

Mongolia-Japan-FAO/UN Special Programme for Food Security  
INCREASING THE SUPPLY OF DAIRY PRODUCTS TO URBAN CENTRES  
BY REDUCING POST-HARVEST LOSSES AND RE-STOCKING  
GCSP/MON/001/JPN



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MONGOLIA  
MILK PRODUCTION, PROCESSING, CONSUMPTION  
AND OUTLOOK TO 2010



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World dairy production and trade: trade policy and development for Asia  
Dairy Economics, Trade Consumption, Marketing and Development of Dairying**

**Paper on  
Mongolia: milk production, processing, consumption and outlook 2010**

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Mongolia-Japan-FAO/UN Special Programme for Food Security project (GCSP/MON/001/JPN)  
Increasing the supply of dairy products to urban centres in Mongolia  
by reducing post-harvest losses and restocking

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**Abstract**

Milk is sacred in Mongolia where milk and milk products are staple foods and produced in great abundance from 30 million cattle, yaks, camels, horses, goats and sheep. Livestock contribute more than one fifth of GDP and almost half of all employment in what was, until very recently, a predominantly nomadic culture. Dairying in particular provides much-needed nutrition, regular incomes and jobs and is set to play a major role in helping the country achieve its Millennium Development Goal of halving hunger and poverty by the year 2015.

In the socialist period Mongolia used to be self-sufficient in milk. During the rapid transition to the market-based economy in the 1990s, the dairy industry collapsed and by 2002 most of the processed milk sold in urban areas was imported. The industry is characterised by obsolete infrastructure and technologies, a chronic shortage of trained people and consumer concern about the quality and safety of Mongolian milk and milk products. Like other countries in the East Asian region, Mongolia is rapidly urbanising and domestic products now need to be tailored to modern market tastes; though the huge wealth of traditional milk products is still an important part of Mongolian culture and heritage.

The paper briefly describes attempts to revive and modernise the dairy sub-sector. It focuses on recent efforts to revitalise the national 'white revolution' programme using a sector-wide, cow to consumer strategy involving public and private sector partnerships. At 134 kg per person per year, milk availability is high by Asian standards; even so, the market is very small relative to the country's potential and comparative advantage for producing 'clean' milk. The outlook to 2010: Mongolia plans to substitute the vast majority of imports with domestic milk, but will also need to look to exporting quality, niche products to the rapidly growing markets of nearby, milk-deficit countries to continue to grow its own dairy industry.

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## 1. INTRODUCTION

Mongolia is more than three times the size of France. Broadly speaking, moving from south (China) to north (Siberia), the country is divided equally into desert, desert-steppe and steppe regions, each with mountain ranges, some rising to well over four thousand metres. Being so far from the sea, the climate is extreme continental with temperatures ranging from as low as minus 50°C on the steppe in winter to plus 40°C in the Gobi desert in summer. Ulaanbaatar is the coldest capital city in the world. Throughout 2006, the 800<sup>th</sup> anniversary of the founding of the State of Mongolia by Chinggis Khaan is being celebrated.

The livelihoods and wellbeing of Mongolia's 2.5 million people depend mainly on livestock and on milk in particular. Cows, camels, yaks, sheep, goats and horses are all milked at certain times of the year and number over 30 million head. Nomadic herding and traditional dairy products making are at the core of Mongolian society providing the biggest share of national income and employment.

Milk is both sacred and a staple food. Livestock contribute more than one fifth of GDP and almost half of all employment in what was, until very recently, a predominantly nomadic culture. Dairying in particular provides much-needed nutrition, regular incomes and jobs and is set to play a major role in helping the country to become more food secure and, in so-doing, achieve MDG 1 (Millennium Development Goal) of halving poverty and under-nutrition by the year 2015. This means reducing the number of under-nourished people living below the poverty-line from 800,000 to 400,000.

Mongolia used to be self-sufficient in milk. During the rapid transition from state-run to market-based economy in the 1990s, the dairy industry collapsed. By 2002 most of the processed milk sold in urban areas was imported.

This paper briefly describes attempts to revive and modernise the sub-sector. It focuses on recent efforts to revitalise the national 'white (milk) revolution' programme using a sector-wide, cow to consumer strategy involving public and private sector partnerships; lastly, the outlook to 2010 is considered.

Until very recently, the industry was characterised by obsolete infrastructure and technologies, a chronic shortage of trained people and consumer concern about the quality and safety of domestic milk and milk products. Like other countries in the East Asian region, Mongolia is rapidly urbanising and products now need to be tailored to modern market tastes, though the huge wealth of traditional milk products will continue to play a central role in Mongolian culture and the livelihoods of nomadic herders.

