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SCIENTIFIC PAPER

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## *Planning on farm, a tool for the development of sustainable agriculture*

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**ABSTRACT:** A study was conducted in 25 farms of the Perico, Martí, Colón and Jagüey Grande municipalities (Matanzas province, Cuba), in order to elaborate the farm plans applying a methodology for such purpose. A guide was prepared from the methodology proposed by Palma and Cruz (2010), modified according to the Cuban context, and several facilitators were trained who worked with farmer groups, for which in the elaboration of the plans the knowledge of the people with more experience was utilized. Researchers and professors of municipal university centers, research centers and agricultural teaching centers participated in the study. At the end of the workshops, the plans were revised by the whole group. The main limitations found were: food insufficiency, inaccessibility to water, existence of animals with low productive potential, lack of grazing paddocks, little diversity of pastures and deforestation. The elaboration of the plans through this methodology facilitated an exercise of collective reflection, from which the aspects that should be solved in the transformation of the farms were determined, with the support of the tacit knowledge of the farmers with more experience and that of the specialists. In addition, it was proven that the farm plan can serve to define and/or to adequate intervention strategies.

*Key words:* farmers, development plans

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### INTRODUCTION

In the context of the current world economic crisis, aggravated by the collapse of the European socialist governments and the economic blockade imposed by the United States, Cuba has developed strategies and policies to decrease the food dependence on the external market, among which is the reform of land tenancy established by the executive decrees 259 and 300. This law linearly increased the land ownership in private hands and the family agriculture, according to the guidelines of the economic and social policy approved in the Sixth Congress of the Cuban Communist Party, particularly guidelines 176 and 177. For such reason, thousands of farms have emerged in the country for management, in which the new farmers are not always well knowledge-equipped. In this sense, a total of 1 538 000 ha of land have been granted to 172 000 usufructuaries, following the executive decrees 259 and 300 (Orta, 2013).

According to Bermúdez (2005), planning constitutes the most important part of the managerial process of a farm, and its main argument is based on the combination of the biological character of the agricultural activity, with the cyclic effect of climate phenomena. Planning is defined in agreement with

the time established for the recovery of the investment. This author identified long-term planning as the one which generally stipulates remarkable enlargements in the productive capacity of the exploitation, through significant investments on fixed items, such as: pastures, constructions and facilities, machinery, equipment and animals; while short-term planning is the one aimed at improving the efficiency of the productive capacity through the investment of work capital, which is recoverable in a relatively brief time, and in it the long-term objectives and purposes of the farm should be taken into consideration.

The plan includes a vision of the intended goals with regards to the farm development, and can contribute to solve problems, utilize the opportunities that appear, use correctly the available resources or manage the necessary resources more effectively (Palma and Cruz, 2010).

In the Marxist discussion it has been proven that farmer forms have great capacity of adaptation in time, because they can make a more rational and adequate use of resources and a better conservation of the ecosystem, apply better productive practices; as well as have previous social capital, cultural knowledge and cooperation capacity, as long as

the minimum resources are available (Suset *et al.*, 2010). For such reasons, the elaboration of the farm plans is very helpful, mainly for the new farmers who recently received lands and who are entering the logics of the current farmer culture.

In this sense, it should be emphasized that there are successful experiences in Central America, from methodological developments of regional institutions (Eek, 2005; Palma and Cruz, 2010; Aguilar *et al.*, 2010), with the application of this work methodology. In Cuba, the project Local Agricultural Innovation Program (PIAL for its initials in Spanish), led by the National Institute of Agricultural Sciences (INCA) and funded by the Swiss Development and Cooperation Agency (SDC), has made efforts to articulate actors related

to the participatory agricultural innovation in the generation of genetic diversity and sustainable technologies, for which it works in 45 municipalities of the country, from which four are in the Matanzas province.

The objective of this research was to elaborate the farm plans applying a methodology for such purpose, in 25 farms of those municipalities, as a first step in the development of sustainable agriculture.

## MATERIALS AND METHODS

Twenty five farms (table 1) of the Perico, Martí, Colón and Jagüey Grande municipalities (18 livestock production and 7 food crops or mixed farms) were selected, and the plans of all the farms were elaborated, according to the methodology proposed

Table 1. Main characteristics of the selected farms.

