



# Dairy Development for the Resource Poor A Comparison of Dairy Policies and Development in South Asia and East Africa

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## EXECUTIVE SUMMARY

### Overview of the Study

The process of dairy development that this study addresses is driven by underlying fundamental changes in economic growth, the value of resources and consumer demand. However, it is also shaped by public policies, interventions and investment decisions and will be accompanied by changes in impact on incomes, opportunities and livelihoods of producers and changes in opportunities and returns for market agents and investors. This study examines dairy development in two key dairy producing regions in the developing world: East Africa and South Asia. The aim of the study is to analyse the trends in dairy development in these two regions and identify their key determinants, to assess the impact of policy interventions on those trends and to identify impacts of dairy development, particularly on the poor.

The study is reported in three parts: Part 1 presents a conceptual framework for dairy development, followed by a section presenting a regional analysis of dairy development trends across all the countries in the two regions and a synthesis of the outcomes of the case study analyses, highlighting implications for policy interventions and investment, including proposing a model for pro-poor dairy development. Parts 2 and 3 consist of in-depth case studies and analyses of dairy development trends, determinants and outcomes in Kenya and Ethiopia (Part 2) and India and Pakistan (Part 3).

### A Conceptual Framework for Dairy Development

As a simplistic description of the beginning and end points of the dairy sector development process, two stylized representations of dairy systems are used:

- the 'traditional system' (also known as the small-scale subsistence or Southern tropical model) to reflect the small-scale, farm-household milk production and informal market systems that predominate in most developing countries; and
- the 'commercial system' (also known as the large-scale industrial or Northern cold-chain model), representing the large-scale industrialized production and integrated marketing that is observed in developed countries.

It is important to note that elements of both models will often occur simultaneously in both high- and low-income country settings. The characteristics of these models are described below and reflect both farm and market differences.

Characteristics of 'traditional' milk production systems include:

- multi-objective household model of farmer behaviour,
- low levels of inputs and outputs, and
- nutrient deficits in both farm and household.

Characteristics of 'commercial' milk production systems include:

- single objective enterprise model of farmer behaviour,
- high levels of both inputs and outputs,
- nutrient surpluses in both farm and household.

Characteristics of 'traditional' milk marketing systems include:

- diffuse market structure, consisting of many small-scale market agents,
- artisanal processing, labour-intensive handling and transport methods,
- low-cost products, mostly liquid and limited in diversity,
- great diversity in market behaviour and roles, and
- no voice or role in dairy sector policy making

Characteristics of 'commercial' milk marketing systems include:

- concentrated market structure, consisting of relatively few, large-scale, vertically-integrated market agents,
- industrial processing, based on capital-intensive technologies at all market levels,
- value-added products, mostly non-liquid and diverse,
- little diversity in market enterprise types, and
- strong voice and large role in dairy sector policy making.

At the heart of this process is the shift from a multi-objective farm-household activity to a focused-objective enterprise activity. The conceptual framework postulates a number of factors that drive this shift. These include:

Demand levels and consumption patterns, which are closely associated with income and urbanization and with local consumption traditions. Milk is not a commodity but rather a complex set of products, the demand for which is determined by:

- income-related levels of demand, and
- income-related changes in consumption habits and lifestyles, leading to
  - increased demand for quality, food safety and standardization, and
  - demand for convenience.

Opportunity costs of labour and land are also key driving forces for system change, which tend to bring about a substitution of capital for both of these factors and a general shift towards commercial systems. Aspects of this include:

- opportunity costs of land,
- opportunity costs of labour in milk production, and
- opportunity costs of labour in milk processing and marketing.

Market access, infrastructure and institutional development condition the structure and performance of production systems for a highly perishable product. Elements of these described in the report include:

- transaction costs and location of production,

- transaction costs and infrastructure, and
- transactions costs and institutions.

