

Original article

Agroforestry resilience actions in mountainous areas from community projects with the Municipal University Center



Acciones de resiliencia agroforestal en zonas montañosas desde proyectos comunitarios con el Centro Universitario Municipal

Ações de resiliência agroflorestal em áreas montanhosas a partir de projetos comunitários com o Centro Universitário Municipal

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ABSTRACT

Mountain areas face various problems such as environmental degradation, deforestation, unsustainable agricultural expansion, soil erosion, coupled with the loss of traditional knowledge, among others, which has become the focus of concern and reflection of both theoretical and practical discourse, due to the environmental, economic and social deterioration they have experienced. Higher Education in Cuba plays a very important role in the face of these problems, by contributing, through scientific means, to their solution. The following original research has as its objective to implement agroforestry resilience actions in mountainous areas from community projects with the Municipal University Center of Remedios in the province of Villa Clara, Cuba. The methodology used was participatory action research, using theoretical methods such as synthetic analytical and historical-logical, empirical methods such as document analysis, observation, interviews, which allowed recording the information directly from the subjects studied and workshops with brainstorming techniques in the dynamics of the research. The results have been structured in the

foundation of the conceptual elements necessary to clarify the object of study, main needs and potentialities of the mountainous area studied, as well as agroforestry resilience actions, which allowed greater public participation in the community context in the management of its natural resources, aimed at contributing to the fulfillment of the Sustainable Development Goals (Agenda 2030) and one of the strategic axes within the National Economic and Social Development Plan of Cuba.

Keywords: community; project; resilience; mountainous areas; municipal university center.

RESUMEN

Las zonas montañosas enfrentan diversas problemáticas como la degradación ambiental, la deforestación, la expansión agrícola no sostenible, la erosión del suelo, unido a la pérdida de conocimientos tradicionales, entre otros, por lo que se ha convertido en centro de preocupación y reflexión tanto del discurso teórico como práctico, debido a su deterioro ambiental, económico y social que han experimentado. La Educación Superior en Cuba juega un papel muy importante ante estas problemáticas, al contribuir con la vía científica, a su solución. La siguiente investigación original tiene como objetivo implementar acciones de resiliencia agroforestal en zonas montañosas desde proyectos comunitarios con el Centro Universitario Municipal de Remedios en la provincia de Villa Clara, Cuba. La metodología utilizada fue la investigación acción participación, se emplearon métodos teóricos como el analítico sintético y el histórico lógico, empíricos como el análisis de documentos, la observación, entrevistas, que permitieron registrar la información directamente de los sujetos investigados y los talleres con técnicas de lluvia de ideas en la dinámica de la investigación. Los resultados han quedado estructurados en la fundamentación de los elementos conceptuales necesarios para esclarecer el objeto de estudio, principales necesidades y potencialidades de la zona montañosa estudiada, así como acciones de resiliencia agroforestal, que permitieron una mayor participación pública en el contexto comunitario en la gestión de sus recursos naturales, orientado a contribuir al cumplimiento de los Objetivos del Desarrollo Sostenible (Agenda 2030) y uno de los ejes estratégicos dentro del Plan Nacional de Desarrollo Económico y Social de Cuba.

Palabras clave: comunidad; proyecto; resiliencia; zonas montañosas, centro universitario municipal.

