

## Strengthening of local actors from a Local Productive Arrangement: a contribution to the agricultural sector

### Fortalecimiento de actores locales desde un Arreglo Productivo Local: una contribución al sector agropecuario



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#### ABSTRACT

The development of a country or territory is largely conditioned by its endogenous potential, as a key factor for development, related to innovation. Given these elements described, the objective of the study was to develop a Local Productive Arrangement procedure to strengthen local actors based on the improvement of the performance in the agricultural sector in La Isla de la Juventud. Methods of the theoretical and empirical levels were used, highlighting the techniques and instruments used such as scientific observation, interviews, surveys, the force field and the analysis of contents seen from the results of the organizational performance of the institutions within the Local Productive Arrangement. The proposal is an open system where internal and external factors converge as an integrated whole in order to provide efficient management of each actor under study. As fundamental results, it is

#### RESUMEN

El desarrollo de un país o territorio está en gran medida condicionado por su potencial endógeno, como factor clave para el desarrollo, relacionado con la innovación. Ante estos elementos descritos, el estudio tuvo como objetivo: desarrollar un procedimiento de Arreglo Productivo Local para el fortalecimiento de los actores locales, a partir de la mejora del desempeño en el sector agropecuario, en la Isla de la Juventud. Se utilizaron métodos del nivel teórico y empírico, donde se destacan las técnicas e instrumentos utilizados como: observación científica, entrevistas, encuestas, el campo de fuerza y el análisis de contenidos, visto desde los resultados del desempeño organizacional de las instituciones, dentro del Arreglo Productivo Local. La propuesta es un sistema abierto donde confluyen factores internos y externos como un todo integrado, en aras de proporcionar una

highlighted that, not only is the objective fulfilled but it also contributes on the one hand that, the Local Productive Arrangement procedure constitutes a methodology that applied among local actors contributes to the effective articulation between them and to the improvement of the performance of the agricultural sector and, on the other hand, has an impact on the increase in production due to the development of new or improved products and services, and the satisfaction of the food needs of the population in the territory.

**Keywords:** local actors; knowledge; cooperative sector; development; invigoration

eficiente gestión de cada actor en estudio. Como resultados fundamentales, se resalta que no solo se cumple con el objetivo, sino que coadyuva, por una parte, que el procedimiento de Arreglo Productivo Local constituye una metodología que, aplicada entre los actores locales, contribuye a la articulación efectiva entre ellos y a la mejora del desempeño del sector agropecuario y, por otra parte, repercute en el aumento de la producción debido al desarrollo de productos y servicios nuevos o mejorados y a la satisfacción de las necesidades de alimentos de la población, en el territorio.

**Palabras claves:** actores locales; conocimientos; sector cooperativo; desarrollo; fortalecimiento

## INTRODUCTION

In this new society, education becomes an indispensable instrument for sustaining change and reproducing it. Education systems must mobilize towards the knowledge society and generate the significant knowledge it requires. According to Madruga (2014), in this context, globalization, in addition to driving economies towards internationalization, has led them to self-diagnosis in order to compete and it is recognized that the dynamism of this process underlies the strength of their local economies, based on the role played by companies in the promotion of employment, investments and local production.

The link between innovation and development has occupied Latin American reflection for decades. Within the literature, the authors of this research

have identified several authors who have lectured on the subject such as: Herrera (2014); Castro and Rajadel (2015); Rojas (2016); Ruiz, Quintero and Robledo (2016); Di Meglio (2017); Cervo, Schultz and Talamini (2017); Alderete and Bacic (2018); Iglesias, Rosero and Castañeda (2018) and Cruz, Vecino and Cánova (2018), aspects that have been approached from their countries in practical proposals, but they do not constitute unique models for the work in innovation systems, since they have their particularities, which justifies going deeper into the subject, taking as a starting point the results of previous studies.

In line with this, Innovation Systems such as Local Productive Arrangements are necessary because they demand a complex and specific mix of knowledge and productive experiences, which can be

accumulated locally. The process of interaction of social actors generates a certain amount of knowledge that translates into innovation, a central factor in local and regional economic dynamics for government decision-making (Núñez Jover, 2014).

