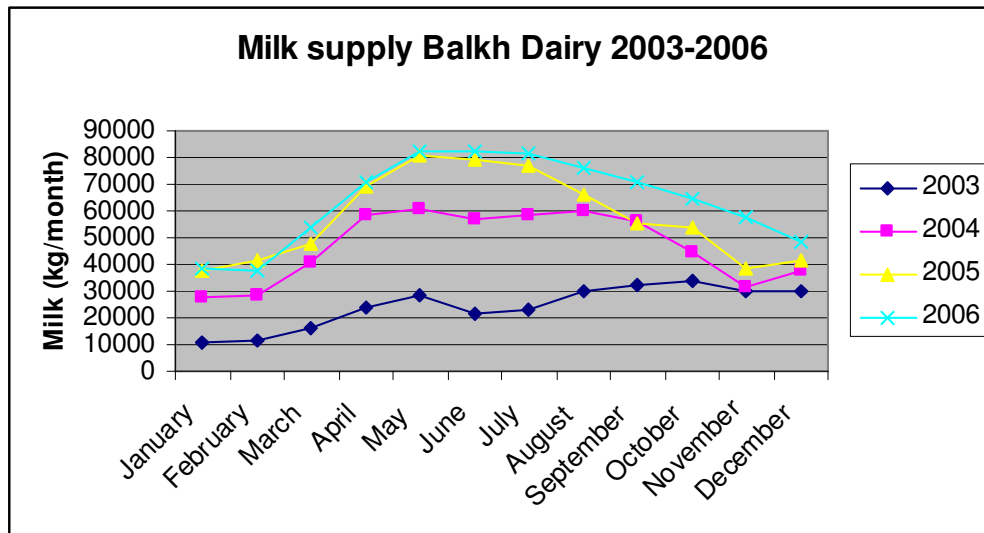
Year	2003	2004	2005	2006
Average kg milk/day	809	1,557	1,911	2,143
Average kg milk/farmer	2.2	3.9	4.7	5.3
Average kg milk/cow	2.0	3.1	4.4	4.9
Number of farmers	372	400	405	450
Number of milking cows	405	510	435	435

Source: FAO statistics

¹¹ King Bash, Balkh Dairy Business Plan, Land o' Lakes, 2006.

The seasonal variation in milk supply in Balkh shows a similar pattern as in Kabul as shown in Figure 3 below. The steady increase in supply over the past few years is also clearly visible.

Figure 3: Milk supply to the Balkh Dairy Plant, averages 2003 – 2006 by month.

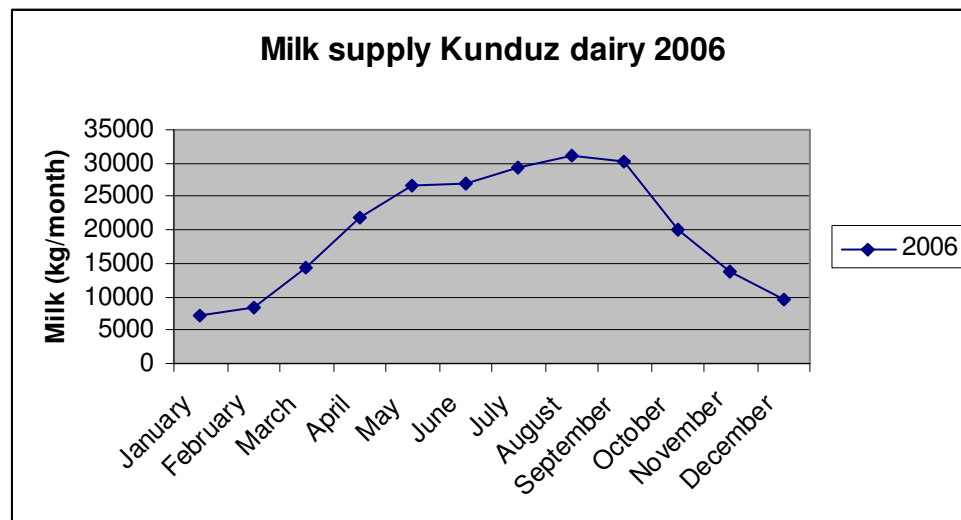


In Kunduz there are 4 milk collection centres and a processing unit with a similar approach as in Kabul and Mazar, but smaller in size. At the time of the visit around 1,000 litres milk per day were collected from some 220 farmers with a total of 250 cows. Here the quantity per farmer is still smaller than in the other areas (an average of 3.1 litre/farmer compared to 4.7 in Kabul and 5.3 in Balkh in 2006) but similar if we look at the situation in the other two areas at the start of the program. However, there is no doubt that it will take more time to develop the dairy sector.

Here too there are plans to establish a new dairy plant which is meeting modern standards, but the available funding is not yet enough. The German Federal Ministry for Food, Agriculture and Consumer Protection already donated \$150,000, but additional funding will be required as the total investments for building and processing equipment will be close to \$ 500,000.

The Kunduz data only cover one completed year (2006) and the table below shows that again the patterns are similar for variations in supply over the year.

Figure 4: Milk supply to the Kunduz Dairy Plant 2006 by month.



Although very popular, these initiatives have not reached yet a level of development that could ensure their sustainability. FAO subsidizes the collection and processing scheme with equipment, technical staffs, a vehicle for collecting the milk, enriched animal feed, cattle health services, artificial insemination, equipment for improvement of cattle stables, fodder choppers and improved fodder crop seeds and fertilizers. Should the milk collection scheme not be subsidized by FAO, they would not be viable at their present level of operation. However, the Balkh Dairy Business Plan showed that under good management dairy processing with a capacity of 5000 l/shift is giving a good return on investments.

In Pul-e Khumri in Northern Afghanistan, where a Swiss project existed before the war, DCA has recently established a small dairy plant for the production of Gouda cheese. At present the plant collects 1,000-1,500 kg milk/day, but the installed capacity allows for a gradual increase of production. The cheese is mainly sold in the Kabul hotels, as the price of \$9.50 per kilo is still too high for many people.

The first larger scale dairy plant is the Mountain Pastures Dairy (MPD), an American-Kazakh joint venture established with USAID financial support. The plant nearly reached completion and is expected to be in operation as from July/August 2007. There is some contradictory information on the processing capacity, but this will at least be 10,000-15,000 liters milk per day. The installed Tetra Pak equipment is suitable for processing UHT milk and fruit juices. At least the first few years the plant will run on imported milk powder, but after that local milk production should replace the imported milk powder. There is however no reliable information on the intentions of MPD to invest in milk collection systems. Land o' Lakes was expected to support the plant management with milk sourcing, but their contract was terminated before anything could be done.

With exception of the FAO operation which is funded through GTZ and the new DCA cheese plant, there has been no sizable attempt to promote milk producers organization. Although the scale of operation and the technologies that were used in the past years were far from adequate, we believe that the present investments in upgrading can take the dairy plants to a level that could cope with the rapidly increasing imports of powder milk and other dairy products into Afghanistan.

2.4 Milk Marketing

As mentioned earlier, most of the milk is consumed by the members of the household and surpluses are converted in quroot and maska. Farmers living in or near urban areas and keeping more productive cows, sell directly to consumers or shops, where the milk is boiled and processed into yoghurt. Most of the fresh products (e.g. bulk milk, cream) therefore never enter the supermarkets, but are sold in the street or on the green markets.

In 2006 USAID conducted dairy product retailer surveys in Kabul, Jalalabad, Mazar-I-Shariff, Charikar and Kunduz¹² and the results of these surveys are of importance in designing future dairy programs. The main conclusions are summarized below, but the reports provide much more detailed information.

Imported dairy products presently dominate retail shop markets, although their share varies per city (Kabul 97%, Mazar 87% and Charikar 64%). Milk powder dominates the market, followed by UHT milk, mainly from Pakistan. Long shelf-life of UHT milk and the fact that no refrigeration is needed are major competitive advantages for which the consumer is ready to pay at least twice as much as for fresh, farm-made products.

A major disadvantage of fresh local products is their inconsistency in quality. Milk may spoil within a day and water might have been added. The surveys showed consumer preferences for safe, high quality products, although the same consumer is not yet ready to pay a premium price for these products. Nevertheless, most shop keepers have sold their fresh products already before eight o'clock in the morning and all of them indicated that they would be able to sell more if available. Especially fresh milk and yoghurt are in high demand if these products meet the required quality standards and have the right image (branding and packaging).

Seasonal variations in demand were observed, but this may also be affected by the changes in supply. Fresh milk is scarce in winter and therefore demand for this product seems lower. However, as the sales of imported products increase in the same period, we may assume that with better availability of fresh products the demand for these products would also be more consistent.

¹² Draft results of a Survey of Kabul Dairy Retailers, Alternative Livelihoods Program, 2007 and related reports on Mazar, Jalalabad, Kunduz and Charikar.

The FAO supported dairy plants were not yet in a position to meet the demands for higher quality as their processing facilities were not adequate. Now, with the investments in new processing and packaging equipment they will be in a better position to compete with the imported products. This should then lead to an expansion of their operations and a commercially viable enterprise. A major concern will remain the quality of the raw milk, which cannot be guaranteed without an efficient collection system and cold chain. Even the best processing equipment cannot improve the basic quality of the raw milk that is delivered at the plant.

3 Options for Dairy Development

3.1 Introduction

Dairy development needs a chain approach: first of all the market for dairy products should be considered: what products are in demand, for which prices and what are consumer preferences for branding, packaging and quality standards. Working backwards from the market, we have to establish a distribution system and make sure that there is a reliable supply of products.

The processing plant itself needs to meet at least the standards of Good Management Practices, but preferable be HACCP certified (Hazard Analysis and Critical Control Point). The quality of the dairy products depends first of all on the biological quality of the raw milk. Milk must:

- Have a natural smell and taste;
- Have a natural composition;
- Contain no residues of antibiotics, added chemicals, pesticides, detergents and disinfectants;
- Be free of dirt;
- Be healthy, i.e., free of pathogenic micro-organisms, and it must come from healthy milking animals;
- Be fresh, i.e., have the correct acidity; and
- Be low in bacteria.

Hygienic conditions in the barn and during milking, clean buckets and milk cans, fast cooling of the milk and care during transport and storage are needed to assure good raw milk quality. A well designed milk collection system has to be in place to avoid any loss of quality. At the same time the collection system should be cost-effective. That can only be achieved if the quantities are large enough to justify transport and cooling.

In order to make the system more efficient and attractive, it is important that the cows produce enough marketable milk. Genetic improvement, good health care, sufficient feed and fodder to meet the nutrient requirements, proper housing conditions and good calf rearing are essential to increase production levels and reduce the costs per kilo milk.

In the next pages we will discuss each of the above aspects of dairy development in more detail.

3.2 Milk Processing and Marketing

The available data show an increased demand for milk and dairy products, mainly as a result of rising standards of living and an increase in (urban) population. The effect of this growing demand is a rapid increase in the imports of dairy products.

One of the priority areas in the Master Plan is to reduce these imports by 50% within the next few years. This can only be achieved if there is not only a substantial increase in processing capacity, but also in the supply of good quality raw milk.

The first FAO processing facilities were too small and did not meet the standards required to produce the quality type of product with enough added value to justify the costs of milk collection processing and distribution. The present approach of establishing medium-scale processing plants with modern equipment for milk reception, storage, pasteurization and packaging is a great step forward. The installed capacity of 5 t/shift allows for a 100% increase in production volume, when working two shifts. With a limited additional investment, the capacity can be increased further to cope with a growing raw milk supply and increased demand for fresh dairy products. The main products will be pasteurized milk (packed in pouches) and yoghurt. By gradual increasing the processing capacity and at the same time developing the market, under utilization of capacity (and thus unnecessary costs) can be avoided. The Balkh Dairy Business Plan shows that this size dairy plant can be operated in a commercially viable way (with a calculated Net Cash Flow of more than \$188.000 at 81% installed capacity use). This, of course, does not include any costs for external support in plant management and dairy farm support services.



The earlier processing facilities did not meet the standards to produce value-added products with the right image.

An alternative could be the establishment of a large(r)-scale dairy plant, with a processing capacity of 50 tons milk per shift. With a plant of this scale it becomes necessary to make a choice between the more expensive UHT equipment or to invest in equipment for the production of fresh products. UHT milk has the great advantage, as we said earlier, of a long shelf-life and no need for refrigerated storage. Competition would be directly with the UHT milk presently supplied by foreign companies such as Nestlé, Haleeb and Condia. Mountain Pastures Dairy has opted for this solution, but to make the dairy plant commercially viable the management will use milk powder for the next few years to assure that there will be no under-utilization of processing capacity and to maintain quality standards. There is no information on raw milk quality testing (e.g. bacteria count, somatic cell count, inhibitors, freezing point), but we may assume that the raw milk quality standards for UHT processing are not yet reached anywhere in Afghanistan. Another point of concern would be the establishment of a milk collection network that could supply 50 t/day throughout the year. This would take time and considerable investments in collection centers.

A cheaper solution would be a large(r) plant that can produce a variety of fresh products (e.g. pasteurized milk, yoghurt, quark, soft cheese, cream). These products would have to compete with the imported dairy products as well as the locally produced fresh products. They would, however, also bring a complete new segment on the market, as there are no locally produced, high quality and branded fresh products available. The retailer surveys clearly indicated a growing demand for these types of product and the interest of the shop owners to supply such products. In this respect the medium-size dairy plants (10 -15 t/day) and the larger dairy plant (50 t/day) both will serve the same markets. Three smaller ones can produce the same quantity and variety as one larger plant and the choice for either one of the options has to be justified.

The main differences are in the development process of the dairy base, plant ownership and organization, risk management and investment requirements.

As section 3.3 will deal in more detail with the development of the dairy base, it is sufficient to state here that in many areas, where there has been no previous milk collection or marketing structure, much time will be needed to improve dairy husbandry practices and to assure a steady supply of high quality milk. For a smaller dairy plant it will be easier to obtain sufficient milk fast enough to cover the costs of processing, than for a larger plant.

Dairy plants can be owned and managed in various ways, e.g. as an enterprise with one or a few owners or as farmers' cooperatives. All over the world there are many examples of both forms, each with its own historic development. In general we can say that cooperative systems took quite some time to develop into the kind of organizations we see today. Most of them started at village level, gradually expanding and merging with neighboring cooperatives into regional structures. The advantage of the cooperative system is that the interests of the farmer as well as those of the dairy plant are the same. A private dairy plant will first of all think about the profitability of the plant and have a different relation with the farmers: they are suppliers and should preferably provide the highest quality milk at the lowest price. However, management decisions in a private plant are easier to make, as this does not require a complicated structure of cooperative ownership and management procedures. In section 3.5 we will discuss the organization structures further.

