
 SCIENTIFIC PAPER

Main limitations and solutions for food production: The contribution of the Innovation Program in Matanzas, Cuba

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ABSTRACT: A research was conducted in order to identify the limitations for food production, as well as their causes and possible solutions, which were identified and constructed, jointly, with farmers, owners or usufructuaries of in 25 farms of the Perico, Martí, Colón and Jagüey Grande municipalities (Matanzas province, Cuba) involved in the Local Agricultural Innovation Program (PIAL). The diagnosis was carried out in a participatory way, from the social, economic and environmental points of view, taking into consideration the methods recommended by the CATIE of Costa Rica. The main limitations identified were: the insufficient feeding basis for the animals; the high prices of agricultural inputs with regards to the price of the farmers' products; the inefficient productive chain, with unfulfillments by suppliers as well as recipients; the lack of agricultural knowledge of some recently incorporated owners or usufructuaries; as well as the low genetic quality of the animals. These limitations fundamentally affect the milk production, which constitutes the main commercial item of most of the studied farms, which in turn are affected by the inadequate soil cover due to overgrazing. The results indicated that the resources obtained by different ways should be directed towards those aspects of higher priority for the farms, which were discussed during the planning with the farmer families and with the managing boards of the cooperatives. This would speed up the elaboration of projects and would clarify the direction of the investments.

Key words: animal feeding, constructed solutions, productive limitations

INTRODUCTION

The countries that signed the Rome Declaration of 1996, at the Summit on Food Security, intended to destine efforts to adopt participatory and sustainable policies and practices of food, agricultural, fishery, forestry and rural development, in high and low potential zones. This is essential to ensure the sufficient and reliable food supply at family, national, regional and world level, and in turn to fight pests, drought and desertification, according to the multiple functions of agriculture (Gordillo de Anda, 2001). In such context, diverse international organisms and several nations have put into practice many initiatives in order to reduce poverty to half by 2015, and one of the main indicators to achieve this is food security.

In this sense, Recarey (2003) stated that conventional agriculture occupied the space required by the productive forces in their time; however, its effects and the environmental cost have forced the attention to be aimed at traditional techniques, with the support of science, to reach productivity and efficiency

levels, without damaging the human health and the environment.

Consequently, the proposal of rural development generated from agroecology is based on the discovery, systematization, analysis and enhancement of the particular elements that withstood the modernization process, to design, in a participatory way, development schemes defined from the local identity of the concrete ecosystem in which they are (Guzmán *et al.*, 2000). Participatory rural development is a new way to define and manage the policies and decisions, in order to achieve the economic and social balance and growth of the rural zones, without damaging the natural resources and utilizing efficiently the social capital and the community cohesion for self-management.

This has considerably contributed to the rooting of the cultural and socio-territorial identity, as a key factor of the mobilization of collective energies in favor of the development of these rural zones, according to Arocena (2004) and Moyano (2008). Likewise, it has allowed the reinvention of the pub-

lic policies from the local governments, in spite of globalization and its consequences.

However, the territorial development in Latin America has shown an economicist emphasis, which has not been overcome and is opposed to the role of agriculture as a key factor to guarantee food sovereignty, equity, sustainability and democracy (Foladori, 2006).

On the other hand, Cuba has put into practice strategies in the national agricultural system, among which is the leasing of land to usufructuaries, but with very limited resources given because of the economic situation the country is going through. For such reason, it is necessary to identify with the owners which are the limitations of the productivity of these lands, in order to accompany them in the transformation of the agricultural systems and adequately direct the funding received from different sources.

In general, the leased lands had been abandoned by enterprises which had them before the economic crisis. They are unused, peripheral and inappropriate for cultivation; they are covered by plants of low nutritional quality or were overgrazed, for which they have several limitations.

In this sense, the Local Agricultural Innovation Program (PIAL), directed by the National Institute of Agricultural Science (INCA) of Cuba and funded by the Swiss Cooperation and Development Agency (SDC), makes an effort to articulate actors, at territorial level, for the strengthening of the local participatory agricultural innovation systems, with the generation of genetic diversity and technologies applicable to these areas. In the case of the Matanzas province, work is carried out in four municipalities. The objective of the research was to identify the limitations for food production, as well as their causes and possible solutions, in farms of these municipalities.

