Chapter 6

Technological & Institutional Changes Affecting Mixed Crop-Livestock Production Systems in the Andes

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Background

The economic opening of the Andean countries (Colombia, Ecuador, Peru, and Bolivia) at the beginning of the 1990s led to a substantial modification of the mixed crop-livestock production systems of small producers in the mountain regions. Many of the basic crops (corn, wheat, and barley) went out of production as a result of increasing imports. The area previously used for mixed crops with livestock production was not replaced with any specific crop and became fallow. In the case of Colombia, the cultivated area decreased by 1 million hectares between 1990 and 1998.

The theory of economic liberalisation includes mechanisms to support the primary sectors that are most affected. However, the dislocation was so significant, that none of the countries was able to allocate sufficient resources to cope with the effects, leaving the mixed systems in a disadvantageous position with respect to other production systems. Contrary to what was expected, the governments actually increased their public expenditures creating fiscal deficits that will be impossible to handle rationally in the next 10 years (gross domestic product debt service jumped from 1% to 6% GDP). The limited availability of resources makes the political cost of investing in poor areas very high, drastically limiting the willingness of governments to invest directly to help small producers.

During the 1990s pressure from the service and industry sectors ensured that the rates of exchange were maintained below their equilibrium levels, thus favouring the import of crop-livestock products and showing a clear bias towards local producers (Table 6.1). As a result of this management of the exchange rates, the debts of the countries increased disproportionately and there were no possibilities for exporting crop-livestock products. For example, Colombia's debt increased from US$ 13,000 to US$ 40,000 million, without any increase in the export volume of US$ 6,000 million.

Table 6.1: Factors affecting the prices to farmers in Colombia: annual average over the period 1990-1998 (%)

Commodity	Price to farmers	International price	Real currency exchange rate	Tariffs	Others
Maize	-11.29	-0.59	-8.16	-0.28	-2.26
Sorghum	-8.89	0.99	-8.16	0.32	0.58
Rice	-1.82	0.08	-8.16	0.98	7.24
Wheat	-12.4	0.83	-8.16	-1.26	-3.8
Sugar	-2.22	-2.88	-8.16	1.48	7.34
Cotton	-7.62	-1.83	-8.16	0.0	2.38
Coffee	-4.09	3.76	-8.16	0.85	-1.58

Source: Jaramillo (1998)

Other structures created during the modernisation process of the states with the intention of contributing to development have had a limited effect. Semi-fiscal fund managers are interested in state-of-the-art technology and very few are willing to invest in infrastructure and/or support small-scale production systems or, even less, mixed crop-livestock production systems.

In addition to the economic aspects, nature has been a very important factor in the sectoral performance of agriculture. The last El Niño was one of the strongest events in the last 40 years, and investments to repair infrastructural damage and compensate for harvest loss have affected both government financial resources and producers' savings.

These macroeconomic conditions have had a direct impact on poor producers. The studies at field level show that

(1) small and medium size producers are under capitalised;
(2) the current interest rates (Figure 6.1) are higher than the profitability that is being obtained in the production systems;
(3) the differences between credit terms and effective durability significantly reduce the possibilities of embarking on the production of long-term crops and/or livestock (Figure 6.2); and
(4) the current production systems do not, and will not, generate the surplus capital necessary to graduate to more intensive systems, which is the only way to modernise the area of small producers and to increase incomes.