Municipality	Farm	Number of people	Extension (ha)	Main use
Colón	La Quinta	3	33,0	Livestock production
Colón	Gispert	4	10,24	Livestock production
Colón	Dairy farm CPA VI Congreso	137	60,0	Livestock production
Colón	Espinero	5	13,42	Livestock production
Colón	Delgado Farm	4	73,81	Milk production
Colón	Morera Borges Farm	3	40,26	Milk production
Colón	Los Madruga	5	26,84	Milk production
Colón	Los del Pino	4	40,26	Livestock production
Colón	La Currita	4	2,0	Livestock production
Colón	Los Febles	4	34,26	Livestock production
Jagüey Grande	La Nueva Esperanza	6	13,42	Livestock production
Perico	Collective Area	6	77,0	Milk, fruit trees and grains
Perico	La Palma	5	13,42	Milk production
Perico	La Perica	2	40,26	Livestock production
Perico	Merceditas	2	6,0	Food crops
Perico	La Esperanza	5	67,1	Mixed
Perico	San Juan	2	13,42	Livestock production
Perico	Santa Rita	4	67,1	Milk production
Martí	El Entronque	5	13,42	Milk production
Martí	Franklin	4	4,3	Food crops
Martí	Tres Hermanos	5	4, 24	Agricultural
Martí	El Mango	7	13,42	Mixed
Martí	La Ceiba	7	13,42	Mixed
Martí	Sebastopol	4	25,7	Livestock production
Martí	La Línea	3	13,42	Livestock production

by Palma and Cruz (2010). This methodology is based on the diagnosis of the current status of the farm and the elaboration of the desired status, which is complemented with maps elaborated by the farmer family.

From this methodology a guide was prepared with some modifications, such as the gathering of the farmers involved in the project with their families, in a unique workshop in each municipality, because in the Cuban rural context the plans of several farms were elaborated in one workshop. It is valid to clarify that the methodology indicates to make a workshop with all the farmers, the elaboration of a farm plan for learning, and, then, the independent elaboration in each farm.

Several facilitators were previously trained who worked in pairs for each group of farmers, in a large local that facilitated the simultaneous work of the groups. Thus the wisdom of the farmers with more experience (three or four per group) was utilized and the plans were elaborated with the participation of several families who exchanged their knowledge.

At the end of the workshop, the plans were revised by the whole group. To this activity researchers and professors of municipal university centers, research centers and agricultural training centers were invited, contributing information and collaborating in the elaboration of the plans –due to their knowledge of the field– and as facilitators.

## RESULTS AND DISCUSSION

Figures 1 and 2 show examples of the maps elaborated by the farmers, members of the families and facilitators of the participatory workshop.

The current farm is considered new (fig. 1a), because it is a land recently granted as usufruct, from lands abandoned by the sugarcane production sector, for which the farm does not have any useful structure or cover. The map of the future (fig. 1b) shows how the implementation of silvopastoral systems, the creation of some infrastructure and an irrigation system from a lagoon, the planting of other emerging feedstuffs (such as sugarcane) and the use of renewable energy, are planned. This would have as purpose the promotion of a milk production farm.

Figure 2 shows a farm that exists since years ago, where the soil cover is not very useful as a consequence of the composition of natural pastures –emerged due to overgrazing– and the lack of pasture enclosing, which has hindered the adequate pasture management. In the map of the future the transformations of the soil cover through the planting of different pasture varieties, the improvement of the infrastructure, as well as the development of renewable energy by means of biodigesters and windmills, are perceived. Likewise, the introduction of new animal categories from the pre-fattening and fattening males rise on the dairy farm is proposed.

