



Policy Note (October 2007)

Dairy Sector Development in Sub-Saharan Africa

This ALive Policy Note on **Dairy Sector Development in Sub-Saharan Africa** is the result of a participative and consultative multi-step process of elaboration involving key actors of the livestock sector development in Sub-Saharan Africa.

The recommendations were endorsed by the Executive Committee of ALive on September 20, 2007.

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This Policy Note was prepared by the Alive Secretariat with inputs from Leif Enemark, Sanne Chipeta, Cees de Haan, and Jorgen Henricksen and comments from ALive Executive members. It is a contribution to the ongoing review of livestock sector policies in Sub-Saharan Africa. This publication is available online at www.alive-online.org.

It is complemented by a toolbox on Dairy Development, which can be found on the ALive website at www.alive-online.org.

Executive Summary

Dairy sector development is an important tool for poverty alleviation and rural development in Sub-Saharan Africa (SSA), as it is a labor and input demanding sector with strong upstream (services, inputs) and downstream (processing and marketing) linkages. It provides a regular income flow for rural families and provides critical nutrients to vulnerable groups, such as young children, pregnant women and HIV-AIDS affected people. Sustainable dairy sector development can thus make an important contribution in meeting the Millennium Development Goals in SSA. Moreover, prices for dairy products have risen significantly over the last years, opening new opportunities for the sector for import substitutions of the more than five million tons of milk (liquid milk equivalents) now imported annually into SSA.

However, not all of Sub-Saharan Africa is suitable for dairy sector development due to large differences in comparative advantages between sub-regions. A sector's comparative advantage depends on its endowments in physical environment (soil, climate), infrastructure (roads, power), service availability (breeding, animal health), market organization, consumer preferences, and stakeholders' skills. The ALive Toolbox on Dairy Sector Development provides a decision support tool to define whether a certain sub-region has a comparative advantage for development. If such advantages do not exist, importation of dairy products - which will provide low-priced dairy products to the urban poor - might be better than artificially maintaining a sector that produces high-priced products for the urban rich.

If a country or region has a comparative advantage in dairy production, a number of policy decisions and actions are required. They include:

- *Targeting the most appropriate production and distribution systems, with due recognition to the fact that almost 80 percent of the production and processing is still in the hands of small producers and traders of raw milk. This policy note therefore recommends that the emphasis should be on the gradual evolution of smallholder systems into more commercial production and distribution systems.*
- *Ensuring access to land and water, with long term security to small holders in the high potential areas good rainfall and moderate temperatures, such as prevail in the Eastern and Southern African highlands and multiple user access rights to the pastoralist in mobile systems;*
- *Identifying the appropriate investment climate and regulatory framework for farmer organizations. Experience shows that an enabling environment that promotes multiple enterprise systems for processing and marketing is most appropriate for dairy sector development. Similarly, it is also necessary to establish an institutional framework for an umbrella organisation where all stakeholders including the public*

sector can participate in a dialogue and take common actions to promote development of the dairy sector;

- Establishing a regulatory framework - due to the fact that most of the milk is still distributed in SSA as raw, fresh milk for further processing at the household level - for dairy processors milk traders, and other stakeholders on a gradual evolution from a raw milk chain to processed production chains, with special attention to consumer education and training of sector stakeholders;*
- Acknowledging that there is still considerable overlap between the public and private sectors in providing services (animal health, animal breeding, and animal husbandry advisory services) to dairy farmers, government needs to develop a clear definition of the respective responsibilities and establish a framework for public sector support, including finance, monitoring and quality control, and support to the conservation of public goods such as local breeds;*
- Formulating the appropriate instruments for public sector investments in infrastructure (roads and power supply) and financial incentives for private investments and eventual initial start-up subsidies for the development of the dairy sector. Care should be taken that such incentives do not foster inefficient industries and have very clear and definite sunset dates.*



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Introduction

Development of the dairy sector is an important tool for poverty alleviation and rural development in several Sub-Saharan African regions, especially with the recent surge in global price of dairy commodities. Experience gained during implementation of various programs can be applied to other countries with potential for development. This ALive Policy Note will highlight important components of dairy sector development based on this experience from Sub-Saharan Africa and other regions such as the South Asian sub-continent. This Note should be used in conjunction with the ALive Dairy Sector Development Toolkit, which supports policy makers in identifying appropriate policy options.