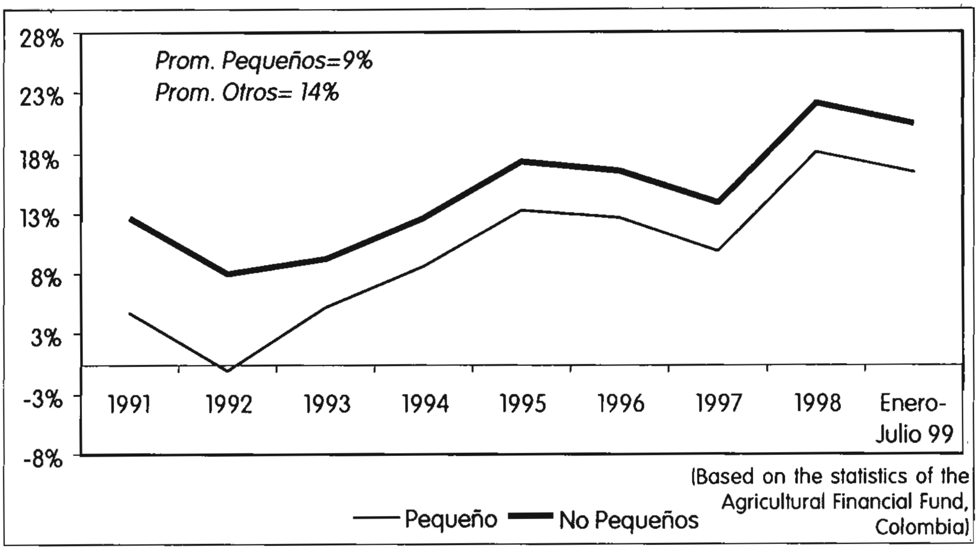

Figure 6.1: **Real interest rates in the agricultural sector of Colombia**

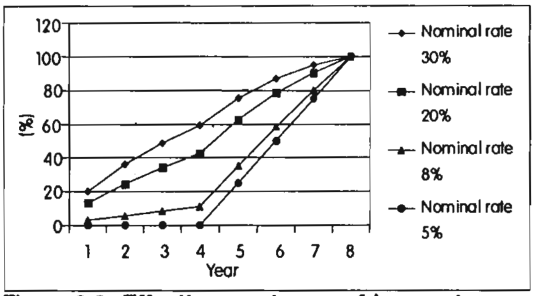

Figure 6.2: **Effective mortgage of loans at different nominal interest rates**

The objective of this paper is to present an analysis of the situation and to suggest steps related to agriculture in general and mixed systems in particular that can be implemented in order to improve the quality of life of the small producers. The CONDESAN experience in the Andean countries is reviewed and the following points are discussed.

- The stability in the medium term (10 years) of the changes introduced by the economic liberalisation. Greater emphasis is placed on the possibility of financing through the formal system and the political willingness to invest public resources in mixed systems of small producers.
- The impact these changes could have on the evolution of the rural sector and mixed systems in particular
- The clearly defined steps followed by CONDESAN in some selected sites in Andean countries in order to improve the quality of life of small producers and to promote mixed farming systems
- Determination of the mechanisms of support that should be strengthened and the needs for research that could contribute to a better performance of these systems

The subjects that are presented are complex. Although they are widely discussed in forums for development they are seldom analysed comprehensively or evaluated in terms of the different trade-offs between different hierarchical levels. This presentation is intended to contribute to the integration of research and development activities.

The additional mortgage (M) was estimated as $M=C^{*}I_n/(1+I_f)^n - C(I_n - I_f)$; where C is the capital, I_n, the nominal interest rate, and I_f, the inflation rate.

The Stability in the Medium Term (10 years) of the Changes Introduced by the Economic Liberalisation

Notwithstanding the possibility of changes in policy in the different countries, clear scenarios can be foreseen in the following.

The power and size of the state

The magnitude of the fiscal deficits, the impossibility of collecting new taxes, the excessive size of the Andean states, and the increasing reluctance of foreign capital to invest in these countries all indicate that in the next 10 years the different states will have little ability to affect the markets of inputs and products, even if there is political commitment. As a result, the state resources intended to benefit defined target populations will be reduced and will have little impact on investment decisions at the field level. Thus the push needed by mixed farming systems will have to come from the private sector, and the great challenge will be to convince the private sector that these alternative methods of production are profitable when international market prices are taken into consideration.