The main agents for the integration of networks in the Local Productive Arrangements are the university, the companies and the government, each of which plays an exclusive role, however, there are occasions in which one plays the role of the other, by not defining the limits or barriers that can hinder the strategic alliances between one and the other.

In this context, the Cuban economy manifests a set of symptoms, such as: chain of non-payments, low efficiency of the investment process, excess inventories, deterioration of working capital, low availability of products and services in the market, dissatisfaction of the final clients, low dynamics of growth of efficiency and productivity, problems in the contracting process and insufficient use of capacities. All this reflects problems in the management of local economies according to the innovation activity that must be generated by the different sectors of the economy, which are within the geographical location of each territory.

One of the pilot scenarios, in which deep transformations are developed in the economic and social sphere, is the actions developed in La Isla de la Juventud, a place where local experiences and initiatives come together through the execution of an Integral Development Plan, aspects that must be followed as a model for ideas and practices common to the development of the country's local governments.

As a consequence of this policy, an Integral Agricultural Development Program is deployed, which has its antecedents in 1987 when the Commander in Chief Fidel Castro Ruz indicates to carry out a study of all the knots that slow down the development of the territory and defines for each sector the problems and the solutions. With more than 20 years of special period, only some sectors come close to this design. In the year 2011, it was oriented to elaborate the projection of the agro-livestock development until 2023. This is where the goals to be achieved in each program and the ways to reach them are detailed.

However, at present, it has been identified that the agro-livestock sector is directly affected by edaphoclimatic, technological, social, human capital capacity, sociological, among others, which brings with it the non-compliance of production plans to meet the growing demand of the pine population. While the industrial sector presents scarce possibilities of technological growth, the capacity to store the productions is very reduced, as well as not having the necessary raw materials to comply with the technological flow.

These needs, in turn, condition the need for change in pine farming, which is not only reduced to changes in the management of production systems, but also concerns something as essential as production relations, by giving integrity to this concept of technological change, while marking the differences with other realities.

Faced with this situation, the need arises to build alliances between different organizations that interact in the territories, where common objectives are sought through the management of innovation and capacity building to strengthen the most important socio-

economic indicators, aimed at improving agro-livestock activity in the territory. The elements described above were also identified in the diagnosis, in government structures and higher education professionals in La Isla de la Juventud.

For this reason, it is necessary to integrate efforts and strategies among economic, political and social agents, directed to agro-livestock activities, as there are still incipient links between the social actors of a territory. These integrations can become mechanisms that promote productive activities with greater efficiency and effectiveness to regenerate the socioeconomic structure of the locality.

Due to the elements mentioned above, the objective of the research is defined as: to develop a Local Productive Arrangement procedure for the strengthening of local actors, based on the improvement of performance, in the agro-livestock sector, in La Isla de la Juventud.

## MATERIALS AND METHODS

The research approach belongs to the experimental quantitative design and a quasi-experiment is developed. The unit of analysis was constituted by the Special Municipality of La Isla de la Juventud and as a case study was the agro-livestock sector; the evaluation period was from 2016 to 2018. Data was collected from the different institutions involved in the Local Productive Arrangement. In the case of the agro-livestock sector, they stand out: Municipal Delegation of Agriculture and the three main companies (Agro industrial, Livestock and Logistics) and other participating institutions were the University and the local government.

The methodology used is based on the proposal of Alcázar (2017). Some modifications were included with the purpose of adapting it to the objectives of the research and to the conditions of the context of La Isla de la Juventud. It consists of eight phases:

1. Brief description of the social context in which it is immersed: to place readers in the main geographical, economic, environmental and political characteristics.
2. Barriers present in the integration and articulation of the Local Productive Arrangement in the agro-livestock sector of La Isla de la Juventud: to highlight the problems that hinder the development and effectiveness of these local innovation systems.
3. Scheme of a Local Productive Arrangement for the agro-livestock sector: to illustrate the interactions that occur between institutions and enterprises, constituted by three key levels (local, national and international).
4. Mapping of the set of actors that articulate around the Local Productive Arrangement (enterprise, university and government): to show the main results of these institutions as seen from their organizational performance.
5. Identify innovations: highlight the changes made through the management of innovation from the Local Productive Arrangement where it is aligned with its organizational performance, in the periods evaluated.
6. Identify interactions between these actors: to highlight the alliances, agreements and demands between the institutions participating in the Local Productive Arrangement and

from other parts of Cuba and the world.