• Dairy sector development as a tool for rural development

More than most other livestock sectors, dairy production is a labor and input demanding sector, with strong upstream and downstream linkages in its respective requirements for services and inputs, processing and marketing.¹

Box 1. Combating poverty through dairy production

Dairy production with its many backward and forward linkages, can reduce poverty, because of its high returns to land and labor. A good example can be found in the Central Highland of Kenya, which is suitable for various cash crops as well as livestock production. In this area, small farmers that produce milk have annual net earnings from milk of about US\$370 per year. Dairy is especially important for the poorest quintile of small farmers, who earn on average 48 percent of their income from milk sales.²

The effect of dairy production is not limited to poverty reduction for the dairy farming communities; it has a significant impact on the health and cognitive behavior of small children and pregnant women,³ and help mitigate the impact of HIV/AIDS. With a 10-15 percent prevalence rate in SSA in the adult population, any mitigation will be significant. Furthermore, 50 percent of HIV affected households are in rural areas that rely directly on agriculture and play an important role in food production.

Dairy production generates more employment than most crops. As a result, it provides farming communities with regular income, which is socially preferable over the lump sum income from cash crops a few times a year. Demand for labor in dairy production is more evenly distributed than labor in cash crop production; thus, it helps reduce seasonal unemployment and the rural to urban drift. Furthermore, the

individual smallholder is not able to fully exploit his income potential unless he joins with other smallholders in dairy associations to pursue common action on the off-farm handling and marketing of milk. Such associations will naturally stimulate capacity building in the community as a positive outcome. Finally, demand trends are positive. For example, over the period 1990-2004 the demand for milk and dairy products in Africa was growing at an annual average rate of 4.0 percent, resulting from a 2.8 percent population growth and 0.8 percent per capita consumption growth.⁴ These trends are expected to continue or even accelerate, as a major increase in the consumption of dairy products in African countries - driven by a growing middle class and urbanization - is expected.⁵ The recent surge in world market prices for dairy products offers, in general, new opportunities for local dairy production in SSA. Smallholder milk production could be the “oil” that fuels future rural economic growth.

Dairy production has also its constraints. It requires skills and knowledge to handle dairy animals irrespective of being smallholder or large scale commercial farmer. It carries risks as diseases or drought can destroy or decimate the herd, and inappropriate policies can lead to strong price fluctuations and seriously undermine profitability.

¹ ILRI (2001a) and Upton (2000)

² IFPRI (2004)

³ De Haan et al (2001)

⁴ Ndambi et al (2007)

⁵ Ndambi et al (2007) and Kristensen et al (2004)



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Current status and recent trends

SSA's milk production has shown a healthy growth over the last decade. For example, over the period 1990 and 2004, milk production grew at a rate of 3.1 percent, with several countries (Ethiopia, Rwanda, and Namibia) growing at more than 5 percent, and the traditional milk producing countries of East Africa growing between 2.5 to 5 percent.⁶ This production originates from a variety of production systems, as shown in Table 1.

For the rest of the value chain, more than 70 percent of the milk is still marketed as raw milk through traditional channels and emerging traders, and only about 15 percent is processed in the modern/industrialised sector. The processing and marketing chain has seen a shift from largely parastatal processing and marketing enterprises, to the private sector consisting of a few medium sized, but mostly small processors and traders, including some cooperatives.⁸ These structural changes are beneficial for the long term development of the sector, but they have caused in the short term, disruptions in input supply and milk marketing.

Table 1: Main dairy production systems in SSA⁷

System/ Description	Extensive systems		Semi-intensive systems	Intensive systems	
	Pastoral systems	Agro-pastoral systems	Large farms (state owned, cooperative or private)	Peri-urban small holders	Small intensive family farms
Areas	Arid and semi arid regions	Semi-arid	East and southern SSA mostly	Around all major SSA urban centres	East and southern SSA mostly
Breeds used	Local	Mostly local	Local + Exotic	Crosses	Exotic
Milk collected, Kg/cow/lactation	< 200	< 200	> 2500	1500 – 2500	1500 – 3500
Typical herd size	10 – 300	2-10	> 300	10 – 30	1 – 5
Main breeding objective	Milk for subsistence	Draft, milk for subsistence and sale	Milk	Milk	Milk
Proportion of milk sold (%)	0 – 30	10-50	> 60	> 60	> 50
Est. contribution to total SSA milk supply (%)	47	9	22	n.a.	23
Main technical constraint	Drought feed supply	Drought feed supply	Health, production diseases	Feed supplies	Health, production diseases, major other diseases
Main institutional or policy constraint	Land and water access, markets	Land access rights, markets	Management skills	Urban planning, pollution	Land access, availability of services