## 2. MILK PRODUCTION AND CONSUMPTION (slides 3 to 11<sup>1</sup>)

### 2.1 Setting

Milk is sacred in Mongolia. It is sprinkled on horses and the wheels of vehicles, trains and even aeroplanes to bless the journey and the traveller. Along with wheat, meat and, more recently, vegetables, milk and milk products are staple foods. Prior to 1990 milk for the processed (formal) market was produced exclusively on some 42 State mechanised dairy farms, collected through a network of cooling centres and processed mainly at one large State-owned dairy in the capital, Ulaanbaatar. In rural areas nomadic families prepared, and still prepare, traditionally conserved dairy products for the customary winter diet of meat and milk. In the short summer, people, both rural and urban, move to summer camps or sanatoria, where they consume up to ten litres of milk daily in the form of *airag* – a mildly alcoholic drink fermented from mare’s milk; and *hoormog* – made from camel milk. As well as being pleasant drinks, *airag* and *hoormog* are natural functional foods that restore the body after the long winter diet of meat and milk-based foods. There are over 500 different dairy products and regional variations.

In the socialist period up to 1990 Mongolia was self-sufficient in milk, and even a small exporter of butter and caseinates. The rapid transition to the market economy of the 1990s saw a sharp decline of the agriculture and food sectors, the almost total collapse of input and output service systems, worsening food insecurity and alarming import increases. The dairy industry collapsed, along with most other food industries. State dairy farms were dismantled or looted and the animals were distributed to the managers and workers. Today there is just one left in a remote area, operated by the private sector. The milk cooling centres were allocated to individuals and soon went out of use as the assets were looted or sold off. The main Ulaanbaatar dairy struggled on under the joint ownership of the Capital Property Agency and a small number of entrepreneurs who acquired a minority shareholding.

By the late-1990s Mongolia was importing over three quarters of its wheat and three quarters of its processed milk and milk products. In 1998 the Government started the ‘green revolution’ programme to revive wheat and vegetable growing. In 1999 the ‘white revolution’ programme was launched to revive the dairy sub-sector; progress was limited due resource constraints and increasing competition from imports, both finished products and raw materials for recombination. This encouraged the establishment of two dairies with business models based on importing subsidised milk powder for recombination.

The turn of the century saw two winter zuds<sup>2</sup> in which more than 30 percent (10 to 12 million) of the animals perished. These animals mainly belonged to the relatively inexperienced State farm employees that were allocated them during the break-up of the State mechanised farms. Milk production plummeted further and by 2002 Mongolia was importing almost all its processed milk and milk products needs. The formal milk collection and processing industry virtually ceased and urban consumers, especially young consumers, became accustomed to imported, western-style dairy products.

In 2003 the Government approached FAO and Japan for support and, in late-2004, the Mongolia-Japan-FAO/UN Dairy Food Security project commenced<sup>3</sup>. With funding from the Government of Mongolia and the Japanese Kennedy Round II facility (USD 1.96 million), FAO is executing a project to revive the dairy industry under its Special Programme for Food Security. The objective of the project is: to improve food security by providing a sustainable supply of safe milk and dairy products to urban centres in Mongolia. The project started in November 2004 and is currently scheduled for completion in April 2007. It supports the national economic strategy of reducing poverty by improving overall food, income and job security and operates initially in the key central *aimags* (provinces). Here are found the main cow milk producing areas and the main urban consumption centres of Ulaanbaatar, Darkhan, Erdenet Baganuur and Sukhbaatar.

<sup>1</sup> Slides from accompanying PowerPoint presentation.

<sup>2</sup> A winter is declared a *zud* when animals are unable to scrape snow away to graze the residual steppe vegetation, due either to higher snowfall or colder temperatures than normal.

<sup>3</sup> Mongolia-Japan-FAO/UN Special Programme for Food Security project: Increasing the supply of dairy products to urban centres in Mongolia by reducing post-harvest losses and restocking

The safe, practical and affordable technologies and systems for profitable dairying that FAO promotes are being tailored to the market and demonstrated. This is being done in close consultation with the public and private sector dairy operators and communities involved at each stage of the milk production-processing-marketing food chain. Women play a major role as they tend the animals and process milk into traditional products such as *aarul* (dried curd), *tos* (cream) and *airag* (fermented mare's milk).

Today, the national herd is rapidly recovering, at least in terms of overall numbers. The latest census (December 2005) indicates the numbers of cattle, goats and sheep are increasing due, to increased investments in dairy farming and good cashmere and wool prices (slide 6). Last year (2005) was very dry, so wheat production was only about half that for an average year. More importantly, for the dairy sub-sector, hay production was down. So far, 2006 appears to be a good year with a relatively mild spring, good rains and, probably, the best hay harvest for the last ten years.

## **2.2 Milk production and consumption**

Milk production and consumption are characterised by (i) a very small domestic market for processed milk and milk products, (ii) a huge disparity between rural and urban consumption patterns, (iii) poor quality milk, (iv) over-reliance on imports for urban markets (v) the extreme continental climate with long harsh winters and springs (October to May) and (vi) a vast natural resource base for milk production from the six million or so animals that are potentially in milk at any one time. Grasslands comprise 22 percent of the country and pesticides and other chemicals are rarely, if ever, used. Mongolia thus has a potential international comparative advantage for producing 'clean' milk under extensive conditions, both for ecologically-conscious markets and for nearby milk-deficit markets in the region. Selected data related to the dairy sub-sector and farming systems are indicated in slides 3 to 11.

