

Scientific Paper

Contribution of innovation to local development management in a municipality of Matanzas

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Abstract

In order to know the contribution of the innovation system to local development management in the Perico municipality –Matanzas province, Cuba–, a systematization exercise was carried out in the period 2013-2016. For such purpose, interviews were made to key actors, who were identified and classified according to the objective, the functions and interest of the study, as well as according to the practices implemented in the farms. The information was processed using the method of divergence and recurrence analysis¹. In addition, the productive diversity, mercantile production and incomes of the involved farms; the flexibility of the current legislation with regards to the economic activity; the establishment of innovations, private and state initiative for innovation; the participatory processes and commercialization of local products, were evaluated. The incorporation of good practices of the innovation system allowed an increase of the farm mercantile production and incomes, which was favored by the direct relation between the originated transformations regarding diversity and practice, and the economic-productive indicators. The practices promoted from the local innovation system have allowed the modification of the ways to disseminate knowledge, by opening exchange and innovation spaces that stimulate the consolidation of alliances and links among the local sectors. However, no effective mechanisms of mobilization which would allow to overcome the citizens' lack of confidence and discouragement were achieved.

Keywords: community development, agricultural exploitations, economic indicators

Introduction

The transformations started in 2007 have gone through stages until in the 6th Congress of the Cuban Communist Party, in April, 2011, it is defined that the economic system which will prevail will continue to be based on socialist ownership, and that it will give autonomy to the local management of Governments, among other novel aspects.

The concept of local development has been considered from highly diverse perspectives by many authors (Juárez-Alonso, 2013; Alburquerque, 2016). From the social point of view it could be understood as: a dynamics that shows the efficacy of the relations (not exclusively mercantile) among people, to enhance the value of the riches available in the territory; or as a space in which the economic actors are integrated due to their proximity, based on four elements that support it: the sense of

belonging, knowledge transmission, permanent effect and strength of the individual actors; also as a matrix of diverse industrial tissue, as an endogenous process of structural change and as empowerment of the local society.

According to Zúñiga-González (2013) it is a process that facilitates the reactivation of economy and the dynamization of the local society, through the efficient use of endogenous resources of the territory, with potential to stimulate and diversify its economy, promote employment and improve the quality of life of the local community, as a result of commitment in the space of active solidarity.

With regards to the above-stated facts, the municipalities are spaces of training and all their inhabitants are educational agents as they relate to each other, and it is in these relations when values and attitudes are transmitted (Jiménez-Montoya *et al.*, 2017).

¹ DESCO. *Sistematización de experiencias. Guía conceptual y metodológica*. Lima: Centro de Estudios y Promoción del Desarrollo, 2001.

As a product of all the processes undergone by the Cuban nation, the protagonist role of local Governments has varied as strategy to respond to the current needs in certain historical processes of the revolutionary process, but has lacked an adequate regulatory framework and an explicit policy. The reforms that in this order occurred with the crisis of the nineties had a pragmatic approach, of trial and error; by facilitating the possibility of reproduction of traditional criteria, of economic functioning, at the moment in which it is considered timely, according to Proenza-González (2016).

This determined the emergence of multiple initiatives, including the Municipal Integral Development Programs (MIDPs), which appear with the objective of guaranteeing, through decentralization, development of the country and increase of the population's standard of living. This allowed municipalities such as Perico, in Matanzas province, to be included in the initiative that has permitted to overcome the reconversion of the sugar industry, once the main employment and richness source of the territory for several decades; and at the same time it has allowed the identification of its main potentials to generate richness in the agricultural and service sectors.

The development management processes in local environments require the design and implementation of a strategy of continuous development, which, with the use of the available local resources, has its main bases on the continuous innovation process, which allows to find the most suitable and sustainable solutions to local requirements from a multidimensional perspective of development. For such purpose, it is stated as alternative to face a type of policy capable of stimulating the creation of innovative territorial environments for the strategic coordination of social actors and the promotion of local productive and entrepreneurial creativity (Di-Pietro-Paolo, 2001).

In that sense, the objective of this work was to know the contribution of the innovation system in local development management, in the Perico municipality (Matanzas province).

Materials and Methods

Characterization of the municipality under study

The Perico municipality is located in the red plain Habana-Matanzas, in the central-western part of Matanzas province; it has a total surface of 278,3 km², which represents 2,4 % of the provincial

territory. Its total population is 31 148 inhabitants (ONEI, 2016).