Risk management is an important factor. Not only for the farmers involved, but also for the donor organizations providing financial and technical support for the development of the dairy sector. In this respect we can distinguish two main areas of concern:

- Investment risks of one large plant versus several plants; and
- Commercial viability and management capacity in relation to the scale of operations.

One large plant may be cheaper to construct, but if not managed properly, this investment could be lost completely. If one of the smaller plants fails, at least there may be one or more plants left that will develop in the expected way.

Farmers' organizations are new and need time to develop before they can be given full responsibility of managing complete dairy chains. A large plant will involve more villages, provinces and most of all people that all have to decide on what to do and how to do it. A smaller plant will cover a limited area, with people that know each other and are closely involved in the development of the dairy sector. Thus the risk of management failure will be reduced when working with smaller units.

We have seen that FAO invested much time and energy in training, extension and management support to form the village groups of dairy farmers, to establish the dairy unions, to manage the small plants, to increase the milk supply per farmer and to develop the additional services for fodder production, artificial insemination, health care and cattle housing. The strong seasonal variation in milk production and supply is a problem that cannot be solved easily, but which has a considerable impact on plant management. In summer farmers wish to sell all their marketable milk, which often is more than the plant can handle, while in winter the quantity of milk per village is so small that it hardly justifies the costs of collection and processing.

Therefore we can conclude that, based on earlier experience, there will be a need for intensive guidance and support for a number of years. Not only in managing the dairy plants, but also in developing the markets for dairy products. Identification of new clients, response to consumer demands for quality and packaging, reliable services and realistic prices are all part of the activities to be supported.

3.3 Milk Production and Support Services

The present raw milk supply is highly seasonal as farmers have 1-2 cows only and traditionally have spring calving as this coincides with the best feed availability. Concentrate feeding still is a luxury as is the supply of green fodder. Genetic potential of the local cows hardly justifies investments in better housing and nutrition. The exceptions on this farming system are the farmers that live near the urban areas and that have found a market for their milk which allows them to have better animals and to purchase more feed.

We have seen the development over a 4-year period in milk supply per cow and per farmer in Kabul and Balkh, achieved through intensive guidance and support from FAO specialists. The increase in milk per cow and per farmer is fairly fast during the first years, but then stabilizes or increases at a much lower rate.

Table 3: Development in milk supply per cow and farmer from 2003 – 2006

Year	2003	2004	2005	2006
Kabul: Average kg milk/farmer	3.4	4.7	4.8	4.7
Kabul: Average kg milk/cow	3.1	4.3	4.2	4.5
Balkh: Average kg milk/farmer	2.2	3.9	4.7	5.3
Balkh: Average kg milk/cow	2.0	3.1	4.4	4.9

We may not expect that a faster rate of increase is possible, certainly if we increase the area and the number of farmers substantially (the HLP project aims at involving 15.000 farmers, while the FAO at present works with a total of 1220 milk suppliers). The genetic potential of the cows will remain a limiting factor for a number of years.

An important factor will be the establishment of a cold-chain, which allows for the collection of both evening- and morning milk. Currently only morning milk is collected, as the milk quality would otherwise be too low for processing and marketing. As yields per cow increase slowly through higher genetic potential and improved nutrition, the surplus milk in the evening will become too much for home consumption and will have to be sold. Otherwise this will become a serious constraint in the development of the dairy sector.

The figures in Section 2.3 show that the seasonal variation remains quite large throughout the period of milk recording. Seasonal variation can be reduced if:

- The raw milk price in winter stimulates increased production during this period (most dairies work with an average price per year and the savings on a lower summer price are used to pay a higher price in winter);
- The extra costs for fodder conservation and the use of concentrates are compensated by a higher income through increased milk production in winter;
- The traditional spring calving is replaced by year-round calving. The peak production will not always be during spring and early summer, when natural fodder is available;
- Genetic improvement leads to longer lactation periods and lactation curves show a more persistent level of production.

To stimulate farmers to increase milk production and to assist them with the necessary changes in dairy management, support services are needed. We can distinguish the following services:

1. Advisory services on animal nutrition: farmers will have to understand the nutritional requirements of calves, young stock, milking cows and dry cows. What fodders can be produced, what are the best conservation methods, what concentrates are needed, what is the most efficient way of feeding your cattle. Valuable experience has already been gained through the FAO trials with various fodder crops (e.g. various varieties of Alfalfa, Berseem, Oats, Sorghum and Sudan Grass) and the results of earlier trials can be used in future advisory products.

The type of cows we have seen are of fairly low genetic quality, but with good feeding and management they could perform better than at present. Most cows show retarded growth as a result of poor feeding during their rearing period. Therefore the first priority should be to teach farmers to feed their calves and young stock in such a way that they grow into more productive cows. This cannot be done on wheat straw, which is of low nutritive value. For the winter period hay of an acceptable quality is needed. The trials with the various fodder crops already show that much higher yields can be obtained and the climatic conditions in Afghanistan are such that good quality hay can be made in a very short period. If available, hay from the rangeland crops is also very useful. Advisory services, combined with the supply (at a

realistic cost) of seeds, fertilisers, minerals and concentrates would help to improve production levels.

Here we should also mention the plans for establishing a feed mill with a capacity of 50 ton/day. In addition to good roughage, cattle need additional concentrates to boost milk production or to stimulate growth in young stock. At present farmers hardly use any concentrates and it will take time before this habit will change. Moreover, as cattle are ruminants, the first priority in nutrition is the supply of roughage (e.g. fresh fodder and hay). At the present levels of production, only limited quantities of concentrates would then be needed (if any at all). With 15.000 cows and an average consumption of 2 kg/cow/day, the plant would operate at 60% of its capacity. In the poultry programs (HLP/ASAP) there are also plans for establishing feed mills and it is strongly recommended to assess the actual need for an additional feed mill for cattle before any commitments are made. Another point to consider is if the locations and ownership for dairy plant(s) and feed mill(s) have to be the same.

2. Veterinary services: curative and preventive treatment of cattle is essential to improve production and to prevent losses through death, infertility and/or diseases. Veterinary services can be provided through the existing Veterinary Field Units (VFUs) although upgrading of these VFUs might be necessary. The Animal Health component under the HLP program can be used to strengthen these VFUs in the areas where dairy development takes place.
3. Artificial Insemination: reliable AI services are necessary to improve the genetic potential of the dairy cows. In several provinces and districts these services are already provided and can be used. Additional service points may have to be established. The growing interest from farmers in AI Services and the investments made by the various NGOs to provide these services are important to expand the system. Through the Working Group on Breeding and Artificial Insemination a coordinated effort will be made to deliver reliable services in those areas where dairy farming is developed.
4. Farm management support: in addition to the above services there will be a need for advice on housing, milking and hygiene, husbandry practices and other aspects of dairy farming. Investments in improved dairy production should be justified by economic returns and records are to be kept to monitor achievements.

Although it would be best to start the support services as soon as the dairy development program starts, it may be difficult to convince farmers to invest in better feeding and AI services before they can actually sell their milk. Therefore the first step should be to organize the farmers and to prepare the milk collection point or centre. Visiting farmers that are already involved in dairy development through the FAO programs, would also be an effective way of sharing experience between farmers. This should give them enough confidence in already growing additional fodder and using AI services. Concentrate feeding can come when milk collection starts.

The regional differences in milk production are quite large. During the visits to Logar, Mazar, Kunduz and Jalalabad it was obvious that developments in one area will be faster than in others. Jalalabad already has a fairly large number of cross-bred animals and substantial milk sales take place to Pakistan. In Mazar

only two villages sell milk to the Balkh Dairy and the potential to supply much more is very high. However, in Parwan, Wardak, Kapisa and Laghman, the provinces around Kabul, we must expect more difficult conditions: less cows with improved genetics and a lower density of cows per village. Here it will take more time to collect enough milk per collection centre in an economic and cost-effective way.

The problem remains that all suppliers will wish to deliver all their milk throughout the year. As this will be impossible for the processing plant to cope with, strict delivery conditions will have to be made to avoid disappointments. At the same time the support services should strive to reduce the seasonality in production and supply.

3.4 Investments and Financial Sustainability

The establishment of a processing plant requires substantial investments in hardware. Specific points that have to be taken into account and that are directly related to the establishment of a milk processing plant are:

Buildings: a suitable building is needed to ensure good hygiene, proper ventilation and high working efficiency. Different process and storage rooms are needed (e.g. raw milk storage, pre-treatment, dairy product processing, and storage). Hot and cold water outlets, electricity outlets (power load and light load), have to be included. Under the HLP dairy component a local contractor will be hired to carry out the construction works, under guidance and as specified by the Facilitating Partner (FP). The required budget for a complete building depends on the scale of the plant. The costs for the Balkh Dairy building (5 t/shift capacity) has been estimated at \$250.000, while the building for the Baghlan Cheese Plant was less than \$200.000 (similar capacity).



Balkh Dairy Plant under construction.

Auxiliary Facilities: water supply, refrigeration unit, effluent disposal facility, electricity supply and energy supply all have to be reliable and adequate. The availability of sufficient, high-quality water is essential as the quantity of water required is several times the quantity of milk processed. Ice water is needed for cooling purposes and electricity (both from the public grid and an own generator) is essential for operating the plant.

Equipment: the level of technology should be suitable for Afghan conditions and equipment has to be specified for raw milk reception and storage, milk treatment, processing and packaging and CIP (automatic cleaning system). The milk processing equipment should meet the highest standards, while cleaning and disinfection should be easy, effective and efficient. The processing equipment should be reliable, but not too sophisticated to cause serious problems in maintenance or servicing. The recommended capacity of a plant should be considerably higher than most private processing plants, but still small enough to avoid high overhead costs as long as the plant is operated below full capacity and to present a model for other entrepreneurs and farmers.

The Balkh Dairy Business Plan¹³ shows a total investment need of \$759.000, including second hand equipment and transport facilities belonging to the old FAO supported plant. With pasteurized milk and yoghurt as the main products, the dairy plant expects a slight positive cash flow in Year 2 and in Year 5 the cumulative cash flow becomes positive. With the planned grants for building and equipment, the cumulative cash flow is already positive in Year 2. Technical assistance is not included in the calculations and higher investments in milk collection are likely to be needed. The plant is expected to operate with an average raw milk intake of 4.1 ton/day, which is quite modest if we consider the availability of milk in the area and the potential for marketing of dairy products. However, even with this limited capacity the calculated profitability of the plant justifies the investments.

A larger plant with modern UHT processing equipment, similar to the Mountain Pastures Dairy in Kunduz, requires a total investment of \$8-9 million. Such an amount can only be recovered if the plant can utilize its capacity for at least 70-80% throughout the year. If this cannot be realized with raw milk (of acceptable quality) then recombination of powdered milk is the only alternative to become financially viable. For project purposes or as a model to be repeated in other areas this type of dairy plant is less suitable.

Investments in a larger plant for the production of pasteurized milk, yoghurt and other fresh dairy products are much lower than for a UHT plant. The basic needs are similar as those for a smaller plant (5t/shift), but capacity requirements for storage, processing and packaging are certainly higher. From an investment point of view one larger plant is cheaper than two smaller plants with the same total capacity. However, from a management and organizational point of view the investment risks are higher for one large plant.

For the farmers it is not only important that the dairy plant is profitable, but for them it is even more important that they get a good price for their milk. The Guzargha dairy plant in Kabul pays an average price of 13 Afs/liter (\$ 0,26) to the suppliers, while the Balkh dairy in Mazar paid an average price of 12 Afs/liter. Direct sales in the urban areas fetch higher prices (around 20 Afs/liter). The FAO reported an average income for all their suppliers and over the total reporting period (2002-2006) of \$ 363/year. The Balkh Dairy Business Plan (BDBP) calculations are based on a milk price of \$0.25/liter at the start of operations and

¹³ Balkh Dairy Business Plan, Land o' Lakes, 2006

gradually increasing to \$0.30 towards 2013. The HLP economic indicators¹⁴ are based on a raw milk price of \$0.30/liter. These indicators have been attached as Appendix 8.

The raw milk price depends on the price that the dairy plant can obtain for its products. If milk is sold to the shops for \$0.36/liter (18 Afs), as is the case in Mazar, the operating margins for the plant are limited. A similar situation exists in Kabul. With better quality and packaging a higher price can be obtained in the market and the BDBP therefore works with \$0.44 – 0.53 for pasteurized milk and \$0.56 – 0.71 for yoghurt over the period 2008-2013. These prices allow a reasonable margin and the calculated profits will be an additional source of income for the members of the co-ops. At these prices the plant can still compete with the imported UHT milk sold at \$0.80/liter (40 Afs).

The above calculations are based on a gradual development of milk supply and dairy product marketing. The HLP indicators assume that already in Year 1 the 15.000 households will supply an average of 18.500 liters/day. This milk was to be processed through the Guzargha dairy plant, which still has a daily milk intake of less than 2.500 liters/day on average. Even with the expanded capacity that has been installed recently, the Guzargha dairy plant could not cope with 18 tons/day. We can only conclude that the HLP indicators are far too optimistic and therefore provide an unrealistic picture of the revenues of the project and for the farmers involved.

3.5 Organizational Structures

The proposed structures for ownership and management are based on the co-operative system. Farmers own the processing plant and thus control the total chain from cow to consumer (or at least till the retail shops). In India this model was developed shortly after the Second World War (the AMUL Co-operative in Gujarat state was founded in December 1946), and in Western-Europe cooperatives had already been established towards the end of the 19th century. In the Netherlands 85% of the milk is processed by dairy coops.

It is clear that the cooperative system has a long history. In most places it started on a village level, gradually expanding and growing to meet the challenges of competition by increasing the scale of operation. Not only the milk processing industry developed in this way, but similar processes can be seen in breeding organizations, insurance companies, banking systems, feed producers and many other agricultural enterprises. As a pattern the development started always from the bottom and developed step by step.

In Afghanistan the FAO dairy projects followed a similar approach: at village level farmer groups were established (all milk suppliers with a direct interest) that own and manage a (simple) collection centre. Several of these village groups (now formal co-operatives) then form a union. The union becomes the owner of the dairy plant. At present, even after 5 years of operation, these unions do not cover more than 10 co-operative milk collection centers and intensive management

¹⁴ HLP Project Documents - Appendix 13 Livestock Production Working Paper and report Dr Singh

guidance is still provided by FAO staff. In Parwan two milk collection centers were established with support from Land o' Lakes, but these initiatives failed, mainly because the project period was too short to support the co-ops sufficiently in their development.