### **2.2.1 Consumption**

Since 2002, milk production has increased at 12% pa and milk availability is 134 kg of liquid milk equivalent (LME) per person per year – about three times the average for Asia as a whole, and fifteen times more than China (slide 9). Due to recent life-style changes from predominantly nomadic to predominantly sedentary, the country is urbanising rapidly. Since 1990 the population of urban centres has more than doubled to 1.5 million, with Ulaanbaatar alone accounting for 1 million inhabitants<sup>4</sup>. One third of the population is under the age of 14 years and almost half under 20 years old. The majority of young, urban Mongolians have only experienced imported milk and dairy products. Nationwide, imports account for about 20 kg per capita and double this amount in urban areas (slide 15).

Retailing in the key city markets is changing radically. Well-stocked supermarkets with imported produce now dominate, though many imported dairy products appear to be close to, or past their sell-by date. Two large food and beverage companies, one supermarket-based, the other the main producer of vodka, recently diversified into producing UHT milk and fruit juices. Their business model is based on reconstituting imported full-cream milk powder, which is marketed as 'fresh' milk. When the powder comes from EU countries, the export subsidy alone (130 Turgrugs or 11 US cents<sup>5</sup> per litre of LME) is more than most Mongolia herders are paid for their summer milk – when they can sell it. A generation of urban Mongolians has grown up drinking UHT milk, either reconstituted in Mongolia, or imported from Siberia and South Korea. Also, consumers now say they are concerned about the quality and safety of local milk and traditional dairy products and prefer imported products. According to recent data<sup>6</sup>, urban Mongolians consume just one quarter as much LME as their rural counterparts (slide 16).

The informal milk market is important for the older generation, though quality is often uncertain. Raw milk and traditional products account for about half urban consumption. The informal market is important not only as a supplier of milk and dairy products, but also a source of regular income, especially for female-headed households, and jobs<sup>7</sup>.

<sup>4</sup> The urban population comprises cities and aimag centres.

<sup>5</sup> 1166 Turgrugs = one USD (September 2006)

<sup>6</sup> Baseline survey of project areas – 2005 (reference 8)

### 2.2.2 Production and processing

With its huge milk animal resource base and its vast rangelands making up 22 percent of the country, Mongolia has the capacity to produce all its milk, and to export any surplus. Cows, yaks, mares, camels, goats and sheep are all milked, with approximately 80 percent of the milk produced in the short summer pasture growing period (mid-May to mid-September).

Uniquely, mares are intensively milked every two hours, day and night, during this period. The milk is mainly transformed into *airag* (fermented milk). Camels are also milked with the milk normally being transformed into *hoormog*, another highly sought-after fermented drink. In addition, milk vodka is distilled by nomads from highly fermented milk. The first distillate is 40% proof, the second 23% and the third 11%.

The main bottlenecks are: (i) low cow productivity, (ii) seasonal production patterns, (iii) poor feeding regimes and (iv) getting the milk from producers safely and efficiently to urban consumers. It is reported that up to one third of available milk is 'lost' as it cannot be marketed. These post-harvest losses represent some 40 kg of milk per person per year<sup>8</sup>.

A few private milk processors emerged in the 1990s, while the old State dairy struggled on with obsolete equipment and inexperienced management. Some processors failed, their development constrained by difficulties in obtaining good quality milk, equipment and packaging materials, and in accessing modern technologies, investment finance and working capital. Interest on loans averages 2.5% to 3% per month and, with VAT on dairy products set at 15%, just to finance late payment by supermarkets adds significant cost and reduces the competitiveness of domestic produce versus subsidised imports.

### 3. RECENT EFFORTS TO REVIVE THE DAIRY SUB-SECTOR (slides 12 to27)

In line with government policy, the current plan to revive the dairy sub-sector is focussed on the three central *aimags*: (i) where the majority of the urban population lives, (ii) where most cattle are found and (iii) where the main cropping areas are located and thus crop by-products available for feeding. The first phase of the 'white revolution' programme ran from 1999 to 2004. Due largely to lack of resources, human and financial, little was achieved and imports continued to soar. Following the start of the FAO Dairy Food Security project in late-2004 an intensive six-month consultation process involving all public and private sub-sector dairy stakeholders and interest groups took place to develop a comprehensive strategy to revive the sub-sector. The initial drive is incorporated in the programme of work to implement the FAO project. The strategy is now mainstreamed into the government development programme and takes account of the harsh winters and springs when little milk is produced and little or no field work can be done. A sector-wide, cow-to-consumer dairy food chain approach is embraced under three thematic programmes: (i) milk production enhancement, (ii) milk marketing enhancement, including milk collection and processing and (iii) dairy training.

