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Forestry extensionism in Cuba: Reflections on its development

El extensionismo forestal en Cuba: Reflexiones desde su desarrollo

Extensionismo florestal em Cuba: Reflexões a partir de seu desenvolvimento

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ABSTRACT

In order to achieve sustainable development, it is necessary to take into account the rational use of natural resources, which at the international level has attracted a great deal of attention directed to the care and protection of flora and fauna. In this purpose, play an essential role those processes aimed at training and developing values from the awareness to the care and protection of the value of natural resources, which actively involve specialists and local actors. Forestry extension is undoubtedly a process which materializes the noble purpose of educating and raising awareness among different generations about the care, protection and conservation of forests and each of the valuable resources they possess. This article reflected on forestry extension in Cuba based on its importance, articulation with the forestry development achieved in the country, as well as on the role of local actors in this process. The research was based on



the application of theoretical methods: historical-logical, analysis-synthesis, induction-deduction and documentary analysis. The main contribution consisted in the analysis and reflection on some of the essential elements of the extension process, a determining factor in the formation and development of ethically correct attitudes towards the use of forest resources.

Keywords: Environmental culture, community participation, forestry extension process.

RESUMEN

Para alcanzar un desarrollo sostenible es necesario tener en cuenta el uso racional de los recursos naturales, que a nivel internacional ha captado una gran atención direccionada al cuidado y protección de la flora y la fauna. En este propósito ocupan un lugar esencial aquellos procesos encaminados a formar y desarrollar valores desde la concientización hasta el cuidado y protección del valor de los recursos naturales, que involucran de forma activa a especialistas y actores locales. La extensión forestal constituye, sin lugar a dudas, un proceso en el que se materializa el noble propósito de educar y concientizar a las diferentes generaciones acerca del cuidado, protección y conservación de los bosques y cada uno de los valiosos recursos que poseen. En el presente artículo se reflexionó sobre la extensión forestal en Cuba a partir de su importancia, articulación con el desarrollo forestal alcanzado en el país, así como el papel de los actores locales en dicho proceso. La investigación se sustentó en la aplicación de los métodos teóricos: histórico-lógico, análisis-síntesis, inducción-deducción y el análisis documental. La principal aportación consistió en el análisis y la reflexión sobre algunos de los elementos esenciales del proceso de extensión, determinante en la formación y desarrollo de actitudes éticamente correctas hacia el uso de los recursos forestales.

Palabras clave: Cultura ambiental; Participación comunitaria; Proceso de extensión forestal.

RESUMO

A fim de alcançar um desenvolvimento sustentável, é necessário levar em conta o uso racional dos recursos naturais, que tem atraído muita atenção internacional em termos de cuidado e proteção da flora e da fauna. Neste sentido, os processos destinados a treinar e desenvolver valores baseados na consciência do cuidado e proteção do valor dos recursos naturais, que envolvem ativamente especialistas e atores locais, desempenham um papel essencial. A extensão florestal é sem dúvida um processo no qual se materializa o nobre propósito de educar e conscientizar as diferentes gerações sobre o cuidado, proteção e conservação das florestas e de cada um dos valiosos recursos que elas possuem. Este artigo reflete sobre a extensão florestal em Cuba com base em sua importância, sua articulação com o desenvolvimento florestal alcançado no país, assim como o papel dos atores locais neste processo. A pesquisa foi baseada na aplicação de métodos teóricos: histórico-lógico, análise-síntese, indução-dedução e análise documental. A principal contribuição consistiu na análise e reflexão sobre alguns dos elementos essenciais do processo de extensão, determinantes na formação e desenvolvimento de atitudes eticamente corretas em relação ao uso dos recursos florestais.



Palavras-chave: Cultura ambiental, participação comunitária, processo de extensão florestal.

INTRODUCTION

Extension that focuses on working with forest resources is known as forestry extension. Its emergence, closely related to technology transfer, has found a space for development in the concrete needs that respond to the conservation and sustainable protection of natural resources and forest ecosystems. The experiences acquired in this area are valuable tools for raising awareness among individuals and for developing morally appropriate behaviors that benefit the environment and the humanity.

In the forestry field, extensionism constitutes a mechanism to make available to producers the existing technologies in the academic sector in a timely, clear and efficient manner. Through a permanent dialogue that favors the exchange of ideas and knowledge that lead to the execution of joint actions and the establishment of commitments that are the guarantor of the adoption of technological innovations that conclude in the sustainable management of forest resources, as well as in the improvement of productive processes in general (Zamora 2016).