In a country that for 30 years suffered under conflicts and war, where educational systems collapsed and infrastructures were largely destroyed, it will take time to build new structures for milk collection and processing and make them technically and financially sustainable. It would be too optimistic to believe that within 7-9 months some 250 village co-ops in five different provinces can be established that all work together as one great union in the management and operation of a new dairy plant as proposed in the HLP project documents.

Short communication lines, trust and confidence among the shareholders as well as visible ownership are essential ingredients for developing the dairy sector through co-operative systems. The Balkh Dairy Business Plan gives a clear organizational structure (see Appendix 5) which meets the criteria for successful development.

Besides the necessary training of board members in management and administration, it is absolutely essential that support is provided to develop the market and distribution system. Producing fresh milk and yoghurt with a limited shelf life means that these products will have to find their way to the retail shops every day of the year. Spoilage or surpluses will have a strong negative effect on plant profitability. A gradual development of markets is possible when plant capacity is not too large. Expansion of capacity is easy if the original layout and equipment selection are already based on business development. Working with over-capacity is costly and discouraging.

A first step to create larger units and to stimulate closer co-operation between the various dairy plants, could be the joint marketing of dairy products under one brand name. Once quality standards are similar and the markets are ready to absorb larger quantities, this form of co-operation can be used to have a more efficient system of promotion and advertising, to save distribution costs and to avoid unnecessary competition. A next step could then be a more specialized production system in the various dairy plants.

4 Government Policy

As mentioned in the Master Plan, the overall goal of the MAIL is:

“To increase livestock productivity and improve livestock products competitiveness to provide improved availability of animal proteins to the people and increased revenues and well being of the livestock owners”.

This general objective is to be attained through the protection of livestock against animal diseases and the improvement of livestock raising practices in coherence with the three pillars of the National Development Framework. The specific objectives are that, in the medium term, the majority of rural households practicing animal husbandry will:

- have improved significantly their animal husbandry practices and raised their level of income;
- have reached better security regarding health and nutrition of their animals to sustain food security and commercial productions generating farm capital;
- contribute to the national economy through efficient traditional and intensive quality productions for national and export markets.

With respect to milk production at village level, the emphasis will remain on integrated dairy development that includes production, processing and marketing. Particular attention will be given to increasing fodder production and improving its quality, raising awareness about the health aspects of dairy cattle, using artificial insemination to improve the breeds of animals, the creation of milk producing groups and improved access to markets for milk and milk products. In this respect, FAO dairy projects will be of assistance for dairy development.

A reduction in the imports of dairy products of 50% within the 5 year-plan is a challenging target, certainly if we look at the growing demand for dairy products. In order to achieve this reduction in imports, the local dairy industry needs to develop fast, not only by establishing a network of milk collection centers and processing facilities, but also by increasing the milk production per cow through genetic improvement and better feeding. Therefore the MAIL wishes to support developments in the dairy sector through a policy that:

- stimulates local milk production and processing;
- provides quality guarantees for consumers;
- gives a certain level of protection against foreign competitors; and
- supports the development of producer organizations.

In recent years much support has been provided in the areas near Kabul, Mazar-I-Shariff and Kunduz, where security and working conditions are better than in many other parts of the country. For MAIL however, it is important that more regions benefit from project and government support and therefore a dairy development program that can cover a larger area is preferred. This can be achieved by giving additional support to existing initiatives (complementary to ongoing projects) and by developing new initiatives in different provinces. Each target area will then be given a starting point from where further development is

possible and made easier. The proposed approach in the next Chapter was formulated in close co-operation with MAIL and is in line with its policy for integrated dairy development as stipulated in the Master Plan.

Quality control, not only on imported dairy products, but also on local products, needs to be improved. The direct sales in the larger cities are completely without quality control and even the quality of packed products is sometimes doubtful. At the existing milk collection centers quality control is still very basic and this is reflected in the short shelf-life of fresh dairy products. The establishment of a small, independent laboratory for milk and dairy product testing is already in progress through the AHDP project in Dar ul Laman.

As the local milk production and processing industry is weak, protection against foreign competition is not only justified but needed. Growing imports from Pakistan and Iran, often without legal permits or quality control, threaten the development of the local dairy sector. Milk processing based on imported milk powder, without guarantees for making serious efforts to develop a milk supply system, should not be allowed either. Protection, although nowadays not the most popular word in view of World Trade, should stimulate local farmers to become efficient producers. Too much protection will lead to inefficiency and higher production costs, at the expense of the consumers. No protection, however, will be worse as this will seriously hamper the development of the local dairy sector.

5 Recommend Approach for Dairy Development

In this last chapter we will summarize the findings of the study and provide several suggestions to support further dairy development in Afghanistan and the role of the HLP project in this process.

We have seen that an integrated approach as requested by MAIL will be necessary to achieve the objectives, as:

- Without markets farmer will not be interested to invest in increased milk production;
- Without genetic improvement the potential of the local cows is too low to justify investments in better feeding and housing;
- Without improved nutrition the potential for milk production will not be realised and the quantities of surplus milk to be sold will be too small to justify investments in milk collection;
- Without reliable veterinary services the risk of diseases and loss of expensive animals will be too high to compensate for the extra income of milk sales;
- Without cold chain and an efficient milk collection system, the milk quality will not reach the required standards and this will not only cause direct loss to the farmers because of spoilage, but the consumer will not be satisfied with the dairy products either;
- Without proper processing, packaging and branding the competition with other suppliers of dairy products and fresh milk will be very difficult and commercial viability of the system will be threatened; and
- Without a clear marketing strategy and a good distribution system, the sales will be lower than anticipated and the whole chain will be affected negatively.

Dairy development will have to start in those areas where the infrastructure (cow density, road access and electricity supply) make it possible to build up a cost-effective milk collection system and where the potential to produce enough feed and fodder allows for cross-breeding programs and thus higher yields per cow.

Dairy development goes beyond the normal project periods and should be based on a longer-term vision and commitments to provide the necessary support till a sustainable system has been developed.

Dairy development requires substantial investments, not only in processing and milk collection facilities, but also in dairy farming (e.g. barn improvement, more and better cows, fodder production). Investments that take place at the risk of the farmer and only pay-off is his milk can be sold at a profit. Providing sufficient assurances that the milk can be sold at an attractive price and therefore that these investments are justified is essential to involve farmers in dairy development programs.

Dairy development is a strong tool in rural development: it provides regular income, it provides work, it involves both men and women, it helps to integrate farming systems, it provides important by-products such as beef, hides and manure for heating and fertilizers, it makes use of agricultural waste- and by-products such as straw, stover, natural grasses, bran and cakes. In short, it is not surprising that in all the areas that were visited farmers were very eager to become involved in dairy development. Also from government's side at national, provincial and district level, the reactions were very encouraging.

The HLP project support should help to ensure that ongoing initiatives do not fail because the period of technical support was too short. These earlier initiatives are only now developing into the type of dairy structure that meets modern standards for quality and packaging. The network of milk collection centres needs expansion, the cold-chains are still non-existent, the farming systems are still underdeveloped, the markets for dairy products have hardly been opened. Still much needs to be done before the plants in Kabul, Mazar, Kunduz and Baghlan reach a level of maturity and sustainability and can continue on their own.

In other areas there is a demand for dairy development, but here we still have to start with establishing the basic infrastructure: bringing the farmers together, organising the first milk collection centres, providing support in all aspects of dairy farming and quality management, establishing the processing facilities and developing the market for dairy products. As we said earlier, two or three years are not enough to achieve sustainable results. Without a longer-term commitment it is indeed better to go for easier goals and not to think about the long duration dairy development requiring several decades.

During the mission visits were paid to Wardak, Parwan, Nangarhar, Laghman, and Ghazni to discuss the options for dairy development and to get acquainted with the conditions for milk sourcing and marketing. The report prepared by Dr. Kakar, HLP Livestock Co-ordinator has been attached as Appendix 6. The conclusions show that:

- Nangarhar and part of Laghman province have a very good potential for dairy development. The present levels of milk production and the existing infrastructure should make it possible to organize milk collection and processing with a capacity of 10/t shift, gradually expanding to reach 20 t/day.
- Wardak, Parwan and part of Kapisa have potential, but the local conditions are more difficult and the quantity of milk per farmer and per collection centre will be smaller. These provinces will need more time to develop in comparison to Nangarhar. Both Wardak and Parwan prefer the establishment of a provincial dairy plant, but if this is not feasible delivery to a plant near Kabul is acceptable. Kapisa was not visited, but here milk collection centres could be established that supply a plant in Parwan.
- Ghazni Province has a good road to Kabul, but also a considerable internal market for dairy products. At request of MAIL this province was included in the investigations and response from farmers and local authorities was positive. A medium-size plant with a capacity of 5t/shift and possible daily production of 10 t seems feasible.

Security issues play an important role in the selection of provinces, districts and villages for dairy development. In each of the above provinces districts have been identified that are at present safe enough to work in and where villages can be selected that fulfil the basic criteria for establishing milk collection centres.

The FAO data from the 2002/03 census provide an indication on the number of cattle per district, but these are not enough to estimate the actual number of dairy cows and their production potential. Therefore, before any firm commitments can be made a more detailed survey will be needed, providing basic information and answering the following questions:

At district level on:

- Number of milking cows in the district;
- The total milk production or average milk production per cow;
- Best areas for dairy development;
- Potential markets for dairy products; and
- Preferences for specific dairy products.

From the villages interested to participate in a dairy program we have to learn:

- The number of milking cows in the selected villages;
- The present system of milk marketing and use of milk;
- The daily milk production per cow (average at different times of the year);
- The breed of cows and genetic potential;
- The use of AI services (if any) or present breeding system;
- The potential to produce fodder for improved cattle and higher milk yields;
- Access to water, electricity, roads;
- Security situation;
- Willingness to take part in a Dairy Union and to work together with other dairy production cops;
- Willingness to invest in the purchase of land for establishing a dairy plant; and
- Willingness to manage and organize a milk collection centre (MCC).

As a benchmark, a village should be able to supply at least 200 kg of milk per day to justify the establishment of a MCC and have the potential to increase this supply.

Once this information is available, the detailed planning of milk collection routes, locations of MCCs, the capacity of these MCCs (cooling tanks) and milk processing facilities can take place. A list of districts to be included in the survey has been attached as Appendix 7. These districts were recommended by the local authorities and the cattle numbers mentioned in the list are based on the FAO census.

Available market information shows that there is a growing demand for locally produced fresh products *if the quality standards and packaging are improved*. It is most likely that the main products will be pasteurized milk and yoghurt. For pasteurized milk pouches are a cost-effective way of packaging and yoghurt can be packed in plastic cups. The optimal unit sizes of these products need to be determined. In addition there will be a demand for other products, such as butter,

buttermilk, soft cheese and quark. More products mean higher investments in processing equipment and a good balance in investments and returns has to be found.

If we look at the standard procedures for procurement, construction and installation then we may expect that the whole process of establishing a dairy plant will take about 8-12 months from the moment the detailed specifications have been made and approved. Within this period it will be possible to start with the advisory services for farmers, to establish the co-operatives, and to obtain the title to the land on which the plant will be built; and to provide basic training in management and administration, milk collection centre management and marketing. Contacts with potential buyers (retail shops, supermarkets) can be established to prepare the marketing of dairy products.

Actual milk supply will thus start about one year after the start of the project activities. To make sure that the milk quality meets the required standards, farmers should be given (or sold) milk cans that can be cleaned properly, brushes and disinfectants for cleaning, plus the basic training in milk handling and hygiene. Cooling of the milk should take place within two hours after milking. This means that collection points (as places without cooling facilities - MCP) and collection centers (with cooling facilities - MCC) should be established at places which make fast cooling possible. A village that supplies 300-500 liters of milk per day would qualify for a cooling tank. A smaller village would first have to collect the milk at the MCP and then take it to another village with a MCC.

Transport facilities have to be available within the total collection chain. If cooling tanks are used, a road tanker would be the best solution to take the milk from the MCCs to the dairy plant. Quality controls at reception and for payment purposes are to be kept simple, but reliable. At present quantity and fat percent are the only criteria for determining the price of raw milk. Alcohol tests and density tests are carried out to determine if the milk can be accepted for further processing. With the increasing demands for quality dairy products, the criteria for milk quality will have to be reassessed as well.



Obtaining good quality milk throughout the year is the basis for producing quality dairy products.

We should keep in mind that establishing the processing plant is the easiest part of the dairy chain. Making sure that enough milk of acceptable quality is collected daily and that all dairy products are sold at a price which supports the further development of the dairy sector is more complicated to achieve. Based on these basic facts it is evident that project funding and staffing as well as timing of activities have to reflect these requirements.

The expertise required to implement the HLP dairy project would have to include:

Team Leader/Livestock Specialist	- overall project responsibility
Extension & Training Specialist`	- farmer support services
Dairy Engineer	- design and specifications dairy plant
Processing Specialist	- milk processing
Marketing Specialist	- product mix, market development

A strong local team (male and female advisors) will be required to support the farmers in organizational and technical matters related to milk production and collection. Counterpart staff should be available for all specialists, who can be employed by the dairy unions to manage the dairy plants and ensure a smooth operation after project ending. Training and guidance are essential at all levels to achieve sustainability.

The Terms of Reference for the proposed expatriate team in the HLP project papers are all related to the dairy plant and feed mill. On-farm support services were expected to be the task of the FAO and on marketing hardly any expertise was foreseen. We feel that complete project management should be under one FP, but the selected FP will need a strong local team to support the farmers.

APPENDIX 1

Terms of Reference

Islamic Republic of Afghanistan
Horticulture and Livestock Project
Livestock Component
Terms of Reference
for a
Dairy Production and Processing Study

Introduction

Agriculture is central to the Afghan economy. The sector contributes to more than half of GDP (53 percent) and provides employment for two-thirds (67 percent) of the labor force. Nearly four out of five Afghans live in rural areas, which also harbor the highest incidence of poverty. Agricultural performance is thus pivotal to overall economic growth and poverty reduction, and offers the only significant prospect for raising farmer incomes. It contributes to food security, provides rural employment, and reduces the vulnerability of resource-poor rural people. Accordingly, development of the agriculture sector is a central pillar of the government's strategy for economic growth and poverty reduction.

However, Afghanistan's agriculture has suffered badly from nearly a quarter century of prolonged conflict and unrest. The main drivers of agricultural growth and rural poverty reduction—roads and irrigation, technology, information and education, and markets—have all deteriorated because of social conflict, lack of maintenance for infrastructure, and collapse of technical information and market systems. This situation has been exacerbated by frequent droughts.