The financing system: the basis of financing and the economic backing

Until 1995, eligibility for obtaining credit was based mainly on the value of the land equity. The quality of the investment projects submitted was of little importance. This was a very safe system for bankers since the value of land kept rising. This system was based on several negative principles that later prevented the agricultural sector from competing in an open economic scheme.

The principal limitations of this approach were as follow.

- The determining factor for credit approval was the accounting balance of capital, and not the quality of the project with respect to risk, cash flow, or generation of employment.
- Since the banking operation incurred little risk, credit allocation was related to aspects such as the average amount in checking accounts and friendships.
- The guilds and producer associations were not concerned about showing the bankers the efficiency of their businesses, or their limitations and opportunities. In turn, the bankers were not concerned about grading their clients according to the seriousness of the investment.

- There was a reduced emphasis on monitoring the investment in the field. In practice, many of the loans were diverted to other sectors of the economy in several Latin American countries.
- The bankers, as partners in the agricultural operation, were not concerned about adoption of technologies and even less with training of the workers.
- The producers were under no pressure to facilitate strategic alliances in order to reduce costs and achieve long-term price stability.
- No importance was given to cash flows and hence no project analysed the difference between the term and the effective duration of the credit.
- Producers were led to incur large debts (80% of the value of their land) in a system where land represented more than 70% of their assets. The viability of these systems relied on a continuous scheme of high inflation, high internal protection, and the valuation of land.
- This approach left the small producer sector in the hands of an official bank that proved to be the least transparent in the management of credit and in the process of identifying the possibilities of investment.
- It eliminated credit as a flexible and efficient mechanism that could be used by governments to orient policy changes.

New volumes of capital

With the economic opening, important volumes of capital arrived. A great proportion of this capital was used for short-term investments that helped increase the expenditure on industrial goods. This increase in expenditure reduced national savings, thus creating a structural problem and affecting long-term investments. This caused the banks to limit financing to urban consumption activities, with very little priority given to short-term agricultural and livestock investments, and elimination of long-term investments from their portfolios.

Rates of interest and indebtedness of agricultural and livestock producers

The profitability of investments to promote consumption was very high which led the banks to set high interest rates in order to capture private savings. These rates were applied to agricultural and livestock credits at the same time as there was an effective reduction in the prices for their products. This brought about generalised bankruptcy in the rural sector and a rural mass of over 500,000 people who could not be given credit.

The following factors combined to create a vicious cycle.

- As a result of limitations in funds, credit was allocated to short-term projects few of which were in agriculture.
- Long-term projects were faced with short-term credit rates, making them non-viable, even though these types of projects offer better opportunities for investment.

- The governments did not have the resources to contribute as counterpart to credits for international development; the private sector was willing to give this backing but only for urban investment.
- The governments did not want to devalue their currencies to the point of balance because of pressure from industrialists who had acquired debts in dollars and entered into a process of modernisation based on the expectation of a market expansion that in fact never arrived.

Given this background, it is reasonable to predict that there will be a very deep barrier between the agricultural and the capital market for at least the next five years. This implies very little backing from the formal financing system for the agricultural and livestock sector.

The Impact of the Changes on the Evolution of the Rural Sector and on Mixed Farming Systems

The countries of the Andean area were in a process of expansion between 1970 and 1990. With the new macro-economic scenarios and possibilities of financing, investments concentrated on those crops with a high profitability, which led to a significant reduction in the area under traditional crops, and limited agricultural production to those sites with a competitive advantage.

This evolution had been foreseen and discussed for more than 10 years, but few analysts imagined the large amount of unemployment, and the associated problems, that would be generated. The intensive cropping did not compensate for the great displacement of the labour formerly utilised in growing the traditional crops that began to be replaced by imports. The countries were not prepared for rural unemployment (20% direct unemployment and 50% underemployment), and this in turn has led the governments to propose the need to approach rural development as a problem of equity rather than productivity.