The strategy and thematic programmes were finalised at a national workshop in May 2005 and approved by the National Dairy Task Force at its inaugural meeting in May 2005. The high level Task Force was formally established by the Minister of Food and Agriculture in April 2005 and is responsible for guiding implementation of the FAO project and the revitalised 'white revolution' programme. It is chaired by the State Secretary and members represent all public and private dairy sub-sector interest groups, including consumers. Two Regional Project Implementation Teams have also been set up to support and co-ordinate implementation for (i) Tov *Aimag* and Ulaanbaatar City and (ii) Selenge *aimag* and Darkhan City. A third team covering Orkhon *Aimag* and Erdenet City was not mobilised due to lack of project resources to operate in the region.

<sup>7</sup> A recent FAO/International Livestock Research Centre (ILRI) study in Africa and Asia (2004) indicated the dairy sub-sector provides 2 to 6 off-farm jobs for each 100 litres of milk collected, processed & marketed

<sup>8</sup> For project purposes, post-harvest losses are defined as 'lack of realisation of the anticipated value of milk', i.e. any milk that a herder or farmer wants to sell, but cannot because of lack of market access.

Implementation of the three programmes is based on matching technologies and know-how to market needs in order to (i) persuade urban consumers to consume more domestic milk and milk products, (ii) reduce post-harvest losses by linking milk producers with consumers and (iii) substitute imported milk and milk products with quality domestic products.

With public and private sector partners the three thematic programmes are operationalised through a series of sector-wide, vertically integrated, complete cow to consumer commercial model demonstration units. Private sector partners include: (i) herders and farmers, (ii) service providers, mainly veterinarians and AI (Artificial Insemination) technicians, (iii) milk collectors, (iv) milk processors, (v) milk traders etc. Public sector partners include specialists from: (i) the Ministry of Food and Agriculture and decentralised *aimag* Food and Agriculture Agencies, (ii) Food Regulatory and Inspection Authorities, (iii) the Animal Husbandry Research Institute, (iv) education authorities etc.

The model demonstration units include: (i) milk producer groups, (ii) dairy service centres, (iii) milk collection points, (iii) milk cooling centres, (iv) milk processing units and (v) dairy sales centres. The focus is on innovation, quality and training through (i) demonstrating modern technologies, (ii) demonstrating new equipment and (iii) providing up-to-date human skills. The FAO project is sharing the investment risk with its partners by contributing modern know-how and limited equipment (approx. USD350,000). The partners are investing about USD 800,000 in equipment and buildings.

For the first milk season in 2005, a priority 'quick-fix' scheme was undertaken to provide spare parts and equipment to rehabilitate existing strategic milk collection and processing capacity. This included rehabilitation of the UHT milk processing and milk powder plants at the old State dairy in Ulaanbaatar and a small powder plant in Sukhbaatar City in Selenge *aimag*. The scheme facilitated a three-fold increase of milk collected and processed by project partners to 7.5 million litres in 2005 compared with the pre-project 2003 base year of 2.5 million litres; the target for 2006 is 15 million litres (see slide 28).

### **3.1 Milk Production Enhancement Programme**

The aim of the programme is to produce quality milk from profitable cows using good farming practise for enhanced rural incomes and responsible steppe management. The main components include (i) establishing milk producer groups, (ii) establishing dairy service centres and (iii) pioneering a dairy cow genetic improvement scheme.

Three model milk producer groups (MPGs) are being set up. Two Milk Producers' Co-operatives with 38 members are already formally registered and conducting business activities such as collecting milk, providing transport services etc. A further group with 250 herder-members in a remote area is currently being set up. By and large, each group represents a different milk production system, e.g. (i) semi-intensive<sup>9</sup> mixed crop-livestock farming at the Nomgon *Suu* (milk) Milk Producers' Co-operative in Selenge *aimag* (ii) start-up specialised dairy farms at the *Suun Sanaa* (milk vision) Milk Producer Co-operative in Selenge *aimag* and (iii) nomadic herders at Mongonmort MPG in Tov Aimag. At present the focus is on: (i) clean milk production, (ii) improved dairy cow productivity and (iii) building awareness about the benefits of joining a MPG to add value to milk. At the time of writing (September 2006), these are only milk producer co-operatives operating in Mongolia.

Attached to each MPG is a Dairy Service Centre, run by a private Veterinarian. Presently the centres provide animal health and breeding services, on a full cost recovery basis, plus advice on clean milk production. Later, other services will be added such as advice on management and feeding.

Since 2003, the number of semi-intensive dairy farms within a 150 kilometre radius of Ulaanbaatar has trebled to 197 in 2006 (August).

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<sup>9</sup> In the Mongolian livestock context 'intensive' means increased production using local resources, rather than tending towards a high input system

As part of the push for clean milk, herders and milk producers are encouraged to deliver their milk in hygienic aluminium cans, which they purchase from the Dairy Development Fund established in early 2006 by the above-mentioned National Dairy Task Force. This revolving fund is to be used mainly to purchase dairy inputs and supplies that cannot be made in Mongolia. As a further motivation, an incentive milk payment scheme, based on milk quality, is gradually being phased in.