Actions for improving animal health, for introducing modern animal husbandry techniques and for promoting semi-intensive poultry and dairy production are already underway through the Horticulture and Livestock Project (HLP). The animal husbandry sub-component includes training, strengthening support services for livestock producers and studies of modern technologies and alternative products. In this context, it is proposed to carry out a study of the potential for improving dairy production and processing in Afghanistan and the terms of reference for this work are described below.

Terms of Reference for a Dairy Production Specialist

Duration of Appointment: 4 weeks (3 weeks in Afghanistan and 1 week report preparation)

Reporting Responsibility: The specialist will report to the HLP Director and work together with the HLP Livestock Coordinator. The consultant will submit his/her final report to the HLP Director.

Responsibilities: The dairy production specialist will be responsible for the following:

- i) Meet with Livestock Specialist and Livestock Coordinator to review assignment and agree on a work program, locations and dairy farmers to be included in the study.
- ii) Review details of the study with MAIL provincial directors in the concerned areas and with representatives of dairy farmers.
- iii) Assess production trends for milk production and marketing, and the potential for commercial milk collection systems and supply of raw milk of acceptable quality.
- iv) Assess market trends for liquid milk and dairy products and the opportunities for raising income for farmers through the establishment of new processing plants and/or supporting existing processing facilities.
- v) Assess the present farm management levels and the options for improvement of milk production per cow through support services (feed and fodder crop production, animal health and artificial insemination services, training and extension on animal husbandry practices).
- vi) Assess the needs, interest and constraints amongst the producers for investing in improving milk production and milk quality.
- vii) Assess the organisational structures for the commercial and sustainable operation of milk collection, processing and marketing of dairy products (based on cooperative systems and farmers' participation).
- viii) Prepare a preliminary action plan for an integrated dairy development program to be financed in HLP, covering the total chain from cow to consume and with special emphasis on increased economic benefit for the rural producers and the rural community.

Qualifications Required:

- i) Post graduate degree in animal production and field experience in dairy development.
- ii) At least 5 years experience in working with dairy production and marketing.
- iii) Extensive work experience from developing countries and cross-culture situations, preferably from Central Asia countries.
- iv) Extensive experience in working with stakeholder associations and institutions.
- v) Demonstrable experience in project planning and implementation.
- vi) Proven oral and written communication skills, fluency in English and comprehensive computer skills.

Expected outputs:

- i) Debriefing presentation for stakeholder representatives before leaving Afghanistan, covering preliminary observations, conclusions and recommendations.
- ii) Report - detailing the study approach and results, including a draft proposal for HLP interventions for improving various elements in the value chain – to be presented within two weeks of completing field work.

April 2007

APPENDIX 2

List of Persons Met

Appendix 2: List of Persons Met

I would like to thank all the persons listed below, who were most helpful in providing insight and information on the livestock sector of Afghanistan. Their support was appreciated very much.

Mustafa Ghulam Jawad	Deputy Minister MAIL
Abdul Ghani Ghuriani	Acting Director General, General Directorate of Policy and Planning, MAIL
Pohand Rashiq	General Director, MAIL
Azizula Osmani	General President DAH&LP, MAIL
M. A. Masoodi	Veterinary Advisor, DAH&LP, MAIL
Karl Kaiser	HLP Team Leader
Heiner Maehl	HLP Livestock Specialist
Shah Mohd Kakar	HLP Livestock Coordinator
Ludwig Schatz	HLP Training Specialist
M. Akhtari	Head AI Section, DLP, MAIL
Ziaulla Atash	Director Guzargha Dairy Plant, DAH&LP, MAIL
Mohammed Aqa	Assistant Representative, FAO
Lutfullah Rlung	National Field Manager, FAO
Mir Mohammad Bashir	National Livestock Production Officer
Kingsley Bash	FAO Consultant
M.J. Emal	Mazar Livestock Program, FAO
Tek Bahadur Tapa	Dairy Advisor, FAO
P.M. Kishtwarz	FAO Manager, Kunduz
Abdul Aziz Nikzahl	Provincial Director MAIL Kunduz
Mohd Malang Shah	Deputy Chairman Balkh Dairy Union
Abdullah Azizi	SMA, Cattle Feeding, Mazar
John Woodford	AHDP Team Leader
M. Afzal	Livestock Director Jalalabad
Karim	AI Technician Balkh
Ab. Raziq	AI Technician Balkh
Ghulam Hazrat	AI Technician Kunduz
Nazar Muhammad	AI Technician Kunduz
Alain de Bures	Program Advisor Madera
Mohd Essa	Veterinary Advisor, MADERA
Sayed Rahim Shah	Livestock Supervisor, MADERA
A. Qader Samsor	Livestock Advisor, ASAP
Said Gul Safi	President, AVA
Alimuuddin Nasseri	Livestock Coordinator, AKF
Henri Suter	Rural Development Programme Coordinator AKF
Hayatullah Hayat	Animal Health Coordinator, Mercy Corps
Dilip Kumar Chowdry	Livestock Program Manager, BRAC
G. Jerry Thurnball	Country Director, CNFA
Farouk Baroukzai	Advisor to MAIL, French Cooperation Office
Ziauddin Zia	French Cooperation Office
Etienne Lafay	Breeding specialist, French Embassy
Papa Zoumana Diarra	Program Coordinator, Solidarite
Raymond Briscoe	Country Programme Director DCA
Nesar Ahmed Kohestani	Associate Professor, Faculty of Agriculture

See also the persons listed in the report of Dr. Kakar.

APPENDIX 3

List of Literature

Appendix 3: List of Literature

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APPENDIX 4

Terms of Reference for the Dairy Sub-Component



Islamic Republic of Afghanistan

Ministry of Agriculture, Irrigation and Livestock

Terms of Reference 559

Project Name:

Emergency Horticulture and Livestock Project (HLP)

Title of Consulting Services:

Facilitating Partner for Dairy Sub-Component of HLP

Quality Based Selection (QBS)

Funded by:

IDA Grant Number: H226 - AF

June 2007

ABBREVIATIONS AND ACRONYMS

AI	- Artificial Insemination
AHDP	- Animal Health Development Project
ASAP	- Accelerating Sustainable Agriculture Program
AVA	- Afghanistan Veterinary Association
DCA	- Dutch Committee for Afghanistan
DMA	- Dairy Management Advisor
DPM	- Dairy Plant Manager
EC	- European Commission
FAO	- Food and Agricultural Organization
FP	- Facilitating Partner
GIRA	- The Government of the Islamic Republic of Afghanistan (GIRA)
HACCP	- Hazard Analysis and Critical Control Point
HF	- Holstein – Friesian
HLP	- Horticulture and Livestock Project
IMST	- Implementation Management Support Team
LFP	- Lead Facilitating Partner
MAIL	- Ministry of Agriculture, Irrigation and Livestock
MCC	- Milk Collection Centre
MCP	- Milk Collection Point
MPA	- Milk Producers Association
MPD	- Mountain Pasture Dairy
MPU	- Milk Producers Union
NGO	- Non-Governmental Organization
RAMP	- Rebuilding Agricultural Marketing Program in Afghanistan
UHT	- Ultra-High Temperature
UMB	- Urea-Molasses Bloc
USAID	- United States Agency for International Development
VFU	- Veterinary Field Unit
WB	- The World Bank

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1 Introduction

Following a request from the Minister for Agriculture the World Bank agreed to support a first sector development project, the Emergency Horticulture and Livestock Project (HLP). The focus of HLP is on promoting economic growth in the two most important sub-sectors: horticulture and livestock. Project financing will provide for three components to: (i) increase productivity and marketable output of perennial horticulture; (ii) increase productivity and improve output of livestock; and (iii) strengthen the associated departments of the Ministry of Agriculture, Irrigation and Livestock (MAIL), implement the project, monitor progress, and evaluate impact. The project is designed as the first stage in a program that will unfold over the coming decade to support the horticulture and livestock sub-sectors nationwide. The program has been designed in collaboration with other donors under the umbrella of the MAIL Master Plan and it is expected that additional financing will become available once these developments are established. This will provide common approaches and procedures for implementation.

At HLP project maturity (4 to 7 years after initiation), it is expected that improvements in the production capacity of the horticultural and livestock sectors will be well established (in terms of product quantity and quality) and that market channels for Afghan products will have been improved, with initial increases in aggregate export volumes and reductions in imports. Women farmers will benefit particularly from project activities through the major role that they play in horticulture and livestock production. At a higher level, the project will have a positive impact on broad-based economic growth in rural areas targeted by the project, by increasing the demand for rural non-farm sector output, and from multipliers on farmer' expenditures. On the institutional front, project support for the restructuring of MAIL will help to develop the basis for strong policy, regulatory and support organizations for the agricultural sector. Overall, these benefits will contribute to the Bank's rural poverty reduction goals, as well as providing a key element of a counter narcotics strategy by fostering an alternative to poppies, and stimulating rural incomes through supporting small-scale farmers, and expanding the rural non-farm sector. The second project component, which is aimed at increasing productivity and improvement of output of livestock, includes three major livestock production sub-components: animal health, integrated dairy development and poultry production.

The present Terms of Reference describe the work to be undertaken by a Facilitating Partner (FP) to assist the MAIL of the Government of the Islamic Republic Afghanistan (GIRA) to *implement the dairy sub-component* of the HLP. A Lead Facilitating Partner (LFP) has been appointed to form an Implementation Management Support Team (IMST) together with staff appointed by the MAIL.

2 Project Environment

2.1 Agriculture

Agriculture is central to the Afghan economy: The sector contributes an estimated 53% to the Afghan GDP, and agriculture provides employment for 67% of the labor force. Nearly 80% of the Afghan population lives in rural areas which also harbor the highest incidence of poverty. Agricultural performance is therefore pivotal for overall economic growth and poverty reduction and offers the only significant prospect for raising farmers' incomes, contributing to food security, providing rural employment, and reducing the vulnerability of resource poor rural people. Development of the agriculture sector is a central pillar of the Government's strategy for economic growth and poverty reduction.

However, Afghanistan's agriculture has suffered badly from a quarter century of prolonged conflict and unrest. The main drivers of agricultural growth and rural poverty reduction – roads, irrigation, specific technologies, information, education, and markets – have all deteriorated due to social conflict, lack of maintenance for infrastructure, and collapse of technical information and market systems. This situation has been exacerbated by frequent and prolonged droughts. To enable faster overall economic growth, and to significantly reduce rural poverty, agriculture needs to grow at a minimum rate of 5% per annum over the next decade.

2.2 Livestock

Livestock and agriculture have considerable traditional, social, and economic importance in Afghanistan. Moreover, the country has uneven climatic conditions. World Bank experience with livestock development in such situations demonstrates the need for a balance between extensive and mixed farming production systems. This helps ensure the best use of scarce and variable feed resources and promote optimum livestock productivity relative to the comparative advantages of the country. Evaluation of Bank-financed projects also demonstrates that farmers will adopt production growth and marketing initiatives when a secure production environment exists, including a favorable regulatory framework and effective and accessible veterinary services and technical advice.

In Afghanistan, several lessons are apparent from the last 40 years. In the 1970s, the country was self-sufficient in meat and milk and enjoyed significant exports of animal fiber and high-value processed products (carpets and skins garments). By contrast, today, imports of frozen chicken, eggs, and dairy products are growing rapidly; average meat consumption is less than 10 kg per capita per year. Added to this, the exodus of people due to war created a vacuum that permitted a large part of the added value of traditional animal products processing and products to be captured by neighboring countries. There is therefore an urgent need to increase protein production to help redress poor diets and reduce imports.

The survival of traditional nomadic livestock production systems depends on natural pastures in the hills during spring and summer and the capacity of traditional lowland reserve lands during winter. Decades of civil unrest have

affected Afghan pastoralists more than other livestock owners. Not only have the numbers of flocks fallen by half, but flocks have been excluded from rangelands by new cultivators and have become increasingly vulnerable to contagious diseases. As a result, natural pastures—particularly highly productive summer pastures—are being poorly managed. The incidence of environmental degradation through the encroachment of seasonal agricultural activities has accelerated in the last five years. There is urgent need to promote dialogue between local communities and national authorities. In particular, it is necessary to explore ways for communities to agree on fair regulations on livestock movement and access to natural pastures in the context of concerted pasture management plans, including exclusion of cultivators from agreed access areas.

2.3 Dairy Production

According to the FAO census of 2002/03 there are some 3.7 million heads of cattle in Afghanistan, with an average of 0.7 cows >2 years of age per household. This gives an estimated total of 2.1 million cows. The number of cows per household varied from 1.8 cows in the Eastern region to 0.2 cows in the Northern region. However, the actual number of milking cows is even lower, as only 60% reportedly produced milk in the years of the census. Not all farms have cattle and of these not all have cows. The survey showed that some 74% owned cattle, while only 50% had cows that could produce milk and offsprings. The other animals are oxen used for draught purposes.

The total milk production in Afghanistan is not enough to meet the demands for dairy products. Based on the FAO 2003 census the annual production figures in the MAIL Master Plan were estimated at 945,000 t cow milk, 210,000 t ewe milk and 180,000 t goat milk. Milk and dairy product consumption is estimated at 66 kg/year per capita (180 g/day) which is much lower than in most countries. Local production is insufficient to meet demand and imports are rapidly growing. The total volume of imported dairy products is estimated at 100,000 tons of liquid milk, mainly in the form of milk powder and the rest as UHT. These imports are a considerable drain on the country's resources and the Government is determined to make strong efforts to replace at least part of the imports by own production.

In most villages farmers rely heavily on cattle to enable crop production. Draught animals are extremely important as there are very few tractors. In addition cattle provide dung for fertilising the land and as a source of fuel for cooking and heating. Often dung produced in summer is used for fuel in winter, while the winter dung is brought on the land. Meat and milk are additional products and first of all used for household consumption. Surpluses are either bartered or sold.

The regions of Afghanistan show a large variation of phenotypes in cattle. The most common type of animal is the so-called 'Watani' which means 'native' and is usually black with white spots, but can be multi-coloured. The smallest cattle are the Kunari kept in the eastern and north-eastern mountainous provinces (adult weights of about 190-200 kg) while the larger framed Kandahari and Sistani cattle are found in Herat, in the North and in Kandahar area. The Kandahari and Kunari are known to be among the best dairy cattle with

estimated lactation yields of 1,000-2,000 and 900-1,100 kg respectively. The average yield of local dairy cows is estimated at 750 kg per lactation. The influence of exotic breeds (e.g. Friesian, Brown Swiss and Jersey) is visible as a result of earlier and ongoing artificial insemination programs. Available data do not indicate the number of cows that already have a higher genetic potential for milk production, but with the limited scale of AI services in relation to the total cow population, the number of cross-breeds is probably less than 10%.