The territory has an agricultural surface of 24 892 ha, from them 11 652 are cultivated and 12 399 are in the non-cultivated category, from which 5 098 ha are dedicated to animal husbandry, with predominance of natural pasture. The prevailing soil type is Ferralitic Red. The land use is agricultural, and within the main crops the following stand out: potato, food crops, sugarcane; while in animal production soils are dedicated to cattle and pig rearing.

Agriculture is the main economic activity of the municipality. The main enterprise is the Agricultural Enterprise Máximo Gómez Báez, for its productive activity as well as for the quantity of labor it gathers in its broad range of agricultural processes; to it different production organization forms are subordinated: three base entrepreneurial units (UEB for its initials in Spanish), two cooperatives of agricultural production (CPA), three basic units of cooperative production (UBPC), four cooperatives of credits and services (CCS) and four base entrepreneurial units of services.

Work methodology

The systematization axis was defined: innovation for development in its productive and associative cultural dimensions.

Key actors, who were identified and classified according to the objective, functions and interest of the study, as well as according to the practices implemented in the farms, were interviewed. In addition, their filiation as member or not of the Innovation Platform and Groups and the sector to which they belonged, were considered, in order to make up a representative sample [(managers and officials of the Government, enterprise directors, farmer men and women, members of the Council of Municipal Administration (CAM), university professors, researchers from the Pastures and Forages Research Station Indio Hatuey (EEPFIH), citizens who live in the different areas of the municipality)]. A total of 20 interviews were made, following the principles of qualitative research methodologies in which the sample is progressively constructed, subject to the dynamics derived from the research findings.

The necessary and complementary information was requested through the use of the work mechanisms established in the municipality. Workshops were carried out that were facilitated

by the team of the EEPFIH, which accompanies the experience, and by professors from the Municipal University Dora Alonso. The information was processed using the divergence and recurrence analysis method, according to the handbook for the systematization of experiences of the Development Studies and Promotion Center (DESCO) of Peru.

For the study of the economic-productive evolution the six «confidence samples» (CS) farms of the PIAL² project were used; the primary records of each were used, as well as informal interviews to the farmers.

In the case of the diversity study, four of these farms were utilized; the methodology proposed by Vázquez *et al.* (2014) was applied, which was adapted according to the interests of this research. In it the evaluation through a scale from 0 to 4 degrees is proposed, which conceives the scale value (4) as optimum and allows to weigh the indicators that interest the most with regards to the self-regulation capacity of the system.

In order to facilitate the evaluation, the biodiversity elements were grouped into: «productive biodiversity», as the introduced biota that is planned and cultivated, or reared, with economic purposes; «auxiliary biodiversity», as the non-cultivated vegetation that inhabits naturally or is introduced, which is managed to influence positively the remaining biodiversity.

In turn, these functional components were related to the management that is made in the production system, to perform the diagnosis through the following:

- a. Design and management of the elements of the productive biodiversity (PrBDM): the indicators about types and diversity of productive items and the complexity of their designs and managements, are included; which are multiplied by their weighing factor, determined through expert consultation, and are averaged.
- b. Soil management and conservation (SMC): the specific managements performed on the soil are considered, which contribute to the conservation and improvement of the functions of the biota that inhabits it; which are multiplied by their weighing factor, determined through expert consultation, and they are averaged.

- c. Design and management of the elements of the auxiliary biodiversity (AuBDM): the structure of the elements that integrate it is considered, as well as the complexity of the designs and managements that are made; which are multiplied by their weighing factor, determined through expert consultation, and they are averaged.

Finally the biodiversity management coefficient (BMC) of the production system was determined, through the following expression:

$$\text{BMC} = [\text{PrBDM} + \text{SMC} + \text{AuBDM}] / 3$$

The obtained value allows to classify the system with regards to the complexity level reached by the designs and managements of the biodiversity elements. For the complexity degree of biodiversity the following ranges were used: 0,1-1,0: simplified (s); 1,1-2,0: little complex (lc); 2,1-3,0: moderately complex (mc); 3,1-3,5: complex (c); 3,6-4,0: highly complex (hc).

Results and Discussion

Productive dimension of the innovation axis

In the framework of the actions that are developed in the municipality, as strategy, work was done particularly with a group of innovative farmers. This was decided under the assumption that, geographically distributed in most of the territory, these farmers, once successful experiences are achieved with the technologies and good practices implemented in their farms, will be responsible for irradiating and showing their learning to another group of farmers in their surroundings and from their interaction networks; with which, in the medium- or long term, a critical mass will be formed that will increase based on the knowledge of food production in the territory.

