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Bibliographic review

# Evolution of the agrarian extension in Holguin, Cuba. Contribution to territorial development

## Evolución de la extensión agraria en Holguín, Cuba. Contribución al desarrollo territorial

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**ABSTRACT:** The province of Holguin is pioneer in the agrarian extension activity in the country; however, there are scarce documents that show how it has evolved in time, which limits the access to the antecedents and impacts. Therefore, the objective of this work was to show the contribution of agrarian extension to the territorial development of Holguin province, from the recounting of the main events and reflections occurred in the Cuban revolutionary period. Primary sources (interviews to extensionists, managers, farmers, and teachers) and secondary sources (reports, scientific articles, memoirs of events) were used to compile and analyze the necessary information. The results showed five stages of extensions development with an impact on territorial development, especially in the training of human talents and productive processes, at different system levels. However, the current challenge is to develop the Agricultural Extension System, for which it is essential to make it a priority within agricultural policies.

**Key words:** rural development, innovation, territory, agriculture, technology transfer.

**RESUMEN:** La provincia de Holguín es pionera en la actividad de extensión agraria en el país, sin embargo, son escasos los documentos que evidencien cómo ha evolucionado en el tiempo, lo que limita el acceso a los antecedentes e impactos. Por lo anterior, el objetivo de este trabajo fue mostrar la contribución de la extensión agraria al desarrollo territorial de la provincia de Holguín, a partir del recuento de los principales acontecimientos y reflexiones acontecidas en el periodo revolucionario cubano. Se utilizaron fuentes primarias (entrevistas a extensionistas, directivos, agricultores, docentes) y secundarias (informes, artículos científicos, memorias de eventos) para compilar y analizar la información necesaria. Los resultados evidenciaron cinco etapas de desarrollo extensionista con incidencia en el desarrollo territorial, sobre todo, en la formación de talentos humanos y procesos productivos, a diferentes niveles de sistema. Sin embargo, el reto actual es desarrollar el Sistema de Extensión Agraria, para lo que es determinante se convierta en prioridad dentro de las políticas agrarias.

**Palabras clave:** desarrollo rural, innovación, territorio, agricultura, transferencia de tecnología.

## INTRODUCTION

The year 1950 marks the origin of the agrarian extension activity in Holguin, as in the rest of Cuba, which was made, fundamentally, through transnational companies, with commercial aims (sale of agricultural machinery and agrochemical products) and it was minimal the one carried out by the Ministry of Agriculture (MINAG) (1). Subsequently, and up to the present time, different forms of agricultural extension (transfer, development, participatory and integral) have been consolidated and coexist, considered as such, because they have three attributes: an explicit methodology for the whole process, human resources prepared for the use of this methodology, as well as the material and financial resources for its execution. These qualities differentiate them from extension actions, which are very specific activities carried out with producers, for example, the transfer of a particular technology or technical training on some specific aspect of the production process (2).

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After 20 years proposed by MINAG, the implementation of an Agricultural Extension System (SEA, according its acronym in Spanish) has not yet been consolidated. On the other hand, strengthening Local Food Systems requires the design and implementation of a coherent system of knowledge management, training, education and innovation, which includes all stakeholders (managers, farmers, producers, among others), through participatory dialogue, collective leadership and learning by doing (3). The transfer of technologies to producers has predominated within extensionism, with the limitation that it does not always respond to farmers' demands, although it complies with certain food production programs, where most of the decisions are assumed as general policies (4). However, in Holguín province, principles and methods have been gradually adopted in the work with farmers and in extensionist training, but the very complexity of agricultural processes leaves many challenges for agricultural extension, among them: adjusting to farmers' demands, continuing to change approaches and activating the National Agricultural Extension System throughout the national geography (5).

If it is considered that Cuban agrarian extension, in the last 20 years, is an emerging discipline, and in Holguin, as a pioneer province in the activity (5), results and gaps are observed, it is necessary to divulge its evolution; however, when consulting the scientific literature it is confirmed that the systematization of experiences is still limited (6). Therefore, without pretending to cover exhaustively all the achievements and extensionist challenges of the region, the objective is to show the contribution of the agrarian extension to the territorial development of Holguin province, from the recounting of the main events and reflections.