The FAO introduced new varieties and conducted a large number of feed trials. In total 3,000 demonstration and field trials were carried out with oats (922), Berseem (738), Lucerne (490) and Hybrid Sorghum (961). A smaller number of trials was conducted with millets, fodder beets, elephant grass, sainfoin (*Onobrychis vicifolia*), red clover and ordinary sorghum. The main findings of these trials are briefly described below.

Fodder oats was newly introduced and became a popular crop as it provides a real alternative to barley and wheat. Yields of oats as green fodder varied from 22 t/ha to 115 t/ha, which was strongly related to the number of cuts (with average yields of 65-80 t/ha). The new varieties of oats on warmer locations (Nangarhar, Kandahar, Farah) and autumn cultivation gave higher yields than in the highlands (double). In highlands other cultivars or crops will be needed.

With Berseem the growing season and the number of cuts strongly influenced yields. Mixed cultivation with cereal (wheat, barley) appeared effective (less frost damage, less weeds and less insect damage). It was found that Shaftal (Persian clover) was about as good as Berseem, while for Lucerne a good choice of varieties proved to be important. More information is needed to make firm recommendation on Lucerne varieties. With Sorghum and Millet the results were strongly influenced by the availability of water. Under good conditions high yields are possible. Farmers were seen to show interest and the FOA experts recommended more testing and promotion. The FAO 'Livestock Development for Food Security – Final Technical Report on Livestock & Fodder Production Activities' provides the detailed results on fodder trials.

Besides the introduction of new fodder varieties on irrigated land, the inputs of minerals and concentrates, as well as fodder production on rainfed land had good effect. Supplementary feeding included urea-molasses blocks (UMBs) and mineral mixes. The UMBs were distributed as emergency feeding, but commercial production might still take place. Manufactured concentrates are not available, but sometimes farmers feed grains (barley, maize) to productive animals. The results of the fodder tree trials are currently being assessed.

Although the reports on the higher rangelands seem positive, there is concern about the rangelands in the lower areas and closer to the villages. Much rangeland is being cultivated (rainfed crops) with risks of erosion and disappointing yields if rainfall is not sufficient. Overgrazing of the remaining rangeland is taking place and there would be a need for rehabilitation, improved rangeland management and better information (extension). A government policy to protect the rangelands is needed.

Even though most cows are of fairly low genetic quality, they could perform better than at present with good feeding and management. Most cows show

retarded growth as a result of poor feeding during their rearing period. Therefore the first priority should be to teach farmers to feed their calves and young stock in such a way that they grow into more productive cows. This cannot be done on wheat straw, which is of low nutritive value. For the winter period hay of an acceptable quality is needed. The trials with the various fodder crops already show that much higher yields can be obtained and the climatic conditions in Afghanistan are such that good quality hay can be made in a very short period. If available, hay from the rangeland crops is also very useful. Advisory services, combined with the supply (at a realistic cost) of seeds, fertilisers, minerals and concentrates would help to improve production levels.

In many villages there is some form of small-scale milk processing by farmers and traders. Here milk is bought from neighboring farms and the processing capacity rarely exceeds 500 liters/day. Direct sales of raw milk and yoghurt are common in the larger cities, where farmers living in the vicinity find an attractive market. It is especially here that we find the most productive cows.

Milk collection schemes were developed by FAO, in combination with simple processing facilities. The first place was Kandahar (1998), followed by Kabul (2000), Mazar-I-Shariff (2002) and Kunduz (2005). These schemes have generated considerable interest among the farmers but have remained quite limited in scale, reportedly because of late provision of needed equipment and insufficient financing. Recently investments have been made in new processing equipment for Kabul, while in Mazar-I-Shariff a new dairy plant will be operational as from July 2007. The Kandahar collection scheme had to be discontinued for security reasons. The total quantity of milk collected shows strong fluctuations according to season. In spring and summer, during the traditional calving period which coincides with the better availability of fresh fodder, more milk can be collected than the dairy plant can manage. In winter there is a shortage of milk as many cows are dry and feed is scarce.

In Pul-e-Khumri in Northern Afghanistan, DCA has recently established a small dairy plant for the production of Gouda cheese. At present the plant collects 1,000-1,500 kg milk/day, but the installed capacity allows for a gradual increase of production. The first larger scale dairy plant is the Mountain Pastures Dairy (MPD), an American-Kazakh joint venture established with USAID financial support. The plant nearly reached completion and is expected to be in operation as from July/August 2007.

As milk is a major source of protein for many people in Afghanistan, the Government has given high priority to the development of the dairy sector through initiating integrated dairy programs that will increase the yield per cow and facilitate the marketing and processing of milk.

3 Project Description

3.1 Project Objectives

Based on the experience gained from earlier projects and lessons learnt, the overall objective of the project's animal production sub-component is: to enhance productivity and stimulate livestock production marketable output at national and regional levels in order to contribute to poverty reduction, nutrition improvement and import substitution.

The specific objectives of the dairy sub-component are to:

- Further enhance the development of the dairy sector through the implementation of an integrated dairy program - covering production, collection, processing and marketing of milk - and to promote the sustainability of the new structures through setting up farmers associations, regional unions and if feasible a National Dairy Federation.
- Contribute to a national policy in support of cooperative dairy development in Afghanistan aimed at reaching a higher level of self-sufficiency in milk production, while at the same time reducing the imports of dairy products.
- Develop and strengthen a national dairy strategy as an effective tool for providing economic opportunities and empowerment of women, improving food security and increase rural incomes of vulnerable households in close cooperation with the MAIL and other stakeholders.

3.2 Scope of Work

The sub-component will aim at training about 15,000 milk producers in improved animal husbandry practices and at organizing them into village milk producers groups, regional dairy unions and (possibly) a national dairy federation that are sustainable in terms of inputs supplies, provision of services, the collection and processing of milk and marketing of dairy products.

The sub-component will be implemented through an FP and the first task of the FP will be to conduct a survey to determine the best districts for dairy development in the provinces of Parwan, Wardak, Kapisa, Kabul, Laghman, Nangarhar and Ghazni. The survey will cover some 300 villages and will provide basic indicators for dairy cow population and the quantities and distribution patterns of marketable milk, design the most appropriate milk collection system(s), assess the potential for milk processing and marketing and prepare the detailed planning for dairy development in these provinces.

After approval of the results of the survey, actual implementation of the dairy program will start and include:

- The organization of milk suppliers in village groups that manage the milk collection center or point in their respective village, take part in demonstration and training activities to improve dairy husbandry and will become shareholders in the processing plants (through a dairy union). Organizational structures and responsibilities have to be defined. Earlier experiences from other projects will be used to achieve the best organizational structures and to avoid unnecessary delays in implementation.

- Formulation of the detailed specifications for the small- and medium sized dairy plants to be established, based on the projected milk supply and marketing strategies. The IMST will be responsible for the actual procurement of all processing equipment and auxiliary facilities needed to have a functional dairy plant. *The project budget allows for a maximum of three new dairy plants with capacities from 5 -10 t/shift.* Pasteurized milk and yoghurt are expected to be the main dairy products.
- Preparing the designs for the buildings for each of the dairy plants. Where possible standard designs will be used to save costs and improve efficiency. A local contracting company will be hired through the IMST to construct the building, but the supervision on the construction works will be done by the FP.
- Formulation of the specifications for milk collection systems. This includes detailed requirements for milk collection centers (MCCs), milk collection points (MCPs), quality control equipment, milk handling and transport. In short: the total requirements from farmer to dairy plant. The project budget is based on a total involvement of 15.000 milk suppliers in 250 villages. The IMST will again take care of procurement.
- Developing the support services that are necessary to increase milk production (per cow and per farmer), that reduce seasonality in milk supply and that improve raw milk quality. The provision of support services will be closely co-coordinated with existing services (e.g. fodder production, artificial insemination, animal health) to avoid duplication and unnecessary competition. As women are mainly involved in all dairy husbandry activities that take place within the compound, female advisors will be needed to provide extension services. Men are involved with the necessary field work, e.g. for the production of forage and fodder crops, milk deliveries and the management of the collection system, so also male advisors are needed to reach this group.
- Provide support to the Dairy Unions in the management of the dairy plants and the marketing of the dairy products. Earlier marketing surveys showed that there is a growing demand for fresh, local dairy products of good quality (e.g. acceptable shelf life, good taste, meeting food-security standards, good image and packaging), but this market has to be developed with support of the FP.
- Provide support to the existing dairy plants in Kabul, Mazar-i-Shariff, Kunduz and Pull-i-Khumri as required. The focus of this support will be on expansion of the existing operations, mainly through the development of the milk collection system, but possibly also in processing equipment (e.g. Kunduz). Investments and training are to be provided after a needs assessment and approval of the relevant authorities.
- Providing equipment through the IMST for project technical staff (computers, training equipment, vehicles and communication equipment) to implement the project in a smooth and efficient way.

The FP will promote dairy development under the leadership of the IMST and in close cooperation and coordination with other projects and programs promoting dairy production in the selected provinces and districts.

As already indicated, the IMST is responsible for the financial management and the procurement of all goods and services under this FP contract. The FP will prepare all necessary specifications, after which the procurement unit of the IMST will be responsible for timely delivery. It goes without saying that close coordination and reliable planning between the FP and IMST will be essential for a smooth implementation of the project component.

The working environment in Afghanistan will require a flexible response to changing conditions, especially with respect to security. In case of unanticipated problems or need for changes the design of the sub-component allows that activities can be moved or reallocated to other locations within the target provinces/districts or even other locations without major risks for achieving the overall objectives. However, the bidding company has to take into due consideration the security situation and how to cope with it, including appropriate budget allocations for anticipated security measures.

3.3 Expected Results

By the end of this project it is expected that:

- About 15,000 selected households in 250 villages will be able to supply milk to a dairy plant in which they share ownership through a co-operative system. A milk collection system that is functional and cost-effective has been established and is operated by the farmer village groups;
- The milk producers (male and female) have been trained in all aspects related to dairy production (e.g. animal nutrition, health care, calf rearing, milk quality, housing) which enables them to produce more efficiently;
- Support services (e.g. production and supply of forage and feeds, veterinary health care and artificial insemination) have been organized to cover all villages participating in the dairy program in an efficient and reliable way, aiming at sustainable continuation after project ending;
- The new dairy plants (with capacities from 5-10 t/shift) are operational and process enough milk of acceptable quality to serve a growing market. The financial and economic performance of the plants is strong enough to make them viable on a commercial basis (or at least clearly heading in that direction);
- The feasibility of a 50 t/day feed mill (or several smaller ones) to provide the dairy cows with good quality concentrates has been studied and if justified, these feed mill(-s) will have been built and made operational;
- The legal arrangements required to support existing dairy plants, established by the FAO or NGOs, have been set up, and required assistance in hardware and/or technical support, has been provided within the available resources of budget and manpower.

- A study will have been made to examine the feasibility of establishing a National Dairy Federation (NDF) to support the sustainable development of the dairy industry.

In terms of additional production generated through the project activities, it is expected that:

- Providing a market outlet for milk to 15.000 households will result in a growing supply of locally produced fresh dairy products, which will reduce imports and increase the standards of living in the target areas;
- A basis has been established for dairy development in various provinces, districts and villages, which will make it easier to intensify the services and facilitate the growth of the dairy industry (e.g. more milk per cow, per farmer, per village).

4 Inputs of the Applicant

4.1 Tasks to be Performed

The first task after mobilization will be the initial survey of the 250-300 villages, after which a detailed work plan has to be formulated. It is anticipated that the survey can be completed within 2-3 months by making use of several teams that collect the data and discuss the proposed approach with the potential stakeholders. After agreement on work plan and approach, the following tasks are foreseen:

1. The FP will prepare the designs and specifications for the dairy plants. If possible the dairy plants will be similar, to facilitate procurement and establishment. During the procurement period, land title (lease agreement or ownership) for the location of the dairy plant will have to be obtained by the co-ops involved;
2. The FP will organize the farmers into village co-ops and several close-by co-ops will form a dairy union. Each union will become the owner and manager of a dairy plant. Legal procedures will have to be followed and use will be made of the earlier experience of other projects in this field;
3. The FP will organize initial training of identified farmers in groups, based on active participation of the trainees. A training package may have to be developed which covers all essential subjects in the field of dairy production (feeding, breeding, management and animal health). The training programs will be ongoing and will be carried out for both men and women involved in dairy production. Extension activities will be conducted in close co-operation and coordination with MAIL;
4. In cooperation with veterinary field units (VFU) regular vaccination programs will be introduced and health care provided in the villages involved in the dairy program;
5. In conjunction with artificial insemination (AI) services reliable services will be provided and/or introduced in the villages involved in the dairy program. Where necessary inputs will be provided to establish these services;
6. The FP will organize milk collection routes, with sufficient cooling facilities to allow farmers to supply their milk twice daily without unnecessary loss of quality. Management of the collection centers, organization of transport, milk quality control, and payment procedures are to be developed with support of the FP and under responsibility of the co-ops;
7. The FP will supervise the construction of the dairy plants and the installation of processing equipment. The FP will provide all necessary technical and management training to the staff of the plant and the management board of the union to operate the dairy plant in an efficient way;
8. The FP will assess the needs to strengthen the existing dairy plants in Kabul, Mazar-I-Shariff and Kunduz that were established with support of the FAO and the DCA plant in Pull-I-Khumri, and provide the necessary support to develop these dairy plants into commercially viable enterprises;

9. The FP will ensure follow-up support for at least one year after the start of operations to strengthen the sustainability and management of the dairy plants, collection systems and milk producers;
10. A study will be carried out to examine the feasibility of creating a national dairy federation (NDF) to help coordinate the work of the dairy unions. The role of the NDF could be to interface between the unions and MAIL field services in order to contribute to policy decisions and to facilitate MAIL monitoring of dairy production.

Local Implementing Partners may have to be contracted by the FP to organize the earlier mentioned support services for dairy farmers in the project area. Teams of female trainers should carry out the training for women farmers and male trainers are to work with male farmers. All trainers are to receive technical and institutional development training from their supervisors before their first assignment and refresher training as required. All teams of trainers will be supported and supervised by senior dairy advisors of the FP.

A gradual coverage of all districts will be needed, but at the end of the project period a balanced distribution of milk collection centers should have been established and operational in the project area. However, the actual number of milk suppliers in each district will have to be determined after the start of the project activities and may vary per district.