Finally, *technology and policy interventions* can alter the opportunities and incentives for dairy system change and development. Generally, improved technology will reduce production costs and induce shifts towards more commercial systems; adapting to changes in other factors will be dependent on the availability of technological alternatives, either existing or new. Policies - deliberate or inadvertent - for market regulation and infrastructure investment can alter market institutions and transactions costs. Critically, policies can partially determine the winners and losers of structural changes in the sector, determine market participation of smallholders versus larger producers and employment generation and incomes at both farm and market level.

## Measuring Dairy Development

Our conceptual framework has at its core the shift from labour intensive practices towards more capital intensive practices, both on farm and in market, due to increased opportunity costs of labour. That shift also implies **higher productivity of labour**. The stages of change between traditional and commercial systems can thus be measured in terms of labour productivity; if we equate that change with 'dairy development' we can use labour productivity as a general proxy for dairy development, reflecting changes in all parts of dairy systems. Due to data limitations, however, that productivity measure will take several different forms in the analyses that follow.

## Impacts of Dairy Development on the Poor

While 'development', meaning a shift towards commercial systems, of the dairy sector is favourably viewed by policymakers, it should be understood in the context of the contribution of livestock production to livelihoods and income generation for smallholder farmers through the production of higher-value products compared to most crops. Of key importance are the differences in policies that can condition those outcomes in terms of benefits to different communities and social groups. Elements of the outcomes for the poor include income and employment generation, which includes not only self-employment of farmers and market agents but also hired labour on farm and in the market. Less tangible returns to milk production include the value of livestock assets for finance and insurance functions.

Dairy development is also linked to nutrition, both among farm families and resource-poor consumers of dairy products and also in terms of farm soil nutrients. Consumption of even small amounts of milk can have dramatic effects on improving the nutritional status of poor people and is especially important for children and nursing and expectant mothers. Further, as long as low soil fertility remains a major constraint to agriculture in most developing countries, manure from dairy cows can provide a critical source of organic matter and nutrients, boosting smallholder's crop yields on farms where chemical fertilizers are often unavailable and unaffordable.

Policy interventions, as well as market forces, can help to determine whether dairy development follows more or less equitable development paths. An **equitable development** path occurs when shifts towards farm and market commercialization are associated with **increased alternative off-farm employment opportunities**, in urban areas and in alternative agricultural enterprises or industries. An **inequitable development** path occurs when increased commercialization at farm and market levels are associated with **reduced opportunities and employment alternatives** for small-scale farmers and market agents.

## Comparative Trends in Dairy Development among Countries in East Africa and South Asia

These two regions represent some of the most important dairy development zones among poorer countries globally. Within them occur countries where dairy production and consumption has a long historical tradition and has been an important part of agricultural systems. In other countries in the same regions, however, dairy production has been a less significant enterprise, often for cultural reasons but also due to limited potential. These regions thus present an excellent choice for understanding both the driving factors and the pro-poor implications of dairy development and of

related policies and interventions. Data used from five South Asian countries and ten East African countries, based on FAOSTAT and the World Bank's World Development Indicators database, is used in a regional analysis of comparative trends in milk production. Milk production is used as a proxy for dairy development. Explanatory variables include proxies for various aspects of demand and market development, inputs and labour markets, technology and human capital, infrastructure and transaction costs and policy.

## Summary of Results of Regional Analyses

**East Africa.** Demand-related factors play a key role in explaining development of the dairy sector in East Africa, as shown by the significant contribution to growth of demand-related factors in the three countries with the fastest growth in milk production (Sudan, Kenya and Uganda). Development of formal milk markets, input markets, technology and policy do not explain the differences between fast-growing countries and the rest. This suggests that adjusting supply to type and quality of products demanded, expanding demand by reducing consumer prices and reducing transaction costs should be a necessary condition to expand the dairy sector in East Africa.