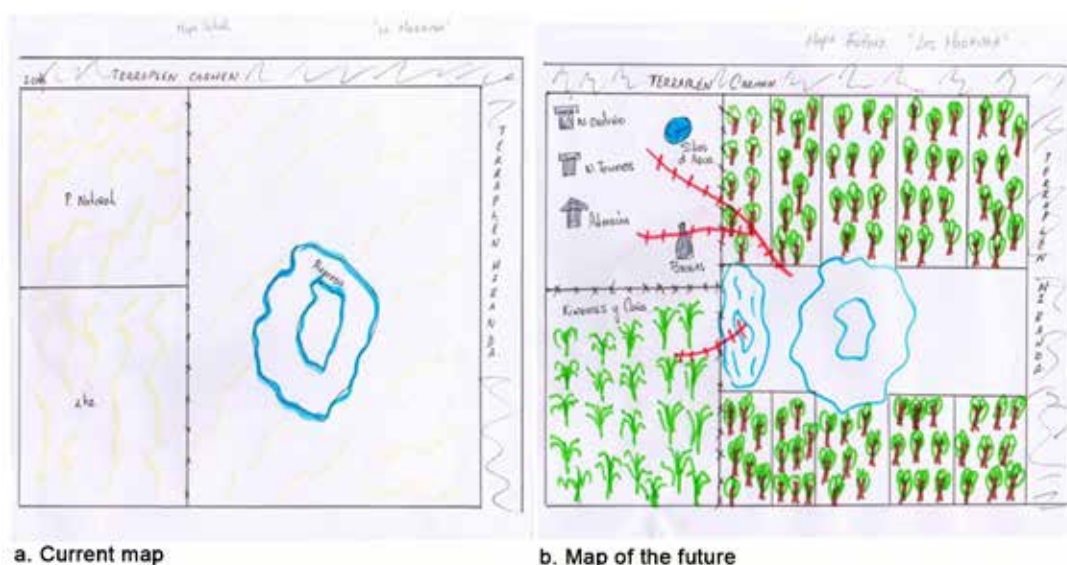


Figure 1. Los Madrugá farm (owner: Yoel Madrugá).

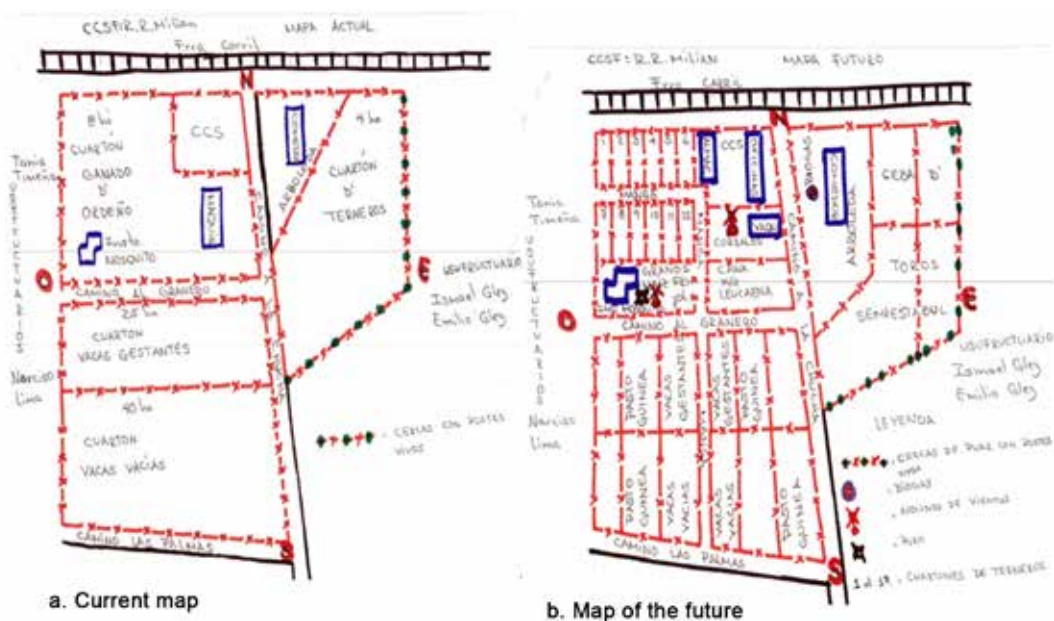


Figure 2. Farm Collective Area of the cooperative of credits and services Ramón Rodríguez.

The structuration of these transformation projects has allowed the owners to visualize more exactly the possible outputs of the farms and the quality of the products, in order to be able to make their business plans. This starts a process of change in the entrepreneurial culture of the agricultural sector, which has been “marked”, until now, by the culture of expectation propitiated by the vertical and authoritarian system that characterized it for more than forty years (Figueroa, 1998; Machado *et al.*, 2009).

Table 2 shows the limitations of a farm, their causes and the possible solutions to revert each situation. The actions that should be carried out and details about them are shown in table 3 (there appears, as an example, the aspects related to only one farm).

With these results the entrepreneurial capacity of farmers to promote innovation and increase productivity and efficiency of their farms and, thus, of the family entrepreneurial sector, is proven. At present, this aspect is highly relevant in Cuba and worldwide. According to studies conducted by FAO (2014), which were divulged to commemorate the year of family agriculture, it is acknowledged that this agriculture is responsible for 70 % of the world food production and that more than 1 000 500 million agricultural exploitations are linked to it. Particularly in Latin America, the agriculture of high investment in capital produces, even, for exporting (Machado, 2004).