A feed mill to produce mixed feed could be established if commercially justified. Several projects, mainly related to poultry production, consider the establishment of feed mills and the need for additional feed milling capacity should be assessed before any commitments can be made. The demand for concentrates from dairy farmers is presently very low, but may increase with higher milk yields, better genetics and reliable outlets for raw milk. A feed mill (or more if considered appropriate) will be owned and managed by a farmers' co-operative. The structure could be similar as for the proposed dairy plants. The FP will support the board of the co-ops in the technical and financial management of the feed mills and organize the necessary staff training to make the feed mills commercially viable.

4.2 Staffing

The FP will employ high level international and Afghan staffs who are familiar to all aspects of the project. The FP will thus provide all management staff and ensure training of all field staff.

The staff to be recruited by the FP for implementing the dairy component can be divided in international staff and local staff directly employed by the FP. The project planning and budgets are based on the staffing – and their main responsibility and qualifications for key personnel - as mentioned below, but the Applicant is welcome to offer alternatives within the available budget.

International Staff:

Team Leader/Livestock Specialist (22 mm): he/she will have overall responsibility for the timely and effective implementation of the dairy sub-component and work in close liaison with the IMST and MAIL. In addition to the managerial tasks, the TL will be responsible for the institutional development of the farmers organisations involved in the dairy program. Monitoring and reporting as specified in the ToR are part of his duties.

Qualifications: A post-graduate degree in animal production or veterinary science and at least ten years of practical experience in dairy development in developing countries. Relevant experience in formulating and/or managing dairy development projects in Afghanistan is desirable.

Dairy Engineering Specialist (4 mm): he/she will prepare the detailed specifications for the dairy and feed plants, the milk collection centers and the basic layout of the buildings (detailed drawings will be made by an architect under responsibility of the FP) and supervise the construction and installation of the plants. He will also train the maintenance and service staff of the plants.

Qualifications: A post-graduate degree in engineering and at least ten years of practical experience in design and implementation of small-scale dairy and feed plants. Relevant experience in dairy development projects in Afghanistan is desirable.

Dairy Extension and Training Specialist (8 mm): he/she will be responsible for the development of support services in the project areas, making use of existing structures where possible.

Qualifications: A post-graduate degree animal production and at least ten years of practical experience in training and extension in developing countries. Relevant experience in dairy development projects in Afghanistan is desirable.

Dairy Processing Specialist (4 mm): he/she will assist in the technical management of the plant (milk collection, reception, processing and packaging), quality control of raw milk and dairy products and train the technical staff of the dairy plants.

Qualifications: A post-graduate degree in food processing and at least ten years of practical experience in small- to medium scale milk processing in developing countries. Relevant experience in dairy development projects in Afghanistan is desirable.

Marketing Specialist (3 mm): he/she will identify the best product mix for each of the dairy plants and develop the marketing strategy to ensure a reliable and commercially attractive distribution of the dairy products.

Qualifications: A post-graduate degree marketing and/or economics and at least ten years of practical experience in agricultural marketing in developing countries. Relevant experience in development projects in Afghanistan is desirable.

Feed Milling Specialist (3 mm): he/she will assess the need for additional feed milling capacity and if approved assist in the design and starting-up of the feed mill, formulate concentrate compositions based on available ingredients and livestock requirements, and recommend specific training to improve the management and operation of the feed mill.

Qualifications: A post-graduate degree in agriculture and/or livestock production and at least ten years of practical experience in feed milling and animal nutrition in developing countries. Relevant experience in livestock development projects in Afghanistan is desirable.

Local Staff:

Counterpart Team (5 persons, total 110 mm): for each of the positions in the expatriate team it is recommended to have a local counterpart who will be involved throughout the project period and will be involved in all day-to-day activities related to their field of expertise.

Qualifications: the counterpart team will have similar qualifications as the experts in the expatriate team, but with a minimum of five years relevant working experience in Afghanistan.

Dairy Management Advisors, (5 persons, total 110 mm): the DMAs will be based in the areas of dairy development, from where they will direct technical and operational supervision and monitoring of the support services, the training of farmers, reporting to and assisting the TL.

Qualifications: A recognized qualification (Diploma, B.Sc. or above) in agriculture, animal production or veterinary science and at least five years of practical experience in implementing and supervising dairy production programs in Afghanistan.

Dairy Plant Managers (3 persons, total 54 mm): there will be one DPM based in each of the new dairy plants, to provide direct technical and operational support and supervision to the construction, installation and operation of the dairy plants in close co-operation with the counterpart staff and management board of the dairy unions.

Qualifications: A recognized qualification (Diploma, B.Sc. or above) in food processing and at least five years of practical experience in small- and/or medium scale dairy plant operation.

Logistic Officers (4 persons, total 80 mm): to provide administrative and logistic support in each target area, including data entry in Kabul and to assist with supply of inputs.

Staffing general services (guards, drivers, etc. – as required): at each of the dairy plants staff will be required for the smooth operation of the activities. The staffing of the dairy plants and feed mills will only be partly covered from the project budget. The sales of dairy products and feeds should cover all operational costs as soon as possible to ensure the sustainability of these services.

4.3 Other Inputs

Besides the staffing as indicated above the FP will be responsible for the provision of transport facilities for the extension staff and the staff conducting the initial survey through hired vehicles.

Demonstrations, training sessions and training materials as indicated in the Tasks to be Performed will be organized by the FP and required inputs to achieve the objectives have to be included in the financial proposal.

Operational funding for the first year of operations (mainly salaries) for the feed mills and dairy plants has been included in the budget.

4.4 Additional Requirements

Additional funding will be available for the procurement of equipment and other hardware through the IMST as described in the next paragraphs.

Office accommodation: office accommodation of a reasonable standard is expected to be provided by the MAIL and the IMST will ensure that these offices contain the necessary furniture and office equipment to carry out the assignment. Office utility costs (electricity, water and internet, etc) will be taken care of by the MAIL. However, the Applicant is recommended to include renting of adequate office premises in case the MAIL can not provide the required office space.

Transport: the IMST has already procured the necessary vehicles for the central office in Kabul. For the implementation of the field operations transport will be hired by the FP.

Dairy plants, milk collection centers and feed mills: all procurements related to civil works, milk processing equipment, cooling tanks, milk cans, feed processing equipment and other investment items will be handled by the IMST. Specifications will be made by the FP and submitted in time to assure timely delivery of inputs. Planning of input delivery will take place in consultation with the procurement team.

5 Monitoring and Reporting

5.1 Monitoring

The FP will set up policies and procedures to monitor at all crucial stages of production and processing. Baseline information about animal numbers, production level, cow management practices and available services in the village will be collected during the survey, which will form the basis for the selection of the villages and districts.

In its proposal the Applicant shall describe the indicators that will be used to measure the changes brought by the Project and which approach will be used to collect and process these indicators.

An end-of-project evaluation will be done by independent consultants in conjunction with the MAIL. The evaluation should bring out the achievements against the set targets. A final Project Review Meeting shall be held upon completion of the project.

5.2 Reporting

The FP shall submit the following reports to the IMST:

- (i) Inception Report, including the results of the survey, a detailed work plan and the budget for Y1. This document will be produced within 3 months after arrival in Afghanistan.
- (ii) Quarterly and Annual Progress Reports. These reports will specify in the progress made during reporting period, explain changes in implementation and give the planning for the next period.
- (iii) Study Reports: where appropriate special study reports will be submitted to the IMST.

Each report will be submitted in three copies and one electronic version to the IMST. All reports must be in English. The format of the progress reports will be made in consultation the IMST Team Leader.

A draft Terminal Report will be prepared by the FP prior to three months of the Project end date. The Report will then be finalised incorporating comments and suggestions, if any, made by the MAIL before end of the contract.

6 Project Risks

Although the previous dairy projects, implemented by the FAO, had a very positive impact and have been used as an example for the design of the present project, there are several risks which may hamper project implementation. These risks can be summarized as follows:

- **Security conditions** do not permit the implementation of the project and in particular the working of female trainers. However, when certain areas do not allow the implementation of project activities, alternative locations will be selected in consultation with the IMST.
- **Demand for dairy products** does not increase and milk processing is not profitable. The marketing of dairy products and the development of medium-scale dairy plants are important aspects of the dairy program and constraints may hamper all other aspects of the program if not adequately addressed by the FP.
- **Supply of good quality raw milk** could be insufficient during the initial phases of project implementation, especially during the winter period, and this may have a negative effect on plant profitability and dairy product quality.
- **Project Period** is too short to achieve sustainable results in dairy development. This is a major risk if no commitments are made for further support.
- **Unstable socio-economic** situation in the country may have a negative effect on project implementation and achievements.

The Applicant shall propose the risk mitigation plan in its proposal.

Provisional Work Plan for Year 1

Project Planning HLP Dairy Sub-Component

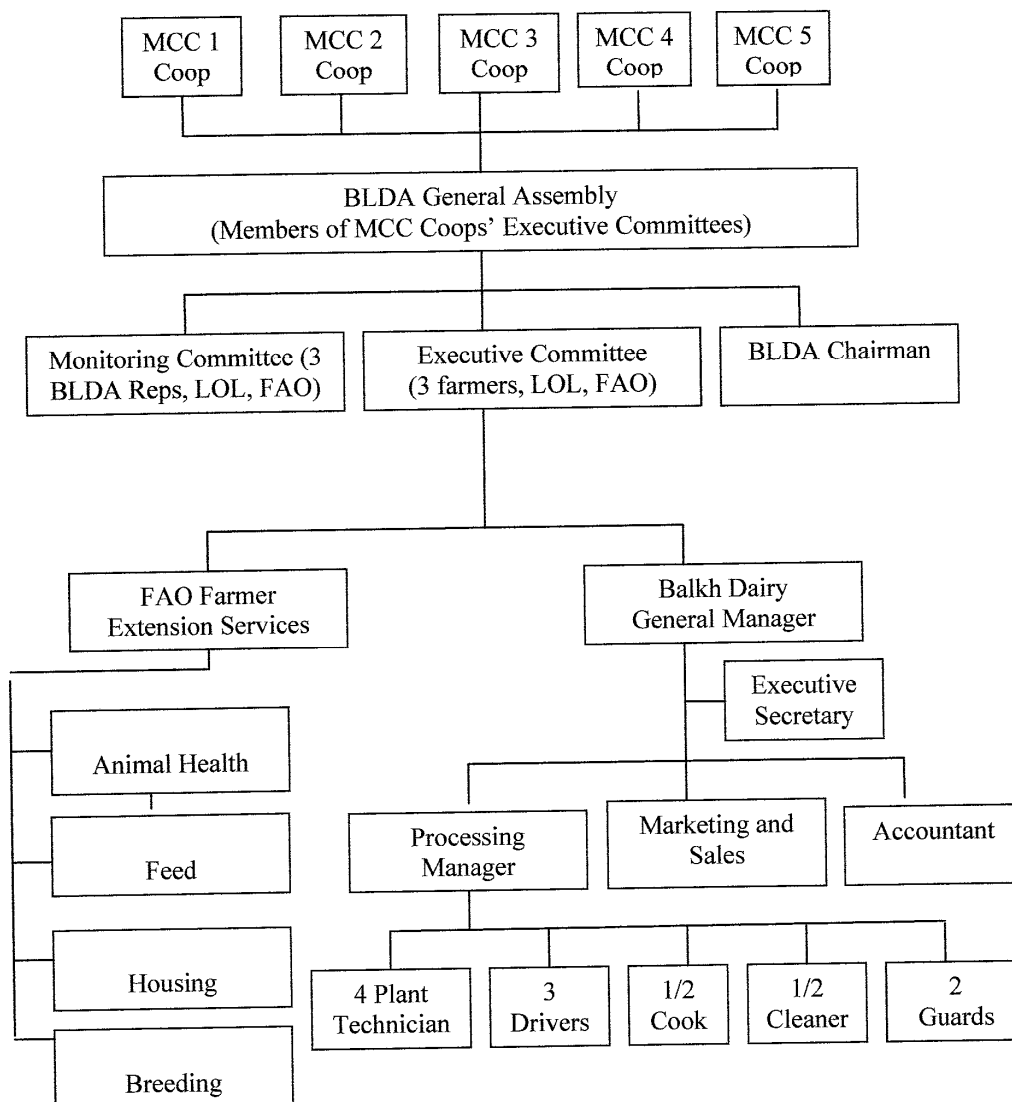
Activity	Main operator	2007						2008					
		J	A	S	O	N	D	J	F	M	A	M	J
Project Preparation													
Contracting of experienced dairy company	WB/MAIL												
Project Planning & Design Phase													
Market survey	FP												
Milk supply survey(300 villages) and selection of 250 villages	FP												
Marketing plan and product range determination	FP												
Dairy plant design and technical specifications	FP												
Milk collection and quality control system designed	FP												
Financial and technical feasibility dairy plant	FP												
Planning of organisation, management and training	FP												
Planning of support services (feeding, breeding, husbandry)	FP												
Feed mill design and specifications	FP												
Financial and technical feasibility feed mill	FP												
Securement of title of lease agreement for construction site	Coops												
Architectural drawings for buildings	IMST												
Preparation workplan and tender instructions	FP												
Implementation Phase													
Milk processing plants													
Tender procedures to select contracting company for buildings	IMST												
Construction of dairy plants	Contracter												
Procurement & delivery of processing equipment and consumables	IMST												
Installation of equipment and test running	Supplier												
Supervision on construction and installation	FP												
Recruitment of dairy plant managers and staff	FP												
Training of plant managers and operators	FP												
Actual start of milk sourcing and 1 year operation dairy plant	FP												
Milk collection and supply system													
Procurement and delivery of milk collection equipment and transport	IMST												
Installation of milk collection centers in 7 provinces, reaching 250 villages	FP												
Organisation of milk collection routes and training MCC-operators	FP												
Feed mills (if approved)													
Tender procedures to select contracting company for buildings	IMST												
Construction of feed mills	Contracter												
Procurement & delivery of equipment	IMST												
Installation of equipment and test running	Supplier												
Supervision on construction and installation	FP												
Recruitment of manager and staff	FP												
Training of feed mill manager and operators	FP												
Purchase of feed ingredients	FP												
Actual start of feed production and sales	FP												
Support services for milk suppliers													
Training of farmers in dairy husbandry and milk quality control	FP												
Delivery system of feed and advice on animal nutrition	FP												
Establishment of AI services (training, equipment & supplies)	FP												
Involvement of veterinary services (private clinics)	FP												
Preparation of information and extension materials	FP												
Reporting and monitoring													
Monthly technical and financial reports	FP												

APPENDIX 5

Organization Structure Balkh Dairy

Balkh Dairy Business Plan

Appendix 2 Management Structure of Balkh Dairy Livestock Association



APPENDIX 6

Report on Field Visits by Dr Kakar

Study Report
On
Dairy Development in
Wardak, Parwan, Nangarhar and Ghazni Provinces
May 26 - 31 and June 5-6, 2007

Mission Purpose : Study of dairy production in Wardak, Parwan, Nangarhar and Ghazni provinces

Mission Members: Mr. John Bonnier, Dairy Study Consultant, Dr. S. M. Kakar, Livestock Coordinator, HLP / MAIL

Drivers : Mr. Fawad, Driver HLP/ MAIL (Car plate no. 179)
Mr. Amir Mohd, Driver HLP/ MAIL (Car plate no. 317)

The mission was held to study the present dairy productions and productivity in Maidan Shaher, Jalriz and Nirkh districts of Wardak province; Charikar, Bagram, Jabalseraj and Said Khil districts of Parwan province; Jalalabad markaz, Behsood, Kama, Batikot and Surkh rod districts of Nangahar province; and the provincial capitals Qarabagh, Khwaja Meri and Ghazni.