METHODOLOGY

The study was conducted in 25 farms of the Perico, Martí, Colón and Jagüey Grande municipalities, in which a diagnosis was made in a participatory way. For such purpose the social, economic and environmental aspects were considered, and the natural resources were counted, in order to know the productive potential. The selection criteria were based on the land tenancy form –farms belonging to cooperatives of credits and services (CCS), usufructuaries recently incorporated to agriculture, developing farms, livestock production

farms and food crops production farms– and on the entrepreneurial capacity of the owners for the agroproductive transformation. Some farms which had been created more than 10 years before were included.

The farm plans were elaborated, according to the methodology suggested by Palma and Cruz (2010), which proposes to start with an exchange with the families of the farms that should be transformed, so that they, once aware, complete with the facilitating team the following steps of the exercise:

- 1. Collection of the general information of the farm.** General data of the owner and his/her family and general characterization of the farm (extension, location, prevailing physiographic characteristics, accessibility conditions, soil type and its use).
- 2. Construction of the family vision.** Basically the vision should answer the question: what do we want the farm to be like in five or ten years.
- 3. Description of the current situation of the farm.** The main tool to analyze the current situation of the farm is the map the family will draw. It may be necessary that the facilitator tours the farm with the family, to elaborate the map afterwards. It describes what is there in the farm, how it is used and the status of the farm resources.
- 4. Identification of the farm limitations or problems.** The most important problems of the family, that affect their welfare and/or the productivity of the land uses in their farm, are characterized. For such purpose the limitations, their causes and possible solutions are related.
- 5. Identification of the opportunities for the farm development.** In this component the opportunities shown by the farm and the environment, and which could contribute to reach the family's vision, are mentioned.
- 6. Construction of the desired situation for the farm.** For the elaboration of the farm plan, which is based on the family's vision, the limitations and their possible solutions, the opportunities shown by the farm and its environment, the actions that will be carried out by the family in the next years (2, 3 or 5 years, according to the plan) in order to achieve the farm that corresponds to their vision, should be proposed. For such purpose, the construction of a map of the future is proposed.
- 7. Actions that should be carried out to reach the desired farm.** The activities or investments

that should take place to achieve the changes described in the above-mentioned map are described, through a direct language and with short phrases. In addition, it is necessary to consider the importance of the existing technologies that are promoted, because they should be used to achieve the sustainable land use. To complete this component the family should decide what to do, when and with what resources it will be done; besides, a budget should be elaborated in which the costs and responsibilities of each family member are related.

RESULTS AND DISCUSSION

Figure 1 shows the tree of problems faced by the studied farms. In it the critical points of the productive chain are shown: a) insufficient feeding basis for the animals, mainly due to the little availability of quality seed and to the high prices of the agricultural inputs with regards to the price of the products, which prevents the access to the markets; b) the inefficient productive chain, with unfulfillments by the suppliers as well as the official recipients of the products; c) the lack of agricultural knowledge of some recently incorporated owners or usufructuaries; and d) the low genetic quality of the animals, because of the difficulties to acquire better breeds.

When analyzing the frequency of the limitations, it was observed that the feeding basis of the animals constitutes a limitation in all the farms (fig. 2), which shows the rooted culture of extensive and subsistence livestock production that persists in the Cuban farmers, because this activity was not a priority for them until after the 20th century, when the state livestock production collapsed. For such reason, generally these farms do not have resources for the creation of the minimum infrastructure (electrification, access to underground water), and there are no possibilities for planting due to the lack of protection for the farm.

