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Livestock and Fish

Dairy value chain in Honduras and Nicaragua: Background proposals for the CGIAR Research Program on Livestock and Fish

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International Livestock Research Institute

P O Box 30709, Nairobi 00100, Kenya
Phone + 254 20 422 3000
Email ILRI-Kenya@cgiar.org

P O Box 5689, Addis Ababa, Ethiopia
Phone + 251 11 617 2000
Email ILRI-Ethiopia@cgiar.org

www.ilri.org

Dairy value chain in Honduras and Nicaragua: Background proposals for the CGIAR Research Program on Livestock and Fish

In Central America, dairy products are an important dietary component for consumers from all social strata. The potential to increase the consumption of dairy products is high, with domestic consumption growth rates in Honduras and Nicaragua of 6.7 and 11.7%, respectively. Average per capita consumption in Latin America is currently 100 kg Litres of Milk Equivalent (LME) per year versus 265 kg LME for USA (FEPAL 2006). In lower income strata in Central America—representing the majority of the population—the per capita consumption is far below the Latin American average.

Population growth and on-going urbanization create favourable conditions for expanding markets. In 2030, the Central American population will be 56 million, compared to 35 million in 2005. Moreover, 65% of the population will live in cities of more than 50,000 inhabitants, compared to the current 40%. Most urban consumers have access to electricity and hence refrigeration facilities. Population expansion will be accompanied by a growing diversity of consumer preferences for a great variety of dairy products. Strengthening small industries to enter market niches for products with higher added value would change the business panorama of the value chain for small producers.

Why this value chain?

The majority of the poor in Latin America live in tropical lowlands or hillsides. About 50% of this population, mostly rural dwellers, is still considered poor (UNDP 2003). Within the rural sector, dual-purpose livestock systems (meat and milk) constitute a principal economic activity of small producers. About 400,000 small-scale producers in Central America own livestock, with more than 75% of income being generated by milk sales. Nicaragua and Honduras, with more than 200,000 poor smallholder livestock producers, are key players for developing the dairy sector in the region.

After the poultry sector, milk production and marketing, and the dairy-products industry constitute the fastest growing livestock subsector in the region and continue offering valuable opportunities for small producers. Interventions to increase small-farm productivity should therefore be based on milk production, the creation of value-added products in the dairy industry and the improvement of linkages along this increasingly dynamic value chain.

However, several factors limit the participation of small-scale farmers in dairy value chains. The quality of milk produced by small farmers is usually poor, due to a lack of adequate on-farm infrastructure, inappropriate milking practices, and collective investment in cooling systems on the farm and for transportation. In addition, links of individual farmers to associations and from these to buyers remain weak. The lack of strong links along the value chain inhibits not only the flow of information on what constitutes product quality and how to achieve it but also the establishment of quality-based incentive systems that benefit both producers and buyers. This suggests a need for tools to improve small-scale producer efficiency, links between actors in the value chain and increasing the level of added value generated by the dairy sector overall.

Production constraints

Constraints include low and unstable productivity, poor milking hygiene and bulk milk collection. They are related to low productivity and poor quality milk, and often to high production costs. Some producers receive low prices because of a lack of storage capacity, especially in times of high production (rainy season). In addition, milk quality is often low due to long periods between milking and cooling, which takes place in large milk collection centres in nearby towns. Usually cooling starts after 2–3 hours, but during the rainy season when roads deteriorate this can take up to 5 hours, further increasing bacterial count and acidity.

Supply constraints

In spite of an annual average growth rate of 4.2%, second only to poultry as a source of animal protein (FAOStat 2009), milk production is not sufficient to meet growing domestic demand. This situation is further exacerbated by high seasonal fluctuations in milk availability with markedly reduced production levels during the dry period (Fujisaka et al. 2005).