## DEVELOPMENT

### Stage I. (Before 1988): Transfer of agrarian technologies

The main paradigm of Cuban rural development was based on the principles of the Green Revolution and economic policies adopted by the socialist camp (7); nevertheless, in Holguin, in 1963, the Provincial Agricultural Extension Center was established in La Jíquima farm, in Calixto García Municipality. In 1977, the Provincial Extension Commission was created, conceived to manage scaling up (the best research results on a small scale were extended to larger areas) and the introduction of achievements to production. In 1984, the demonstrative areas of tropical viands, grains and pastures - forage were created, technically directed by the National Institutes, which contributed to strengthen the provincial group.

In 1987, it was created in Holguin the Territorial Station of Agricultural Research (ETIAH, according its acronyms in Spanish) (1) in locality Jíquima, in the municipality Calixto García. It was with the main objective of developing the agrarian extension in the province, in addition, to propitiate the development of researches of territorial character; due to that, traditionally, they were executed only the researches planned by the Institutes and the National Experimental Stations. The extensionism of transfers, which prevailed as the only form of extension, was a valid attempt to achieve visible effects of the scientific results, but rarely succeeded in satisfying the needs of the farmers, because these were not previously considered (8). With the ETIAH, several Experimental Stations were agglutinated and plans for the introduction of research achievements were instituted, which made it possible to bring research closer to the productive base.

**The University and agricultural extension**

During this period, there was no training of students in extension, because the curricula for the training of agronomists in Cuba lacked a holistic curricular approach (9). The career began in the University of Holguin in 1973 with the Holguin residents of the 4$^{th}$ and 5$^{th}$ year and technical subjects in all the years. Later, in 1977, the career was transferred to the Higher Institute of Agricultural Sciences of Bayamo (ISCAB), in Granma province.

**Reflections:** The work styles adopted are justified by the boom of the Green Revolution, the Soviet Union's provisioning of the necessary agricultural inputs and the scarce links with other countries, where other forms of extensionism were applied. With the ETIAH, the foundations were laid for a change in the vision of technicians in understanding the agrarian reality of farmers. The extensionist training was invalid and it is considered unfavorable to finish Agronomy studies in the province, because it limited the students' familiarization with the productive context where they would be inserted upon graduation.

### Stage II (1988 - 1993): Valorization of the territorial context for the introduction of agricultural technological achievements

In the country, starting in 1989, multidisciplinary groups linked to the National Food Program were created, led by the Cuban Academy of Sciences, today by CITMA (Ministry of Science, Technology and Environment), with the objective of providing technical assistance by objectives and localities (10), in addition to generalizing the nation's agricultural results. At this stage, the introduction of scientific and technical advances was based on the annual plan for the introduction of territorial achievements, but it was not always satisfactory, mainly due to the differences between the conditions where the technologies were generated and the real conditions of production.

Cuba's experience during the 1990s with the food crisis, when international aid was scarcely available, forced it to resort to its own natural and human resources so as not to depend on imports (7) which led to the reorganization of the agricultural sector. In the province, these national events during the special period motivated changes in agronomic research trends and led to a complete renovation of its proposals to producers (8).

**The University and agricultural extension**

In the ETIAH the links with the students of Agricultural Sciences were enhanced, from the labor practices of the students in their experimental areas, from the course 1993-1994, favored by the creation of the Agricultural Department in the University of Holguin, subordinated to the ISCAB, today University of Granma. In the career, there was a predominance of a productive technical approach and a limited presence of humanistic topics in its curriculum, which implied graduating professionals with high technical level, but little prepared to assume their function as promoters of a sustainable rural development (11).

**Reflections:** The ETIAH was consolidated and firm steps were taken in favor of agricultural extension, fundamentally, in the validation of technologies in production conditions, the training of farmers and the feedback of professionals during the research process. The initiatives arisen with the Agronomy Engineering Career contributed to the later reopening at the University of Holguin.

## Stage III (1994 - 2003): Approach to the systemic vision of the agricultural environment

**Incidence of research-development projects**

With the advice of France during 1994-1997, the first agricultural extension project entitled "New Action for the Generalization and Effective Use of the results of Science and Technology" (NAGÜE) was developed in Holguin. It was coordinated by MSc. Jean Louis Diman, from the University of the Antilles and Guyana, based in Guadeloupe (French Overseas Territory), and on the Cuban side by Eng. Nelvis Almaguer Perez, from the ETIAH. Methodologies for soil and climatic and socioeconomic recognition were used (zoning, typology, climatic and soil characterization), the systemic approach was introduced, experimenting farmers were identified, productive systems were characterized through interviews and actions were implemented.