7. Visible cooperation relations with other entities of the country for the Local Productive Arrangement: seen the consolidation of the results with the alliances carried out according to the levels established in the scheme and mapping of the set of actors.
8. Identify policies that affect the Local Productive Arrangement from the territory: the local government perceives a system of work in the medium and long term, which is seen from the Program of Integral Development of La Isla de la Juventud, in its projection, until 2023.

Methods at the theoretical and empirical levels were used; within these, the techniques and instruments used stand out, such as: scientific observation, interviews, surveys, SWOT analysis (Weaknesses, Threats, Strengths, and Opportunities), the field of force and the analysis of contents seen, from the results of the organizational performance of the institutions within the Local Productive Arrangement. In all statistical analyses, the SPSS version 20.0 and Minitab version 16.0 packages were used, with a confidence level of 95 % or higher. Scales are used for the reliability analysis, with Cronbach's Alfa method 0.897 to know the confidence levels of the instruments.

The research is a partial result of the project "Local Productive Arrangements to Improve the Performance of Isle of Youth Institutions", led by a group of professors from La Isla de la Juventud "Jesus Montané Oropesa" and the participation of managers, specialists and workers from local government and agriculture.

## RESULTS AND DISCUSSION

### Brief characterization of La Isla de la Juventud

La Isla de la Juventud is the second most important island of the Cuban archipelago due to its size and population. It is part of the Los Canarreos archipelago, located in the southwestern portion of the Cuban island platform. Under its administrative jurisdiction are more than 500 cays that make up the majority of the archipelago of Los Canarreos, which makes it cover a total area estimated at 12 397.8 km<sup>2</sup> of which 80.5 % corresponds to the marine part. The terrestrial portion, with an extension of 2 419 km<sup>2</sup>; of them, 2 204.15 km<sup>2</sup> belongs to La Isla de la Juventud and the rest to its adjacent keys (ONEI, 2017).

For its functioning, the territory is divided into 10 popular councils, of which four are urban, six are mixed and 12 districts are not associated with popular councils. Its delimitation responds to socioeconomic criteria such as population, settlements, and access roads, among others.

Daily life is developed in 58 settlements; of them, nine urban and 49 rural, distributed in the northern zone, because in the southern zone there is only one, the Crocodile Community. The 49 rural settlements are grouped into over 200 inhabitants, with a total of 16 and under 200 inhabitants, with a total of 33. The system is completed with the dispersed rural population, with 4 689 inhabitants.

La Isla de la Juventud has a population of 84,467 inhabitants with a population density of 35.7 inhab/km<sup>2</sup>. 83.7 % of the population is urban and 16.3 % rural; in the capital city of Nueva Gerona, 54.5 % reside. In the northern sector, 99.5 % reside.

Given the economic and social complexity prevailing at the end of 2011, in April 2012, the Council of Ministers approved the Comprehensive Development Plan La Isla de la Juventud, which is currently being implemented.

The vision for this special municipality is as follows (IPF, 2012):

This is an independent, agro-productive municipality that meets all its local food needs and contributes to meeting national demand, especially for grains, meat and milk, food, coffee and vegetables.

It has developed the local industry, social and tourist services and has strengthened the capacity to face trend dangers and extreme events. Similarly, this productive economic development has boosted the generation of new and varied jobs, the implementation of local development programs, including the mini-industry, from the use of raw materials and has improved the quality of life of its inhabitants and community participation.

It pursues two basic objectives:

1. The economic-productive development of the territory, through the production of food, the use and reactivation of the potential of natural, human and economic resources, the responsible management and protection of natural resources and the environment, as well as guaranteeing the necessary infrastructures that support the development of the territory.
2. Social equity and improvement of the quality of life, with the generation of jobs, the increase of services and the improvement of the habitat.