For such reason the CS farms (fig. 1), as they were called, were selected based on their geographical location, among other aspects.

During the studied period 58 species aimed at animal feeding, fruit and timber species, besides aromatic plants and flowers, were disseminated. As part of this work 579 actors were trained in 69 training activities, which allowed to form 427 farmers and officials, from them 137 women; and 36 technologies and good practices were introduced.

²Productive units of the Perico municipality which are used to intervene and study systematically the influence of the actions of the international project Local Agricultural Innovation Program (PIAL)

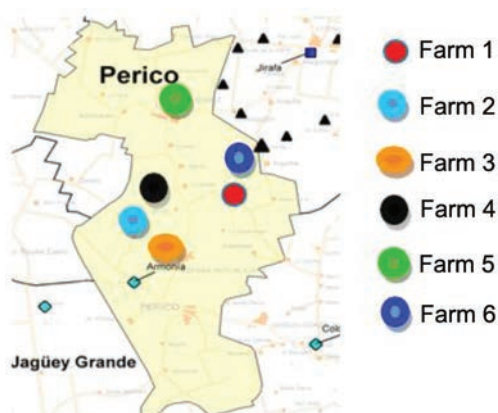


Figure 1. Geographical location of the confidence samples farms.

When studying the evolution of these farms, concerning the mercantile production and incomes, it could be verified that the six farms selected for the study were highly productive and profitable during the three years (fig. 2). The indicators of production and incomes documented for the study showed an increase (from 2014 to 2016) in all the studied systems; which showed substantial improvements in terms of increase of productions, for family and local consumption, and also of increasing the economic possibilities for the farm-linked families. On the other hand, the productive results of 2015 were limited, in some cases, by the severe drought that affected the grain and tomato crops, because Matanzas was among the provinces classified with extreme and severe drought at national level³.

In spite of the noted variations, the results showed the relevance of the diversity of organisms for the functioning of ecosystems. Meanwhile,

their structure and functions were determined by the biodiversity components and their interactions, as well as by the functional connections that are formed among them. In general, the more diverse agroecosystems are, the more stable and resilient they tend to be (Altieri and Nicholls, 2013).

The studies of the evolution of biodiversity, correspondingly, showed an increase of the complexity of systems in all the cases, which went from simplified to little complex, in spite of the short evaluated period. Farm number five turned out to be the most complex and productive, and the aspects related with the soil management and conservation and the productive biodiversity showed higher trend to be increased (table 1). Hence this farm has higher capacity of resilience, adaptation and favorable situation, in the face of the imperatives of the external climate and economic conditions.

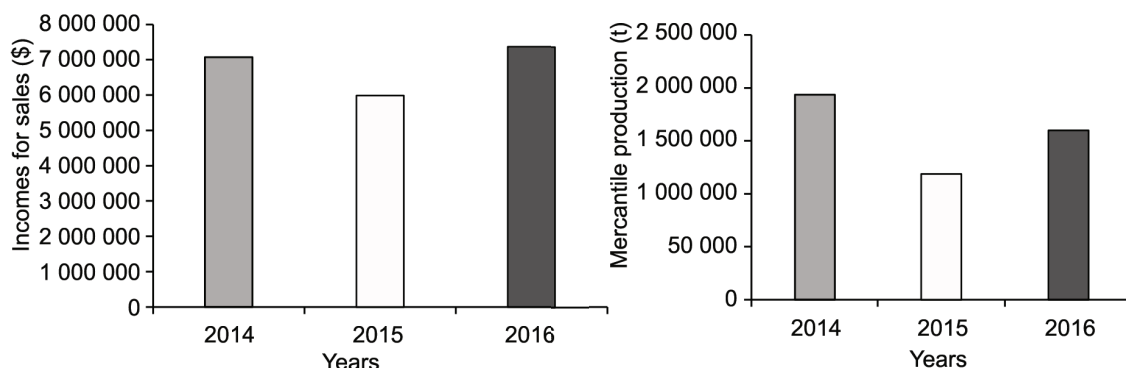


Figure 2. Performance of production and income in the analyzed farms.