RESUMO

As áreas montanhosas enfrentam vários problemas, como a degradação ambiental, o desmatamento, a expansão agrícola insustentável, a erosão do solo, juntamente com a perda de conhecimentos tradicionais, entre outros, razão pela qual se tornaram foco de preocupação e reflexão tanto no discurso teórico quanto no prático, devido à deterioração ambiental, econômica e social que sofreram. A educação superior em Cuba desempenha um papel muito importante no enfrentamento desses problemas, contribuindo para sua solução por meios científicos. A pesquisa original a seguir tem como objetivo implementar ações de resiliência agroflorestal em áreas montanhosas por meio de projetos comunitários com o Centro Universitário Municipal de Remedios, na província de Villa Clara, Cuba. A metodologia utilizada foi a pesquisa-ação participativa, com o uso de métodos teóricos, como os métodos analítico sintético e histórico-lógico, métodos empíricos, como análise de documentos, observação e entrevistas, que possibilitaram o registro de informações diretamente dos sujeitos investigados, e oficinas com técnicas de brainstorming na dinâmica da pesquisa. Os resultados foram estruturados na fundamentação dos elementos conceituais necessários para esclarecer o objeto de estudo, principais necessidades e potencialidades da área montanhosa estudada, bem como ações de resiliência agroflorestal, que permitiram maior participação pública no contexto comunitário na gestão de seus recursos naturais, visando contribuir para o cumprimento dos Objetivos de Desenvolvimento Sustentável (Agenda 2030) e um dos eixos estratégicos dentro do Plano Nacional de Desenvolvimento Econômico e Social de Cuba.

Palavras-chave: comunidade; projeto; resiliência; áreas montanhosas; centro universitário municipal.

INTRODUCTION

The main environmental problems in the today's world affect everyone, and although they have been studied and numerous efforts have been made to contribute to their solution, it is still up to society to find effective methods to ensure the recovery of ecosystems through its own practices. Faced with this reality, the member states of the United Nations have implemented a group of measures in the search for the environmental sustainability of the planet, such as the Sustainable Development Goals (Agenda 2030), approved in 2015. These goals represent the global commitment to eradicate extreme poverty, fight inequality, injustice and solve climate change (ECLAC, 2019).

The integrated and indivisible application of these objectives is a challenge for many countries and especially for those in which the negative effect of climate change seriously compromises their economic, political, social and ecological development. Hence the need to implement policies to achieve more effective solutions to minimize and mitigate this situation in the various ecosystems, human settlements, which are the support of various socioeconomic activities of vital importance for development and to protect the natural, cultural and economic heritage.

These elements in mountain areas can contribute to the production of a new environmental knowledge where dialogue prevails, since existing knowledge comes from science and people's daily lives (García Dueñas et al., 2022).

It is agreed with what Oxfam (2018) stated that in order to achieve resilient community development, it is necessary to understand the existing and potential risks that may affect the communities we are addressing, their vulnerabilities, capacities and opportunities for change.

Resilience seen in an integral, systemic, resistance and recovery manner, not only in terms of natural resources, but also with respect to other socioeconomic aspects. In order to achieve resilient community development, it is necessary to raise awareness on the subject, build conscious, concerted, planned and transformed intervention strategies from the community, with multiple stakeholders involved (Morejón Ramos et al., 2021).

Mountainous zones are areas of great social significance due to their high ecological, economic, historical, cultural, aesthetic and scenic values. To a large extent, the environmental crisis and its different manifestations represent a serious danger for everyone, consequently, Cuba's natural resources are affected in varying magnitude, both in their availability and quality, and there is a significant degree of pollution and environmental deterioration (PCC, 2019).

It is significant to continue strengthening and consolidating the operation of comprehensive environmental protection programs, based on actions to confront and adapt to climate change, such as the "State Plan to Confront Climate Change in the Republic of Cuba".

Agroforestry systems provide different options of how to use land, which involves combining species, trees and shrubs in time and space with agricultural crops and animals to seek greater sustainability and land use (Gassner & Dobie, 2023).

The Municipal University Center plays an important role in identifying the training needs, the training that local development demands, according to the territorial strategy formulated for its development. The university actors involved in these activities require a change in the work culture: "... to modify their traditional ways of relating to the context and move towards better dialogues with local actors and needs, displacing the classic model of knowledge supply for processes of joint construction of knowledge" (Díaz-Canel Bermúdez et al., 2020).

