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Inclusion of small-scale milk producers in modern dairy value chains

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Inclusion of small-scale milk producers in modern dairy value chains

Bram Wouters, and Jan van der Lee¹

Abstract

The worldwide demand for milk is ever-increasing. The question we address here is how small-scale milk producers, mainly based in developing countries, can participate in modern dairy value chains? First, markets should have the preconditions of a reliable market, a competitive milk price and access to essential services and inputs. Second, small-scale producers need to improve farm management practices (feeding, breeding, control animal diseases) to become economically and environmentally more sustainable. Several models for small-scale inclusion are then explored in detail. We conclude that for successful inclusion, an integrated approach is needed in which policy, market, services, input supply and production aspects get attention. Strong producers organisations, that linking farmers with markets, services and inputs, can be a very good vehicle. However, more examples need to be analysed in order to make stronger policy recommendations.

1. Introduction

This chapter focuses on the challenges and options for small-scale milk producers to participate in modern dairy value chains. The majority of small-scale producers are based in developing countries. Demands for milk and milk products produced in modern dairy value chains keeps rising. IFPRI projections² indicate a large increase in the world wide demand for dairy products. This is driven by population growth, higher consumption of animal protein due to rising incomes, urbanization and westernisation of human diets, particularly in East and Southeast Asia.

The recent³ hike in food and feed prices have put local food production back on the agenda of many governments. For dairy, the choice seems simple: to develop local supply chain or to increase imports. A number of arguments plea for the first. There are national interests, such as import substitution and diversification of agriculture, but also local interest, to support rural economic activities that create income and employment. The challenge of national supply development then boils down to the quest of including small-scale producers in modern dairy value chains.

This chapter draws on research from various countries, such as China, Turkey, Malaysia, Philippines, Indonesia and Ethiopia, and aims to draw general conclusions.⁴ We first describe the research, followed by some characteristics of small-scale dairy farming in

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² Delgado C., H. Rosegrant, H. Steinfeld, S. Elui, C. Courbois (1999). *Livestock to 2020, The next food revolution*. Food, Agriculture and the Environment Discussion Paper 28, IFPRI, FAO and ILRI.

³ 2007/2008.

⁴ The projects were funded by the Ministry of Agriculture, Nature and Food Quality of the Netherlands (BO-10-006-064 Dairy Chains Turkey and BO-10-006-075 Dairy Sector Ethiopia).

developing countries. Then, essential conditions, challenges and possible models are discussed. We conclude this chapter with conclusions and recommendations.

2. Research methodology

The methodology followed in this research was the following:

- Literature review; identification of stakeholders;
- Description of the dairy value chain by fact finding (semi-structured interviews with stakeholders) based on a framework for analysis;
- Discussion of findings with stakeholders (workshop, meetings);
- Identification of options for improvement with multiple stakeholders.

3. Support schemes for small-scale dairy farming in developing countries

Dairy production is important for subsistence farming systems. This is the case in pastoral systems but also in mixed farming systems. In Turkey and Ethiopia for example, dairy products are part of the traditional rural diet: yoghurt and white cheese in Turkey, traditional butter, sour milk products and cottage cheese in Ethiopia. Traditional milk production and processing is linked with informal marketing channels (traders, open markets, local shops etcetera).

Hence, during the seventies and eighties, various schemes have been set up to enhance the growth and development of smallholder dairy production (Asia: India, Thailand, Indonesia, Sri Lanka, Malaysia; Africa: Kenya, Tanzania etcetera). These schemes aimed to contribute to better food security and food quality, poverty alleviation through income generation and creation of additional employment. Many of these schemes were based on the successful Operation Flood Model from India, with a strong emphasis on small-scale farmer participation and cooperative development.

Support schemes were developed under conditions of market protection and with much support and involvement of government and donors. Over the last decades, market liberalization promoted less market protection while due to competing claims, feed prices have increased. The economic sustainability of local dairy production, particularly small-scale dairy farming, is under pressure in many countries nowadays.