Forestry extension does not have a long tradition as other forms of extensionism. However, it has become a key process in the context of climate change impacts. According to Kandzior (2001), it was born with the emergence of the concern for forest degradation, in order to promote the application of the respective forestry legislations. The first initiatives were taken on the European continent and gradually spread to the rest of the world. Although the annual incorporation to the forest area is still scarce, Cuba has maintained a growth in forest cover. The main cause is the decrease in reforestation levels due to the depletion of the availability of land for forestry use (FAO 2020).

In this sense, anthropic action has a direct impact, the results are evident in the transformation of the original Cuban landscape. In response to this situation, since January 1st, 1959, the Cuban Revolutionary State made great efforts to guarantee the rational use and preservation of forest resources. The state created a group of institutions, entities, organizations and groups that undertook forestry development activities.

Since the transformations carried out, it was evident the importance of developing a forestry extension process that is articulated with the rest of the processes, actions, strategies and policies that contribute to the care, conservation and rational use of forest resources. Taking the above into account, this article aims to reflect on forestry extension in Cuba based on its importance, its bond with the forestry development achieved in the country, as well as the role of local actors in this process.



DEVELOPMENT

Theoretical approach to the forestry extension process

The extension process has been approached throughout history from different approaches and forms, depending on the country or territory in which it is developed. According to **Kandzior (2005)** the term extension refers to an extended formation and indicates a vertical formation between actors, with the transmission of information from a sender to certain receivers.

Extension, assumed as a process, from a general conception, includes in its development educational, instructive, communicative, collaborative and participatory actions, just to mention a few. Its treatment acquires very particular characteristics in correspondence with the area of knowledge in which it is developed, therefore different types of extension can be found.

Extension is a non-formal educational system that acts in the communities and through the teaching-learning process pursues changes in knowledge, skills, attitudes and values in the population to facilitate their participation as subjects and objects of development. Through it, beneficial changes are achieved for the development of the personality and society through education. It is also a synergetic process to transform man and the society around him, and an educational process for the development of physical, intellectual and moral faculties and aptitudes, which seeks to develop the individual integrally (**Ramsay and Beltrán 2007**).

Research developed by **Kandzior (2001, 2005)**, **Ayala and Cappelo (2018)** and **López (2019)** show that it is impossible to refer to forestry extension without assuming it as an educational process, which plays an important role in the training and development of ethical values towards the conservation and sustainable protection of natural resources and forest ecosystems. This process, based on the awareness of the participants, aims at transforming negative behaviors into positive ones, and multiplying the latter among the members of the community.

In this regard, it is essential to study the criteria of **Ayala and Cappelo (2018)**, who emphasize extension as an educational process whose object of intervention is related to specific technical aspects of the management and organization of forest plantations or native forests.

Forestry extension is the set of activities that, through participation, organization and development with the community, through a process of communication and education, aims to achieve the optimal use of forest resources, compatible with traditional uses and the demands of society (**Navarro and Serrada 1993**).

Since its appearance, many international forestry extension activities have been directed towards objectives defined by the Forestry Services (forest development programs; forest heritage management; development of technical projects; advice on compliance with laws and regulations). However, for several years now, great importance has been given to forestry development related to the needs of communities, especially rural communities. The closest predecessor of forestry extensionism is agrarian extensionism.



In Latin America and the Caribbean, extension activities began in the 1940s to 1950s under the influence of the model of the United States of America and evolved in search of their own identity until today. Empirical knowledge was transmitted from farmer to farmer, from father to son, in a gradual learning process, without the existence of institutionalized forms of extension (Rivera 2008).

In the particular case of Cuba, extension activities began in the 1950s through transnational companies with mainly commercial purposes. These activities were aimed at the promotion and sale of agricultural machinery and agrochemicals, and the first minimal actions were also carried out by some bodies of the Ministry of Agriculture of the time (Rivera 2008).

According to Russo (2020), the new extension paradigm should respond to a broad vision that seeks to strengthen the relationships between the individuals involved in agricultural and forestry development processes. According to Ramírez (2020), forestry extension has a multidisciplinary function and is a dynamic concept.

Forestry extension in Cuba: general considerations

Forestry extensionism in Cuba acquires particular characteristics that allow specialists, technicians, workers and leaders, in charge of managing them, to have elements that operate from the objective and subjective points of view. The transformation attained in the forestry sector -as in so many other sectors- since the revolutionary triumph, was the reflection of all the measures carried out by the Cuban government. An example of this was the design and execution of the National Reforestation Program. With the mission of "giving back" to the island its forests, the country's highest leadership entrusted resources, knowledge and the will to rescue the forest heritage.

