Universidad de Guantánamo

Ciencia y Progreso
Publicada en línea: julio, 2021, RNPS: 2477, ISSN: 2707-7098
http://cienciayprogreso.cug.co.cu

La gestión de la Innovación Agropecuaria. Una mirada desde el municipio "El Salvador"

The management of agricultural innovation. A view from the municipality "El Salvador"

Tamara Gaínza-Rodríguez; Elisa Brooks-Nápoles; Luís Raúl López-Ibáñez
Centro Universitario Municipal El Salvador
Correos electrónicos:
tamarat@cug.co.cu
ORCID: https: //orcid.org/: 0000-0003-0327-2610
https: //orcid.org/: 0000-0002-4105-3745
https: //orcid.org/: 0000-0001- 9565-9999

Recibido: 22 de octubre de 2020
Aceptado: 16 de noviembre de 2020

Resumen

En este trabajo se realiza un análisis, sustentado en los presupuestos teóricos que aporta la literatura nacional e internacional relacionada con los sistemas de innovación para el desarrollo agropecuario local y un acercamiento a la gestión de Innovación Agropecuaria en cinco Cooperativas de Créditos y Servicios del municipio El Salvador. Se aplicaron métodos y técnicas de investigación. Los resultados permitieron confirmar la necesidad de impulsar sistemas de innovación que faciliten la articulación de actores y el intercambio de saberes con otros actores involucrados con el sector agropecuario en la generación colectiva de alternativas para la producción de alimentos.

Palabras clave: Sistemas productivos; Agro productoras; Diversidad; Soberanía alimentaria.

Summary

In this work, an analysis is made, based on the theoretical assumptions provided by national and international literature related to innovation systems for local agricultural development and an approach to the management of agricultural innovation in five credit and service cooperatives in the municipality of El Salvador. Research methods and techniques were applied. The results made it possible to confirm the need to promote innovation systems that facilitate the coordination of actors and the exchange of knowledge with other actors involved in the agricultural sector in the collective generation of alternatives for food production.
Keywords: Production systems; Agro producers; Diversity; Food sustainability

Introduction

The 21st century imposes on man the challenge of producing his own food. However, in the last twenty years, the development of science and technology has had a significant impact on agriculture through the use of chemical products, pesticides, multiple technologies, irrigation systems and various mechanisms for breaking up the land. This has led to unsustainable agriculture due to high input prices and the appearance of new viruses, insects and fungi that are increasingly resistant to conventional agrochemicals, in addition to the macro-porosity, water logging, salinity and erosion of the soil.

These phenomena indicate the need to trace in Cuba, strategies and alternatives compatible with a more efficient agriculture, which does not mean a backward movement to the first years of the triumph of the Revolution, but the coherent and organized application of the best of high technology, science and the use of traditional knowledge that have been in man for centuries.

In this sense, the System for Local Agricultural Innovation (SIAL) is a proposal that seeks to manage innovation and development in a participatory manner at the territorial level. This means that this participatory process, where local actors transform knowledge into value, is adopted as innovation.

In the agricultural sector, rural innovation processes entail the need for the creation and transformation of roles, human and professional capabilities, and institutional changes. A multifaceted process requires the integration of knowledge from multiple sources.

Actors with different perspectives, interests, roles and powers must be brought together to create negotiated commitments that meet common needs.

Particularly in the municipality of El Salvador, derived from a study of productive systems, it was possible to evidence processes of soil degradation, low use of productive waste, and the absence of a culture of social participation for the solution of local problems. This generated the need to create a culture with a participatory and interactive approach among the different stakeholders in order to achieve sustainable agriculture and guarantee food security.

This work proposes an approach to the implementation of the local agricultural innovation system in the municipality of El Salvador.

Development

The implementation of the "Participatory Plant Breeding Program" in Cuba in 2000 laid the foundation for strengthening Local Agricultural Innovation (PIAL), according to Ortiz (2017):

> This program facilitated multispectral participation in the design, construction, implementation and evaluation of local technologies for their incorporation into the agricultural sector. Its objective was to strengthen an agricultural innovation system that recognizes and incorporates the contribution and capacity of agricultural producers and farmers to generate economic, social and environmental benefits for society, promoting agro-diversity as a strategy for food security and sovereignty in the Cuban context. (p. 77)

It is highly topical, since the agricultural context requires innovation processes for the creation and transformation of roles, human and professional capabilities and institutional changes.