In order to achieve the above objectives, the Integral Development Plan defines

three strategic axes: 1) Agricultural Program, 2) Industry Program and 3) Tourism Development Program.

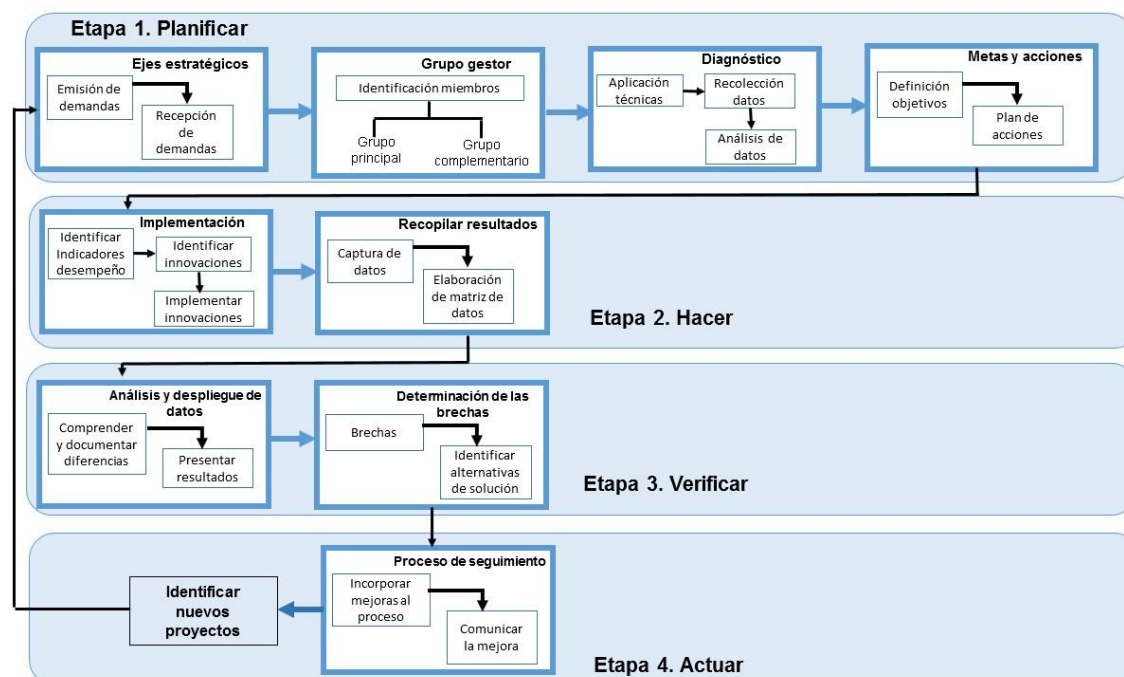
According to the results of the diagnosis, the results planned in the Integral Development Plan were not satisfying the expectations they generated. Under the direction of the government in the territory, the enterprises and the university were summoned to reflect on the causes and conditions that were manifesting and impeding the adequate development of the program.

### **Procedure for a Local Productive Arrangement**

Figure 1 shows the procedure for the development of a Local Productive Arrangement, where the case study was adequate in the cooperative sector, where it is intended to facilitate the generation of new knowledge within the sector and the application of this in the development of new products or services as an integration process, which are part of the policies of the Comprehensive Agro-livestock Development Program.

Meanwhile, the procedure adopts from the management of knowledge and innovation, management process (Deming cycle), where the basic elements within an organization are: creation, adoption, distribution and review of knowledge. It is an iterative learning cycle, showing the nature and characteristics of each element.

The balance on the emphasis to be given to each action will vary according to each entity of the agro-livestock sector and according to the situations, given that not all the productive activity shows the same level of progress. Therefore, the elements described above lead to encompassing the philosophy of the organization that learns.



**Fig. 1** - Local Productive Settlement Procedure in La Isla de la Juventud

The proposal coincides with the criteria of Silva (2005) and Alcázar (2017), referring to the fact that productive agglomerations generate innovation capacity and specialized knowledge as a strength for local government decision-making.