The least capital-intensive operations, such as the mixed-farming systems, will have little opportunity to be relocated to sites with a greater comparative advantage. However, there is a strong possibility that small farmers will be able to increase their landholdings (agricultural area) because for the first time in the last thirty years the price of land has gone down — by more than 60%.

CONDESAN's Efforts to Help Small Farmers in the Andean Countries

The operation sizes of farms could be improved if the opportunity to expand the area under mixed farming systems could be exploited, but this will only be possible if concrete steps are undertaken. The following paragraphs summarise the activities being implemented in several benchmark areas by the Consortium for the Sustainable Development of the Andean Region (CONDESAN). The main objective is to help the governments solve the problem of ensuring equity and management of natural resources while focusing on technical and economic efficiency.

Under the present circumstances, the big challenges of the rural sector will be the use of under-utilised land to generate new jobs, ensuring adequate handling of natural resources, and guaranteeing food security. For mixed farming systems, the discussions should focus on their economic competitiveness with other forms of employment generation (like tourism, agroindustry, and construction of roads) and other forms of management of natural resources (like forests to protect water sources and capture CO_2 and construction of terraces). It will be easier to convince governments if the mixed systems are more efficient per invested dollar than the alternatives. This implies quantifying the trade-off between generation of employment and the value of the environmental externalities.

The CONDESAN strategy is based on the premise that there is available land that is under utilised and now low cost. As mentioned above, lack of land for exploitation by mixed farming systems is no longer the limitation that it was before the 1990s. Furthermore, there are capitalists and landowners who want to enter into strategic alliances to ensure their possession of the land and/or production of raw materials

The current scenario can be summarised briefly as follows.

- There are few small producers who can finance the establishment of mixed farming systems on a scale that guarantees an equivalent wage with the rest of the society.
- Even though the value of land has dropped, many producers still cannot accumulate enough capital to purchase land and thus expand the size of their operation.
- With the increased levels of unemployment, farming families have fewer off-farm opportunities to gain cash income, so the cash cost of capital has increased for the small producer.
- The states are neither willing, nor have they the capital, to finance the establishment of mixed farming systems completely, even if it is shown that this is one of the better alternatives for investment.

Given this scenario, the most viable solution is to enter into commercial alliances with entrepreneurs and/or large producers, who are in turn supported by the state with levels of investment in the order of 30%. These alliances should be administered initially by the private sector, and subsequently evolve towards administration by producers with a greater business capacity.

There is a consensus about the need to make the change through strategic alliances. This is the result of recognition of such things as the likelihood of better administration, the advantages of vertical integration of the production chain, and the likelihood that agreements will be reached on prices at critical moments. However, it is absolutely necessary to have objective criteria so that the investment can be prioritised in such a way that it fulfils the expectations of the partners.

CONDESAN's approach is illustrated by an example: the Livestock Fund for Development in the town of Pensilvania, Colombia (CONDESAN 1999). The results of the ongoing case study are summarised below.

Initial conditions

- Low-producing farms on hillsides - 2.5 kg of milk per day, 0.8 AU (animal units) per ha
- Cows with low milk production potential
- High rainfall, high erosion
- Technology validated under similar ecological conditions
- No funds to buy grass and legume seeds or improved cows
- Short-term profitability not enough to pay loans
- No matching funds to have access to Government Guarantee funds

Challenges for CONDESAN

- Design a project that would be attractive to farmers and others
- Encourage the creation of a farmers' association and a livestock fund
- Create a strategic alliance including the local government and the private sector based on actual revenues for all the partners
- Help negotiate the financial support
- Create the financial mechanisms that would stimulate participation

Project highlights

- Designed to increase milk production from 300 to 1,200 kg of milk per lactation
- Increase stocking rate from 0.8 to 1.5 AU/ha
- Increase parturition rate from less than 55 to 70%
- Provide farmers with up to 1000 improved cows (up to 8 cows per household)
- Benefit 250 farmers
- Investment required : $887,000 (80 % from a loan and 20 % from the private sector)

- Revenue in net present value (NPV): a) farmers $709,000; b) livestock fund $349,000 (private sector)
- Negative cash flow during the first four years $221,000. Two thirds covered by farmers from the profits and one third by the livestock fund.