The elaboration of the plans allowed an exercise of collective reflection to determine the aspects that should be solved in the transformation and to define and/or to adequate intervention strategies. According to Eek (2005) and Delgado and Ibrahim (2010), the planning of a group of farms in a zone is valued by development organizations as a sort of diagnosis previous to the interventions.

There is agreement with these authors in the advantages of the elaboration of the farm plans, because it allows to outline strategies aimed at a productive and economic growth; make an efficient use of the economic and human resources; plan an adequate, efficient and sustainable use of natural resources; outline guidelines for a farm development that takes into consideration social (family) and gender equity aspects; define, consistently, the needs of the farmer family before rural development institutions and organizations (self-management); make feasibility analyses to decide on the granting of credits to farmer families; as well as to provide follow-up to the economic and productive development of farmers and to *in situ* (inter-institutional) coordination, among others.

This last aspect is highly important, because several development projects have incidence on the same productive scenario, as in the case of the farms of this study, in which the following projects are executed: “Biomass as renewable energy

Table 2. Limitations, causes and possible solutions in a farm.

Limitation	Cause	Solution 1	Solution 2
Food insufficiency	Sugarcane area under transformation, overexploitation of natural pastures	Training, planting of pastures and forages	Planting legume trees and varieties of improved pastures
Accessibility to water	There is no well	Making a well	
Animals of low productive potential	Inadequate breed, difficulties to inseminate	Working linked to the Genetic Livestock Production Enterprise San Juan, Martí municipality	Establishing links with the Cuban Association of Animal Production (ACPA)
Lack of corralling	Lack of barbed wire	Finding funds through projects	Development of living fences
Little diversity of pastures	Sugarcane area under transformation, Unavailability of pasture seeds	Introducing diversity, planting energy (sugarcane and king grass) and protein varieties	Establishing an alliance with the Agricultural Polytechnic Institute; identifying sites for planting energy and protein species
Deforestation	Lack of water and paddocks, and of knowledge about available technologies	Training in the topics of feeding balance and virtues of the forage species and improved pastures; visits to successful experiences; corralling	Making a well, Installing a windmill

Table 3. Actions, schedule, resources and form of execution of the actions in an involved farm.

What to do?	When?	Resource	Who executes?	How?
Locate and purchase seeds, prepare land, fencing in and planting forage species (bank)	January/2015, April/2015, May-July/2015	Funding, seeds, barbed wire, machinery and fuel	Farmer	Farmer's management
Make a well	When the windmill is made	Funding, labor and construction materials	Farmer	Work contract
Transform the areas into systems with trees	2015-2016 According to the resources	Funding, machinery, barbed wire, labor, fuel and seeds	Farmer	Farmer's management
Plant fruit trees	2015-2016 According to the resources	Seedlings, labor, funding and fuel	Farmer	Farmer's management
Build infrastructure	After making the well and setting the windmill	Roof, varied inputs and labor	Farmer	Farmer's management
Know successful experiences	November/2014	Time, fuel and mobility	Farmer	Links with PIAL
Link with the Polytechnic Agricultural Institute	September/2014-May/2015	Time, fuel and mobility	Farmer	Links with PIAL
Teach a course on food basis	October-November/2014	Time, fuel, mobility, trainers, expendable material and bibliography	Farmer	Links with PIAL

source for rural areas (BIOMAS-Cuba)", "PIAL" and "Co-innovation".

In addition, it allows to elaborate the budget and to decide which crops or items will be produced (Bermúdez, 2005), which is of interest in the current transformations of land use and tenancy in the country, because many new land tenants lack the knowledge for land management. The elaboration of the farm plan, in a participatory way with the concurrence of several farmers and other institutional actors of the municipality, is an advantageous space for the construction of this knowledge in the new

farmers. Among the principal limitations in the farms, the following were identified: food insufficiency, accessibility to water, animals of low productive potential, lack of paddocks, low diversity of pastures and deforestation. This is probably due to the fact that most of them are newly-created farms, in lands abandoned by the sugarcane agriculture which were delivered in usufruct by the executive decree 250-300.

It is concluded that farm plans, elaborated with this methodology, are a very necessary and useful tool in the current context of the Cuban rural development.

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