Takes from Morales, Sanabria and Caballero (2015), the role given to the government in the leadership of the organization of integration processes, based on national and local policies that guide them at the appropriate times and on the needs demanded by society and the environment; also Pineda, Morales and Ortiz (2011) highlight, in their proposal, the role of the State in the integration of universities with enterprises and other actors to formalize technology transfer actions and knowledge management.

However, it differs from the importance that Chávez (2016) only gives to the university in knowledge management, to

create an environment of favorable interaction between businessmen and research centers as research and development laboratories, in the same way he limits his proposal to university-business relations and omits the role that the government exercises in the management of these chains as a policy maker; thus he focuses his management on the role of agro-livestock cooperatives as representatives of producers, without considering the rest of the local actors.

From the analyses made with the reference models and procedures found in the literature and that proposed by the authors of this research, it can be summed up that a determining role is given to the actions carried out by the government within the formation of the productive complexes, by means of the formation of relations of cooperation and complementarity between the integration

agents, those who share the same geographical space.

The proposed procedure assumes the conception of the Temaguide model. This is the result of research carried out by a group of European organizations, where the innovation management process is explained through five phases: monitoring, focusing, training, implementation and learning; the latter constitutes the basis on which the methodological proposal is developed.

### **Barriers present in the integration and articulation of the Local Productive Agreement in the agro-livestock sector of La Isla de la Juventud.**

Once the results were obtained, they were presented to the management group with the intention of identifying the relational gaps in the Local Productive Arrangement. It was recognized that important productive and organizational results have been obtained, however, there are other elements that constitute barriers or gaps for the success of this process. The most important are listed below:

There are still limited skills in the enterprises of the agro-livestock sector, a product that there are insufficient professionals with knowledge of the sector, motivated by the exodus to other better-paid agencies and influenced by the low motivation of young people to access agro-livestock careers.

The predominant culture in the sector does not contemplate training as a necessary process of assimilation and dissemination of knowledge in the daily practices of the company, which accentuates the lack of common identity and the low levels of articulation with the innovation networks,

which is manifested in insufficient commitment to investment in innovation.

In the case of local government, over- operationally and problems associated with housing, industry, tourism and transport mean that time devoted to strategic actions associated with knowledge management in the agricultural sector is scarce, making it difficult to promote innovation.

For the University of La Isla de la Juventud, the fundamental difficulty lies in the slowness with which they transfer knowledge, their scarce orientation to the diffusion and generation of innovations towards the enterprise sector and the low motivation of their professionals to research or innovate in the primary sector of the economy. In addition, it has not been possible to expand the offers in the formation of careers such as: Engineering in agro-industrial processes, Forestry Engineering, Agricultural Mechanization and Veterinary medicine, necessary for the development of competences in the agro-livestock sector.

Finally, the existing difficulties in transporting passengers from La Isla de la Juventud to other regions of the country hinder policies that promote the mobility of human capital between universities, both national and international, as well as research projects and the articulation and integration between the different networks of existing knowledge on innovation.

Similar results were identified by Guzón, Alberto, Pérez, Bérriz, Brito and González (2011), fundamentally associated with the management of available resources in the locality, the conception of development strategies that consider the environmental dimensions and the quality in the production of goods and services for the community.



### **Some results of the implementation of the Local Productive Arrangement procedure**

Based on the strategic axes defined, the local government was accompanied by the University of La Isla de la Juventud and other global organizations, with the aim of identifying work strategies and the set of actors to mobilize according to their implementation, taking advantage of the creativity of all its members and the diversity of thoughts around the problems detected and that, in essence, two of the axes are directed towards food production.

Brainstorming was used to develop the activities. In the sessions, with the presentation of the results of the diagnosis, the rules for its development were introduced, immediately encouraging the production of ideas and their level of priority. Both groups, led by a local government representation, define the set of actors to participate and the levels of relationship.

The criteria to define the levels of relationship among the actors were: functional and institutional relationships, existence of levels of subordination and hierarchy, existence of measurement criteria in the work objectives that address levels of relationship, levels of accompaniment in the productive processes or services and levels of satisfaction between the parties with the actions undertaken.

