ISSN 2310-340X RNPS 2349 -- COODES Vol. 9 No. 2 (May-August)
Hernández Regalado, G.; Díaz Aguirre, S.; Díaz Iturriagagoitía, M. "Awareness-raising program on ecosystem goods and services" p. 593-615
Available at: https://coodes.upr.edu.cu/index.php/coodes/article/view/439

2021

Awareness-raising program on ecosystem goods and services

Programa de sensibilización sobre los bienes y servicios ecosistémicos

Programa de conscientização sobre bens e serviços do ecossistema

Glenda Hernández Regalado[1]; Susana Díaz Aguirre[2]; Marianela Díaz Iturriagagoitía[3]

[1] Centro de Investigaciones y Servicios Ambientales ECOVIDA. Pinar del Río, Cuba.

https://orcid.org/0000-0002-7803-613X

glenda@ecovida.cu

[2] Universidad de Pinar del Río "Hermanos Saíz Montes de Oca". Pinar del Río, Cuba.

https://orcid.org/0000-0002-6338-7519

sdaguirre@gmail.com

[3] Universidad de Pinar del Río "Hermanos Saíz Montes de Oca". Facultad de Ciencias Económicas. Centro de Estudios de Dirección, Desarrollo Local, Turismo y Cooperativismo. Pinar del Río, Cuba.

https://orcid.org/0000-0003-4734-7688

mneladi@upr.edu.cu

Received: 31/05/2021
Accepted: 12/08/2021

ABSTRACT

Understanding the relationship between local populations and ecosystems is of great importance because ecosystems are the basis on which human societies are sustained, providing goods and services that satisfy different needs associated with human welfare, constituting a heritage for communities, especially in protected areas. Hence, the article

is the result of a research aimed at implementing an awareness-raising program based on the relationship between the local stakeholders of Valle Ancón (one of the communities of the protected area, Viñales National Park) and the ecosystems, specifically their link with the goods and services they provide. Based on the following methods: documentary analysis, analysis and synthesis, expert interviews, survey, discussion groups and non-participant observation, the community diagnosis was carried out. This made it possible to examine the criteria and perceptions on the use and exploitation of ecosystem goods and services, the causes that are influencing the lack of recognition by local stakeholders and the effects that the lack of knowledge of these has had on the natural heritage. Thus, through the implementation of the awareness program, local stakeholders were made aware of the need to facilitate new alternatives and strategies to integrate ecosystem goods and services into local development planning, and to promote the preservation and sustainable use of ecosystems.

Keywords: protected area; ecosystem goods and services; local development; awareness-raising program

RESUMEN

Entender las relaciones entre las poblaciones locales y los ecosistemas es de gran importancia ya que estos son la base sobre la cual las sociedades humanas se sustentan, al proporcionar bienes y servicios que satisfacen diferentes necesidades asociadas al bienestar humano, constituyendo un patrimonio para las comunidades, sobre todo, de las áreas protegidas. De ahí que, el artículo es el resultado de una investigación orientada a implementar un programa de sensibilización a partir de la relación entre los actores locales de Valle Ancón (una de las comunidades del área protegida, Parque Nacional Viñales), con los ecosistemas, específicamente su vínculo con los bienes y servicios que ellos proveen. A partir de los métodos: análisis documental, análisis y síntesis, entrevista a expertos, encuesta, grupos de discusión y observación no participante, se realizó el diagnóstico a la comunidad. Lo anterior posibilitó indagar en los criterios y percepciones sobre el uso, aprovechamiento de los bienes y servicios ecosistémicos, las causas que están influyendo en el poco reconocimiento por parte de los actores locales y los efectos que ha tenido el desconocimiento de estos sobre el

patrimonio natural. De modo que, a partir de la implementación del programa de sensibilización, se concientizó a los actores locales facilitar nuevas alternativas y estrategias que integren los bienes y servicios ecosistémicos en la planificación del desarrollo local, además, se promovió la preservación y uso sostenible de los ecosistemas.