**South Asia.** The dairy sector in South Asia is following a different path. Consumption of dairy products is higher on average than in East Africa and demand-related factors have been contributing to growth in the dairy sector for the past 30 years in all countries. Differences in growth are more related to the possibility of expanding supply to match the growing demand of dairy products. India and Pakistan were able to link the transformation in agriculture originated in the Green Revolution to successfully expand production and output; this is reflected in the contribution of input markets and technology to growth in milk production. In the case of countries with slow growth in milk production, such as Bangladesh and Nepal, development of cereal production, feed markets and a growing demand did not translate into technical change in the dairy sector, as was the case in India and Pakistan. The policy environment in these countries is also less favourable than in the fast-growing countries. Sri Lanka's constraints to growth in the dairy sector appear to be mainly on the supply side. As in East Africa, development of formal milk markets in South Asia is not associated with increased growth rates.

## Country Case Studies from South Asia and East Africa - Kenya, Ethiopia, Pakistan and India

These four countries represent a range of production conditions, histories and policy environments related to dairy development: India and Kenya are also held up as examples of 'successful' dairy development. Where available, detailed provincial and district data on dairy development and potential determinants were gathered. Data were analysed using similar approaches to those applied in the regional analysis outlined above. Due to severe data limitations, relatively complete analyses were only possible in Kenya and in India. Data were also gathered from farm and market level on income and employment generation in different scales of dairy enterprises.

The results exhibit more similarities than differences. Of importance to dairy development in all cases are the roles of demand growth, the traditional market and availability of improved dairy animals. Policies related to investment and trade show mixed results. More detail from the four country case studies can be found in Part 2 (Kenya and Ethiopia) and Part 3 (Pakistan and India) of this series. The final synthesis of the regional and case study results, summarized below, highlights the main results from all the analyses.

## Synthesis of Regional and Country Results: Defining an Agenda for Pro-Poor Dairy Policy and Development

**Demand for dairy products:** The analyses highlight the importance of growth in consumption and demand, brought about either through growth in GDP per capita or exports, or through increased urbanization.

- A clear understanding of potential market trends and opportunities is needed for policy and planning in the dairy sub-sector. Because demand is highly conditioned by local perceptions and traditions regarding dairy consumption, this understanding should be pragmatic and based on local realities, not on assumed replication of trends observed elsewhere.

- Where poor people play a large role in the consumption of dairy products, interventions to support the provision of low-cost products are likely to stimulate dairy development.
- The Indian milk revolution, for example, may be largely a result of demand-side forces, although the technical and agricultural sector factors discussed below played a key role as well. Unless these facts are understood, there may be overemphasis on supply-side interventions that have not been demonstrated to bring about development in a number of cases.

**Improved dairy animals and other farm technology.** A consistent and clear result of the analysis, both at the regional and country-case levels, is that nearly all strong dairy development growth scenarios are associated with *technical change in terms of yield per animal*. Genetic improvement has obviously had dramatic impact on development and growth.

- Clearly, use of exotic cattle genetics is a rapid and potentially sustainable path to higher productivity, even among small-scale and resource-poor farmers and in warm, semi-arid or humid climates. At the same time, the failures caused by importing high-grade animals should be noted and avoided.
- National and local breeding strategies need to address the realities of climate and disease risk. Given appropriate breeding strategies and disease control measures, however, it is possible to develop and sustain cross-bred dairy production systems; such systems have often played a key role in dairy development.
- Although it is difficult to capture the role of fodder technology in the aggregate analyses in this study, for the Kenya case it was possible to demonstrate that planted fodder technology played a key role in growth in dairy productivity.
- Research has shown that the ‘appropriateness’ of intensive fodder production is much more likely to depend on availability of cheap labour, scarcity of land and good access to milk markets, than it is on agro-climatic setting. Where labour is scarce, evidence shows that intensive fodder cultivation practices and feeding of crop residues to cattle, unless mechanized, are unlikely to be taken up. Interventions to promote those should pay very close attention to labour opportunity costs.
- Where relative land and labour values constrain uptake of specialized fodder technologies, a potential avenue for increased productivity is through improved ‘food-fodder’ crop varieties, bred to increase the fodder quality and digestibility of the straws and stovers they produce.