The immediate aims of the pilot dairy cow breed improvement scheme are: (i) to produce more productive and profitable cows adapted to Mongolian conditions, (ii) to boost winter milk production when supplies are at their lowest and farm-gate prices at their highest and (iii) to maximise returns from male off-spring for beef and for breeding in remoter areas where AI is not economical. The scheme comprises: (i) animal identification, (ii) AI using semen from adapted improved dual purpose dairy-beef breeds (using imported Simmental semen from young tested European bulls), (iii) performance recording for economically important traits (milk and meat) and (iv) analysis of data for genetic improvement for milk and meat production. The scheme is designed to be affordable and sustainable in the longer term. The AI component is already operated on a full cost-plus recovery basis, which pays for the performance recording component. The scheme will ultimately involve about 2,500 dairy cows and their off-spring, including cows from areas supported by other projects. To date 56 farms and herders with some 800 cows are involved. The scheme is supervised by the 'Gene Bank' of the Ministry of Food and Agriculture and delivered through the above-mentioned Dairy Service Centres, by private veterinarians and AI technicians. Milk samples and farm records are collected on a monthly basis and tested automatically on a rapid milk analyser at the Animal Husbandry Research Institute in Ulaanbaatar, where the records are entered on a dedicated database in a new unit set up by the FAO project. It is planned to provide feedback to farmers and herders by the end of 2006, but it will be some time before enough records and experience are available for analysis for genetic improvement.

The pilot dairy cow genetic improvement scheme is closely linked to the national animal genetic improvement scheme launched by the Government in mid-2006 and, more specifically, to the commercial dairy heifer multiplication scheme.

## **3.2 Milk Marketing Enhancement Programme**

The goal of this programme is to provide affordable, quality Mongolian milk and milk products for urban Mongolians, and is the main intervention focus of the FAO project. The seven main food and dairy companies now processing domestic milk are working together in various capacities with the FAO project to implement the programme. Their plants range in daily milk processing capacity from: (i) less than two metric tonnes (four dairies), (ii) 2 to 10 mt (three dairies) and (iii) over 10 mt (one dairy – the old Ulaanbaatar State dairy now operated under a management contract by the minority shareholder). Commercial milk collection and processing models are being demonstrated that include: (i) milk collection units, (ii) milk cooling centres, (iii) milk processing units and (iv) dairy sales centres. Obsolete milk collection and processing infrastructure is being replaced with modern technologies and equipment. To date 11 units have been opened in rural and urban areas covering all the links in the farm to consumer dairy food chain.

### **3.2.1 Milk collection and processing**

Five model milk collecting units are spread from Sukhbaatar City on the Siberian border in the north to Mongonmort in the centre. A unit comprises: (i) a 3 mt truck, (ii) 42 forty litre hygienic aluminium milk cans and a strainer, (iii) a jet can washer, (iv) LP system activators<sup>10</sup>, (v) a basic milk testing kit and (vi) training. The unit investment cost for the equipment ranges from USD7,500 to USD8,000.

Two model milk cooling centres have been established by adapting abandoned buildings; a 20,000 litre capacity unit in Mandal *Soum* (town) and a 10,000 litre unit in Jargalant village. Both feed milk in to Ulaanbaatar up to 300 km away. The units comprise: (i) a milk reception set, including milk meter, (ii) a plate cooler (well water temperatures are below 10°C, even in summer), (iii) one or two five thousand litre capacity refrigerated milk storage tanks, (iv) a can washing kit (tank, water heater and jet washer), (v) a milk testing kit, based on the 'Lactoscan' rapid milk analyser and (vi) training. The unit investment

cost for the equipment ranges from USD20,000 to USD30,000. In addition, milk tankers (capacity 2 mt) have been assembled in Mongolia from chassis and tanks imported from China. The cost is USD8,000 per tanker, compared with over USD100,000 for an imported, pre-built unit.

Three model milk processing units have been set up; two new small-scale enterprises, one in Darkhan City and one in Baganuur City. Both units have business plans based on processing up to two mt of milk daily into pre-packed or bulk, ready-to-drink pasteurised fresh and flavoured milks and natural and flavoured drinking yoghurts. The units comprise: (i) a milk reception set, including a can washing kit, (ii) a hand or an automatic pouch filler (iii) an in-pouch pasteurising and cooling unit, which also provides cooling water for a batch yoghurt making tank (iv) a milk separator and butter churn, (v) cold storage, (vi) a milk testing kit, based on the 'Lactoscan' rapid milk analyser and (vii) training. The unit investment cost for the equipment ranges from USD20,000 to USD40,000.