⁶ IFPRI (2001)

⁷ Source: Adapted by authors on the basis of Ndambi et al (2007) e-conference and own observations and Sere and Steinfeld (1996)

⁸ IFPRI (2001)



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Main issues

- **Macro level issues**

From the perspective of national policy makers, the import policy for dairy products is a top priority issue. Sub-Saharan African countries import about 500,000 tons whole and skim milk powder or about 90 percent of its needs. With the exception of Kenya, all SSA countries are dairy product importers.⁹ Thus, the decision on whether (a) to allow—often subsidized imports and provide low cost dairy products to urban poor, or (b) protect the emergence of a local industry, and help the rural poor, is a critical policy choice.¹⁰ Occasionally, the import into SSA has been at world market prices, but about half of total import comes in subsidized or granted form. The revenue from sales of recombined dairy products from subsidized imports has sometimes been put aside in various funds to support the development of the dairy industry, although the benefits often have not reach the intended beneficiaries.

A second macro-level policy issue concerns the priority to be given to different production systems. As indicated in Table 1, 80 percent of production comes from the smallholder sector, either from agro-pastoral or from intensive units in the highlands. Experience from Asia, shows that smallholders are generally competitive (and for the foreseeable future will remain so), particularly where the opportunity costs of family labour and wages remain low.¹¹ This should therefore be part of the decision-making - avoiding unproductive investments in accelerated “modernization” of dairy production.

- **Farm and herd level issues**

Access to land, either through ownership or long lasting lease contracts, has always been a sensitive issue that causes serious disturbances in farming communities. Without a title deed or a long term, leasing contract there is little incentive for improving the land. There is major reluctance from banks and credit institutions to give credit without land as collateral. In pastoral and agro-pastoral systems, mobility and access to key resources (low lying valley bottoms and flood plains) comes under increasing pressure because of crop encroachment of these key resources.

Access to water is also crucial for livestock production. Dairy production requires significant quantities of drinking water for the animals as well as water for hygiene. For example, a dairy cow producing 10-15 liters of milk requires 80-100 liters water per day. Access to water is even more essential in pastoral production systems, as this also defines

the area that can be grazed. Government involvement in mapping and distributing water resources has often led to marginalization of minorities, and in the arid and semi-arid areas to overgrazing (see ALive Policy Note on Pastoral Systems Mobility).

Access to credit is often a serious bottleneck in dairy production, which requires significant capital. It is difficult for a smallholder dairy farmer to obtain credit due to lack of collateral; and even if collateral is available, the interest rates are frequently prohibitive and repayment periods too short for dairy production. Banks often do not have lending products for livestock production or agriculture. Finally, accessibility of rural banks has been an important constraint.

- **Technical service provider level issues**

A smallholder dairy farmer needs the following technical services:

- Animal Health/Veterinary services, divided in preventive (vaccinations, tsetse control, etc.) and curative (treatments of individual animals for diseases such as wounds, udder infection (mastitis), etc) services;
- Breeding services to upgrade the genetic potential of the dairy animals through artificial insemination (AI) or natural breeding; and
- Agricultural technology advisory services on feeding, management, milk hygiene, and farm economics.