4. Dairy value chains in developing or emerging market countries

In many Western countries, modern industry led dairy value chains are the only market outlet for milk producers. Often they are export oriented. Characteristics of these value chains are:

- relatively short (often 'cold') efficiently operated chains with input suppliers, producers, processors, retailers and consumers as the actors;
- relatively limited number of actors;
- quality assurance at all stages of the chain: input supply, production, processing and distribution;
- high value addition by means of production of a large variety of products sold in attractive packages and at relatively high prices.

The dairy value chain in many developing or emerging countries is characterised by a large variety of market outlets or by a number of parallel value chains which produce (mainly) for the local (urban) market. Modern dairy value chains often take only small part of the milk produced. Informal marketing channels with strong traditional features are found in for example Ethiopia and Turkey.

In Ethiopia urbanisation is low. More than 98% of the milk produced is either consumed at home or marketed through informal marketing channels. Formal marketing channels are dairy cooperatives or milk collection centres operated by registered milk processors. Dairy cooperatives sell the milk to registered milk processors. Some large scale farms process their own milk and produce dairy products for the urban market (vertical integration). Milk processing is in the hands of local companies. A special feature of the Ethiopian milk market is the effect of the fasting times (practised by followers of the Orthodox religion) on the demand of dairy products. During 200 days a year consumption of animal products is not allowed. As a result, the demand for milk and milk products drops by more than 20% especially during the long fasting periods.

In Turkey, the dairy value chain is in a process of transition from a traditional value chain with informal marketing channels to a modern industry led value chain. Registered dairy plants process about 30% of the milk produced into a variety of dairy products. These are marketed through supermarkets, groceries and special shops. The dairy companies source their raw milk from both large (state and large private farms) and small suppliers, by means of milk collection centres run either by the companies or dairy cooperatives. Small-scale farmers market their milk through formal marketing channels (milk collection centres, cooperatives) but they also use informal channels like traders, street vendors or small-scale processors specialised in cheese making. Milk which is not accepted by the large scale processors because of quality reasons finds its way through the informal marketing channels. The traditional dairy value chain acts also as a buffer in case of less demand by the large dairy companies.

In South-East and East Asia, production and consumption of dairy products is rather new. However, informal marketing channels have developed in many countries as farmers sell fresh milk at the farm gate or to restaurants. In general, informal marketing channels provide much employment. For example, the liberalisation of the milk market in Kenya has generated much more employment than before.¹

5. Development of formal dairy value chains

Most governments direct their policies to develop the formal, modern dairy value chains. An emerging trend in many countries (China, Turkey, Philippines, Malaysia) is the establishment of large-scale farms and in some cases mega farms to ensure a constant supply of high quality milk and milk products for urban markets. The fast expansion of

¹ Staal S.J., A.N. Pratt and M. Jabbar (2008). *Dairy Development for the Resource Poor*, Part 1: A Comparison of Dairy Policies in South Asia and East Africa, PPLPI Working Paper no 44-1, Pro-Poor Livestock Development Initiative, ILRI, FAO, Website: www.fao.org/ag/pplpi/

supermarkets, particularly in S-E Asia, contributes to the demand for a large variety of high quality products. Also, food safety crises like the melamine food scandal in China, stimulate this trend. The large-scale production units are often owned by private investors and/or linked to milk processors (vertical integration). Governments facilitate these developments by leasing out state owned land, provision of capital and tax facilities. Lack of knowledge and management skills to run these farms often lead to disappointing results. The long term sustainability of these mega farms is questionable. Once profitability is disappointing, dairy investors have been closing businesses as easy as they initiated them.

However, in our opinion it is expected that in most countries, milk for the formal marketing channel will be produced by a mix of small, medium and large-scale producers. There are a number of conditions and challenges for small-scale producers to participate in modern dairy value chains. As discussed hereafter, these constitute a mix of capacity issues at individual, organisational, and institutional level.¹

6. Conditions for participation of small-scale farmers in modern dairy chains

A *reliable market* is a first pre-requisite for small-scale farmers to produce for the formal market. Fluctuations in demand are common, caused by fasting periods (Ethiopian Coptic Christians), holiday seasons (Philippines, Thailand) or high supply (during wet seasons). Milk processors manage their milk intake by varying their quality standards. In Ethiopia, the unreliability of the milk market discourages farmers to invest in commercial dairy farming. Fluctuations in demand can be met by producing dairy products with a long shelf life (like UHT milk, cheese) or processing of milk into milk powder. Seasonal fluctuations in supply can be mitigated by differentiating milk price between seasons. This is hardly practiced yet.