Díaz-Canel Bermúdez and Delgado Fernández (2021) as well as Núñez Jover et al. (2021) reflect that, within the tasks of the Municipal University Center, knowledge management is fundamental to promote local innovation. That is to say, to train professionals with a high scientific, technological and information management knowledge, and in this way to face situations specific to their profession, as well as unpredictable problems that arise in the professional activity and in the social life of each community.

Cuban higher education provides services both to the surrounding community and to society in general, by making the benefits of knowledge available to all and contributing to meet the demands of preparation from the municipality.

The objective of this study is to implement agroforestry resilience actions in mountainous areas from community projects with the Municipal University Center of Remedios in the province of Villa Clara, Cuba.

MATERIALS AND METHODS

The philosophical basis is found in the dialectical-materialist conception, the guiding principle in the research, which allowed analyzing the components of the research design from a scientific-methodological perspective of the educational processes in the new socio-historical contexts.

The methodological path was qualitative research based on participatory action research for which it was assumed the criteria of Jordán Yépez et al. (2017, p. 19) who state that "it is a conventional (traditional) research, whose notorious feature is to involve the participation of a community, which is involved in a research or action process for development".

The authors in different roles are participants in the processes that were studied, from a holistic perspective, the multiple dimensions and contexts that influence the object of study and involve the

participants in the definition of problems and solutions were explored. This facilitated the generation of knowledge from practical and experimental experience to enrich and contextualize the research results, to understand reality and transform it. By involving the factors in critical reflection and decision making, it is sought to generate positive and significant changes, promoting collaboration through dialogue and interaction.

The research was carried out in the mountainous Popular Councils of the municipality of Remedios, Villa Clara Province, Cuba. The sample was formed by five students of the Sociocultural Management for Development career, where the academic, labor and research components of their training were oriented towards resilience actions by projects in diverse contexts, by being protagonists, committed and responsible with their own research activity, during the 2023 course. Also, part of the sample was an official and two teachers from the Municipal University Center that serve the popular councils of the mountainous zone, as well as twelve people among members of the government, territorial entities, key actors by Popular Councils.

Depending on the dynamics of the study, a set of theoretical and empirical methods were used in dialectical unity.

Theoretical methods

The historical-logical: it made possible the study of the theoretical-conceptual framework on agroforestry resilience by integrating university, community, government, from different theoretical positions.

The analytical-synthetic: it facilitated the work with the theoretical-methodological references, information collected with the realization of the decomposition into its parts and inferences, which allowed identifying regularities and reaching conclusions in relation to the object of study, by identifying, organizing, planning, contextualizing and summarizing the principles, scientific ideas that should be taken into account to implement agroforestry resilience actions in the integration of university, community, government.

Empirical methods

Documentary analysis: the Municipal Development Strategy was reviewed to determine to what extent and how agroforestry resilience was developed under the conditions of university, community and government integration.

Observation: it was used throughout the research process, which allowed obtaining information about the conditions and characteristics to reveal the patterns of conduct, behavior and actions through the integration of university, community and government.

The interview: it allowed to obtain valuable information, value criteria, proposals for actions on agroforestry resilience through the integration of the university with the community and the government.

These methods made it possible to record information directly from the subjects studied, together with the workshops with brainstorming techniques in the dynamics of the research.

RESULTS AND DISCUSSION

In the analysis of the documents, it was determined that the Municipal University Center of Remedios has its own projects to contribute to the strengthening of integrated management with municipal development strategies.

The observation showed that the agroforestry system is not being used in the mountainous area of Remedios, so there is a lack of generalized knowledge of people knowledgeable on the subject. Although there are projects, the actions are not focused on their integrality and their implementation is not carried out or is only partially carried out.