These services have in the past been provided by government because of lack of capacity in the private sector and the widespread belief by government that a smallholder farmer with limited education would not know which type of advice was needed or be willing or able to pay for services. But dwindling budgets and general management problems decreased the efficiency of the services to very low levels. In particular:

- In *veterinary services*, budgets have been barely enough to carry out the critical preventive task of vaccination, and definitely have not allowed for the treatment of individual animals, in spite of clinical care becoming increasingly important for the more expensive dairy cows. Policies of cost recovery have not resulted in increased funding for the services, as the revenues had to be returned to the general state coffers. The establishment of private veterinary practices was hampered by unclear definitions of what should be retained by the public sector and what can be covered by private or associate services, and the ensuing unfair competition between government veterinarians and private clinics.¹²

⁹ Ndambi et al (2007)

¹⁰ ILRI (2001b) Sumberg (1997) and Williams et al (1995)

¹¹ Staal et al (2006)

¹² De Haan et al (2001)



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- *Artificial insemination (AI) services* experienced a similar fate, as lack of operating funds led to a decline in the quality of the services provided and cost recovery led to a decrease in the use, and consequently a reduction in the genetic progress. In addition, AI service (bull selection, timeliness of the services) was often not adequate for the smallholders, but based on the needs of large scale dairy farms; and
- *Agricultural technology and advisory services* experienced a number of structural problems due to the top down approach in the transfer of results from research to the advisory service staff and in the supply to individual farmers or farmer groups. In addition, the research results were often not appropriate to small farmers. Messages often focused on the technical aspects of production, but paid much less attention to marketing and processing and the economics of the dairy supply chain. However, over the last decade there has been a change towards giving farmers and producers a much greater voice in the identification of the research topics and a proven menu of technologies is now available for smallholder producers in high potential areas (see Box 2).

Box 2. Technologies that worked

One of the most successful technologies for dairy development has been the package of genetic improvement with exotic breeds, combined with stall feeding. While local breeds have performed best in hot tropical environments, smallholder dairy farmers in the more temperate areas of Eastern and Southern Africa have shifted almost universally and successfully to crosses between exotic and local breeds in a free stall system. In principle, the system is the same as in any other modern dairy farm around the world - only the herd size is different. The zero grazing system has been introduced through various programs and demonstrations at farm level and has been promoted through advisory services. It is quite a unique example of the massive impact a new technology can have on production systems of smallholders, if the technology is appropriate (e-conference).

With declining public services, farmers associations, farmer groups or cooperative societies are gradually taking over, as farmers organized themselves in connection with milk collection, transport, processing and marketing. For example, in Kenya¹³ membership of cooperatives or other types of grouping has risen from 2,000 in 1963 to over 100,000 today. In India, the cooperative dairy movement now has over 14 million members. Services rendered by these groups often went beyond milk collection and marketing, spreading to a

diversity of other areas, like veterinary services, AI, bulk feed, drugs, and credit. Major issues in both countries concern government interference in their operations, competition from pure private processors, and informal sector traders with lower overhead costs. As a result, the availability of support services is often a more important factor attracting membership of the cooperative than milk market access. In addition, the transfer of service tasks from the government to the private or associate sector has often been too fast, in particular, when farmers groups are expected to take over the funding of previous government operated services. In some countries, a deterioration of the quality of the services has followed.

- **Milk collection, processing, and marketing** Milk as a perishable commodity has had the attention of numerous institutions that lay down rules, regulations and standards. Clearly, improperly handled milk can cause serious health hazards. Too often western standards - with obligatory pasteurization,- have been slavishly copied. The pasteurization and bottling process doubles the cost of the processed milk and is often not necessary because in many cultures milk is fully boiled again in the household. A policy which unnecessarily prescribes packed, pasteurized milk prevents poor consumers from buying milk, and at the same time depresses producer prices. Thus, a delicate balance needs to be kept, between a policy supporting poverty reduction and food security by allowing raw milk to be marketed direct to the consumer, and the minimization of the adverse effects on public health, taking full account of local food preparation habits. Attempts to dismantle the raw milk market allowing only the sale of processed milk, has often failed, and even in countries with a good processing industry, such as Kenya and India the raw milk market still handles about 70 percent of the milk marketed.¹⁴

The potential expansion of dairy enterprises gives added value to the milk produced in the rural areas, and generates employment. One of the main constraints is lack of training institutions to take up small-scale processing. Moreover, an advisory system supporting already established processing units is virtually non-existent. Another constraint is marketing and specifically market information that will guide processors on where to market their produce and how to sell at the right price.