The economic development model that prevailed in Cuba from the triumph of the Revolution until the end of the 1980s, 20th century, had two major objectives: to promote economic development and build a more just and equitable society for the entire population, without discrimination of any kind (Castañeda *et al.*, 2017).

In 1969, forestry engineering studies began in Cuba, thus guaranteeing the training of young people with a marked sensitivity for the care and conservation of the environment, with emphasis on forestry resources. With the young engineers trained in the country and others graduated in the former Soviet Union, it was strengthened the preparation of personnel linked to forestry activities, who had little knowledge in this area.

As the economic situation worsened in the late 1980s and early 1990s, forestry activity also suffered a strong impact, so the development of actions aimed at raising community awareness became vitally important. A stronger link between specialists, technicians and workers and the communities was demanded, promoting the exchange of experiences and knowledge with local actors.

The development of this activity was supported by the participation of local a -mainly producers- heirs of the experience and wisdom passed down from generation to generation. At the same time, the diversification of activities in the sector, such as coffee and cocoa industries, promoted new opportunities to develop Extensionism that reached a greater number of producers.



The introduction of Information and Communication Technologies (ICTs), mainly since the 1990s, has also had an impact on the forestry extension process, offering new ways of providing local individuals with the information and knowledge to be transmitted. The use of ICTs has resulted in more attractive training content, faster exchange of experiences, and greater socialization and visibility of the knowledge gained.

Throughout the development of forestry activities in Cuba, forestry extensionism on a scientific basis was supported by the creation of entities, departments and groups that promoted strategies, programs or independent activities that contributed to the purpose of the process. Among the main ones, a reference can be made to the following:

- The Revolutionary Forest Guard (today's Forest Ranger Corps), 1959.
- The Rebel Army Department of Reforestation (1959).
- The National Institute of Agrarian Reform (INRA), 1959 from the Forestry and Fruit Department (General Forestry Directorate in 1963).
- The National Institute of Health and Forest Harvesting (1967).
- The Forestry Research and Training Center (1969), later the National Forestry Institute (INAF).
- The creation of the Forestry Technological Institute "Invasión de Occidente" (1967).
- The beginning of the studies of Forestry Engineering at the School of Agronomy of the Faculty of Agricultural Sciences of the University of Havana (1969).
- The Integral Forestry Companies (EFI), 1976, now Agroforestry Companies.
- The Turquino-Manatí Plan (1987).
- Creation of the Ministry of Science, Technology and Environment (1994).
- The National Commission of the Turquino-Manatí Plan (1995).
- The ForCuba Group (1997).
- The State Forest Service (1998).
- The Mountain Agriculture Business Group (GEAM), 2000.
- The Agroforestry Group (2015).

In this context, essential adjustments have been made in the productive sector as a means of increasing agricultural and forestry production. Including new forms of production organization that favor decentralization and diversification of production, which modify and expand MINAG's scope of action by including not only producers involved in all forms of production, but also those families or groups of people who require a flow of information, knowledge and/or the introduction of technologies and techniques adapted to their demands, that are essential to improve agricultural, cattle and forestry practices, and consequently increase production (Padrón *et al.*, 2011).



Some of the main elements that have a direct impact on the satisfactory development of forestry extension and the achievement of the proposed objectives include:

- The level of instruction and education attained.
- The formation and development of an environmental culture from primary school through higher education, and even during professional performance.
- The support of the State and the Government in the care of the environment, conservation and sustainable protection of natural resources and forest ecosystems.
- The development of national programs and strategies, as instruments that establish the directions to be followed to raise environmental awareness among the Cuban population.
- The implementation of policies and laws that establish the general principles and regulations for the sustainable development of the forest heritage.
- Permanent training of workers, technicians and specialists.
- Development of national and international events to exchange experiences and make decisions that favor the sustainable and environmental development of the country.

The changes that took place during the last quarter of the twentieth century and during the two decades of the twenty-first century had a significant impact on the extensionism developed in the agricultural sector, aimed at increasing agricultural production, in addition to emphasizing its focus on the forestry sector.

As forestry extension is an educational process, which aims -among other aspects- to make local participants aware of their responsibility towards the rational use of forest resources, it is crucial their implication to achieve sustainable environmental development, but with implications for the country's economic and social development. The goods and services provided by the forest must be properly managed and local participants have a primary responsibility in this regard.