Each member of the alliance plays a complementary role. The foundation Darío Maya was given the responsibility of creating a farmers' association to manage the fund. The local government, through the municipal extension agency, has the obligation of providing technical assistance to the farmers at different stages of the project, including marketing of the final products. The Federation of Coffee Growers was asked to organise the community and become the main private sector partner to provide the initial funds needed to create the livestock fund. The Banco Cafetero was the financial source of the loan. CONDESAN is providing funds and backstopping and facilitating the process. Farmers sign an agreement of co-responsibility to pay the loan and to share 50% of their profits with the livestock fund.

Some Lessons Learned

- Strategic alliances with the private sector require government funds in the order of 30% of the total amount required. In order to achieve this, the project must focus on including governmental priorities such as generation of rural employment or protection of the environment.
- The fund should be managed initially by the private sector and then transferred to farmers. The process should include training of farmers in managerial skills.
- The operational size of the participating farms is critical. The size should be sufficient to minimise fixed costs and for efficiency.
- Fast implementation should be a priority. Thus the product selected should be one that has a high demand from the private sector partners. Having partners from the private sector who have strong links to local and international markets facilitates fast implementation of the project.
- The geographical coverage should be selected in such a way that as many small farmers as is economically viable are included. The alliance must be able to be effective over a wide area without its profitability being significantly reduced. This is necessary so that the alliance can select areas with biological potential, since this guarantees productivity, and enables the inclusion of an adequate number of small farmers working in areas where a large impact on environmental factors is expected.
- It is of utmost importance to generate income within a short time frame. This is the most attractive bait for the private sector to ensure future investment that will benefit a larger rural population. Products with production periods of less than 18 months have a clear advantage.

- A very important part of the economic and social benefit is related to the potential evolution of the alliances. It is expected that one by-product of the alliances would be an increasing evolution towards niches where the population is poor and a large environmental impact can be expected. The government is willing to invest in order to achieve this change. The ex ante analysis shows that alternative approaches may produce a large total benefit (economic and social). Some products are more suitable than others for this evolution, but in most cases it depends on the capacity of the convocation and leadership of the entrepreneurs and managing partners.
- Long-term products currently have better profitability. Timely investment can make use of cyclic prices in both the national and international markets. The profitability of the investment and the cash flows are closely related to the starting time of the activity. Thus current and future prices should be regarded as a key element in identifying the niches for investment in Andean countries. For example; the prices of livestock have been low for the last 40 years. This suggests that the region is at a stage of liquidation of inventories that will be compensated for in the future by higher prices, even for domestic consumption. Judging the right moment for investment requires long-term information and involves studies of cycles of production and prices. Entering these businesses without good knowledge of these fluctuations is very risky. For many of the products analysed, the present moment is not the time to invest.
- Alternative sources of finance — The large export companies have access to credit in dollars. It would be impractical to allocate resources to them through the internal system when only the endorsement of the government will make it possible to attract new capital to the sector.
- Maintaining/creating rural employment — The investment necessary for generating permanent employment is a major issue. Unemployment is one of the principal problems that we are facing in rural areas and is a valid indicator for identifying the niches where government investment would be more effective. There are good opportunities to invest in small producers who can increase their profitability with minor changes of management.
- Equivalent income of the producers that enter into the alliance — The shadow prices for farmers adjusted for the costs of basic services would be an indicator that would show the regional niches where investment should be focused. The shadow price of wages is one of the most decisive factors in the profitability of the alliances. The critical economic situation in the Andean countries is making farmers enter into alliances where they contribute labour for 12 months without receiving any payment in cash, only receiving any income at the time of harvest.

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