**Agricultural sector growth.** In some regions and countries, general agricultural sector growth and transformation was shown to play a role in dairy development; for example India and Pakistan were able to link the transformation in agriculture originated in the Green Revolution to expand milk production. The link with the agricultural sector is not as evident in some other South Asian countries or in East Africa. Productivity change in those cases may continue to rely on fodder technology, given the low opportunity costs of labour.

**Traditional milk and dairy product markets.** One of the key findings of the study is that traditional/informal milk markets have apparently played a key role in dairy development in both regions and in most countries. In countries with the strongest growth, such as Pakistan, India, Sudan and Uganda, traditional, small-scale markets control over 80% of marketed milk; there is no evidence that this basic structure will change significantly in the next few decades. These facts, which are often overlooked because traditional markets are generally not reflected in national dairy industry statistics, pose several important implications for dairy policy and development.

- All the evidence suggests that the traditional market dominance is not a result of lack of investment in formal market channels, or of non-enforcement of national milk standards; rather they are the result of continued strong demand for the products and services that they offer. As a consequence, in many cases, investment in formal dairy processing facilities, both in the private and public sectors, have failed leading to underutilized capacity surviving on subsidies or abandoned milk processing plants and cooling facilities.

- In some cases there is strong demand for traditional products by high-income consumers as well as the resource poor; growth in disposable income may not necessarily significantly reduce demand for traditional products.
- The analysis in this study does not support the view that formal market structures are required to stimulate dairy development. One of the countries in this study with the strongest growth, Pakistan, displays a negligible formal market share. In East Africa, the analysis suggests a negative association between formal market share and dairy development, as measured. This is likely to be because formal market share in that region was less a result of market forces but rather due to public investment decisions. Also, poorly managed formal market institutions provided a much less effective link between farmers and consumers than the traditional informal market.
- Traditional informal markets have clearly provided an effective, functional link between farmers and consumers which responds to consumer demand: they should not be regarded as market failures. Moreover, such markets are generally those most often serving the needs of small-scale farmers and resource-poor consumers. The analysis has also demonstrated the large and positive employment implications of such markets.
- Public policy-makers should engage constructively with traditional markets rather than oppose them directly, particularly as demand for food safety may grow with increases in disposable income. Policies that allow the continued functioning of such markets, but which support increased quality and food safety, are likely to be pro-poor in nature. Policies that simply oppose and attempt to police such markets are likely to impact negatively on small-scale farmers, consumers and small-scale market agents.

**Dairy co-operative development.** Mixed messages emerge from the analysis of the two countries where co-operatives have played a significant role in dairy development: Kenya and India. In Kenya, evidence suggests that dairy co-operatives played a significant role in fostering dairy development, primarily by providing a stable market environment and delivering services to farmers. In India, there was no empirical evidence that co-operative development was associated locally with dairy development as measured, although it was found to be associated with genetic improvement in dairy animals.

- Dairy co-operatives may play an important role in providing a base for service delivery to farmers, stable agricultural knowledge systems for uptake of improved technology and increased management skills among farmers.
- There is no empirical evidence that dairy co-operatives are more effective than other market channels in linking poor farmers to output markets. Pakistan illustrates very dramatically that strong market growth can occur in the absence of dairy co-operatives.
- The mixed experience suggests that dairy co-operative development is heavily dependent on good co-operative management, honest and effective investment of resources and accountability to the interests of the farmer members. Political and governmental influence in co-operatives needs to be minimized.
- Further, dairy co-operatives often cannot easily tap into the strong demand for traditional products and raw milk and generally remain tied to demand for formally processed products. While traditional demand remains the driving force, dairy co-operatives face the same growth impediments as the formal private sector.
- Investment in dairy co-operative development can be effective and pro-poor - if it is well-managed, placed outside strong political forces and is linked to strong demand. Because of these constraints, dairy co-operative development should not be the primary focus of dairy development efforts; rather it should be part of a mix of market channels, including formal private sector and small-scale traditional.
- Other less formal forms of farmer groups, such as self-help groups, could play important roles in some local cases.