Initiatives are needed to improve productivity, hygiene and general quality in milk producing farms, particularly among the smaller producers. Improved forage-based systems are key (Peters et al. 2003), providing year-round sufficient quantities of high quality feed based on a combination of high quality grasses and legumes in a diversified resilient landscape often including shrubs and trees, and combined with conservation technologies (hay, silage). Genetic improvement of animals and improved herd and farm management are also essential.

Market/institutional constraints

Constraints to the marketing of raw milk largely explain the wide presence of micro-processors, some on the farms themselves, to produce fresh cheese and cream sold in local markets. This contrasts with the increasingly stringent food safety standards which demand differential responses of milk producers especially to reach more profitable formal markets in urban centres. An analysis of the value chain (e.g. the case of informal cheese exports from Nicaragua to El Salvador) is needed to determine which proportions of the revenues are going to the different actors (farmers, intermediaries, retailers), to be able to focus interventions on improving the economic situation and thus conditions at producers' level, improving overall quality, hygiene and profitability.

In milk collection, solutions are needed to improve milk collection processes and food safety measurements in collaboration with industry partners and to improve quality control and food safety standards from production to local and regional markets.

Criteria and rationale for choosing Nicaragua and Honduras

Criteria	Rationale																																				
Growth and market opportunity	<p>Import substitution</p> <p>Nicaragua: import: USD 17.7 million</p> <p>Honduras: import USD 58 million</p>																																				
	<p>Effects on income</p> <p>In Central America the dairy sector generates more than 540,000 direct jobs, usually with higher wages than in other livestock activities (FEALAC 2006). The sector also generates about 1,600,000 indirect jobs in the area of supplies, equipment, and services that form part of the dairy cluster. Pomareda (2005) estimates total jobs created by dairy production, industry and distribution in Central America (five countries) at about 11 million, with more than half of them are in rural areas.</p>																																				
	<p>Distribution</p> <p>The distribution of dairy products follows different channels depending on the scale, type and quality of products. The most extended market represents 60% of total milk production (mainly by smallholder farmers) and consists mainly of raw milk and fresh white cheese with a short shelf life due to low (hygienic) quality. About 20% of these fresh cheeses produced in Nicaragua is exported to El Salvador. Pasteurized milk (including UHT), white and matured cheeses of several varieties and cream, all requiring refrigeration, are marketed in the larger cities and represent about 40% of total regional production. Supermarkets and local stores are the main channel for delivery. They all have access to distribution services from industries or collectors of industrial products. In Honduras, a network of small dairy processing units (CRELs) guarantees storage capacity and good hygienic conditions and at the same time provides services to dairy farmers (e.g. veterinary products, feed supplements).</p>																																				
	<p>Trade</p> <p>The main dairy product traded is white fresh or semidry cheese, followed by pasteurized milk, including some long-life presentations. They account for 65% of total dairy exports, primarily within the region. Most dairy exports from Nicaragua are destined to Guatemala and El Salvador.</p>																																				
	<p>Value of exports of dairy products (thousands USD)</p> <table border="1"> <thead> <tr> <th>Country</th> <th>2005</th> <th>2006</th> <th>2007</th> <th>2008</th> <th>Main products</th> </tr> </thead> <tbody> <tr> <td>Costa Rica</td> <td>29,465</td> <td>36,327</td> <td>47,580</td> <td>57,650</td> <td>Fluid milk and cheese</td> </tr> <tr> <td>El Salvador</td> <td>4,381</td> <td>5,084</td> <td>6,764</td> <td>7,894</td> <td>Fresh and dry cheese</td> </tr> <tr> <td>Guatemala</td> <td>3,215</td> <td>3,509</td> <td>3,643</td> <td>2,984</td> <td>Fresh and dry cheese</td> </tr> <tr> <td>Honduras</td> <td>10,504</td> <td>10,878</td> <td>11,462</td> <td>18,410</td> <td>Fresh and dry cheese</td> </tr> <tr> <td>Nicaragua</td> <td>32,008</td> <td>57,663</td> <td>89,847</td> <td>116,239</td> <td>Fresh and dry cheese</td> </tr> </tbody> </table>	Country	2005	2006	2007	2008	Main products	Costa Rica	29,465	36,327	47,580	57,650	Fluid milk and cheese	El Salvador	4,381	5,084	6,764	7,894	Fresh and dry cheese	Guatemala	3,215	3,509	3,643	2,984	Fresh and dry cheese	Honduras	10,504	10,878	11,462	18,410	Fresh and dry cheese	Nicaragua	32,008	57,663	89,847	116,239	Fresh and dry cheese
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<p>Consumption</p> <p>The poorest 50% of the population (CEPAL 2004) consume small amounts of dairy products (in fluid milk equivalents), primarily fresh raw milk and white of local origin. The higher value dairy products are consumed primarily by the urban middle and higher and rural middle class. There are therefore two challenges: to supply low cost, high quality dairy products for the poor, while at the same time capturing the market for high value added dairy products consumed by a smaller segment of the population with higher income (Pomareda 2005).</p>																																					
<p>Market development</p> <p>Local markets. Largest increases in demand will come from urban consumers, however, the rural population itself comprises a relevant market, with the basic dairy products (raw milk, fresh cheese, and cream) being an important part of the diet. Social programs such as the 'Vaso de Leche' (a glass of milk for every student attending public schools) in Honduras is an example of this and helps to boost local demand.</p>																																					