In interviews it was found that the director of the Municipal University Center is a member of the Administration Council; for each Popular Council teachers have been distributed and projects are conceived for joint work, taking advantage of all the potentialities offered by the community with the objectives of: raising the efficiency of the productive chain, generating products and services available to the population that contribute to resilience, improving government management, incorporating diagnostic results, student scientific results, masters and doctoral degrees to government policies and decisions, based on the experiences achieved, as a tool for management,

training, counseling, strengthening local and institutional capacities. For this reason, projects have arisen such as:

- Community projects to strengthen the participation of the population in the solution of their own problems at the local level
- Community projects for the implementation of gender equity approaches and support to vulnerable groups
- Social communication and education projects related to management and quality of life

These are reconciled with the programs and objectives of the Municipal Development Strategy and approved by the government of the municipality to contribute to the fulfillment of the development objectives and be able to induce sustainable changes in the short, medium and long term to affect the resilience of the mountainous area, the quality of life of the population and, therefore, respond to a study of economic feasibility and social effect, in correspondence with the Plan of the Economy of the municipality to have real support from the municipal government.

In order to identify the causes that prevented the deployment of the community's creative potential when facing the daily problems of the area, which affect its resilience, it was recognized that the experiences carried out were not sufficiently known or valued by the social actors involved. This led the facilitator, in each exercise, to play the role of dynamizing the participation of the key actors of the territory in each workshop.

Two workshops were held.

Workshop 1: Diagnostic update

Participants: five students of the Sociocultural Management for Development career, one official and two teachers of the Municipal University Center that serve the mountainous area's popular councils, twelve members of the government, territorial entities, key actors by Popular Councils.

Objective: update the diagnosis by Popular Councils in the mountainous area of Remedios.

Reach consensus on group criteria in:

- What are the most important economic, social and environmental needs of the mountainous area of Remedios?

- What are the most important potentialities that exist to solve the needs?

Diagnostic dimensions: economic, social and environmental.

Formation of the groups: the minimum number of participants for the preliminary diagnosis was not less than twelve people and was representative of the integration of the University, community and government. Other people from the municipality who, due to their function, experience and expertise, could exercise criteria in an adequate manner, were also invited to participate.

The total number of participants was divided into two groups, so that they could simultaneously work on the three dimensions of the diagnosis.

In each of the rounds, the leader of each group asked each member to write on pieces of paper the three most important needs in the dimension of the diagnosis under analysis (only one piece of paper should be placed on each). *10 min*

On a piece of paper or flipchart, each member placed their papers. Afterwards, they read it as a group and those who were most in agreement were part of the consensus and wrote it down on a larger piece of paper. *15 min*

The group leader sought consensus so that all the criteria provided by the group members were grouped as a minimum of three and a maximum of ten needs in the diagnostic dimension under analysis. *15 min*

On a map of the People's Council, where the settlements could be seen, the group identified the places with the greatest needs. *10 minutes*

From the needs identified by the group, the facilitator asked each member to write on a piece of paper the local potentialities that can be activated in the municipality to solve them or contribute to their eradication. *10 minutes*

Finally, the facilitator sought consensus on the potentialities of the greatest possibility. *15 minutes*. Total time approximately 1 hour and 15 minutes.

Main results of the update of the diagnosis of the People's Councils of the mountainous area of Remedios, derived from the workshops (Tables 1 and 2)

Table 1. Needs of the mountainous area of Remedios in economic, social and environmental dimensions

Dimension	Main needs of diagnostic results
Economic	<ul style="list-style-type: none"> • Deficient use of local productive capacities • Little material, technical and financial support for people's own efforts and self-employment to develop agroforestry practices • Non-introduction of scientific results that would bring economic savings to the country
Social	<ul style="list-style-type: none"> • Migrations to the municipal capital. Socially disadvantaged social groups • Need for training and access to information on agroforestry practices (suitable trees, animals, crops, soil management) • Public services depressed and far away from the population, roads in poor condition • Little promotion and support for agroforestry practices (traditional or other techniques that have worked)
Environmental	<ul style="list-style-type: none"> • Micro-landfills, use of fertilizers that pollute the environment • Deforestation with indiscriminate felling of trees, unsustainable agricultural expansion, soil erosion • Little use of renewable energies • Lack of sewerage and precarious sewage treatment systems • Poor mobility to settlements due to roads in poor condition