Clearly, there is a need for an innovation model that recognizes and incorporates the contribution and capacity of the different actors in the agricultural context.

In scientific literature, various authors have dealt with the subject of innovation, such as Freeman (1982), Nelson (1993), Castro (2001), Landfall (2012), Nuñez (2014), who agree that an innovation system encompasses the set of organizations that contribute to the development of innovation

capabilities in a country, sector, region, and locality. It is made up of elements and relationships that interact in the production, dissemination and use of knowledge.

In turn, Nuñez, (2014), proposes that a:

> Local Innovation System is the articulation between local actors: governments, cooperatives, farmers, businesses, media, education sector, health institutions, among others, strongly connected with national and foreign actors capable of providing knowledge, technologies, financing and other inputs for local development. (p. 62)

These criteria are taken as a reference in this work, as they have converging points since it is focused on local agricultural development and aims to achieve an interactive learning process that involves involvement, commitment focused on the culture of participation to achieve a multiplier effect among the different actors.

It coincides with the references raised by Ortiz, La O and Miranda (2017), when they propose that

A Local Agricultural Innovation System consists of organizing locally the interrelationship among the actors involved in the operation of agrifood chains so that

- The limited resources available for research are oriented to the specific needs of farmers and the actors involved in production chains.
- It takes advantage of the local knowledge of the farmers themselves and other actors to stimulate diversification and increase production in a sustainable way.
- The access of production units and other actors in the chains to the knowledge of their counterparts in the territory, universities and research centers is facilitated.

It can therefore be an effective tool for local governments to help manage their development strategies.

Currently, the project was incorporated to the Municipality in September 2018 and covers 20 peasant farms belonging to four Credit and Service Cooperatives, which has allowed the joint and participatory work with research institutions (CITMA, Mountain Development Center), productive forms, peasant organizations, as well as individual producers together with other entities in order to promote the development of agricultural and chain production in the territory. In addition to collective ownership of agricultural processes, with well-defined responsibilities for each of the participating actors.

The municipality of "El Salvador" is located in the northwest of Guantánamo province and its territory extends from north to south, bordering on Holguín province to the north, Niceto Pérez municipality to

the south, Manuel Tames municipality to the east, Guantánamo municipality to the southeast and Santiago de Cuba province to the west.

It has a total area of 630.38 km2, which means 10.2% of the surface of the province and a population of 43,994 inhabitants, of which 43.6% reside in the mountains, with a natural growth rate of 1.7%; of these, 21,941 are men and 2,197 women.

It has two well-defined areas, the plain and the mountains. The mountain zone occupies 61% of the territory (387.96 km2) with predominant slopes between 15 and 25%, thin and skeletal soils; in the plain the slope oscillates between 0 and 10%, the soils are deeper, totally fertile on which the economy depends, based fundamentally on the cultivation of sugar cane and various crops.

The fundamental economic-productive activity of the municipality is the agricultural one, which has its main seats in the intramountainous valleys with production of several cultivations and cattle. In the net mountain zone the fundamental activity is coffee, forestry and in lesser percentage the cocoa.

The municipality has 12 CPAs and 30 CCSs; with 2515 associated to the CCSs, of which 1997 are men and 518 are women.

There are 24 dedicated to coffee, one to fruit trees and five to various crops.

The work, in a first stage, was aimed at diagnosing the production systems, socializing the project's objectives in the different scenarios and local actors, and disseminating good practices, which would allow the formation of networks around the issue of food security, agro ecology and climate change.

For this work, three farms were evaluated, which are dedicated to the exploitation of small livestock (sheep-goats) and their soils are of medium and low fertility.