- *Cottage level processing* There is a long tradition for preserving milk by letting it go sour and adding various herbs and by smoking in order to prolong shelf life.. This method has been used by the Maasai tribe over hundreds of years. Other types of cottage level processing are the preparation of butter and soft cheese, which is practiced in West Africa and Ethiopia. There are various technologies and types of

¹³ Danida (2005)

¹⁴ Staal et al (2006), ILRI (2001b), Ndambi (2007)



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equipment available for cottage type processing as shown in the FAO Dairy Information Toolkit.¹⁵

- **Commercial processing** While more than two-third of the SSA dairy supply is still marketed through raw milk channels, commercial processing will gain importance as growing quantities of milk to be supplied to big cities will require an organized way of channeling milk to the consumers. However, current investment in the collection infrastructure (rural roads, collection and cooling centers) is still very low.

Recommendation 1: Acknowledging that most of the milk is still distributed as raw, fresh milk for further processing at the household level, the regulatory framework for dairy processors, milk traders, and other stakeholders should encourage a gradual evolution from the raw milk chain to more processed production chain, with high priority to consumer education and training of sector stakeholders.

- **Consumer level issues** Relying on subsidized (dumped) milk, dairy products from locally produced milk have to compete with products from recombined milk at prices which often do not cover cost price for locally produced milk. The competitiveness of local products is often hurt further with advertisement for imported products and stories of local raw milk being contaminated. In countries with a tradition in dairy production, consumers often are willing to pay a premium for fresh or pasteurized milk. However, for the “new” consumers the taste of reconstituted, sterilized milk often equals the proper taste of milk and they are sometimes even willing to pay a higher price for reconstituted price.¹⁶

¹⁵ FAO

¹⁶ De Haan (2001), Staal (2006)



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Policy and investment options and Recommendations

Most countries have policies or plans concerning smallholder-focused dairy sector development. It should not be underestimated what effect a policy can have on dairy sector development and on the livelihoods of a large number of people. But even good intentions do not help if those policies are not enforced – or not appreciated and accepted by the stakeholders. And in monitoring and evaluation of the policies, the intended beneficiaries may not always be consulted, leading to wrong conclusions with undesired changes in policy as a result.

- Macro level** The country's comparative advantage for dairy production should be the essential criteria in deciding whether to fill the possible gap between demand and supply of fresh milk or with recombined milk from imported skim milk powder and butter oil. In general, temperate climates (highlands) with long growing seasons have the best conditions to compete with world markets supplies. Factory gate prices of milk from both sources should be the main criteria for deciding on whether the strategy will promote local production or encourage imports. In making this decision, a clear distinction should be made between subsidized (dumped) milk prices, and low priced milk from efficient milk producing countries such as New Zealand, which produce without subsidies. In the case of the former, protection is allowed under the WTO agreements. So rural poverty reduction and employment generation might justify some protection and subsidies in the initial phase in those countries with a good physical environment for milk production. But once the subsidy path gets started, it is very difficult to get out of it, as has clearly been demonstrated in the industrialized world. Milk from pastoral and agro-pastoral systems often supplies local markets and is less sensitive to competition from other countries.

Recommendation 2: Investment in dairy sector development should be conditioned on the region's or country's comparative advantage, balancing the advantages of rural poverty reduction against the provision of low-cost milk to urban consumers.

If dairy development is given a high priority, there is a need to establish agricultural policies, which promote an institutional and regulatory framework that will catalyze investments in the entire chain. First, the institutional framework is critical. Milk, as a perishable product, needs to be sold every day, and dairy producers have therefore little negotiating power. Cooperative dairy enterprises are therefore widespread in the

developed and developing world (see Box 3). The public sector can support the capacity building for cooperative development, but needs to walk the thin line between support and interference. It should be stressed that cooperative societies are only one of the options for dairy farmers to organise themselves and to organise milk collection and marketing with private partners. A policy enabling a plurality of enterprise forms should therefore be encouraged.

Recommendation 3: The establishment of an appropriate investment climate and regulatory framework for farmer organizations is a critical condition for success. Experience shows that an enabling environment that promotes multiple enterprise forms for processing and marketing is most appropriate for dairy sector development. An institutional framework for an umbrella organisation - where all stakeholders including the public sector can participate in a dialogue and take common actions promoting development of the dairy sector – should be established.