Source: Own elaboration

Table 2. Potentialities of the mountainous area of Remedios in economic, social and environmental dimensions

Dimension	Main potentialities of the diagnostic results
Economic	<ul style="list-style-type: none"> • Presence of natural resources such as forests, water, wildlife and fertile land • Existence of conditions to diversify income sources such as: agriculture, forestry, beekeeping, sustainable tourism, forest products, among others • Existence of quality local products that can be marketed, such as organic food and handicrafts
Social	<ul style="list-style-type: none"> • Rural communities with strong social cohesion ties (constituency delegate, school and family doctor) • Presence of traditional agroforestry techniques individually in the local culture • Communities of solidarity
Environmental	<ul style="list-style-type: none"> • Presence of ecosystems with unique biodiversity • Wide range of ecosystems • Comprehensive environmental protection programs

Source: Own elaboration

Workshop 2: Proposal of agroforestry resilience actions

Participants: five students of the Sociocultural Management for Development career, one official and two teachers of the Municipal University Center that attends the popular councils of the mountainous zone and twelve members of the government, territorial entities, key actors by Popular Councils.

Objective: identify traditional agroforestry practices or other techniques that have worked in the mountainous area.

Propose agroforestry resilience actions for the mountainous area of Remedios from community projects with the Municipal University Center.

Based on group criteria, a consensus was reached on the traditional agroforestry practices that have worked in the mountainous zone and the main actions to be carried out, stimulating creativity and

the generation of new ideas based on agroforestry resilience issues. The exercise of collective critical thinking on the problems allowed to advance in a participatory manner with the help of the group technique, towards a matrix of prioritization of actions by projects with the objective of defining the actions to be carried out.

Using the brainstorming technique, the participants are asked to comment on them and explain why they believe they should be carried out. A first selection was made, taking into account a group of factors such as: objectives, material planning, human resources planning and social impact. When it was decided to select actions by community projects from the beginning, tools were used to retain the relevant knowledge produced as a result of the actions and processes promoted.

The most convenient way to retain knowledge is its effective socialization among the people and organizations that need it, expanding its social base; for this reason, local decision-makers stimulated spaces for socialization and dialogue of knowledge, because knowledge management is a social process that occurs in the interactions between actors and the structures of society.

The authors carefully recorded the most relevant information in order to integrate the social actors of the community and to identify, acquire, develop, disseminate, use and retain relevant knowledge for agroforestry resilience actions through community projects, based on a dialogue of knowledge.

Approximate time 1 hour and 15 minutes.

The Municipal University Center is responsible for conducting scientific research, postgraduate courses, training and consultancy in accordance with the needs detected in the workshops and diagnostic updates, increasing the number of actions in the mountain areas to consolidate itself as a platform for the dissemination and exchange of knowledge for innovation and management, with direct training to the public actors that execute the management and for the non-state actors that are articulated in the different stages and actions, by providing information and orientation service from the government, president of Popular Councils, delegates, administrative, cadres of the different entities, citizens and self-employed workers.

These results allowed to conclude that:

- In municipal development strategies, project-based actions do not focus on their comprehensiveness and their implementation is affected by multiple objective and subjective factors
- The opportunities of municipal initiative projects for agroforestry development in mountain areas are not yet fully exploited due to limitations in diagnostics and feasibility analyses
- It is necessary to continue improving and developing effective forms of participation of the population, in an environment of equity and inclusion
- Economic, social and environmental problems that affect agroforestry resilience persist in the mountain areas

Agroforestry resilience actions

Agroforestry resilience actions refer in this study to any practice that allows strengthening the capacity of agricultural production, of fruit trees, timber and animals to be able to resist and recover from environmental impacts, adapt, minimize negative impacts and develop, taking into account the objectives, material planning, human resources planning and social impact by community projects.