Palabras clave: área protegida; bienes y servicios ecosistémicos; desarrollo local; programa de sensibilización

---

RESUMO

Compreender as relações entre as populações locais e os ecossistemas é de grande importância, visto que estas são as bases sobre as quais as sociedades humanas se sustentam, ao fornecer bens e serviços que satisfaçam as diferentes necessidades associadas ao bem-estar humano, constituindo um património para as comunidades, sobretudo, desde Áreas protegidas. Assim, o artigo é o resultado de uma pesquisa que visa implementar um programa de conscientização baseado na relação entre os atores locais do Valle Ancón (uma das comunidades da área protegida, Parque Nacional de Viñales), com os ecossistemas, especificamente sua vinculação com os bens e serviços que fornecem. A partir dos métodos: análise, análise e síntese documental, entrevista com especialistas, inquérito, grupos de discussão e observação não participante, o diagnóstico foi feito à comunidade. O exposto permitiu investigar os critérios e percepções sobre o uso e exploração dos bens e serviços ecossistêmicos, as causas que influenciam o pouco reconhecimento dos atores locais e os efeitos que o seu desconhecimento teve sobre o patrimônio natural. Assim, a partir da implementação do programa de conscientização, os atores locais foram alertados para viabilizar novas alternativas e estratégias que integrem bens e serviços ecossistêmicos no planejamento do desenvolvimento local, e foi promovida a preservação e o uso sustentável dos recursos.

Palavras-chave: área protegida; bens e serviços do ecossistema; desenvolvimento local; programa de conscientização

---

INTRODUCTION

Ecosystems are complex and dynamic compositions of plant communities, animals, microorganisms and the natural environment, which interact as a unit and depend on each other, from which humans derive numerous benefits, as well as from the biodiversity they harbor.

Thus, there is a growing recognition that ecosystems, including their biodiversity, play a key role in generating human well-being, both from a biological subsistence point of view and from an economic, social and cultural perspective.

Therefore, Aguirre et al. (2018, p. 120) considers that "taking into account what ecosystems represent for the communities settled there and their accelerated destruction, it is necessary to value it integrally as a tool that allows communities to quantify the goods and services (BSE in Spanish) they offer them".

BSE are the benefits that people obtain from the functioning and processes that characterize ecosystems, whereby they "sustain and satisfy human life and directly and indirectly affect the protection and improvement of the environment and the quality of life of people" (Rodríguez García et al., 2017, p. 1).

In recent years, ecosystem goods and services have become an important field of research generating multiple works related to the study of ecosystems and the valuation of the services provided (Aznar Sánchez & Velasco Muñoz, 2016).

In Latin America, case studies are documented in Brazil, Colombia, Mexico and Peru. In this sense, Aguirre, Alvarado and Granda (2018); Valencia, Rodríguez, Arias and Castaño (2017); Brito, Moreta, Gavilanes and Tapia (2020) consider it essential to know the goods and services that ecosystems provide by facilitating the direction in decision making towards the appropriation of mechanisms that lead to the sustainability of development at the local and regional scale.

Andrade, Segura and Sierra (2017); Hernández, Molina and Agraz (2017); Marín, Alarcón, Silva and Moreno (2016); Villamagua (2017); Arcos, Gutiérrez, Balderas and Martínez (2020) agree on the importance, in the study of ecosystem goods and services,

of having the active participation of the community and knowing their perception as a planning tool to identify the impacts of different management options on the capacity to produce them and as an input in decision-making processes.

Hence, Melgarejo (2019) argues that once the sociocultural, economic, ecological and political dimensions are included in the processes of valuation of ecosystem goods and services, it is possible for communities to recognize the importance or value that these have for their well-being.

Likewise, since 2013, the Cuban government, in accordance with the provisions of the National Economic and Social Development Plan -a long-term normative document, which defines the purposes, general strategy and main policies of national development- promotes studies of ecosystem goods and services as an element of the process of improving the country's economic model.

Rangel et al. (2013); Portela et al. (2019); Angulo and López (2017) emphasize the economic valuation of ecosystem goods and services as a useful tool for decision making, creation, conservation and management of natural areas.

Villamagua (2017, p. 1) states that understanding how local stakeholders relate to ecosystems and how they value the services they obtain through various activities is a task that is recognized as essential to formulate management strategies that benefit both local livelihoods and environmental conservation.

Precisely, "in the current processes of ecosystem assessment, environmental management and land use planning, the importance of local stakeholders' knowledge of BSE is increasingly recognized" (Codato, 2015, p. 1).

Indeed, a study on social perceptions in communities included in conservation areas is transcendental because it demonstrates the need to know how stakeholders think about their relationship with ecosystems (Acosta Alcolea et al., 2015).