Such aspects are not exclusive of Cuba or of the studied zone. In many Latin American countries there is a similar situation, because the milk production is based on extensive livestock production, which shows low production values (two liters of milk per cow per day, weight gain which does not exceed 300 g per day), low carrying capacity per hectare, scarce application of soil and grassland renovating techniques, soil loss, high compaction levels and, as consequence, a high environmental impact on the natural resources. This was reported by Rodríguez *et al.* (2006), when studying farms in the Colombian foothill; while Frers (2013) stated that overgrazing and deforestation are two of the main causes of

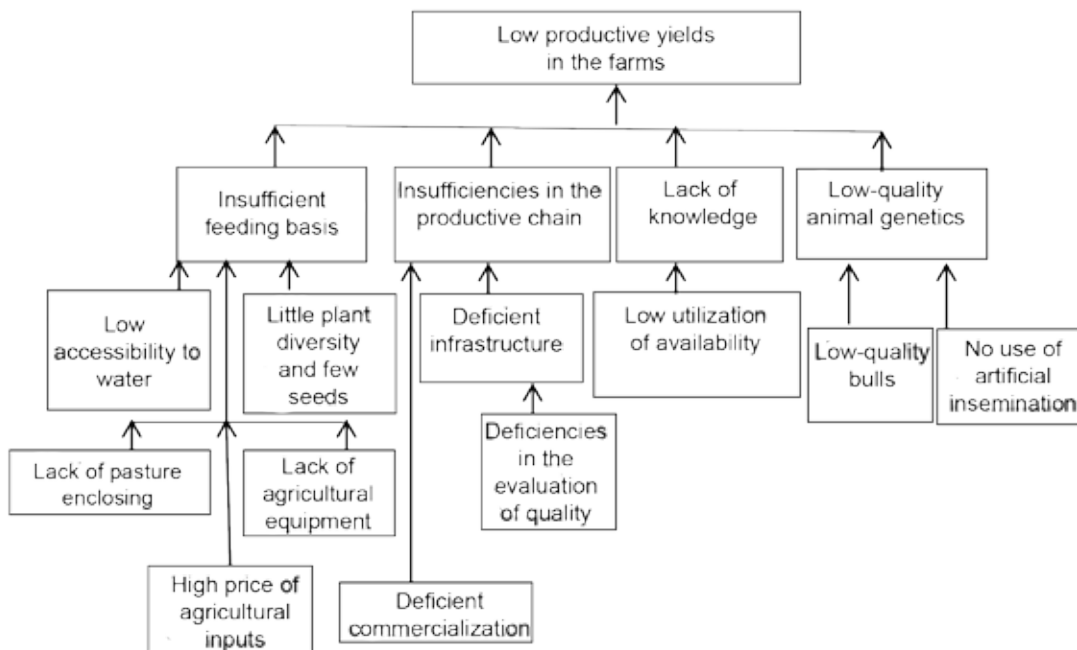


Figure 1. Tree of problems made from the participatory diagnosis in the farms of the PIAL project.