Criteria	Rationale
	<p>Regional markets</p> <p>The regional market consists specifically of the urban population of the Caribbean Basin countries obtaining products from small retailers and supermarkets, and to food industries that use milk, cheese, cream, and other dairy products, and is estimated to represent a population of 150 million consumers. Trade agreements also create opportunities for high value dairy products entering high income niche markets, where differentiated products can be sold successfully, for instance, Central American dairy exports to the US markets are essentially fresh and semi-mature cheeses targeted at the Central American immigrant market in major US cities. To obtain sustained access to these markets, however, significant changes in both policies and public and private institutions will be needed.</p> <p>Nutritional contribution to diet</p> <p>Dairy (milk, cheese) is the most important source of animal protein in both Honduras en Nicaragua including the poorest category. The challenge is providing them with nutritious less expensive dairy products, especially for children, while ensuring adequate food safety and product quality.</p>
Pro-poor potential	<p>Nicaragua and Honduras have currently 120,000 and 100,000 poor livestock keepers, respectively. Most dairy farms in Central America are small and scattered, although there are some dairy clusters in a selected number of zones. The typical dairy oriented farm carries, on average, 5 to 10 milking cows that produce between 15 and 50 kg of milk per day. Milk production is 3–5 kg per cow per day. Income comes from milk production (75%) and sale of weaned male calves and culled cows (25%), compared to 95% of income coming from milk in specialized dairy systems. This dual-purpose system is more risk averse and allows farmers more flexibility when either the milk or beef price fluctuates by feeding calves more milk when price is low, such as often during the rainy season.</p> <p>Milk production contributes between 5.9% and 9.2% of the agricultural gross domestic product (AGDP) and between 0.9% and 1.9% of the gross domestic product (GDP). When contributions from the dairy-products industry and other activities of the cluster are included, these figures triple. Furthermore, in the ‘dairy basins’ of each country, the importance of dairy activities is much more significant than what the aggregate figures for each country suggest.</p>
Researchable supply constraints	<p>Production constraints. As mentioned before, constraints are low and unstable productivity, seasonal feed constraints poor milking hygiene, and bulk milk collection.</p> <p>Supply constraints. In spite of an annual average growth rate of 4.2%, as a source of animal protein only second to poultry (FAOStat 2009), milk production is not sufficient to meet growing domestic demand. Initiatives are needed to improve productivity, quality, hygiene and general quality in milk producing farms, particularly among the smaller producers.</p> <p>Market/institutional constraints. An analysis of the value chain (e.g. the case of informal cheese exports from Nicaragua to El Salvador) is needed to determine which proportions of the revenues are going to the different actors (farmers, intermediaries, retailers), to be able to focus interventions on improving the economic situation and thus conditions at producers’ level, improving overall quality, hygiene and profitability.</p>