Activities:

Wardak Province :

A pre-test approach was made with Mr. John Bonnier to study dairy development in Wardak province. First of all the Provincial Director Agriculture for Wardak province was visited and briefed about the HLP project concerns. He well came and expressed his support to the mission, he add that they already submitted proposals to PRT and Ministry of narcotic drug control for establishing Milk mike to Guzargah dairy processing plant supporting by FAO in Kabul) and Director of Agriculture. Mr. Mustafa Zafer, Mr. Raz Mohd and Dr. Khair Mohd FAO also participated in the meeting. Collection Centers (MCC) in number of the districts with installation of 4 cold rooms, but he add that they extremely need for a milk processing plant in the province. Later on a joined meeting was held with livestock from

Maidan Shaher, Jalriz and Nirkh districts, 3 dairy production cooperatives farmers functioning in Wardek province (provides

HLP project Livestock sub-component (Dairy development objectives) was explained to the farmers as :

- Investing the building and equipments of the dairy plant
- Invest in milk collection centers,
- Support services for breeding, health, housing and breeding (AI)
- Support in establishing market and distribution of dairy products

- Support in plant management and staff training,

Then the farmers were asked for reporting on livestock present situation in the province and the improvement that need to be made in the future. During the meeting the following points were discussed with the farmers :

1. Number of milking cows in district / village level,
2. The total milk production or average milk production per cow (average at different time of the year,
3. Best area dairy development, potential markets for dairy production and use,
4. Preference for specific dairy products,
5. The breed of cows and genetic potential,
6. The use of all services (if any) or present breeding system,
7. Potential of produce fodder for improved cattle and higher milk yields,
8. Access to water, Electricity and road,
9. Security situation,
10. Willingness to take part in a dairy Union and work together with other dairy production cops,
11. Willingness to invest in the purchase of land for establishing a dairy plant
12. Willingness to mange and organize a milk collection center,
13. A village with producing of at least 200 liter per day will be justify for establishing of a MCC and have the potential to increase this supply.

Hers was no any recent livestock head count available except the 2003 made by the FAO of the UNDP, the farmers reported that:

1. In average a 10 % percent increase have been made in the number of livestock in general,
2. 2-3 litters at one time or 5-6 litters / day milk could be collected, but by utilizing the AI service a significant improvement has made in milk production,
3. Almost all the district, mostly Sayed Khil, Chak, Behsood I and Behsood II districts are dairy development areas, and Kabul province is a potential market for the use,
4. Dried ugard and Chaka
5. Mostly the local native breed is common, but in some crass breed using the AI service are available,
6. Usually natural breeding, but in some percentage of artificial insemination, health care, fodder crop, concentrated feed and extension services are provided by the FAO technical staff, and mostly to those farmers who are member of the cooperative,
7. There is enough water, road under construction and electricity is under plane,
8. Security is fine in some area, not in all the districts,
9. The farmers are willing to take part in dairy union and to work with other dairy cops,
10. The farmers are willing to arrange the land for the dairy plant,
11. The farmers are willing to manage the milk collection centers,

12. The farmers were complaining about the lack of market for the dairy production,

After the meeting with the farmers the Provincial Governor was visited and has briefed about the HLP project and the meeting was held with the farmers. He well come the mission and insisted on building a milk processing and concentrated feed production plants in the province that they can support Kabul with products. He also reported on the provincial improvement plans including road construction, extending the electricity, power line from Kabul and construction of the Chak-e-wardak dame and power station and was also willing to arrange land for the Dairy and feed plants.

Parwan Province :

As plane the mission studied the dairy production in Parwan province. The Director Agriculture, Veterinary and Livestock Directs were visited and briefed him on HLP project and the Dairy development study purpose. He expressed his support to the mission, as per his advice the Bagram, Sayed Khail and Jabalseraj districts under the study plane and two Milk collection Centers (MCC) established before by ARO in Madad khil village of Jabalseraj district and Safian Laghmani village of Charikar were visited and the farmers were invited for joining meeting.

The joined meeting was held with the Director of Agriculture, other Cooperatives and extension workers and livestock owners invited from different districts at Agriculture office. HLP project objective and goals were discussed and the farmers were asked for the improvement and requirement to be made in the dairy production field. The questioner was discussed and got their view in the dairy production that needs to be supported in the future. The farmers pointed out as :

1. A 10 percent increase have been made every year in the number of livestock in general,
2. 2-3 litters at one time or 5-6 litters / day milk could be collected in the summer at the first quarter after the delivery, but decrease in the winter. AI service has been used with no much result.
3. Charikar, Bagram, Said Khil, Jabalseraj, Shinwar and Surkhi Parsa district are cattle populated areas
4. Ugard , milk and Chess,
5. The local native breed is common, but some crass breed and improve breed can also be seen,
6. Usually natural breeding system is on used, but in some percentage artificial insemination, health care is providing to the farmers by the government,
7. There is enough water, road access and electricity available and extension of electricity is under plane,
8. Security is fine in most of the districts,
9. The farmers are willing to take part in dairy union and to work with dairy cops,
10. The farmers are willing to arrange the land for the dairy plant, The Agriculture Director was ready to arrange even provide the land for the plant,
11. The farmers are willing to manage the milk collection centers,
12. The farmers were complaining about the lack of market for the dairy production,

The two MCC established by ARO in Madad khil village of Jabalseraj district and Sofian Laghmani village of Charikar were visited and found no longer working. The MCC was will constructed and equipped with milk collection apparatus, processing machinery e.g. Ice cream and yogurt makers. The Executive director and the cooperative Heads have been interviewed for the reason; the following points were pointed out :

- Due to short period of the project support,
- MCC with processing in the area far away from the market,
- No access to the market and it was not possible to get the milk from the farmers and sale back the products on the same farmer in the same village,
- Lack of the transportation,
- Dis-corporation, and miss understanding,
- Small out-put and in-put

After the meeting access was made to meet the provincial Governor, he was shortly visited and due to some urgent meeting in Bagram he mad excuse.

Nangarhar Province :

After arriving Jalalabad the Director General of Agriculture, Provincial Veterinarian and the Livestock Director were visited and have briefed them; Plan was made to visit the concerned districts for inviting the farmers for the meeting.

Next day a joined meeting was held with the Director General of Agriculture, Livestock and Veterinary Directors and Farmers at the office of the Veterinary Directorate.

1. Almost 10 percent increase had been achieved every year in the number of livestock in general,
2. 2-3 litters at one time or 5-6 litters / day milk could be collected in the summer at the first quarter after the delivery, but decrease in the winter. AI service was given good result,
3. Khiwa, Kama, Batikot, Behsood, Surkhroad, Shinwar, Khoqiani, Sherzad, and Mohmandara district are cattle populated areas,
4. Yoghurt (7 Kgs / Rs: 70- 100 Rs), milk 22 Rs/ Kg and Chess (7Kg / 1,000Rs),
5. The local Kunari breed is common, but some , improved, crass breed as well as numbers of buffalos are available in the area,
6. Usually natural breeding as well as artificial insemination in use in high level compare to other part of the country, health care,
7. There is enough water, road access and electricity is available in the province,
8. Security is fine in most of the districts,
9. The farmers are willing to take part in dairy union and to work with dairy cops,
10. The farmers are willing to arrange the land for the dairy plant, The Agriculture Director was ready to arrange even provide the land for the plant as per government role could be provided based on lease,
11. The farmers are willing to manage the milk collection centers,
12. The farmers were complaining about the lack of market for the dairy production,

Ghazni Province :

Mission was held to study dairy production in Ghazni province. Director Agriculture, Provincial Animal Health and Livestock directors were visited together. They were briefed on the HLP project livestock sub-component. The Director of Agriculture expressed his support to the program. He reported the livestock and security situation in the related districts in the province. As per his advice the Qarabagh, Khwaja Omeri and Ghazni province farmers were invited for the meeting. The meeting was held in Agriculture office in Ghazni Province:

First the participants were shortly briefed on the activities will carried out by the HLP, and the farmers were asked for the requirements need for the dairy development. The questioner was discussed with the farmer, they answered as:

1. Due drought in number of districts/villages the dairy cattle has reduced, but in some more has increase,
2. Milk production was found different from 2-3 litters to 10 for local breed even more the 20 liters for the exotic breed at one time, but by utilizing the AI service a significant improvement have been saw in milk production,
3. Ghazni City, Nawar, Malistan, Ander, Qarabagh, Khwaja Oamary, Muqor, Gilan, Aab Band, Jaghato and Waghaz Districts are populated cattle areas, but at the moment, Ghazni Center, Khwaja Omari and Deh Yak are suitable for the security reason to be covered for the project site activities.
4. Dried yoghurt and Chaka are the most common milk production,
5. Mostly the local naïve breed, some crass breed using the AI service,
6. Usually natural breeding, but in some percentage of artificial insemination, health care and extension services are provided by the Government Veterinary and Livestock departments.
7. There is Shortage of water electricity as well high way roads and in some extend muddy roads have extended to the districts ward,
8. Security is fine in some area, not in all the districts,
9. The farmers are willing to take part in dairy union and to work with other dairy cops,
10. The farmers are willing to arrange the land for the dairy plant through the government lease contract based,
11. The farmers are willing to manage the milk collection centers,
12. The farmers were complaining about the lack of market for the dairy products,

After the meeting, Provincial Governor was visited and briefed him on HLP project and the meeting held with the farmers. He rely appreciate and add that it is too need for the dairy development in Ghazni province, most of the communities are farmers and have access to the livestock. He said based on the land lease contract policy, he will ask the Director of Agriculture for the arrangement of the land whenever it needs. He adds that he ready for any kind of the assistance.

Comments :

- Most of the Farmers visited in Wardak, Parwan, Nangarhar and Ghazni provinces indicated to be interested to have a dairy development program (Integrated e.g. AI, Health, extension, Concentrated feed, fodder crop seed,) in their own province that they can easily approach for selling their milk on regular base and get daily income;
- Assisting in market development;
- A quite number of cattle were available and many of the villages and the householders are busy with handling cattle at houses with no access to the market. Produce dried yogurt in summer and selling once in a six months;
- The farmers were to interested with MCC as much with the Milk processing plant for easily access to the market;
- Many of the districts in these provinces were found with much water. Road access and better security at the moment, which suit for dairy development;
- Provinces centers are extended with electricity, only Ghazni province was having the generator as electricity supplier source;
- Specially interest for the AI service, in Wardak, Parwan and Ghazni provinces found in low percentage;
- The farmers were asking for AI, Health, fodder crop, quality vaccine, and remedies, and marketing;
- The agriculture and as well as Provincial governors were also highly interested to have such kind opportunity for the farmers in their provinces at the time that where there is no any other business that the people can be kept on daily job, they were ready for providing land;
- Farmers were interesting in development of livestock cooperatives and were happy in the management of MCC and coordination with other cooperative.

List of Participants Attended the Dairy Development Meeting in Wardak Province

1. Eng. Fazal Omar	Ag. Director	Maidan Wardak
2. Shukrullah	Cooperative Director	Maidan Wardak
3. Mohd Ebrahim,	Cooperative Member	Maidan Wardak
4. Bozurg Gul	Cooperative IC	Jalriz
5. Mohibullah	Cooperative	Nirkh
6. Hedayatullah	Livestock Director	Maidan wardak
7. Dr. Zikrullah	Provincial Veterinary Director	Maidan Wardak
8. Dr. Zafer	Guzargah, Diry plant IC, FAO	Kabul
9. Eng. Raz Mohd	Dairy extension worker, FAO	Kabul
10. Dr. Khir Mohd	Guzargah Dairy AH IC	Kabul
11. Shirullah	Cooperative Member	Maidan Wardak
12. Dr. Abdul Qadir	Animal Health IC	Maidan Wardak
13. Abdul Fatah	Administration, Agriculture	Maidan Wardak
14. Haji Gul Mohd	Plan Director Agriculture	Maidan Wardak
15. Abdul Ahad	Ebrahim Khil Cops Director, Farmer	Maidan Wardak
16. Assadullah	Awal Khil Cops Director, Farmer	Maidan Wardak
17. Mohd Husain	Part II Cops Director, Farmer	Maidan Wardak
18. Shir Mohd	Property Director, Agriculture	Maidan Wardak
19. Rahimaullah	Cops Director, Farmer	Jalriz
20. Sahar Gul	Farmer	Jalriz
21. Gul Mohd	Farmer	Jalriz
22. Nader Khan	Cops Member, Farmer	Maidan Wardak
23. Abdul Matin	Cops Director, Farmer	Maidan Wardak
24. Mir A. Zahir	Cops Director, Farmer	Nirkh
25. S. Habibullah	Cops Deputy, Farmer	Nirkh
26. Hidayatullah	Cops Director, Farmer	Maidan Wardak
27. Fakhruddin	Cops Director	Jelriz
28. Noor Mohd	Farmer	Jelriz
29. Ghulam Sakhi	Cops Awal Khil, Farmer	Maidan Wardak
30. Zmari	Cops Member, Farmer	Maidan Wardak
31. Haji Jabbar	Cops Member, farmer	Nirkh
32. H. Mohd Aman	Cops Member, Farmer	Nirkh
33. Mohd Halim	Farmer	Jelriz
34. Abdul Ali,	Agriculture	Maidan Wardak
35. Mozamle	Agriculture	Maidan Wardak