In planning the actions, the following were taken into account: content, objectives, material planning, human resource planning and social impact; the actions were carried out in accordance with the conclusions of the diagnosis and that they were feasible to achieve objectives and impacts and could be executed. They can be defined as all those that make possible the implementation of community projects and contribute to the agroforestry resilience of the area.

The starting point was the updating of the diagnosis with the workshops, the participation of the community and key stakeholders to identify and evaluate the problems of all types that needed to be resolved.

It was taken into account that the municipality's field of action is increasing and that these are problems with a high impact on the agroforestry resilience of the mountainous zone, which are difficult and costly to solve, especially in the current period, when the country's difficulties are worsening, together with other accumulated problems and due to the limited financial and executive capacity to undertake actions of this type.

The selection took into account the problems, objectives and possibilities of combining actions with various sources of financing, material resources and executive capacity to achieve agroforestry resilience, together with the plans and objectives that the government had characterized with respect to certain points or places, where there were already decisions and support for action, particularly within its Municipal Development Strategy, external cooperation with international projects that provided assistance (technical, financial, institutional, etc.), together with the characteristics and potential of the community, its political and mobilizing potential and municipal powers to design and implement local policies.

With the coordinated participation of various actors, both public (local governments, state agencies), as well as social and non-governmental sectors and the resident population that participated at different levels (decision-making, informative, executive, popular control, etc.). With the combined financing from the municipal budget and external public programs (from departments, provinces, nation), which were combined with financial support programs and other external sources (private sector, cooperatives, international cooperation, non-governmental organizations, etc.).

To achieve a social impact, with sustainable and determinable changes that occur with the actions, both in the life of the community, as well as in its environmental, socioeconomic, cultural, etc. situation. Maintaining an attention of all the factors of the community, with the interest of consolidating and expanding its results and social impacts and of all kinds, achieving sustainability in time of the same.

Agroforestry resilience actions within community projects with the Municipal University Center

- Comprehensive diagnosis of the mountainous areas of the territory, taking into account the physical, geographic, socioeconomic and environmental situation.
- Raising public awareness of the usefulness of environmental education in explaining global environmental problems, with emphasis on climate change and proposing actions for adaptation and mitigation of its impacts.
- Participation workshops to identify needs, potentials and prioritization.
- Identify and document traditional agroforestry resilience practices and other techniques that have worked in the area.

- Share scientific and technical knowledge with the community, learn from the traditional practices and experiences of the local people and disseminate them.
- Strengthening the intersectoral link to project agroforestry resilience actions in state institutions and communities (sustainable agriculture, reforestation of fruit trees, timber, care of protected areas, water resources, animals, land use).
- Strengthening of integrated production chains in the conditions of the mountainous zone.
- Introduction of scientific results contributing to improve the management of information and knowledge for the management of government, state departments and agencies.
- Introduction of scientific results such as: the fertile irrigation of alcohol distillery wastes to sugar cane plantations.
- Joint work of teachers, students of the Municipal University Center and health personnel in the preparation of the presidents of the People's Councils to take preventive actions against climate change, care and conservation of the environment, from scientific work, awards at the Forum of Science and Technology, among others, all of which has contributed to the elimination of micro dumps in whose places the villagers planted ornamental gardens, medicinal plants and beehives.
- No use of polluting chemical products in soil fertilization, preserving food production and its sustainability by substituting these products with natural fertilizer, eliminating contamination of the environment, drinking water, soil, air and ecosystems.
- Training to face climate change disasters, care for the environment, which had an impact on the efficiency demonstrated by them when facing the preventive activity before the population and the mobilization of the population to improve living conditions, looking for their own solutions such as animal extraction, for the transfer of the population in places with difficult road accessibility.