Criteria	Rationale
Enabling environment	<p>Technological policies for cattle production are provided in four major areas: pasture improvement including use of multipurpose forages and sylvopastoral systems, genetics, reproductive technology and farm management. Integrated pasture systems with sylvopastoral components will also contribute to mitigation to climate change (e.g. carbon sequestration), conservation of biodiversity (including reducing pressure on natural forests) and improve water use.</p> <p>Animal health and food safety policies. The efforts of the national veterinary services have centred on the development of technical capacity and human capital. In recent years there has been more interaction with the private sector and attention to market access. There is a need for integrated animal health management—better use of veterinary medicine—to comply with safety standards.</p> <p>Commercial policies. Countries in general have agreed to lower tariffs in bilateral trade agreements, particularly with the US. Yet in the case of Central America, one of the greatest problems is the not-harmonized external tariffs for dairy products. Bilateral trade between these countries is important, yet it is limited by different tariffs and other regulations regarding extra-regional imports.</p> <p>Environmental policies and ecosystem services. Livestock production has long been an important cause of natural habitat and biodiversity loss in Latin America (Pagiola et al. 2006). In Central America deforestation as a result of the establishment of pastures is expected to continue as a result of growing demands for livestock products and low productivity. Therefore, immediate dissemination of efficient and environmentally friendly, i.e. eco-efficient (CIAT 2009) farm technologies, such as the establishment of improved pastures, legumes and integration of sylvopastoral practices reducing emissions and increasing carbon fixation, is required to improve competitiveness in local and regional economies, while leaving a minimal ecological footprint.</p>

Criteria	Rationale
Existing momentum	<p>Dual-purpose cattle systems constitute a principal economic activity for around 400,000 small producers in Central America, with more than 75% of income generated by milk sales. Significant progress toward poverty alleviation and improved diets for consumers can be made through intensification of these systems. The specific arguments can be summarized as follows:</p> <p>Cash flow for small producers. Dairy is often the most important provider of cash for small producers, utilizing productive systems strongly based on domestic resources (land and labour) and offers a route for capitalization and escape poverty.</p> <p>Potential for high value dairy products. Currently small producers cannot compete in commodity oriented systems due to their inability to take advantage of economies of scale associated with large intensive operations. They must therefore engage in vertical integration aimed at producing and marketing value added products with local identity based on high-quality raw milk (Pomareda 2007).</p> <p>Taking advantage of expanding markets. Population growth and on-going urbanization accompanied by a growing diversity of consumer preferences for a great variety of dairy products create favourable conditions.</p> <p>Gradual trade liberalization. In the trade agreements with the US the participating countries have negotiated between 10 and 15 years of decreasing protection for the dairy sector. The remaining time should be utilized to develop differentiated high value products and to gain market access both locally and with partner countries.</p> <p>Needs and opportunities for private investment. In order to increase competitiveness and to improve productivity and added value, small producers and industry enterprises will need an injection of capital and knowledge.</p> <p>Multiplier effects and scaling up. One important aspect of promoting milk production and small-scale high quality dairy industries is the multiplier effect for local economies, through employment generation and the development of small businesses for input supply and services.</p> <p>Increased integration with formal market chains for fresh milk</p> <p>There exists a high seasonal variability in production of fresh milk affecting both utilization of production capacities and availability to consumers. The linkage of improved production technologies such as drought adapted forages and forage management connected with milk quality standards and organized collection and support services provide a unique opportunity to improve income generation across the value chain, while enhancing product quality to consumers.</p> <p>Small and medium-scale industrialization: search for value added products</p> <p>Thousands of small processing units generate products based on raw material of limited quality. In contrast, most of the available quality milk is collected in bulk by a few plants, which can then generate products of guaranteed safety. The opportunity lies in identifying, motivating, and supporting a segment of these small-scale industries to grow and become involved in the principles of quality.</p>