The third model milk processing unit is located with a medium-sized milk processor in Ulaanbaatar. It produces Gouda and Cheddar cheeses and processed cheese, all for the first time in Mongolia. The cheese market in Mongolia, and the region, is mainly for processed cheese, but there is also a growing liking for European-type cheeses, so cheese is made both for the natural cheese market and for processing. Two processed cheese varieties are produced: (i) a sliceable sausage pack for fast food outlets and (ii) a cheese spread for the retail market. Processing extends the shelf-life of the natural cheese, which is made mainly from surplus summer milk for sale throughout the year. The recipes have been formulated to use yak cheese and other cheese-like traditional products made in summer by nomadic herders out on the steppe. Both processed cheese lines are long shelf-life, niche products that can also easily transportable to the rapidly growing regional dairy market (see slide 29 and box). The model unit has a daily capacity to convert up to one mt of milk into approx. 100 kg of cheese and to produce 250 kg of processed cheese. The unit comprises: (i) a 600 litre locally fabricated cheese vat and cheese making kit, (ii) a cheese ripening room and a cheese store, converted from 20 foot shipping containers, (iii) a steam generator, (iv) a cheese grinder, (v) a cheese processor, (vi) a processed cheese filler, (vii) a cheese making testing kit, based on the 'Lactoscan' rapid milk analyser and (viii) training. The investment cost for the equipment is USD30,000. A similar unit procured from the west would cost over USD120,000.

The key criteria for selecting equipment, and supplies such as packaging materials, includes: (i) safety & efficiency, (ii) hygiene and durability and (iii) affordability and availability. All the imported equipment and supplies have been procured through local agents to ensure availability and servicing after the FAO project is completed. The FAO project is also working with local suppliers to fabricate many items, including the milk coolers, in-pouch milk pasteurising units and cheese vats and presses (see slide 30).

The model units are demonstrating that quality milk can be produced and collected from remote countryside areas and transformed safely and affordably for consumers in urban centres. Milk is currently collected from 1,500 rural families – nomadic herders, *Soum* and *Bag* households and dairy farms. The volumes collected by milk processors are set to increase five-fold this year (2006) to about 15 million litres from the 2003 base year.

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<sup>10</sup> Since the late 1990s FAO has pioneered a low-cost alternative for collecting milk from remote areas or when conventional milk cooling is not available. Known as the Lactoperoxidase (LP) system, two activators are used to reactivate a natural enzyme preservation mechanism present in milk. Originally developed in Sweden and extensively field tested, the technology is safe and inexpensive. It is already in use in a number of countries and has received WHO/FAO Codex Alimentarius approval. In Mongolia the LP system is used for preserving milk under certain conditions in summer, when temperatures on the steppe and in the Gobi reach 40°C plus. If available, chilling is always first preference. In 2005 the system was piloted for cow and yak milk using both 50-litre doses for cans and multiple 1,000-litre doses for tanker milk collected from remote areas without electricity. In the field trials, milk stayed fresh at ambient temperatures for up to six hours longer than non-treated milk. With pre-cooling to 15°C in water troughs (using animal watering points), it was possible to successfully operate once-a-day collection, i.e. evening milk collected with morning milk. The combination of improved cooling and LPs has already reduced the milk losses of one of the private sector partners from 70,000 litres in 2005 to just 2,000 litres so far in 2006 (August). The technology is already transferred and local dairies are now importing the activators directly from a supplier in Europe. Costs work out at 5 Turgrugs per litre of milk treated (about 0.4 US cents). For more information visit: [www.mongolia-dairy.com](http://www.mongolia-dairy.com) or [www.fao.org/ag/agA/agap/lps/dairy/ECS/Papers/pp\\_vms.htm](http://www.fao.org/ag/agA/agap/lps/dairy/ECS/Papers/pp_vms.htm)

### **3.2.2 Marketing**

In September 2006, the final link in the cow to consumer dairy food chain was opened, a model 'One-stop' Dairy Sales Centre in Ulaanbaatar. The five main processing dairies that collect and process Mongolian milk in Ulaanbaatar joined together to sell quality milk and dairy products. This was organised in association with the recently formed Dairy Steering Group of the Mongolia Food Industry Association. Sales are aimed at those customers who are (i) especially interested in fair-priced, quality domestic milk and milk products and (ii) who are unable to buy these products from their local store or supermarket. The centre also enables the smaller dairies to convert their products into cash more quickly.

As many Mongolians still prefer to buy raw milk for making *Suuthe tsai* (the traditional Mongolian salt tea beverage offered to every guest and restaurants customer), the 'One-stop' centre also markets bulk chilled raw milk and bulk yoghurt produced by the above-mentioned model Milk Producer Cooperatives. This type of raw milk sales does not pose a health hazard as the milk is boiled during the preparation of *Suuthe tsai* and other traditional products, either at the household level or in restaurants. Raw milk sales are licensed by the City Food Inspection Agency in accordance with stringent hygiene and quality standards. The 'One-stop centre has its own milk testing laboratory, certified by the Inspection Agency, to ensure the products on sale meet the standards that modern urban consumers demand. The FAO project provided the agency with a rapid 'Lactoscan' milk analyser for quality checking.