**Smallholder competitiveness.** There is ample evidence to suggest that smallholder dairy producers are generally competitive and are likely to endure for some time, particularly where the

opportunity costs of family labour and wages remain low. The most compelling evidence towards this is the continued dominance of smallholders in all the countries studied, even where there is steady economic growth. Furthermore, dairy as an enterprise is an option available to landless and socially marginalized groups.

- Policy-makers and development investors should resist the often-heard assumption that the role of smallholders is ending and that efforts should now be made to support larger-scale, 'more efficient' milk production to meet growing consumer demand. Instead, that growing demand should be used as a mechanism to help continue and sustain smallholder dairy enterprises.
- Smallholders may, in some cases, face increased barriers to participating in changing markets; alternative options, such as contract farming, should be explored and promoted where appropriate.

**Public investment.** Due to data limitations, the analysis was not able to show a link between agricultural research and development (R&D) and growth in dairy development, mainly because no measures of R&D investment specifically for dairy were available. In spite of the lack of strong empirical evidence in this analysis, it is reasonable to assume that investment in dairy R&D and provision of appropriate credit to smallholder producers will grow in importance, particularly as producers shift towards greater commercial orientation, increasing their demand for improved technologies and investment.

**Trade policy.** Imports and exports, as well as macro policy and level of openness of the economy, show very mixed results and cannot apparently be demonstrated to play a consistent role in the pace of dairy sector development.

- Exports, as demonstrated in South Asia, may play a role in dairy development. Export opportunities might increase if, for example, EU export subsidies are curtailed as is expected, although barriers to entry remain significant.
- Countries that do not have a strong tradition of milk production and consumption, such as Sri Lanka and Bangladesh, are particularly susceptible to import competition. Supporting the development of traditional markets takes on the added feature of helping buffer domestic producers from imports.
- Even though trade in dairy products tends to receive a disproportionate amount of attention, perhaps because of issues of national pride and self-sufficiency, there is little evidence that trade issues are of major importance for the welfare of the large majority of producers, market agents or even consumers. The projections of the Livestock Revolution (Delgado et al. 1999, 2001) show very clearly that the demand growth and opportunities in milk is going to happen domestically rather than across borders.
- Policy-makers and planners would be well advised to focus their attention to the much larger and more dynamic domestic markets, rather than the smaller and less welcoming international markets.

## **An Agenda for Pro-Poor Dairy Policy and Development**

The lessons learned from this analysis, as well as those gleaned from the other research cited, suggest some elements of what might be termed an 'agenda for pro-poor dairy policy and development'. The objectives would include:

- employment creation in rural and peri-urban areas, both on farm and along market distribution and value chains;
- reliable income generation and asset accumulation for resource-poor farmers;
- provision of low-cost and safe dairy products to resource-poor consumers;
- improved natural resource management and sustained farming systems through dairy cattle-mediated nutrient cycling; and
- improved child nutrition and cognitive development in resource-poor households.

Implementation of such a model would incorporate the lessons and recommendations outlined above, and so would include the following main elements:

- build on traditional dairy product consumption habits and preferences, at the same time as promoting demand for new products;
- support development and evolution of traditional domestic markets for milk and dairy products, at the same time as promoting appropriate formal market development;
- emphasize and support the role of smallholder dairy production as primary means of rural income generation and of sustaining the intensification of mixed crop-livestock systems through:
  - appropriate improved animals and the systems required to deliver these to smallholders
  - fodder technologies and exchange mechanisms for fodder and crop residues
  - institutional mechanisms for enhancing smallholder participation in growing local markets - co-operatives but also contract farming and other forms of farmer groups.

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Pro-Poor Livestock Policy Initiative (PPLPI)

Web site: <http://www.fao.org/ag/pplpi.html>

Working Papers:

[http://www.fao.org/ag/againfo/projects/en/pplpi/docarc/wp44\\_1.pdf](http://www.fao.org/ag/againfo/projects/en/pplpi/docarc/wp44_1.pdf)

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