Research and supporting action

The three main principles to improve small-scale dairy production across Central America are: (1) a value chain approach from producer to local, national and international markets addressing constraints and capitalizing on opportunities; (2) a focus on specific regions where dairy has an important potential to mobilize the local economy; and (3) a focus emphasizing learning across different biophysical and socio-economic environments and defining specific options for local, national and regional policies and programs.

Potential interventions include:

- Improved forage, pasture and sylvopastoral systems that are resilient to climate change to increase productivity (including growth of animals) and assure stable milk production throughout the year, and including improving economic efficiency by reducing production costs
- Improve milk quality and hygiene through better processing techniques
- Strengthen farmers' organizations, at the production, processing and marketing level (including promotion of niche products and Protected Designation of Origin).

Gender


Roles of women and men vary according to the different components of the dairy value chain. Whereas in general the crop–livestock sector has a mostly masculine character (10–20% of farms are owned/managed by women), women play an important role especially in processing and management of resources. In small farms (with some dairy cattle) they are sometimes also involved in feeding and milking, but in general they engage mainly in processing of milk (e.g. fresh cheese, *cuajada*) for household consumption and local/regional markets. In larger dairy farms with more products the men are usually engaged in production and marketing, whereas the women control inputs, do the financial administration and participate in decision processes on production and marketing.


Geographic focus


Nicaragua and Honduras are among the poorest countries in the region; about 50% of the population live below poverty line. Livestock production and in particular dairy is one of the most important agricultural activities, with the majority in smallholder systems. The main emphasis of the value chain will be Nicaragua, but with potential scaling into Honduras. The systems studied are of relevance to the Central American region and beyond: if successful the research and development efforts will have an impact on national dairy value chains. The major action sites with the highest potential for impact in Nicaragua include the South Pacific Region of Nicaragua (Rivas), Matiguas, Muy Muy, RAAN (Siuna), Las Segovias and Chinandega. For Honduras, Olancho and Yoro have been identified for scaling.

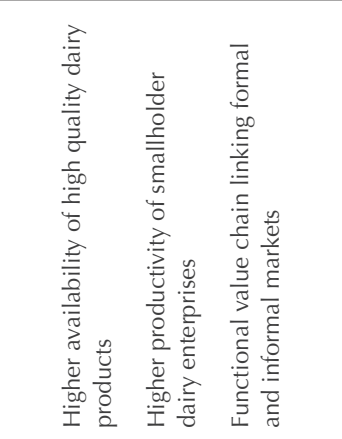
Potential for impact

With the increasing population, changing demographics and external trade opportunities, there is an increasing internal and external market for dairy products. While direct impacts are expected from improved production and income generation for the 220,000 poor livestock producers in Nicaragua and Honduras, beneficiaries will be much greater including the large number of people linked to the dairy chain and rural and urban consumers facing a shortage of dairy products. In Central America the dairy sector generates more than 540,000 direct jobs, usually with higher wages than in other livestock activities (FECALAC 2006). The sector also generates about 1,600,000 indirect jobs in the area of supplies, equipment and services that form part of the dairy cluster. Pomareda (2005) estimates total jobs created by dairy production, industry and distribution in Central America (five countries) at about 11 million, with more than half of them in rural areas.