For each of the mapping levels, a reflection workshop was held. In the first one, with a local perspective, the actors directly involved in the management of the processes are identified. Towards the interior of the territory are included: the University with its structures, Delegation of the Citma, Group of Technological Diffusion, Direction of Soils, Direction of

Vegetal Health and Laboratory of Entomophagus and Entomopathogen. The local government with its directorates, which are articulated to the enterprise sector as agents of interfaces (extensionists) or organizations of support and decision making.

It was considered to incorporate into the process the efforts made by the national associations operating in the agro-livestock sector, such as: the territorial branches of the Cuban Association of Agricultural and Forestry Technicians (ACTAF), the Cuban Association of Animal Production (ACPA), the National Association of Small Farmers (ANAP), LABIOFAM, Veterinary Scientific Council, the Technological Dissemination Group, prominent producers in production areas, represented in the eight Basic Units of Cooperative Production and the 16 Cooperatives of Credits and Strengthened Services.

Another workshop was to take a national view, taking into consideration the direct subordination of the agro-livestock sector to the Ministry of Agriculture. This implies the need to create cooperation and articulations of national actors for the implementation of policies and learning, as well as the generation, dissemination and assimilation of knowledge.

A broad network of research-development centers and scientific-technical services was identified and distributed among various agencies of the Central State Administration, such as the Ministry of Agriculture (Minag), the Ministry of Science, Technology and Environment (Citma), the Ministry of Food Industry and the Ministry of Higher Education (MES).

Based on these alliances and the agreements signed by the territorial delegation of agriculture and the

University, training activities, scientific technical services and advisory services were extended to other centers of the Month network, including: the Institute of Animal Science (ICA), a center with which a direct accompaniment is developed to the system of livestock exploitation and the development of a Doctorate in Agro-livestock Production with 14 trainees, with the Agrarian University of Havana (UNAH), leading entity of careers in Agro-livestock Sciences; 23 professionals from the agro-livestock sector graduated in the Specialty of Agrarian Extension.

Other activities were carried out with the Pasture and Fodder Institute "Indio Hatuey", which made it possible to follow up on the systems for establishing pasture and fodder and from which a Master's degree in Pasture and Fodder was obtained; with the Higher Institute of Technologies and Applied Sciences (Instec), the present research project was developed, linked to Local Productive Arrangements and their impact on the performance of the agricultural sector.

The workshop for the definition, from the international scope, allowed to recognize the strategic alliances with international institutions for the development of joint projects with the University; this last one aligned to the needs of the development of the management of the knowledge and the innovation to contribute in the improvement of the performance of the agricultural sector.

Through the R+D+i projects, the University made its international contribution to the development of the agro-livestock sector with the project: Strengthening of rice production in the conditions of La Isla de la Juventud; agreements were signed with CUBAPOM and MUNDOBAT for 86,000 euros in

donations for the establishment of technologies for rice cultivation.

With the project Local Productive Arrangements for the performance of the agro-livestock sector, agreements were signed with the Universities, Autonomous State of Mexico and the Free University in Colombia, which contributed to the preparation of the project members and a donation of 2700 CUC per diem.

As part of the meetings, each participant had the freedom to express their opinion and their criteria on the issues under debate, which establishes, by consensus, that the following premises are met: commitment of senior management and workers, creation of the working group, assurance in the allocation of necessary resources and that managers are willing to accept and participate in the implementation of the procedure for Local Productive Arrangements.

The procedure for the Local Productive Arrangement differs from other analyzed proposals because it takes into consideration the common objectives of the participating integration agents, by not differentiating who is more important in the proposal, taking into account the premise of having committed actors to establish equal weighting and thus give equal weight to pay attention to the articulation, all while recognizing the role of government in leading the process.

The actions to implement the innovations were framed in the strengths achieved by the University of La Isla de la Juventud in its integration process, in the improvement of the role of local government and the opening that has led the agro-livestock sector, from the Comprehensive Agricultural Development Program.

In the implementation process, the local government led the actions for the development of the Local Productive Arrangement, which identified the work strategies and the set of actors to mobilize, depending on their

implementation. For the development of the activities, participatory techniques were used, which led to the production of ideas and the identification of the priority level.

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