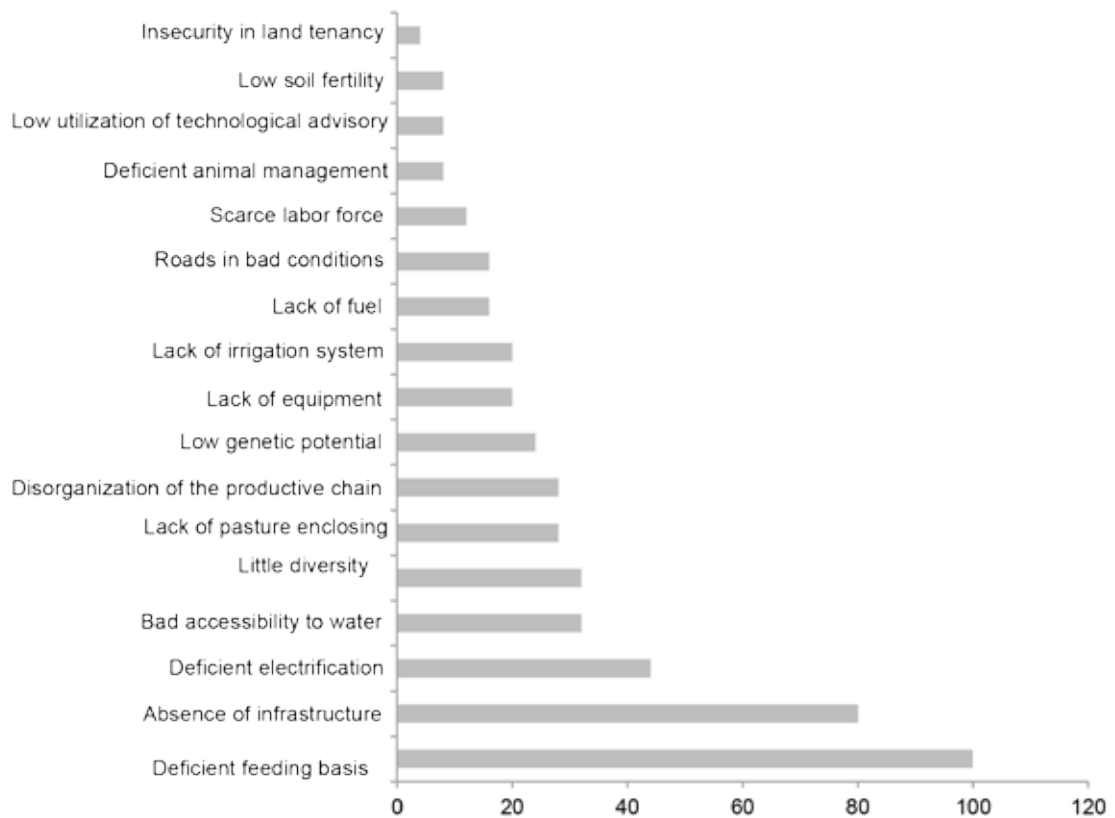


Figure 2. Frequency of the main limitations of the involved farms, in four municipalities of the PIAL project (%).

the degradation and low productivity of soils in Argentina.

On the other hand, Comerma and Paredes (1978) stated that the low fertility (around 32 %) of the national surface is a priority limitation in Venezuela; while in Cuba, Morell *et al.* (2008) reported that 38 % of the soils showed some degree of erosion. If the potential erosion is evaluated, this percentage can be increased to 52 % (even more at present), which will have repercussion on the progressive reduction of productivity if no contention methods are applied. The studied farms are located in overexploited, deforested zones, with poor soil cover, which goes against their conservation and productivity.

Livestock production in the private sector exceeds in number of animals the state livestock production and represents the 83 % of the total milk production of the country (Oficina Nacional de Estadísticas, 2011). This value is not higher due to the above-mentioned limitations, which, together with the high prices of inputs, discourage the milk deliv-

ery by farmers through the official way. This result was reaffirmed by the Cuban Ministry of Agriculture, in a recent meeting of livestock producers, as an aspect that has incidence on the productive levels and the mortality of the herd (AIN, 2014).

On the other hand, the farmers coincided regarding the lack of adequate funding to obtain resources (fig. 3), due to the high prices of inputs with regards to the prices of their products, for which it was identified as the most frequent cause of the farms' unproductivity. This forces the farmers to deviate part of the production in order to be able to fund the resources aimed at the development of the farm, which proves the need of investments for the livestock production development of the cooperative and farmer sector (fig. 4).

As it is observed in figure 4, some of the measures proposed as solutions constitute actions supported by PIAL for the development of farms, especially those related to the introduction and dissemination of genetic and technological diversity, experimentation in the farm, as well as implementa-