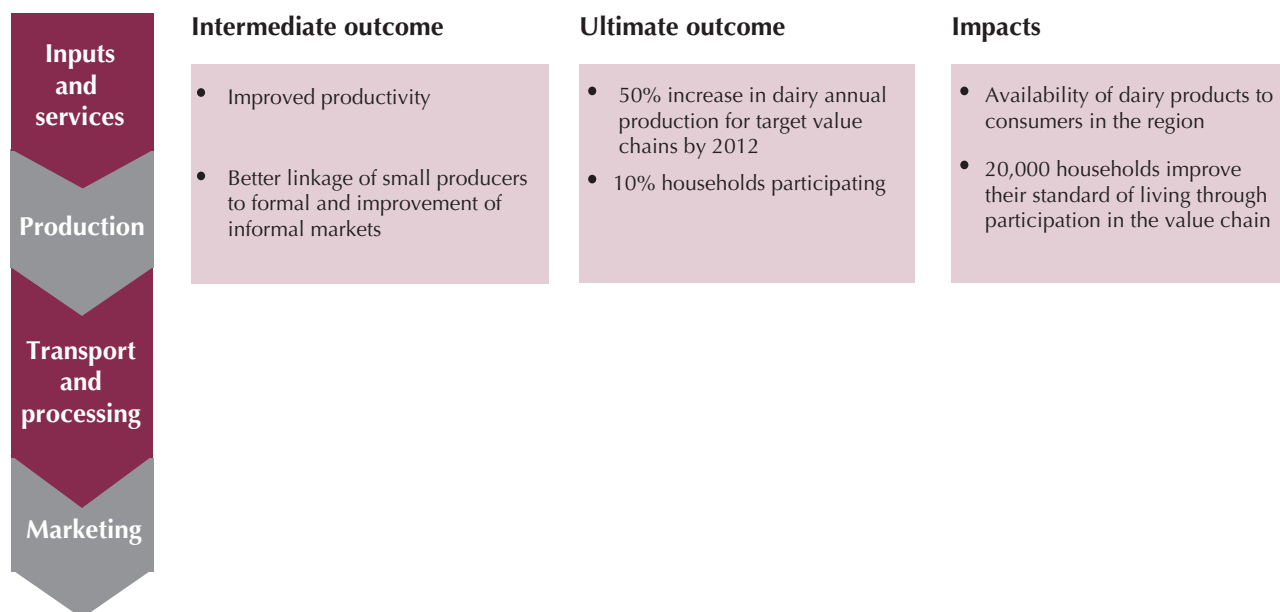
Opportunities and constraints and the research and development actions to overcome them				
Value chain components	Developmental challenge	Researchable issues and supporting actions	Indicative partners	Outcomes
 <p>Inputs and services</p>	<p>How to organize efficient and sustainable input services for smallholders including</p> <ul style="list-style-type: none"> Animal health Milk hygiene 	<p><i>Researchable issues</i></p> <p>Conduct gap analysis to identify upgrading needs in terms of technological changes needed to meet public and buyer standards</p> <p>Strengthen local dairy clusters by Identifying key support services</p> <p><i>Supporting actions</i></p> <p>Develop a business development plan and budget for upgrading needs</p> <p>Facilitate integration between small farmers, small dairy enterprise and buyer to establish agreements for physical and process upgrading</p> <p>Develop local platforms for collective action and link these to relevant organizations</p>	<p>Research</p> <p>CATIE</p> <p>SIDE</p> <p>INTA</p> <p>DICTA</p> <p>Supporting actions</p> <p>Nitlapan</p> <p>CANISLAC</p> <p>SwissContact</p> <p>GTZ/DED, UNAG, URACCAN</p>	<p>Inputs and services are accessible to smallholder farmers</p> <p>Farmers organized and linked to service providers, and development and research</p> <p>Conducive policy environments</p>