Although farmers play an essential role because of their knowledge and practical experience (12), until the beginning of NAGÜE there was little research to understand how producers worked, what proposals they adopted and how deeply rooted their practices were; in addition, the factors that were unfavorable for the farms were identified because they are closely interrelated (13).

The extension network materialized from the proposal of a researcher, who received a course on extension methodologies in Egypt, in 1994. With the designation of extensionists in the municipalities (Gibara, Banes and Calixto García), greater research and productive results were achieved, because the validation of technologies was carried out with the protagonist participation of the farmers (8).

With NAGÜE, work was done to train research personnel in the ETIAH and training was facilitated in the province and in Nicaragua, where two colleagues adopted the 'farmer-to-farmer' methodology. In 1994, structural and organizational changes took place in the EITIAH with the creation of the Department of Research, Development and Agricultural Extension (IDEA, according its acronyms in Spanish), which brought together the network of territorial extensionists who served the municipalities. The Department also included the seed production groups, which were in charge of securing the seed needed to carry out the programmed extensions (14).

Once NAGÜE project concluded in 1997, with the I Franco-Cuban Colloquium on Agrarian Extension, the extension group remained organized as a provincial system, even though there was no unified extension system in Cuba (8), until the Ministry of Agriculture (MINAG) decided to implement the Agrarian Extension System (SEA, according its acronyms in English) in the year 2000. During this period, the extensionist group continued to be strengthened in Holguín through postgraduate courses and training at the ETIAH, as well as through exchange missions to France. By an orientation of the Provincial Direction of MINAG, in the year 2000, the Training School of MINAG was unified with the ETIAH, which was located in Velasco, Gibara municipality.

With the beginning of Participatory Plant Breeding (PB) in Cuba, in 1999, agrodiversity fairs began to be held (15), so since 2000, extensionists from Holguin were inserted in the PF project, led by the National Institute of Agricultural Sciences (INCA). The main results were training in the participatory construction of technologies, learning among farmers-researchers-decision-makers, as well as the change of conceptions and work methods, based on an integrated and systemic understanding of the functioning of local productive systems (16). The territorial agricultural extension was closely linked to other research-development projects of different Institutes (Viandas Tropicales, Liliana Dimitrova, and Jorge Dimitrov) and the National Agricultural Extension Branch Program, led by MINAG's Directorate of Science and Technology.

From 2001 to 2003, based on the experiences of the NAGÜE project, the second French-Cuban collaboration project on agricultural extension was developed in Holguín, Camagüey and Havana provinces under the name of PASEA (SEA Support Project). The general coordinator of NAGÜE was, on the French side, MSc. Jacques Marzin, expert researcher of the International Center of Agronomic Research for Development (CIRAD), based in Montpellier (France), and on the Cuban side, PhP. C. Teodoro López Betancourt, of the Directorate of Science and Technology of MINAG, based in Havana. The objective was to support the implementation process of the SEA (MINAG, Cuba), as a liaison device between the different actors involved in the system and the different forms of production organization. Because of this project, a proposal was formulated for the organization structure design and operation of the Agricultural Extension System in MINAG, with the participation of all the current forms and actions of extension, as well as the establishment of a new methodology with a generalist, systemic and participatory approach, where producers play a leading role (2).

The main achievements of the PASEA project were the strengthening of extension methodologies based on systemic, participatory and generalist principles. The implementation of actions with farmers, derived from a previous diagnosis; diagnoses at various levels (province, municipality and production unit); materialization of a working method closer to the producer, called "interest groups" (farmers gathered, voluntarily, to solve a common problem). The recognition of the different types of extension existing in the country and the importance of functioning as a system, which is a strength, given the complexity of Cuban agriculture, where a single entity could not attend to all the agrarian organizational structures and farmers (2). It is also worth recognizing the continuous training process for the professionals involved, which laid the foundation for the application of approaches and methodologies, as well as for undergraduate and postgraduate university training.

At this stage, in order to strengthen the extension network, monthly meetings were held between researchers and extension agents, and seeds, guidelines on new technologies and the monthly institutional work plan were distributed to extensionists. The researchers received soil, climate and social information on the areas where the extension agents were working, which made it possible to adapt the different technologies conceived to these areas. Farmers were encouraged to experiment on farms and new forms of training were developed, such as field days on their farms, participation in the municipal meeting given by agricultural technicians, consultation of brochures where research results were disseminated and visits to demonstration areas. It is considered a fruitful period, especially for the farmers and the efficiency of their work, because they were advised based on the identification of their needs (17).