Box 3. Market development through producer cooperatives can strengthen poor livestock keepers

Producer organizations may be a necessary tool to strengthen the competitive position of poor livestock farmers in liberalized markets and make markets more accessible. The Indian experience of dairy development through Operation Flood shows how a commodity-based cooperative system, combining low level farm technology with very sophisticated processing and marketing technology can significantly reduce poverty by securing a reliable market outlet for small-scale producers. Operation Flood is an extensive operation covering several Indian states. Nine million small-scale farmers delivering milk to 65,000 cooperative societies brought a tremendous growth in milk production:

- Cooperative members benefited from higher prices, production, income, etc.
- Sixty percent of the members are landless poor, and some of the secondary indicators are quite favorable. Membership in a cooperative society has had a strong impact on education, especially among the girls in member households.
- Competition with the private and informal sectors has increased prices.

Public sector interference in the management and pricing of the milk has been one of the main issues over the 40 years of existence of the cooperative movement.



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Second, there is a need to establish the appropriate regulatory framework. Experience shows that important aspects of the regulatory framework consist of: (i) ensuring access to land, water, and capital; (ii) promoting capacity building and clarifying the optimum distribution of responsibilities and partnerships between the public, private, and associative sectors; and (iii) providing the appropriate incentives for investments. These aspects are detailed below:

- **Regulating access to land, water, and capital**

Access to land and water While overall policies vary from country to country, long lasting lease contracts or a title deed issued to a farmer so there is a legal binding contract that provides a right to cultivate the land needs to be pursued. In Tanzania for example, leasing contracts are now given up to 99 years; in Kenya land is being traded and title deeds are given. Securing access by women and enabling decentralized decision making at the community level on land allocation are other important features of an equitable and sustainable development of the sector.

Use of water resources in many regions will require detailed planning and assessing the consumption of water for the production of various commodities to determine the best possible use of the available water resources. Introducing decentralized management (involving women) and full cost recovery have shown to be important for piped water systems. In the pastoral areas, the transfer of the management responsibility of water points to communities or private operators has been shown to be superior to government management, although poor operation and maintenance of the water points and overgrazing around the points still prevail.

Access to credit facilities This will require policies encouraging credit and savings facilities to be established in the rural areas and make appropriate products available for all the components of dairy production from milk production through processing and marketing. The investments required at farm level are livestock sheds, livestock, and sometimes operating costs for the initial period. Open sheds are often adequate, although government rules and extension services often advise too elaborate and expensive installations. There are a number of NGOs that provide livestock on a credit in kind basis, returning a pre-determined number offspring as repayment for the credit. This has been shown a successful approach for example, in Indonesia and Kenya. A useful summary of the good practice in this area is provided by IFAD¹⁷ and the World Bank.¹⁸

Recommendation 4: For sustainable and pro-poor dairy development, it is critical to ensure access to land and water, with long term security for small holders in the high potential areas, and enabling multiple user access rights for the pastoralists in the mobile systems (see PN on Pastoral Mobility).

- **Regulating the distribution of responsibilities**

In a close dialogue with stakeholders, policies should be drafted to support and promote a division of labor between government services and private services to facilitate a complementary use of resources and avoid unnecessary competition. The following table provides general guidelines on the distribution of responsibilities between the public and the private sectors, although country- or region- level adaptations according to the stage of development of the sector will be required.

¹⁷IFAD (1995)

¹⁸ World Bank (2001)



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Table 2. Distribution of responsibilities for implementation, funding, and oversight of some key services for dairy sector development¹⁹

	Responsibility	Funding	Oversight	Comment
Breeding services	Private	Private	Public/ Private Partner	Initial subsidy might be justified
Feed Supply Services	Private	Private	Public /private for quality control	
Clinical veterinary services	Private	Private	Veterinary associations	
Preventive veterinary services	Public	Public/private	Public	Only for main contagious diseases (Formal List A from OIE) where possible implemented through contracting private vets.
Advisory Services	Private/public	Mainly public (see text below)	Private/public	See text below
Milk collection	Mainly private	Public/private	Private	Initial subsidy might be justified
Milk processing	Private	Mainly private could be funded through a cess on milk	Private	Initial subsidy might be justified
Research	Mainly Public	Mainly public	Public/private	Initially public funding
Education	Public	Mainly public	Public/private	Initially public funding