For forestry extension to have an impact on the daily actions of local participants, in which they are both managers and beneficiaries, the process must respond to their individual and community needs, while planning actions that guarantee the sustainability of forest resources.

Local participants, as an essential component of the forestry extension process, are the starting point and the main beneficiaries of all extension interventions that are developed. They are the ones who provide the necessary elements for the extensionist to receive feedback and improve the process. In forestry extensionism it is very important to share the knowledge accumulated in the communities, achieving the development of a participatory extensionism, from the exchange of experiences, information and knowledge, with communication flowing in both directions (extensionists-local actors and local actorsextensionists).



It is also necessary for the extensionist to know the history of the community in which he/she is going to work, its customs and traditions. The extensionist must be able to identify the leaders of the community, who will serve as support and guide him/her in the development of the study. The interaction with the environment and the socialization of his/her knowledge in a simple, easy-to-understand way will allow the local participants to see in him/her one more member, interested in their needs and problems, willing to collaborate with the best resource: knowledge. In this sense, the Colombian Agricultural Research Corporation (**AGROSAVIA 2021**) emphasizes on the bond of virtual and face-to-face spaces to strengthen regional networks.

Cuba, a country rich in history and traditions that are in closely related to its forests, forest species and forest resources in general. There are many historical events that are linked to a tree, a forest or a massif, and this also needs to be taken up and passed onto the new generations, faithful heirs of the revolutionary work. In the socialist society, sustainability and sustainability from the use of natural resources are conceived in the revolutionary model. In this approach, all age groups are incorporated, starting with the awareness of their rational use through the most dissimilar ways, both formal and non-formal. In the National Environmental Strategy 2016-2020 (**CITMA 2016**), the principles on which Cuban environmental management and policy are based include:

- Sustainable development.
- Environmental education, communication and information aimed at developing an environmental culture among citizens.
- Sustainability of consumption and production, as well as eco-innovation, as integrated concepts in national, sectorial and territorial strategies and programs.

Participatory forestry extension

The scope of forestry extension transcends the care and conservation of forest ecosystems, influencing the rational use of their resources from a sustainable and sustainable development perspective. Therefore, it is a challenge and a necessity to assume it as an educational process in which values are formed and developed to enable responsible management of the environment and to involve people of all ages in this work. Raising people's awareness of environmental problems becomes the combination of teachings, learning, knowledge and shared experiences, for the good of humanity.

Forests and other forest resources cannot be managed effectively without an appreciation of how these resources affect human organizations. Community-based management of forest resources is becoming more important every day, both for the people who manage forests and for those who decide how they should be managed (**Navarro and Serrada 1993**).

With the active participation of all local members, management can accomplish superior results in the social, economic and environmental spheres. In this sense, participatory forestry extension plays a leading role, in which information and knowledge flows in various directions. This form of extension is characterized by being:



- A horizontal communication: someone has a message and has to transmit it, but men and women also have messages and they want and can give them. Everyone has to talk and listen to the each other. But it is not enough to "hear". Listening means: respecting and incorporating the proposals of the other.
- A horizontal relationship: The extensionist does not place himself in a position of superiority, but of equality.
- Practical: according to mutual interests, concrete, useful (Flores *et al.*, 1994).

As mentioned before, there are currently different environmental and socioeconomic challenges related to the forestry sector. Forest areas are influenced by the effects of climate change and an evident decrease in the social use of forests. All these elements must be combined when approaching forestry extension, which must contribute to the efficient link between the community and forest resources, to basic training in the knowledge and application of tools and techniques available for the sustainable development of forest related resources. The environmental values provided by forests are essential to achieve an adequate balance. The aim is to make the use of forest products compatible with their conservation and to adequately plan the forest area to avoid their loss or deterioration. Talking about how people represent environmental issues makes it necessary to consider the programs and projects developed to address socio-environmental problems. It often happens that these strategies do not always take into account how the subjects perceive the environment, what opinions they have about the reality of their contexts, how they feel reality and what is the commitment they have to transform it (López 2019).

Forestry extensionism as a process must continue to develop and go beyond a training or advisory service, or as an instrument to increase productivity and improve the quality of life of the community. It should contribute to strengthen the self-management capacity of local subjects to influence the sustainable use of forest resources, so that they benefit from the advantages they offer and in return guarantee their care and conservation. We agree with Castillo *et al.*, (2021), when referring to the approach to problems, from self-management and in a participatory manner, to address the sustainability of extension actions and achieve a fairer and more sustainable development at the local level.