Main results

- Material and technical support for people's own efforts and self-employment
- Creation and strengthening of production and service cooperatives
- Creation and improvement of local infrastructures to streamline procedures
- Vulnerability and risk reduction in the face of natural disasters
- Improvement of the environmental image of the mountainous area
- Development and use of renewable energies

- Rescue of traditional agroforestry resilience practices and other techniques that have worked in mountain areas

All those involved in agroforestry resilience actions, municipal governments, other state and non-state actors and the municipal administration benefited. It was possible to update the diagnosis with the participation of the community and all factors, with individual and collective stories from which lessons learned were collected that allowed adjustments on the fly in the implementation of actions by local development community projects, and that are key for the work in the municipal government. The final implementation is presented in figure 1.



Figure 1. Example of Agroforestry Resilience Actions implementation

Source: Own elaboration

In this regard, Vega Alba et al. (2019) explains that local development projects must involve an articulation between the state and society, from productive, social and knowledge approaches, which implies important transformations between the processes of constitution of actors, local agents, such as academics-researchers and students who reflect their context in excellent novel research and productive, economic, social and cultural action.

In accordance with the above, the current Cuban president has expressed that collaboration between the government and scientists should be a permanent working style, not always easy to materialize. It is a dialogue between different actors who must address together very complex problems. This dialogue must facilitate the "profound exercise of innovative thinking" that the country's development demands. The objective must be "to reach the productive transformation that the country needs at this time, which guarantees processes with more efficiency, productivity, utility and income, which satisfies domestic demands, which gives us export possibilities and which, in addition, fosters welfare and development" (Díaz-Canel Bermúdez et al., 2020).

Developing this whole process of insertion of the Municipal University Center in support of government management from science and innovation agrees with González Rivero (2019), when he says that participation must be consciously and if it is not present in social life, society is involuting, it regresses, it can perish. Two different positions are attributed to participation. One has to do with the identification that is achieved for people to promote decisions; the other, with the idea of taking part, being part and having part. That is to say, to be linked to decision-making in each place.

The analysis of agroforestry resilience in mountain communities is undoubtedly an indispensable shift in the development agenda as it implies taking into account social, economic and environmental issues.

The impacts of environmental events are cumulative over time and their frequent occurrence reduces the agroforestry resilience of communities. In relation to this, if sustainable development is to be achieved, it is important to recognize these risks and create capacities. These capacities can be created through community development processes in which a critical awareness of the different problems is fostered in order to face them collectively through participation and cooperation in community projects aimed at this end.

In order for there to be an adequate integration of knowledge and innovation, universities, research centers, administrations, companies and, above all, the government must be involved, as an element that regulates and decides social relations in the territorial context. Innovation is the result of a process that encompasses its introduction, diffusion and use, in addition to the link with the development of learning capabilities as the true driving force of current economic processes and with the rest of the changes that may occur at the social level (García Lorenzo, 2021).

According to Díaz-Canel Bermúdez and Delgado Fernández (2021), government management requires innovation policies for the fulfillment of the objectives outlined with an integrating approach, which are coherent and compatible with the context and the strategic direction.

The strengthening of agroforestry resilience in mountain areas is undoubtedly a relevant issue and therefore an effort aimed at contributing to the fulfillment of the Sustainable Development Goals (Agenda 2030) and one of the strategic axes within the National Economic and Social Development Plan of Cuba.

The progressive implementation of resilience actions with community projects from the Municipal University Center of Remedios, in interrelation with the main actors of local development, made it possible to determine the necessary information to carry out integrated management plans in mountain areas, contributing to resilience, by managing the knowledge, participation and cooperation of different social actors.

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Conflict of interest

Authors declare that they have no conflicts of interest.

Authors' contribution

Carmen Rosa Rodríguez and Mirta Cárdenas González have contributed substantially and united in all aspects or categories within the research.



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