Agreeing with Muhamad et al. (2014), there are currently few studies that address human preferences related to ecosystem goods and services through a human

perception perspective, their attitudes and beliefs, of which Cuba, and specifically Pinar del Río, is not exempt.

Different studies recognize (...) that the evaluation of ecosystem services should incorporate ecological, social and economic valuation in order to have a more integrated view of them for the formulation of more sustainable management strategies, however, there is much literature on the quantification of ecosystem services and relatively little on the valuation of ecosystem services from the social point of view (Villamagua Vergara, 2017, p. 103).

Undoubtedly, social approaches to ecosystem goods and services can strengthen and complement various aspects of economic and ecological approaches, including a greater appreciation of regulating and cultural services that are generally overlooked or undervalued.

In view of the above, in Valle Ancon there is a lack of knowledge on the part of local stakeholders about the different aspects of ecosystems and the magnitude of the goods and services they generate. This problem limits their level of awareness of the importance of ecosystem goods and services, as well as their capacity to formulate appropriate responses.

In addition, there is inadequate experience with integrated approaches capable of optimizing flows and goods and services, and little participation in protected area management processes, limiting, to a certain extent, the effectiveness and impact of policies focused on the preservation of natural ecosystems.

Consequently, the research aims to implement an awareness-raising program on ecosystem goods and services. Its implementation made it possible to reflect on the benefits of ecosystem conservation, in addition to promoting a space for dialogue about the use and exploitation of BES.

MATERIALS AND METHODS

In the research, theoretical and empirical methods were used in order to determine the most essential components in the context in which the phenomenon under investigation develops.

Theoretical methods

- Analysis-synthesis: It enabled the study of theoretical references and contemporary trends related to ecosystem goods and services
- Inductive-deductive: It was used for the critical analysis of the theoretical references related to the study of ecosystem goods and services
- Documentary analysis: This was used for the analysis of reports, resource protection and management programs, technical reports, and management plans, which was very useful because it provided information on theoretical aspects of the subject, essential for the development of the research

Empirical methods

- Expert interviews: Interviews were conducted with environmental and development project coordinators, specialists in the study of the Viñales protected area, and the director of Viñales National Park

These interviews made it possible to gather information on the current state of ecosystem goods and services, criteria on their use, exploitation and importance for human wellbeing, as well as the effects that the lack of knowledge about them has had on natural heritage and social development.

- Non-participant observation: This allowed complementing and enriching the derivations obtained through the application of the other research techniques
- Discussion groups

Two discussion groups of 10 people each (20) were developed: the first with formal leaders (3), housewives (4), students (3) and the second with 6 farmers, 3 forest rangers and the instructor of the Youth Labor Army (EJT in Spanish). This was done to learn

about their perceptions on ecosystem goods and services, their use and exploitation, as well as the activities in which they have participated in terms of training and exchange of experiences and knowledge on ecosystem goods and services.

- Survey: A questionnaire was administered to 111 local stakeholders to identify their perceptions and knowledge of ecosystem goods and services

The purpose of the questionnaires was to collect data to analyze, interpret or report on the *status* of the cultural-symbolic and material dimensions of the human reality under investigation.

Individual, it was carried out by means of a printed questionnaire with questions organized to obtain a massive knowledge of the general situation in relation to the object of study.

Even though it is an eminently qualitative research, we opted for the use of techniques that would allow the collection of measurable data in order to know and study in depth the scenario of action and social objects.

Meanwhile, in accordance with the objective of this research, two types of sample were used: the first one of experts and the second one, from a population of 184 inhabitants, a non-probabilistic, diverse or maximum variation sample, composed of 75 women and 56 men, for a total of 131 people as shown in Figure 1, which represents 71% of the community. Different techniques were applied to the sample.

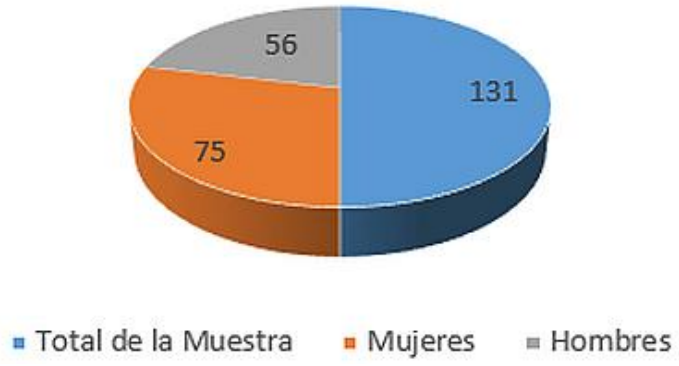


Fig. 1 - Gender division of the population and sample of Ancón
Source: Own elaboration

The stratification of the sample was based on the age ranges of the community, as well as its division by gender. The selection was in correspondence with the active working age and the age of majority, since those before 14 years of age do not represent quantitatively a high number of people.