Related to a reliable market is a *competitive milk price*. Collection and transport of small volumes results in higher transaction costs (for example in Turkey, the milk price obtained by small-scale producers was about 25-30% lower than for large-scale producers). In most cases milk collection needs to be organised either from producers or processors' side. In incidental cases, milk collection is organised and subsidised by the government (for example Malaysia). Processors are more motivated to invest in milk collection when there is a shortage of milk (for example Turkey). When milk collection is organised efficiently from producers side (cooperatives or farmers groups), small-scale farmers can benefit from a more guaranteed market, volume bonuses and premiums for better milk quality. This translates in a higher price. There should be enough opportunities to market milk (number of processors) in order to assure fair price formation for farmers.

To engage in milk production on a commercial scale, small-scale farmers need to have *access to essential services like animal health, AI, extension and inputs like cattle, feed*. Lack of adequate funding have made government services less effective. Many countries are in a process of privatizing these services. Private as well as government services co-exist in many countries.

¹ii Lee, J. van der , A. Tessama, M. Nigussie, M. Asfaw (2009). *Capacity Needs Assessment of the Ethiopian Dairy Chain*.

Linking services and input supply with milk marketing (farmers associations or cooperatives) attracts farmers, especially when credit is provided to buy inputs and services. In certain dairy cooperatives in Turkey, the supply of (cheap) feed was a more important reason for farmers to become a member of a dairy cooperative than the milk marketing. In countries where the dairy cooperative model is adopted, many services and inputs are provided through the cooperative from the start (e.g. Indonesia). In other countries, like Kenya, dairy cooperatives have gradually taken over government services like AI, animal health and private services that are offered and connected to milk collection centres (business hubs).

7. Major challenges for small-scale dairy farmers to participate in modern dairy chains

One of the main challenges for small-scale producers to participate in modern dairy chains is to meet the *quality standards for raw milk*. Informal processing techniques can pose food safety risks, especially when heat treatment is limited. Proper processing (pasteurisation, boiling) reduces the risk for zoonotic diseases like tuberculosis and brucellosis. Besides, good raw milk quality is needed for dairy processors to produce good quality products and extend their shelf life.

Multinational milk processing companies often introduce their world wide quality standards, and codes of good agricultural practices, applying their own enforcement system. The presence of these companies has a positive effect on milk quality improvements (for example in Turkey). However, international food safety standards for raw milk as often laid down in national legislation are out of reach for small-scale producers at this stage. Enforcement of the regulations is weak or non-existent.

Improving raw milk quality needs an integrated chain approach with active involvement of all stakeholders and government agents (animal health aspects). This integrated approach is often missing. Essential aspects of the integrated approach are: quick cooling of milk, milk quality control (nowadays simple tests can be applied), payment of milk according to quality, safeguarding milk quality in the chain from collection point to milk processors by applying hygienic standards at all levels. In addition, provision of training, advice, and equipment to farmers is important to improve hygienic milking practices (containers, detergents, water sources etcetera). Although in many cases significant efforts are made to train farmers in clean milk production, easier gains often can be made downstream: provision of easy-to-clean utensils, cleaning facilities at the collection points and cooling of milk. A dairy cooperative in Bandung, Indonesia applied this approach successfully. Payment of milk according to quality (milk composition, hygienic quality) is essential to motivate farmers to improve raw milk quality.

The integrated approach requires coordination and actions from all actors involved in the chain: input suppliers and service providers, farmers, milk collectors and milk processors and government. This seems to work best when milk processors as main stake holders take the lead.