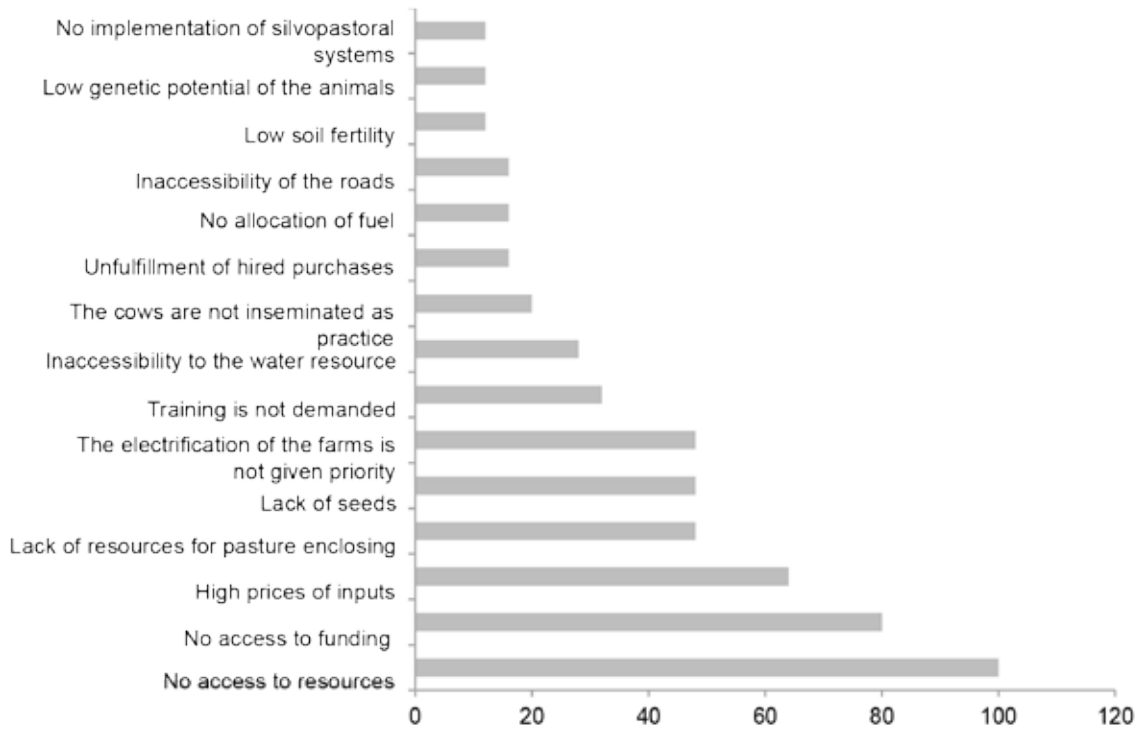


Figure 3. Causes of the limitations in the farms (percentage of farms in which they appear).

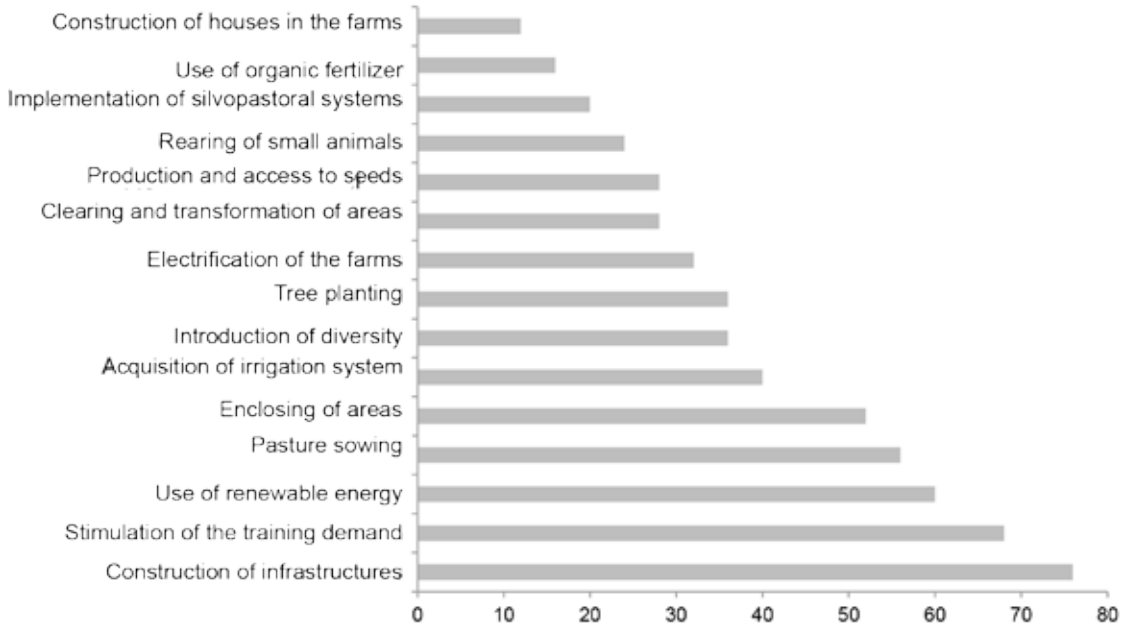


Figure 4. Solutions proposed by the farmers to improve the status of their farms (percentage with regards to the number of farms).