The application of the diagnosis, based on participant observation and open interviews, made it possible to corroborate that

- Local knowledge of farmers and other actors was not used to stimulate diversification and increase production in a sustainable way.
- Limited access of productive units and other local actors to the knowledge of their counterparts in the territory, universities and research centers.
- Deficient management of small livestock due to lack of knowledge.
- Lack of an agro-ecological culture among producers to disseminate good practices.

Hence, in the words of Miranda (2002).

It was necessary to face a transformation in the existing productive systems and enrich it with a system of social organization of innovation that is promoted from the local level and strengthens the above-mentioned capacities of those involved from a position of cooperation and care for nature, by designing productive environments that have the diversity, stability and resilience of natural ecosystems. (p. 3)

Therefore, improvements on farms need to come from more participatory processes, with creative assimilation of proposals and local capacities to manage responses to difficulties and unforeseen events. All those involved need these capacities.

Once the farms have been diagnosed, the first task was to sensitize academics and scientists to implement the SIAL, and to exchange with political and government leaders the desired scope of the system in order to achieve greater commitment and participation in the proposal.

The training strategies were developed according to the demands, while the main transformation strategies were elaborated that at this scale would give answers to the particular problems identified.

The topics shared were:

- Main diseases affecting sheep and goats in Cuba.
- Artificial insemination in sheep-goat cattle.
- Feeding in sheep-goat species.
- The program of genetic improvement. Its application in the Pelibuey of Cuba.
- Elaboration of handicrafts.
- Issues of gender equity and fight against gender violence.

Training events were held at the local level with the particularity that the producers themselves, using the principles of the farmer-to-farmer methodology, led them. In this sense, exchanges, campesino experimentation and visits to different successful experiences were promoted, which made it possible to involve new interested parties and in turn motivate them for the new practices.

The training was presented as a process to modify the knowledge, skills and know-how of producers; this made it possible to visualize in the future an increase in productivity, the correct use of resources, the implementation of changes in attitude and the development of people.

The innovation groups of women creators were created, where their successful experiences were presented at the municipal level, with the participation of local actors.

On the other hand, the environmental situation found reflected the limited agricultural production in its development process in infrastructure linked to irrigation, the misuse and management of soils that influence erosion and abandonment of areas by the resident population, affecting the income levels of producers and families that depend on productive activities on the farms.

The livestock activity presented an unfavorable state, since there is a deficient infrastructure, because there are areas that can be promoted with fodder and benefited with irrigation, in addition there is a potential of subway water with capacity to guarantee the supply to the cattle mass.

In order to transform this situation, visits were made to the farms in order to assess the percentage of species, varieties planted on the farms that are resistant or tolerant to drought. From this study, it was emphasized in the evaluation of the farms to determine the capacity of resilience before the climatic changes.

Workshops on good agricultural practices were held to promote ongoing experimentation by producers on their farms, in order to identify alternatives that are adapted to their needs, climate conditions and specific tastes under organic farming.

The students of the specialties of Agronomy, Forestry and Accounting were linked in the different farms of the CCS closest to their residence with the objective of making the most accurate diagnoses to carry out the fieldwork. Diversity fairs were promoted to generate synergies that strengthen the productive capacities of the systems where the participation of local actors was achieved.

This represented a motivation for the search for solutions to the problems that farmers face every day, in addition to building visible solutions without excessive technical discourse, which not only generates knowledge, but also socializes shares and disseminates it.

The innovation system makes it easier for producers to have varieties of a crop that they have already tried and know how to respond to extreme situations, they gain in security and independence and improve their decision-making capacity; this allows them to creatively solve daily production problems and share their knowledge, receive recognition from their community, their family, the organizations they belong to and the scientists they work with.

Conclusions

The results obtained, allowed to consider that:

The management of agricultural innovation in the local context led to the creation of an interrelationship in which the quality of human capital, the capacity to promote learning, creativity and innovation converge, in line with public policies under the precise guidance of the local government within the local development strategy.

The study and transformation of production systems must necessarily aim at analyzing Cuban agriculture in relation to decentralized and participatory forms of innovation, production and marketing of food. This requires analyzing the history of production systems considering the social, economic, technological and cultural evolution of all its elements.

These processes require the intervention of multiple actors, institutions and disciplines, and agricultural policies.

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