From the actions and activities that are developed, the social function of the trees and the forest must be kept in mind, since the members of the communities are the recipients of all the information and knowledge that will be transmitted. From the most varied initiatives, emphasis is placed on raising awareness about what bad practices and ignorance can cause. Hence, teaching-learning is undoubtedly one of the processes that is linked with forestry extension in a natural and spontaneous way.

Understanding the role of local community participation in forest resource management and planning, requires understanding the idea and the problem to be solved. Increasing this participation means changing the way the Forest Service works and how it makes policies and decisions. Participation is a demand that improves the quality of decisions and makes them more accountable, creating a new path for management (Navarro and Serrada 1993).



In the efficiency of forestry extension work, the extensionists' skills guide and direct the development of the process. Group work involving the extensionist, local subjects and other specialists linked to the problem in matter, is another essential element to be taken into account for the proper planning of extension activities to be carried out. The exchange of knowledge takes place in both directions, extensionist-local subjects and local subjects-extensionist. The contributions in either case contribute to more efficient decision making.

We agree with [Cobas and Madera \(2010\)](#) and [Calzadilla and Jiménez \(2017\)](#) who refer that the preparation and participation of managers, officials and farmers is essential in the development of forestry extension programs, which have a direct impact on increasing the knowledge levels of all participants.

- Among some of the most recurrent problems to be addressed by forestry extensionism are:
- Indiscriminate logging leading to deforestation.
- Reforestation policies.
- Social development and conservation of forest resources.
- Protection, promotion and management of forests and natural areas.
- Social and economic development activities in rural areas.
- Endemic forest species of Cuba.
- Invasive plant treatments.
- Sustainability and economic development.
- Use of non-timber forest products.

Finally, another element to take into account when working with local subjects is the flow of information in community spaces, i.e., how the communication process takes place, beyond the traditional sender-message-receiver scheme. Transforming negative attitudes about the use of forest resources and turning each local subject into a new extensionist is part of what efficient communication can achieve. It is necessary to ensure that each person transmits the knowledge acquired and uses it not only for his or her own benefit, but for the good of all, becoming an extensionist by nature.

In this we agree with [Navarro and Fernández \(2018\)](#), who reflect on the importance of socializing knowledge, raising awareness regarding the needs for changes, training to produce those changes and systematizing to draw experiences.

For [Martínez et al., \(2018\)](#) the knowledge acquired during the forestry extension process contributes to improve the action of farmers and producers, through good forestry practices, which currently constitute a threat to the protection of forest ecosystems. [Moctezuma et al., \(2017\)](#) and [Henao and Tobasura \(2018\)](#) assure that sharing experiences contributes to the socialization of knowledge, which is very important to make the work done visible and for others to implement positive experiences.



When each community member is consciously involved, the experiences gained are multiplied and a greater number of people is reached. Success consists of transmitting positive practices and adding new people every day to the rational use of forest resources.

Castillo *et al.*, (2021) refer to the impact of the extension process -focused on training- for the learning of lessons with an adequate level of knowledge and for the development of local forest culture, in accordance with the high levels of satisfaction of local subjects. All of the foregoing corroborates that we have the necessary tools to develop a quality forestry extension process that responds to the real and concrete needs of rural communities, as well as to effectively address environmental, economic and social problems, taking into account the particular characteristics of each locality that needs an appropriate intervention to solve its problems.

Contributing, through awareness and the development of environmental values, to the conservation of the forest heritage is a first order necessity and a responsibility of every person, regardless of age, sex, level of education or job performance. Many of the problems to which forest resources are exposed, have a solution in the community itself, so it is vitally important to get ahead of this with persuasive work, in which everyone participates and feels that they can make a difference in the search for the common good (Boza *et al.*, 2021).

CONCLUSIONS

In Cuba, valuable efforts are being made to ensure that the population -mainly rural- receives the necessary education and motivation to participate in the conservation and sustainable protection of natural resources and forest ecosystems. The importance that forestry activities have acquired in Cuba over the years, since the revolutionary triumph, has made forestry extension an essential process in the sustainable management of forest and tree resources.

The multiple ways of assuming the scope of extension within forestry, contribute to the objective of changing the attitude of producers towards the solution of their difficulties without affecting the sustainability and sustainability of forest resources.

It is an achievement of the Cuban Revolution that every day a greater number of people participate from the base in the collective construction for the adequate decision. That favors the development of the community, the care of the environment and the rational use of forest resources.

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The authors declare not to have any interest conflicts.

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