Value chain components	Developmental challenge	Researchable issues and supporting actions	Indicative partners	Outcomes
<p>Production</p> 	<p>How to enhance resilient productivity at farm level including</p> <ul style="list-style-type: none"> to overcome seasonal or continuous gaps in feed quantity and quality to improve milk hygiene to develop sustainable production systems resilient to climate change 	<p><i>Researchable issues</i></p> <ul style="list-style-type: none"> Develop improved forage options and facilitate the access of small-scale dairy producers to improved forage alternatives to increase and sustain milk production Develop methodologies for balanced rations at smallholder level <p><i>Supporting actions</i></p> <ul style="list-style-type: none"> Train technicians and producers in methodologies for balancing rations Facilitate the development of farmer led seed supply systems Connect small producers with service providers to assist in the formation of rural enterprises Prepare manuals on milking techniques, milk handling and conservation, and hygienic milking 	<p>Research</p> <p>CATIE</p> <p>INTA</p> <p>DICTA</p> <p>SIDE</p> <p>Supporting actions</p> <p>GTZ/DED, UNAG, URACCAN</p>	<ul style="list-style-type: none"> High quality feed year round Reduced seasonality of milk production addressing seasonal supply constraints Improved milk quality and quality Better linkage of smallholder producers to formal market Higher standard of products from informal market Enhanced sustainability of smallholder crop-livestock system and improved resilience to climate change and environmental shocks

Value chain components	Developmental challenge	Researchable issues and supporting actions	Indicative partners	Outcomes
 <p>Transport and processing</p>	<p>How to provide consumers year round with high quality dairy products, and maximize productivity of smallholder livestock producers</p>	<p><i>Researchable issues</i></p> <p>Develop low-cost traceability systems for collection points capable of assessing the milk quality of individual producers and promote the use of payment systems based on milk quality.</p> <p><i>Supporting actions</i></p> <p>Link small-scale producers to Modern conservation and transport systems for raw milk. Quality enhancing processing systems Modern distribution and sales systems for dairy products Facilitate mechanism to comply with food safety regulations</p> <p>Provide policy support for value of official recognition of certifications made by private animal health services</p>	<p>Research</p> <p>SIDE</p> <p>CATIE</p> <p>Supporting actions</p> <p>INTA</p> <p>DICTA</p> <p>GTZ/DED, UNAG, URACCAN</p>	<p>Higher productivity of smallholder livestock producers</p> <p>High quality dairy products available to consumers year round</p>

Value chain components	Developmental challenge	Researchable issues and supporting actions	Indicative partners	Outcomes
	<p>How to link smallholder producers to the formal market for dairy products and how to provide higher quality products in the informal market, enhancing availability of high quality dairy products to consumers year round</p>	<p>Researchable issues Implement processes of new product development Testing of simple but robust monitoring and evaluation tools that allow to assess the health of the chain on an on-going basis Supporting actions Development of a shared business vision between actors in the chain Strengthening of the small dairy firm as a 'social intermediary' that provides both business value to buyers but also social value to producers and local communities Building clear and transparent governance into the chain for rule setting, enforcement and conflict management</p>	<p>Research SIDE CATIE INTA DICTA Supporting actions CANISLAC CONAGAN SwissContact GTZ/DED, UNAG, URACCAN</p>	<p>Higher availability of high quality dairy products Higher productivity of smallholder dairy enterprises Functional value chain linking formal and informal markets</p>
<p>Crosscutting issues</p>	<p>How does the transformation of the dairy value chain affect gender relations</p>	<p>Assessment effects of transformation of dairy value chain on gender equity</p>		<p>Gender equity in dairy value chain enhanced</p>

Summary of indicators along the impact pathway that we believe can achieve these impacts.



VC component	Value chain outcomes			
Inputs and services	Accessible to smallholder farmers	Farmers organized and linked to service providers		
Production	High quality feed year round and Reduced seasonality of milk production	Improved milk quality and quality	Better linkage of smallholder producers to formal market	Enhanced sustainability and resilience of smallholder crop–livestock systems
Processing	Higher productivity of smallholder livestock producers	High quality dairy products available to consumers years round		
Marketing	Higher availability of high quality dairy products	Higher productivity of smallholder dairy enterprises	Functional value chain linking formal and informal markets	

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