³Instituto de Meteorología. *Estado de la sequía*. La Habana: Instituto de Meteorología. <http://www.insmet.cu/asp/genesis.asp?T-B0=PLANTILLAS&TB1=sqCLIMA&TB2=/clima/Sequia/sqDiciembre2015.htm&TB3=2015>. [04/09/2016], 2015.

Table 1. System biodiversity management coefficient.

Farm	Qualitative expression of the biodiversity management coefficient			
	2013	2014	2015	2016
2	Simplified	Little complex	Little complex	Little complex
4	Simplified	Little complex	Little complex	Little complex
5	Complex	Complex	Complex	Complex
6	Little complex	Little complex	Little complex	Little complex

Summarizing, it could be observed that the socioeconomic and environmental imperatives conditioned behaviors, of acceptance and change, with regards to new knowledge, alternative practices and procedures, in the farmers and in some relevant actors associated to agroproductive processes. The farmers' self-management capacity proved the strong potential and willingness for technological innovation through the horizontal relation and by non-formal ways.

In this regard, Berry (2011) states that the theory as well as the practice observed in the performance of different farm types, indicates that the optimum agrarian structure to decrease poverty is the one based on small family farms, supported from the institutions; with utilization of cultivated varieties, optimum cropping systems; infrastructure for the production, transformation and commercialization; and adequate development of the complementary non-agricultural activities.

The results in this study coincide with those conducted by Berry (2011) on the fact that such structure generates a high productivity level, a relative equity in income distribution and an adequate diversification level among the economic activities of the locality, as long as the farm has an adequate size to produce the marketable surplus. The institutional support to Cuban farmers, their access to credits, lands, health and education, allows them to develop a socioeconomically and environmentally successful agriculture.

The trend to increase the complexity in the farms, as observed in table 1, shows the understanding, by farmers, of the needs and benefits of biodiversity in productive systems.

Regarding the increase of biodiversity, the results coincide with those obtained by Vázquez *et al.* (2014), with regards to the fact that the studied farms under agroecological reconversion did not reach a high complexity level yet: no farm reached being complex. From all of them 30 % were classified as moderately complex and 70 % as little com-

plex, which shows that it is a slow and complicated process that requires the farmer's learning and certain time.

Associative cultural dimension of the innovation axis

When inquiring on the aspects and identified variables to evaluate the associative cultural dimension, aimed at innovation, it could be known that the institutions and the population visualize local sources, such as the bank, as investors of the economic activities. They acknowledge its flexibilization and its attention to local priorities; from the performed work, team work among sectors and opening to new spaces of dialog and coordination were promoted.

The officials and farmers recognize that the current legislation is more flexible and, somehow, stimulates the development of new economic activities. However, the current policies are not incorporated yet to the culture of the institutions and social actors; they show many obstacles and rigid mechanisms that inhibit their consolidation.

The need to increase the fiscal culture in the population is supported by Borda and Caballero (2016), who claim that the functioning of a State depends on its capacity to collect taxes, because higher fiscal capacity corresponds to a higher development level, as it allows to increase the public expense demands in health, education, social protection, infrastructures and communication, issues that demand higher funding capacity. These authors state that the low tax rates and low fiscal pressure limit the development of the country; hence an education with regards to fiscal policy should accompany the actions in favor of improving the innovative capacity of the territory.

From the surveyed people 25 % also referred the rigid commercialization schemes, the inexistence of input markets and the difficult access to more favorable markets (for example, tourism), as indicators of the fact that there is much to solve; and

evaluate the commercialization aspect as bad and regular.

The initiative of the population and institutions, on the other hand, is limited by verticality and lack of communication, characteristic that restricts their innovative capacity; this was reflected on an evaluation of regular found in 50 % of the criteria obtained when interviewing officials. In this regard, Nuñez-Jover and Montalvo-Arriete (2015) analyze how in terms of the implementation of the PCC guidelines two central aspects have been stated relative to the national scientific and technological policy: a) to develop the scientific and technological potential of the country, and b) to utilize better the potential to increase the impact of science and technology on economy and society. Nevertheless, according to the author, the percentage of the GDP dedicated to R+D in Cuba is lower than the mean of Latin America, and covers only salaries and expenses in national currency; while the Cuban enterprises barely participate in science and technology activities, with only 10 % of the total expense. This shows an unfavorable trend regarding innovation at the country level, from the institutional policies.