Another challenge, facing not only small and medium but also large farmers, is the *economic sustainability of the milk production on the long term*: how to achieve and maintain a low cost price? In general, milk output per cow on small-scale farms is low, compared to Western countries and/or is mainly based on concentrate feeds. However, feeding, breeding and animal disease prevention and control are often major limitations on productivity. Poor *feeding practices* not only lead to low milk production levels but also to poor breeding performance and lower disease resistance. As a result, there is no surplus of heifers for selection and herd expansion. Unproductive cows are not replaced. Availability of good quality feed (forage/roughage and concentrate feeds) throughout the year is an important condition, especially when improved breeds are introduced. This often requires access to land to grow forage, as well as inputs like fertiliser and supplements (concentrate feeds, minerals).

Breed improvement through crossbreeding and/or import of grade cattle in most countries is a first requirement to transform smallholders into commercial milk producers. Supply of improved cattle (crossbreds, purebreds) has proven to be an important condition for commercial smallholder dairy development in many countries. For example a shortage of cross bred cattle is one of the factors hindering dairy development in Ethiopia. Former government breeding farms have been privatised while the private sector is hesitant to fill the gap. Improved cow fertility, breeding schemes and young stock rearing could assist in creating a surplus of heifers. In many countries, imports (heifers, embryos) and special heifer breeding projects supply the cattle for herd expansion with varying success. New innovations like the use of sexed semen in the future could lead to a revival of heifer breeding projects. Once crossbreds or grade cattle have been introduced, maintaining the required genetic potential for milk production by AI services, bull schemes and good breeding policies is a special challenge and requires the cooperation of several stakeholders in the chain.

Prevention and control of animal diseases requires commitment of many stakeholders in the chain, particularly the control of infectious animal diseases. At farm level for example, a better prevention and control of mastitis could lead to a higher output per animal and could contribute to improved animal welfare and reduced use of antibiotics.

In general, increasing the milk output per animal and a reduction of losses in the chain will lead to lower green house gas emission. However, *the handling and utilisation of manure* needs to improve to lead to a better nutrient cycling and in this way contribute to a better environmental sustainability of dairy farming.

Factors to improve production (forage production, feeding, breeding, disease prevention and control, young stock rearing etcetera) have to be applied in an integrated way to realize consistent output and a competitive cost price to guarantee economic sustainability. This puts significant requirements on the quality of input and service supply (feed, fertiliser, AI) and the knowledge and management skills of farmers and farm advisors.

Dairy value chain development and inclusion of smallholders requires *coordination among the various stakeholders in the chain*. Multi-stakeholder platforms can be a first step to achieve this and to create more formal institutions like dairy councils or boards. The effectiveness of these platforms depends very much on how various stakeholders are organised. Strong groups representing producers, processors etcetera. to advocate the stakeholders' interest in combination with strong leadership are needed to make dairy boards or councils effective.

The *government's role and policy formulation* can make quite a difference in dairy development. For example, lifting market protection in relation to international agreements and/or high import taxes on inputs can seriously affect the competitiveness of local dairy farmers. So can subsidies. In many countries a long term vision and policy on local dairy production and the role of small-scale producers is lacking.

8. Models to link small-scale farmer to modern dairy value chains

Several models have been applied to link small-scale producers to modern dairy value chains. Linkages vary from individual contractual arrangements of farmers with milk processors to intermediaries catering for milk collection. These intermediaries could be public, private or farmers organisations and could be milk collection centres, traders, farmers groups, or farmer cooperatives.

One well-known and *successful model is the Amul dairy cooperative model* initiated in India during the 1970's. This model has been copied to many countries (Africa, S-E Asia). Milk collection is central. Additional activities like cooling, milk processing, supply of inputs (feed), services, credit, shops and tractor renting services. are linked to the collection. Successful dairy cooperative models can be found in i.e. India, Indonesia, Kenya and Turkey. Cooperative models provide farmers with ownership and more marketing opportunities. Farmers' capital can be accumulated for further investments (e.g. in milk processing or feed production). However, many cooperatives do not function well, because of an overly top-down approach from government side (establishment, cooperative rules and regulations), political interference, people's attitude to cooperatives (poor experiences with collective organisation in countries like China and Ethiopia) and managerial problems. One of the major challenges for dairy cooperatives is to develop the organisation at its own pace, using the available capacities in terms of organisational skills, expertise etcetera. Lack of organisational and managerial capacities often hinder the development of the cooperatives and lead to failures. As successful models show, strengthening the organisational and managerial capacities is worthwhile to invest. .