tion and dissemination of alternative technological practices at local level, which reduce the emissions of greenhouse gases and the vulnerability to the effects of climate change. The capacities of farmers are also enhanced, through training in action and the promotion of exchanges that allow them to be active part of the transformation of their productive systems.

Based on the farmers' criteria 25 action plans were constructed (one for each farm), and 149 actions were identified, which were grouped for their analysis, in order to establish a priority level. Among the ones with higher bearing is the improvement of infrastructure, which, together with the improvement of the feeding basis of the animals and the transformation of the areas for their later use and exploitation, should contribute in 70 % to the improvement of the current situation of the productive systems (fig. 5).

Such results showed the will of the Cuban farmers to continue being central actors in the agricultural transformations that occur in the country, as continuity to the re-launching of the role of coop-

erativism and the Cuban farmers in the face of the caducity of the innovations of the nineties and the bankruptcy of the entrepreneurial and technological model of the state farm (Suset, 2011). This reinforces the importance of strengthening the farmer sector, through the facilitation of its access to the necessary resources to perform its productions.

CONCLUSIONS

Not having an adequate infrastructure or a sufficient feeding basis for the animals constitutes the main limitation in farm productivity, which is also ascribed to the lack of training.

The main solutions to the limitations for food production in the analyzed farms are: the possibility to have access to material and financial resources, and to training, and the availability of seeds; which would allow to implement actions aimed at the improvement of infrastructure, feeding basis of the animals, and the transformation of unproductive areas; which in turn would contribute to the improvement of the farms as economic production unit.

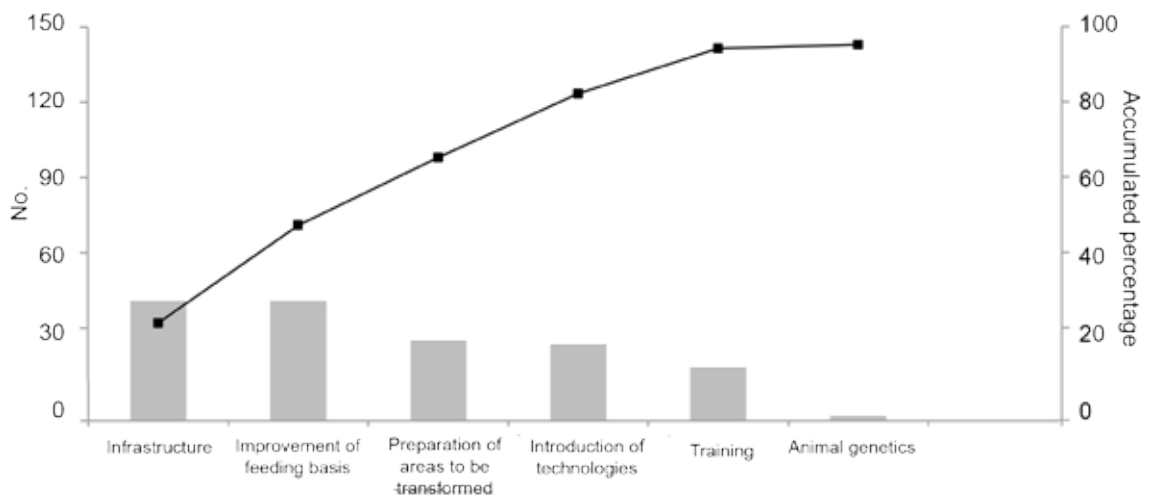


Figure 5. Priority of the actions identified by the farmers.

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