**The University and agricultural extension**

Seven teaching units of the Agronomy Career were strengthened as a way to promote the introduction and generalization of scientific-technical advances during students' internships. In 1999, the National Career Commissions decided to incorporate the subject of Agricultural Extension into the curriculum of Agronomy Engineering and Agricultural Mechanization (11). In the 2003-2004 academic year, the Agronomy Engineering Career in Holguin was materialized, but not in the central headquarters, but in seven Municipal University Centers (SUM), in the semi-attendance modality and in an interview with the career methodologist (MSc. Bernardo Cordoví Montero), it was verified that it was with 700 students.

**Reflections:** Both the NAGÜE project and PASEA contributed significantly to agricultural extension in Cuba and, particularly, in the province of Holguín. It should be taken into account that NAGÜE was developed in a period of deep economic crisis in agriculture and no knowledge of the systems approach; while PASEA took place after a slight economic recovery in the country and was a continuation of the previous Franco-Cuban project, so that the professionals already mastered some tools of analysis and intervention. The period was evaluated as very positive in the training of professionals, since new concepts, tools and methodological aspects were introduced through courses and workshops. The Participatory Plant Breeding project enabled the insertion of extensionists in a participatory process of validation of technologies and their monitoring. The official approval of the Agricultural Extension course opened the opportunity for students and professors to materialize extension training from the territorial University.

## Stage IV (2004 - 2011): Progressive incorporation of extension tools of analysis and intervention to the work with the agrarian environment

**Continuity of territorial agricultural extension with projects**

In this period, the development of several research-development projects financed by CITMA and MINAG was defining for extension, as a way to support agricultural extension, from the planning of actions by periods. Projects were led by the ETIAH, which in 2005 changed its name to UEICAH (Holguin Agricultural Extension, Research and Training Unit), but maintained within its mission the direction of the agricultural extension processes. The main projects executed and led by UEICAH were:

- Agrarian extension, an alternative to face drought
- Characterization and development of actions in state farms for self-consumption
- Implementation of a territorial agricultural extension system
- Edaphoclimatic and socioeconomic classification of Holguin's agrarian systems
- Methodological training and information support to the SEA in Holguin
- Improvement of the provincial SEA as a way to face the drought
- Participative dissemination of viands, grains and vegetables

The Holguin extensionists network participated in the projects "Dissemination of Participatory Plant Breeding (PB)" and the "Local Agricultural Innovation Program", directed by INCA. These projects introduced new concepts to promote local learning processes, promoted actions related to the updating of the Cuban economic and social model (commercialization, new forms of management), and involved the peasant family and all the actors of agrarian development in the municipalities (4).

**The University and agricultural extension**

The training in agrarian extension, in the central headquarters of the University of Holguin, materialized in the 2009-2010 course, with the teaching of the subject Agrarian Extension to the sixth year of the Agronomy Career, in the semi-attendance modality, with it the students incorporated in their training new elements (systemic approach, diagnostics to identify demands, group tools).

**Reflections:** At this stage provincial agricultural extension was threatened to disappear due to lack of consolidation of a national system, however, the projects favored its continuity. The Agricultural Extension course taught at the central headquarters made it possible to interact with other disciplines and to sensitize the main professors to the importance of the systemic approach for the students.

## Stage V. (2012 to present): Consolidation of agricultural extension expressed in training and multi-stakeholder work with the agricultural environment

**Multi-actor work to strengthen agricultural extension**

The SEA, in Holguín province, continued to be led by UEICAH and has 13 municipalities covered with extensionists, who make synergies with other forms of agricultural extension. It is perceived the recognition of the work, as much by directors as by farmers, being the most recognized extensionists, those who have remained in their functions for more than ten years.