List of Participant Attended the Dairy Development Meeting in Parwan Province

1. Mr. Shamir Mir	Agriculture Director	Parwan
2. Shafiqullah	Agriculture Deputy	Parwan
3. Mohd Asif	Livestock Production Director	Parwan
4. Khan Agha	Livestock Extension	Parwan
5. Ilyasuddin	AI, Director	Parwan
6. A. Qahar Khan	Administration, Agriculture	Parwan
7. Said Kabir	Research Director	Parwan
8. Azim Khan	Plan Director, Agriculture	Parwan
9. Abdul Qadir	Haney Bees Director	Parwan
10. Raqib Khan	Extension Worker Agriculture	Parwan
11. Dr. Mohd Arif	Provincial Veterinary Director	Parwan
12. Said Hakim	Agriculture Director	Jabalseraj
13. Ghulam Sakhi	Extension Agriculture	Parwan
14. Mohd Usman	Cooperative Member	Parwan
15. Khor Agha	AI, Technician	Parwan
16. Ghulam Ghaus	Cooperative Director	Parwan
17. Alam Khan	Veterinary Worker	Parwan
18. Abdul Latif	Farmer	Charikar
19. Said Ismail	Farmer	Charika
20. Mohd Mulla	Farmer	Charikar
21. H. Mohd Amin	Farmer	Charikar
22. Naik Mohd	farmer	Charikar
23. Naik Mohd	farmer	Charikar
24. Mulla Husain	Farmer	Charikar
25. Said Wali	Farmer	Charikar
26. Said Mansor	Farmer	Charika
27. Mohd Usman	farmer	Chrakar
28. Qayum Agha	Extension Director	Jabalseraj
29. Haji Aolaswal	Dairy Cops,	Jabalseraj
30. Shah Mohmod	Farmer	Jabalseraj
31. Mohd Wali	Farmer	Jabalseraj
32. Abdul Hakim	Farmer	Jabalseraj
33. Abdul Rashid	Farmer	Jabalseraj
34. Bostan	Farmer	Jabalseraj
35. Qayum Khan	Farmer	Jabalseraj
36. Mohd Aisf	Extension Director	Said Khil
37. MohdYonus	Farmer	Said Khil
38. Hashim	Farmer	Said Khil
39. Mohd Asif	Farmer	Said Khil
40. Ghulam Sakhi	Farmer	Said Khil
41. Basir Khan	Farmer	Said Khil
42. Mohd Asif	Farmer	Said Khil
43. Agha Sahib	Extension Director,	Bagram
44. Malik Baqi	Farmer	Bagram
45. Mir Ahmad	Farmer	Bagram

List of Participant in Parwan Province continued

46. Abdul Jabbar	Farmer	Bagram
47. Abdul Zahoor	Farmer	Bagram
48. Said Jamal	farmer	Bagram
49. Fazal Ahmad	Farmer	Bagram
50. Qahir	Farmer	Bagram

List of Participants Attended the Dairy Development Meeting in Nangarhar Province

1. Nasir Ahmad Faiz	Agriculture	Jalalabad
2. Dr. Gh. Hassan	Provincial Vet.	Jalalabad
3. Dr. Abdul Haq	AH Clinic Director	Jalalabad
4. Dr. Mohd Kazim	AH. Clinic Member	Jalalabad
5. Mohd Afzal	Livestock Director	Jalalabad
6. Mohd Karim	Farmer	Jalalabad
7. Haji Mohmand	Farmer	Jalalabad
8. Gul Mohd	Farmer	Jalalabad
9. Abdullah Jan	Farmer	Jalalabad
10. Gul Rahman	Farmer	Jalalabad
11. Mohd Gul	Farmer	Jalalabad
12. Mohd Nabi	Farmer	Jalalabad
13. Mohd Rasool	Farmer	Jalalabad
14. Haji Kamkai	Farmer	Jalalabad
15. Gul Agha	Farmer	Kama
16. Mir Hashim	Farmer	Kama
17. Pir Mohd	Farmer	Kama
18. Jalaluddin	Farmer	Kama
19. Mohd Gulab	Farmer	Kama
20. H. Shmas Gul	Farmer	Kama
21. Dost Mohd	Farmer	Kama
22. Dr. Abdul Ghafar	Dist. AH. IC	Behsood
23. Hassan Khan	Farmer	Behsood
24. Zar Khan	Farmer	Behsood
25. Miras Gul	Farmer	Behsood
26. Ali Khan	Farmer	Behsood
27. Mohd Khalil	Farmer	Behsood
28. Said Wali	Farmer	Behsood
29. Dr. Rohulamin	Dist. AH. IC	Batikot
30. Kamin Gul	Farmer	Batikot
31. Dr. N. Rahman	Vet. Doctor	Batikot
32. Erfanullah	farmer	Batikot
33. Atta Khan	Farmer	Batikot
34. Wafiullah	Farmer	Batikot
35. Dr. Aminullah	Dis. AH. IC	Surkhrod

List of Participant in Nangarhar Province continued

36. Zia Jan	Farmer	Surkhrod
37. Gul Sharif	Farmer	Surkhrod
38. Lal Mohd	Farmer	Surkhrod
39. Wazir Ahmad	Farmer	Surkhrod
40. Mohd Salah	Farmer	Surkhrod
41. Gul Alam	Farmer	Surkhroad

List of Participants Invited for Dairy Development Discussion in Ghazni province :

1. Mr. Mirajuddin Patan	Provincial Governor	Ghazni
2. Mr. Sultan Husain Abasi	Director Agriculture	Ghazni
3. Mr. Chaman Milaty	Deputy Director Agriculture	Ghazni
4. Abdul Rahman	Cops Director	Ghazni
5. Shir Gul	Cops Member	Ghazni
6. Fazul Haq	Director Plant Protection	Ghazni
7. Dr. Aqiq Ahmad	Provincial Vet. Director	Ghazni
8. Dr. Ibrahim	AH. Clinic Director	Ghazni
9. Mohd Shafiq	Livestock Director	Ghazni
10. Abdul Ghyas	Livestock Assistant	Ghazni
11. A. Wasi	AI Director	Ghazni
12. Said Basir	AI Technician	Ghazni
13. Abdul Wodoud	Farmer	Ghazni
14. Mohd Shafiq	Farmer	Ghazni
15. Haji Hazrat	Farmer	Ghazni
16. S. Abdul Hameed	Farmer	Ghazni
17. Mula Abdul Qayum	Farmer	Ghazni
18. Nasirullah	Farmer	Ghazni
19. Naqibullah	Farmer	Ghazni
20. Haji Hanif	Farmer	Ghazni
21. Mohd Ishaq	Farmer	Ghazni
22. Mohd Anwar	Farmer	Ghazni
23. Mohd Sarwer	Farmer	Ghazni
24. Esmatullah	Farmer	Ghazni
25. Mohd Ebrahim	Farmer	Ghazni
26. Siad Hassan	Farmer	Ghazni
27. Fida Mohd	farmer	Ghazni
28. Said Aayat	Farmer	Ghazni
29. Said Hussain	Farmer	Ghazni
30. Said Safer Ali	Farmer	Ghazni
31. Mohd Ali	Farmer	Ghazni
32. H. Mohd Yasin	Farmer	Ghazni
33. H. Mohd Nabi	Farmer	Ghazni
34. Abdul Rahman	Farmer	Qarabagh
35. Mula Abdul Qayum	Farmer	Qarabagh

List of Participants in Ghazni Province continued:

36. Shir Gul	Farmer	Qarabagh
37. Chaman	farmer	Qarabagh
38. Juma Khan	farmer	Qarabagh
39. Mohd Ali Shah	farmer	Qarabagh
40. Assad Khan	Farmer	Qarabagh
41. H. Ghulam Mustafa	Farmer	Qarabagh
42. Akhter Gul	Farmer	Qarabagh
43. Ali Shah	farmer	Qarabagh
44. H. Yaman Ali	Farmer	Khwaja Omari
45. Ahmad Jawid	farmer	Khwaja Omari
46. Qurban Ali	farmer	Khwaja Omari
47. Mohd Ali	farmer	Khwaja Omari
48. Mohd Nasim	Farmer	Khwaja Omari
49. Jamil	PVT/ AI	Khwaja Omari
50. Mohd Musa	Farmer	Jaghato

APPENDIX 7

Recommended Areas for Dairy Development

Appendix 7: Recommended Areas for Dairy Development

1 Establishment of new processing facilities

- 1A** A new dairy plant could be established near Jalalabad, serving the local market and selling dairy products either to Kabul or Pakistan. Potential districts for milk collection are listed below.

Province	District	No. of Cattle
Nangarhar	Jalalabad Markaz	7,013
	Bishud (now Jalalabad district)	13,950
	Kama	48,313
	Bati Kot	27,094
	Surkh Rod	15,559
	Khogyani (difficult to collect milk)	19,826
Laghman	Qhargayi	43,419
	Mihtarlam	41,084

The potential in this area for milk collection is quite large and the establishment of a larger dairy plant (10-20 t/day) would be justified. The listed districts could form the basis for milk collection routes. Other districts with denser cattle populations are Kuz Kunar Shewa (11,330), Ghani Khel Shinwar (15,366), Sherzad (22,201) and Muhmandara (13,374).

- 1B** Parwan Province, in combination with several districts in Kapisa and one district in Kabul Province could also form one dairy union. With the Kabul market nearby, there seems to be enough potential to establish a processing plant of medium size (5 -10 t/day). Potential districts for milk collection are:

Province	District	No. of Cattle
Parwan	Bagram	11,067
	Chaharika (much direct sales!)	15,915
	Jabalusarai	7,850
Kapisa	Kohistan	27,940
	Mahmudraqi	19,155
	Nurab	40,496
	Tagab	16,171
	Alasay	6,247
Kabul	Shakardara	8,406

The potential for milk collection in these provinces is smaller than in Nangarhar. Kapisa can be used for milk collection, but infrastructure is a problem (roads, lack of electricity, security). Also the genetic potential of the cows is lower in Kapisa. On the other hand it would be good to support dairy development in this poor province.

- 1C** Wardak could be considered as another location for dairy processing, but as its location is not far from Kabul this is also the one with the lowest priority. The districts with the best potential for milk collection are:

Province	District	No. of Cattle
Wardak	Jalrez	5,461
	Maydan Shar	4,888
	Nirkh	5,761

The Kabul Dairy Union is already collecting milk in Wardak (in above districts there are 4 MCPs and 3 Co-ops). Infrastructure, quality of the cows and security are acceptable in these districts. A smaller dairy plant (5-10 t/day) could be justified. An alternative option would be to ask the Wardak farmers to stay with the Guzergha plant (Kabul Dairy Union) and to invest in a cold chain for milk collection.

- 1D** Ghazni Province appears to have a good potential for dairy development: there are just enough cows, partly improved breeds with higher milk production, and an internal market for dairy products that is still growing. Kabul is a 3-hour drive from Ghazni city and therefore also a potential market. A dairy plant with capacity of 5-10 t/day seems justified.

Province	District	No. of Cattle
Ghazni	Ghazni Markaz	3,876
	Khoja Omary	1,738
	Dih Yak	3,817

Districts with large(r) cattle populations, but presently not suitable for dairy development because of security reasons are: Nawur (6,090), Malistan (11,104), Andar (17,422), Qarabagh (13,108), Muqur (3,723), Gelan (2,748), Ab Band (2,623), Jaghatu (4,471) and Waghaz (2,130).

2 Expansion and strengthening of existing processing facilities

2A Kabul Dairy Union – Guzargha Plant

Province	District	No. of Cattle
Logar	Mohammad Agha	8,739
	Pul-I-Alam	15,715
	Baraki Barak	18,928
Kabul	Paghman	5,817

Guzargha would need investments in product diversification (e.g. yoghurt and ice-cream), milk collection system development and capacity increase. Support services and organizational strengthening will have to continue.

Note: milk collection in Paghman might be difficult because farmers can sell the milk directly in Kabul and thus fetch a better price.

2B Balkh Dairy Union – Balkh Dairy Plant

Province	District	Village	No. of Cattle
Balkh	Dehdadi	Sherabad	5,038
		Chehel Gazi	
	Balkh		12,790
	Chahar Bolak (water problems!)		8,968

In Dehdadi alone there is already more milk supplied by one village than the plant can presently cope with. Therefore milk supply is no problem and according to the Balkh Business Plan (LoL) marketing should not be a problem either. As the new plant will go in operation in July 2007 and support still is available, HLP assistance can come at the time when full capacity has been reached and further expansion is necessary. In addition HLP could provide additional training and help to develop the support services.

2C Kunduz Dairy Union

Province	District	No. of Cattle
Kunduz	Kunduz Markaz	32,046
	Chahar Dara	22,182
	Khan Abad	11,162
	Imam Sahib	47,603

FAO supports dairy development in Kunduz, but funding is not enough for the establishment of a new plant. Land o' Lakes is also considering support, but if necessary the HLP can contribute as well. Discussions are already underway for obtaining a site. Imam Sahib is a district with much potential for dairy development. Markets could be Kunduz, Pul-I-Khumri, Takhar and Kabul.

2D Baghlan Cheese Plant

This Cheese Plant was established in 2007 with support from the Dutch Government for the production of Gouda cheese. Next to the former 'Swiss' dairy plant a new building has been established. At the time of the visit, in April 2007, the total milk collection was 1000-1500 kg/day. The main market for Gouda cheese are the Kabul hotels, that can afford to pay a price 9.5 \$/kg. In Baghlan the cheese is sold for a slightly lower price. Milk quality still seems a constraint, as for cheese making high quality milk is needed. The plant may need additional support in the development of the milk collection system and support services.

APPENDIX 8

HLP

Economic Indicators Dairy Component

Economic Indicators Dairy component

Programme :

Provision of inputs and services and milk collection in 300 villages and 15000 farm families leading to better nutrition, genetic improvement, better hygiene and improved health care.

Assumptions :

- Average 1 cow per family today producing 800 litres per lactation with calving rate of 75 % or average milk production per year equivalent to 600 litres/year.
- improvement to 700 litres per year in year 2 and 800 litres in year 3 (better feeding and hygiene). Potential to increase to 1500 litres/year in year 10 (use of cross bred animals).
- Increase of numbers of animals by 10 % in year 2 and 25 % in year 3 (initially registered farmers)
- Increase of participating farmers by 10 % in year 2 and 30 % in year 3.
- ¼ of the production consumed at farm level

Expected added production :

Additional Productions (No cows/production)	Project years		
	Year 1	Year 2	Year 3
No of cows	15000	18250	24375
Yearly production	600	700	800
Quantity milk collected per year (Tons) $\frac{3}{4}$ of production	6750	9581	14625
Daily collection (litres)			
Value paid to farmers (\$)	18500	26250	40000
Added value (in \$ at 0.3 \$/l)			
	20250000	28743000 8493000	43875000 23625000