The five dairies in Ulaanbaatar also supply over 80% of the school meals under the recently launched Government student nutrition programme in Ulaanbaatar for grades 1 and 2 children (aged five to seven). In Ulaanbaatar, 75 schools and 32,000 children now benefit from the healthy, balanced eating and nutrition that milk provides as nature's most complete food. The model dairy units in Darkhan and Sukhbaatar Cities are also involved in similar school schemes. The Government now insists that only domestic milk is used and plans to gradually extend the school programme to all 110,000 students in 2007. Different milk and milk products are provided each day and the scheme has boosted cash flow and earnings for the dairies (slide 27). It is also showing Mongolian milk and milk products to tomorrow's customers.

Now that a quality dairy food chain is demonstrated and working, a major generic milk marketing campaign to promote domestic milk and milk products was launched at the end of September 2006 through the Dairy Steering Group of the Mongolia Food Industry Association. The aim of the campaign is: (i) to educate urban consumers about the benefits of regular consumption of domestic 'fresh' milk and dairy products, (ii) to support the school lunch scheme with quality, domestically produced milk and dairy products and, over time, (iii) to substitute imports and ensure Mongolian herders and farmers benefit from milk consumption, not subsidised farmers from developed countries. The campaign includes: (i) a generic logo to differentiate Mongolian milk from imports, (ii) a generic slogan 'Mongolian milk for health and wealth' (healthy eating and nutrition for Mongolian people, especially children, and wealth - incomes and jobs - for Mongolian herders and milk producers), (iii) TV and radio commercials (iii) press conferences, newspaper adverts and interviews, and (iv) billboards, all harmonised with the school nutrition scheme and the opening of the 'One-stop' dairy sales centre.

### **3.3 Dairy Training Programme**

The aim of the programme is to build local capacity for profitable dairying and enhanced food security. As there was no vocational training available for dairy operators – milk producers, service providers, milk traders, milk processors etc - the first task was to set up a dairy training facility. A National Dairy Training Centre was established by the FAO project at the Food Technology College in Ulaanbaatar and ready by late-2005. The Centre provides a range of vocational and outreach training in subjects covering the entire cow-to-consumer dairy food chain. It has modern teaching faculties, including AV training materials production, and a semi-commercial demonstration dairy with product development and quality enhancement units. The Centre is also used in term-time for practicals for college students. To date over 800 dairy operators have received hands-on, practical training, both at the training centre and out in the countryside, including the staff and advisors from other donor projects.

#### 4. LESSONS LEARNED AND OUTLOOK TO 2010 (slides 28 to 34)

Eighteen model dairy units covering the entire cow-to-consumer dairy food chain are now in operation in the central *aimags* where the majority of dairy cattle are found and most urban consumers live. Private sector partners have invested over USD800,000 and other non-project, domestic and foreign companies are now starting to invest in milk production, collection, processing and marketing. Almost two years into the current dairy sub-sector revival process, a number of preliminary lessons are emerging. These include:

- Mongolia is developing the capacity to produce clean milk that can be processed into high quality, modern milk and milk products, even allowing for the very limited road network and considerable distances involved in getting the milk from the cow to the consumer.
- The dairy industry needs to become even more market-oriented, providing products that meet the growing shift to western consumer tastes.
- There are indications that Mongolia can substitute the majority of its dairy imports with clean, quality, domestic milk and dairy products by 2010. Given the huge distances involved in importing milk to Mongolia, the companies reconstituting UHT milk can now be persuaded to gradually switch to using domestic milk in place of imported milk powder.
- Consumption of traditional dairy products will remain important, especially for nomadic herders and customary occasions.
- Milk production costs and farm-gate prices in summer (12 to 15 US cents per litre) for milk produced under the semi-intensive, peri-urban system are competitive with the most efficient western countries, provided western subsidies are discounted. Producer prices are even lower for milk produced by herders and producers in more remote areas.
- Due to the already high milk availability and consumption levels, at least by Asian standards, once imports are replaced and urban consumption levels increased, market growth is expected to stabilise around 2 to 3 percent per annum, assuming disposable incomes continue to grow. With the recent growth of the mining and tourism sectors GNI (Gross National Income), while still low by western standards, has been expanding at about 12 percent annually since 2002 and should be capable of sustaining this modest growth forecast.
- Mongolia has an international comparative advantage for producing and exporting milk and milk products because of its large livestock herds and its vast natural grassland resources. Hardly any pesticides, animal drugs or milk production-stimulating hormones are used. To realise these opportunities more effort needs to be placed on (i) improving breeding for more profitable cows (ii) quality feed and fodder conservation (iii) export accreditation for milk (and meat) products and (iv) technology transfer and training. FAO is already implementing or plans to implement a cluster of complementary projects in support of these needs.
- In the short-term, investment is most needed for continuing to modernise and expand milk collection infrastructure and to further improve the productivity and profitability of dairy cows.
- In the medium-term investments are required to process surplus milk into niche, value-added easily transportable products such as milk powder and processed cheese for export to milk-deficit markets in the North and North-Eastern Asia region.
- The potential to export Mongolia's traditional mare's milk-based and camel milk-based functional foods, under a green ecological generic brand, should also be explored

In early 2007 the FAO dairy project will refine, adapt where necessary, cost and document the introduction of modern, market-oriented dairying to Mongolia (slide 29). Based on the lessons learned, an investment plan will be prepared to tailor and expand the commercial units to other parts of the country, where market demand justifies investment.