Breeding services Public investment includes an initial support for Artificial Insemination or the establishment of bull stations at more remote areas, milk recording, and animal registration. However, as most benefits of improved breeding accrue directly to the farmer, after this initial introductory period (which has already passed in most high potential dairy areas of SSA), subsidy should be phased out. This will also allow the private sector to develop. Continued subsidy to AI will put even more pressure on the local genotypes than is already the case, and valuable genotypes are threatened with extinction. With the value that these local genotypes might have for future generations as a global public good, public support is probably justified to conserve such local genotypes.

Veterinary Services Public investment in Veterinary Services (VS) should focus on those services which support the public good aspects of animal health. A good instrument to assess the VS needs in the PVS (Performance Vision, Strategy) tool developed by OIE, and the ALive Policy Note prepared specifically on support to VS.

Advisory services Major public investments include capacity building and the development of partnership arrangement with the associative sectors. They will, at least in part, remain a public responsibility; and only a part of the cost can be covered by the small-holder dairy farming communities in the foreseeable future. On the other hand,

experience shows that advisory services are only viable if the benefits to the farmer cover more than the expenses.

Recommendation 5: Government needs to establish a clear definition of the respective responsibilities of the public, associative, and private sectors in the provision of services in the dairy sector, and establish a framework for public sector support- including finance, monitoring and quality control, and support to the conservation of public goods such as local breeds.

Processing and marketing services Hygiene and food safety regulations should be defined with public health as the priority objective, but taking into account local consumption and preparation habits and enforceability of regulations, as discussed above. Public investments in milk testing schemes, combined with public awareness campaigns and training that include also the middlemen and vendors are important tools to improve the public health safety of the products.

The current shift away from para-statal processing plants opens the market for opportunities for small-scale processors and cooperatives to look into a variety of dairy products including commercialization of tailor made traditional products (such as described above). Opening the market for traditional products has been done quite successfully by the Indian Dairy Board.

¹⁹ Based on the results of the e-conference and authors.



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For commercial operations, public support has often been in the form of partnerships (through matching grants, see below) with the private and, in particular, with the associative sector that supports the establishment of the collection and transport cold chain. This type of support has been quite successful in North Africa and South Asia, and is now the basis for the fast expanding Chinese dairy sector. Where the cold chain is weak there is a recognized possibility of adding lactoperoxidase to the raw milk to reduce the growth of bacteria.²⁰

Recommendation 6: In defining the appropriate instruments for public sector investments that support the dairy sector, care should be taken that the appropriate instrument is chosen and that the incentive framework does not foster inefficient industries. Where initial start up incentives are justified, they should have very clear and definite sunset dates.

- **Other infrastructure** Roads and other transport facilities are a crucial factor, and public investment in rural roads - to enable farmers to bring the milk every day to the market - could be one of the most important investments of the public sector as demonstrated by the experience in dairy sector development in the Central Plateau of Madagascar, and more recently in Ethiopia.
- **Incentives** The public sector can provide financial incentives in different forms:
 - As support to the operation of the services it provides. For the public good services (see Table 2), such support is fully justified and deserves the highest priority. However, for private goods, such support has the effect of crowding out the private sector and is only recommended in the initial phase of the development of that service (infant industry justification). A clear time horizon for such support is therefore needed. Wherever possible, such services should be outsourced to private providers;
 - As an import tariff, to protect infant local production with due attention to the criteria explained above;
 - As tax benefits (reduced taxation) for the industry, which is probably less applicable in SSA because of the limited taxation of farmers and processors;
 - As support for consumption to poor and vulnerable groups (school milk, targeted feeding program, but also through the sale of pasteurized milk directly from bulk coolers to the consumer's own containers, which is particularly attractive to the urban poor;²¹
 - As partial direct support, also called "matching grants" whereby the beneficiary contributes with the other part, often according to the degree of public good involved (i.e., a higher share of the public sector, if the public good element is more significant). The matching grant system has been successfully used in many countries, for example in Nigeria, and is easier to manage than subsidized credit schemes.

²⁰ WHO/FASO (2006)

²¹ De Haan et al (2001)