However, the science and technology institutions in the studied territory have a renowned protagonist role through the Municipal University Dora Alonso and in the EEPFIH. They are perceived as important, whereas they have promoted and accompanied the undergone process, which has allowed them to modify, in general, the ways to disseminate knowledge from the diversification and opening of exchange spaces that have stimulated the horizontal communication, inter-learning and establishment of new planning and management mechanisms which are based on the consolidation of alliances and links among the actors at this scale (fig. 3).

In that sense, the director of the municipal university said: «At first the work was more discreet. The obligation stimulated the commitment of the University and the Government (...) we started doing things without knowing how they were done. Today we are convinced that we have to keep on doing what we do because, although all we want has not been achieved, people has learned to work differently, to rely on science, to unite everyone... and this is a feasible way to achieve results»

The officials and university facilitators acknowledged, during the research, several

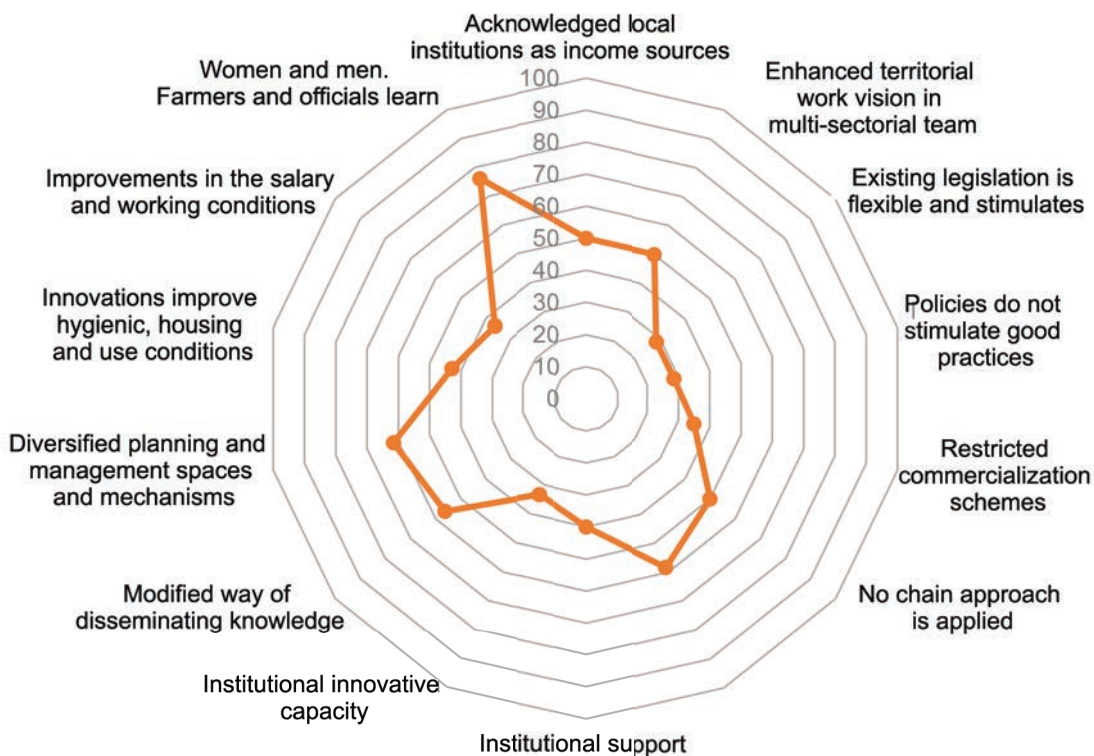


Figure 3. Response patterns of variables in the associative cultural dimension

implemented innovations which have favored improvements in the quality of life and work, access to knowledge and incomes and to the territory in general; at the same time, they indicated others that have not been implemented and which could contribute with the solution of still unrealized local demands. They also identified women, men and farmers, followed by officials as the groups that have learned and contributed more in this process.

Conclusions

- The good practices shared and disseminated facilitated an increase of mercantile production and incomes in the six farms that were monitored during the study.
- The diversity analyses carried out showed the direct relation between the promoted transformations, in diversity and practice, and the considered economic-productive indicators.
- It is acknowledged that the innovation platform and system have allowed to modify the way in which the institutions are seen in the framework of the territory and their commitment with the management of their development; however, an effective mobilization mechanism that allows to overcome the citizens' lack of confidence and discouragement has not been achieved.
- The modification of the ways to disseminate knowledge has allowed to perfect the role of academic institutions in the management of municipal development.

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