To continue to grow its own dairy industry, Mongolia will need to look increasingly to exporting clean, quality, niche products to the rapidly growing markets of milk-deficit countries in the region. According to FAO (2005) nearby East and North-East Asian countries will need to import more than 100 billion kgs of liquid milk equivalent annually by 2015. New domestic investors are already investing in the dairy sub-sector, both in milk production and in milk collection, processing and distribution. Foreign investors are also showing interest and planning to make significant investments. These developments should be encouraged to accelerate domestic and foreign investment in the sub-sector.

While is still too early to draw concrete conclusions, and while much remains to be done, there are indications that the revival of the dairy sub-sector is helping to make Mongolia more food-secure and, in so-doing, achieve its Millennium Development Goal of halving poverty and under-nutrition by the year 2015.

<b>Box: China Dairy Market – selected facts and figures</b>	
<b>China Market</b>	
1. Milk consumption growth (per capita)	8kg (2002) 18kg (2010) 41 kg (2030)
2. Dairy production growth (1991 vs. 2004):	China (15.5%) World (1.2%)
3. Growth in off-farm consumption (mt LME)	7,721,000 (1997) to 12,492 (2002)
4. Dairy trade balance in 2004 (mt LME)	net import 303,855 mt
5. Imports increasing by	15.2% pa (2000-2004)
6. Outlook	catapulting demand
7. China consumes (2004)	19% of global increase in consumption
<b>Mongolia target</b>	
1. Products	non-cold chain products, e.g. milk powder & cheese (fresh & processed)
2. Milk powder	China imports doubled to 146,000 mt (2000-2004) mainly FCMP (62%) & SMP
3. Cheese	small but rapidly growing market 1,968 mt (2000) vs. 7,244 mt (2004) rapidly developing fast food sector Western influence in diet of urban upper income consumers market growing at 113% per year imports growing at 67% year on year (2000-2004)
4. Import tariffs:	cheese 12% milk powder 10%
Source: FAOSTAT (2005) & 3A Business Consulting / Shainwright Consulting & Research Group, (2006)	

## References

1. Delgado, C et al. Livestock to 2020 – the Next Food Revolution. FAO, IFPRI and ILRI (1999)
2. Dugdill, B.T. & Ser-Od, Tsetsgee. Inception Report and Programme of Workshop. Field Document 4, Mongolia-Japan-FAO/UN Dairy Food Security Project GCSP/MON/001/JPN: Increasing the supply of dairy products to urban centres in Mongolia by reducing post-harvest losses and restocking (May 2005)
3. Dugdill, B.T. & Ser-Od, Tsetsgee. Proceedings of the Project Awareness and Inception Workshop. Field Document 6, Mongolia-Japan-FAO/UN Dairy Food Security Project GCSP/MON/001/JPN: Increasing the supply of dairy products to urban centres in Mongolia by reducing post-harvest losses and restocking (May 2005)
4. Dugdill, B.T. & Ser-Od, Tsetsgee. Project Progress Report – July to December 2005. Mongolia-Japan-FAO/UN Dairy Food Security Project GCSP/MON/001/JPN: Increasing the supply of dairy products to urban centres in Mongolia by reducing post-harvest losses and restocking (January 2006)
5. Dugdill, B.T. & Ser-Od, Tsetsgee. Project Progress Report – January to June 2006. Mongolia-Japan-FAO/UN Dairy Food Security Project GCSP/MON/001/JPN: Increasing the supply of dairy products to urban centres in Mongolia by reducing post-harvest losses and restocking (July 2006)
6. Government of Mongolia. Draft Agricultural Development of Mongolia 2006 to 2015 (advance copy, September 2006)
7. National Statistical Office of Mongolia. Mongolian Statistical Yearbook 2005 (2006)
8. Mongolia Food Industry Association. Baseline Survey of Project Areas. Mongolia-Japan-FAO/UN Dairy Food Security Project GCSP/MON/001/JPN: Increasing the supply of dairy products to urban centres in Mongolia by reducing post-harvest losses and restocking (December 2005)
9. Omore, A, Cheng'ole Mulino, J, Islam, S.M.F, Nurah, G, Khan, M.I, Staal, S.J, International Livestock Research Centre and Dugdill, B.T, FAO. Employment Generation through Small-scale Dairy Marketing and Processing. FAO Animal Production & Health Paper 158 (2004)
10. 3A Business Consulting / Shainwright Consulting & Research Group. China – Dairy Opportunities, Consumption, Trends, Players and Outlook to 2008 (February 2006)