A special model applied in China is the *dairy village or park model*. Small-scale farmers are located at one site, with a collective milking parlour and bulk cooling tank. Milking parlour and bulk cooling tank are provided by a private investor or by a milk processing company and often subsidised by local governments. Major reasons for this concentration of farmers are hygienic problems in the villages (manure, flies), improvement of milk quality and relative low investment costs in milking - and cooling equipment. The model with communal milking parlours was successfully introduced in the seventies in the North of Portugal and is still operating. In Turkey, a large dairy company initiated recently the model

in a number of villages. The major aim is to improve milk quality. First results show that hygienic quality of milk (bacteria count) improved considerably while as a result of better milking techniques and advice, somatic cell counts (indicator of mastitis) were reduced as well. However, in this system sampling of farmers milk and reduction of antibiotic residues in milk proves to be difficult while there is a risk of transfer of diseases like mastitis from herd to herd if hygiene is not up to standard. The model operates best if management of the collective milk parlour and storage is carried out either by the processing company or by farmers themselves (farmers' group/cooperative).

Adding more value to milk could also be an option for small-scale farmers. Milk producers groups or dairy cooperatives can be important vehicles. Lack of market outlet to milk processors or monopolies of processing companies can result in low producer prices and may motivate farmers to go into milk processing for niche markets. Small-scale milk processing, either by groups or individuals, can increase raw milk competition, with a favourable effect on farm gate milk prices. In Ethiopia, the formal milk market was dominated by two privatized state companies. The emergence of a relatively large number of small-scale milk processors in the Addis Abeba milk shed has had a favourable effect on the farm gate milk price. Milk processing by dairy cooperatives requires additional organisational and marketing skills to become successful.

Small-scale milk processing requires also more institutional capacity for quality control of raw material and end products. In many countries, systematic quality control is often not in place or enforcement of regulations is low.

9. Conclusions

Based on the dairy value chain analyses made in a number of countries and the role smallholders have in these chains, we come to the following conclusions:

- In most countries the formal modern dairy value chain will be based on milk supplied by a mix of small-scale, medium and large-scale dairy farms;
- In many countries there is a need to develop a clear vision and policy on the development of the dairy value chain. This vision should be developed jointly with the stakeholders involved, with a clear vision on roles of public and private sector actors. A multi-stakeholder platform or dairy council could be an important vehicle to achieve this.
- From a development perspective (income generation, food security and food quality) small-scale dairy farming has a number of advantages over large-scale dairy farming. However, the scale of production and quality of milk are challenges for inclusion of small-scale producers in modern dairy value chains.
- For a successful integration of small-scale farmers in modern dairy value chains, an integrated approach is needed that deals with all aspects at the same time (input and service supply, production, collection, processing, and marketing).
- The establishment of strong producers organisations, to link producers with the market (producers groups, cooperatives etcetera), to provide inputs and services, and to advocate farmers' interest, will assist smallholders to participate in modern dairy value chains. They could be also important vehicles in creating more added value through milk processing.

- Producers' organisations need support to develop their organisational capacities and management skills, to become more efficient in handling of milk and supply of services and inputs.
- Economic competitiveness of small-scale dairy farming can be increased by intensification of the production, in combination with improvement of farming practices (improvement of feeding, breeding, animal health etcetera). This will also increase the environmental sustainability production systems (efficient use of limited resources).

10. Recommendations

Based on our research and the conclusions above, we come to the following recommendations:

- More south-south interaction is needed to learn from examples of producer organisations (cooperatives).
- More research is needed to draw lessons from examples of producer organisations and the factors leading to their success.
- More research is needed about suitable models that increase the economic competitiveness and environmental sustainability of small-scale dairy farming.

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