In the province, many extension actions have been carried out with PIAL for more than 15 years (18), where work has been done towards an increasingly effective articulation based on a systemic, active and participatory logic among actors (19). In addition, the Local Agricultural Innovation Systems (SIAL), because of their multi-stakeholder and interactive nature, have made it possible to build horizontal work strategies in line with the challenges of the context (19). There are eight multi-stakeholder management platforms, 54 local agricultural innovation groups, diversity of cultivars on farms, breeds of (cattle, sheep, goats, horses), more than 3,000 people have been trained (producers, technicians, specialists, decision-makers and students), 95 jobs have been created. The gender approach has been strengthened and the local common bean seed production system was implemented with a substantial increase in Báguanos municipality (18). Through an interview with the PIAL coordinator in Holguín (MSc. Norge Díaz Rodríguez), it was learned that the main technologies disseminated with this project in the province were:

- Production of beans, corn, soybeans, yams, sweet potatoes, tomatoes, and peppers
- Plantain banana plantation
- Selection of tropical tubers plus plants
- Production of seed potato tubers with sexual seed
- Biopesticide production
- Agroecological practices to mitigate the effects of climate change
- Chicken meat under non-industrial conditions
- Use of crops as a source of energy in animal feed
- Voisin grazing (calculation of fodder consumption and number of quarts)
- Artisanal production of goat cheese and other by-products

In an interview conducted by MSc. Agustín Serrano Santiesteban with UEICAH extensionists, the strengths and weaknesses of the territorial FES were identified (Table 1), as well as the actions to be implemented for its improvement.

**Actions:** To develop sensitization workshops on the topic of extension, with managers, fundamentally, to systematize the agrarian extension process in Holguin, redesign the profiles of extensionists implement extensionist development plans, both for extension agents and for other specialists. In addition, to consider the introduction of an agreement to delimit responsibilities in the demand, rescue positive experiences, especially those of producers without successors, update diagnoses based on local development. Besides, separate extension from control, propose projects led by the extensionist, promote communication spaces, extend experiences of the PIAL project, and design a Holguín proposal on how agricultural extension should be implemented.

**The University and agrarian extension**

The University of Holguin has contributed with the provincial SEA, from the officialization (2012) of the Paulo Freire chair, created to: agglutinate actors of the agrarian development, promote the territorial approach, the interinstitutional articulation and materialize formative courses. At the undergraduate level, students have incorporated extensionist skills in their research work and have approached the agrarian reality through coexistence on farms. In the postgraduate, from the formalization of programs of master's degree and specialty in the nation (20), the Postgraduate Specialty in Agrarian Extension was imported to Holguin, from the Agrarian University of Havana and there are 66 graduates. These graduates in the territory

**Table 1.** Main strengths and weaknesses of agrarian extension in Holguín

| Strengths | Weaknesses |
|---|---|
| The UEICA extension system | Unequal support to farmers |
| Extension knowledge and practices | Vertical vision of managers |
| Different forms of extension | Lack of protagonism of extensionists |
| Agricultural extensionist's job description | Lack of activation of the national SEA and extension-focused policies |
| Integration with projects | Incomplete agricultural diagnoses |
| Experimental producers and demonstration farms | Limitations for follow-up |
| PIAL project with actions in municipalities | Inspection and extension function |
| SIAL as a participatory and integrating system | Insufficient systemic vision and identification of demands |

have advantages over others trained with non-extensionist profiles, because they have new conceptions (21) that favor the implementation of transformative actions at the local level (5).

The PIAL/SIAL has contributed, since 2018, to the training of Holguin professionals through the diploma course "Local Agricultural Innovation System: for a participatory approach in the Management of Local Development". Five trainees have graduated from the editions held at INCA and 37 trained in Banes and Urbano Noris (18); in addition, 35 students have been trained in Gibara and Rafael Freire through postgraduate courses. For the future, the diploma courses will be replicated and from SIAL the Specialty and the Higher Technician Career will be developed.

**Reflections:** Provincial agricultural extension has been consolidated, led by UEICAH, although more support is needed from the highest levels of management and the consolidation of the national EAS. In addition, it is urgent to develop extensionist skills in the managers, to materialize the actions defined for territorial extension, as well as to consolidate the multi-stakeholder and management platforms.

## CONCLUSIONS

- The Agrarian Extension in Holguin is delimited in five chronological stages, with its own characteristics, according to the realities that have marked agriculture.
- The agrarian extension contributes to Holguin territorial development with the formation of human talents and agroproductive processes, at different system levels.
- There are still gaps with the agrarian extension in Holguin, which must be gradually rectified and in which much will be able to influence the agrarian policies that are institutionalized in the country, the municipal and provincial governments and the Ministry of Agriculture.

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