Thus, in order to show different perspectives and represent the complexity of the phenomenon studied and to document the diversity of criteria for locating differences and coincidences, as well as patterns and particularities, the techniques described above were applied to the selected sample.

On the other hand, the analysis of the data collected was carried out in a qualitative manner according to the operationalization of the analytical category, through the triangulation of the information.

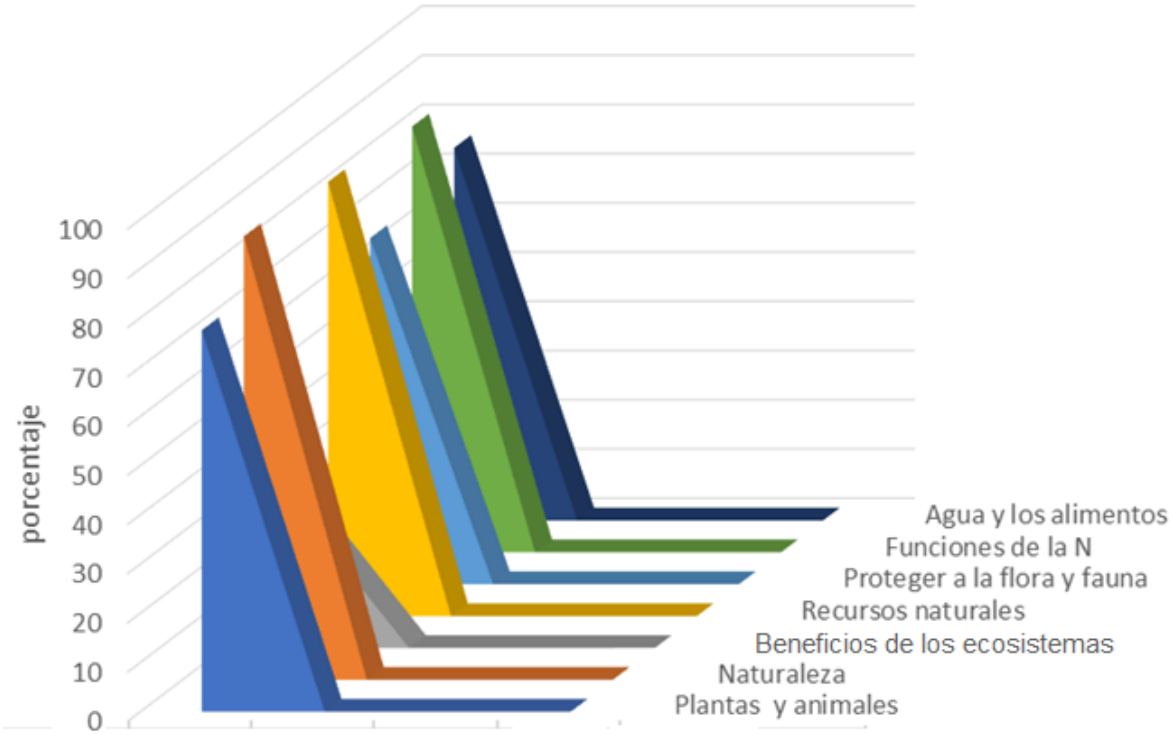
Through it, the results achieved greater relevance within the theoretical construction of the research.

With the inputs gathered in the diagnostic phase, the proposal for the awareness-raising program was implemented, which encouraged critical reflection by the community in relation to ecosystem goods and services.

RESULTS AND DISCUSSION

Ecosystem goods and services allow maintaining balances for the existence of life on the planet, which at the same time satisfy different needs associated with the ecosystem and human well-being.

However, despite their importance, human beings are often unaware of their existence. Therefore, as part of the results of the survey, as shown in Figure 2, there is a lack of knowledge and confusion regarding the meaning of ecosystem goods and services.



Plantas y animales		77.5	
Naturaleza		90.09	
Beneficios de los ecosistemas		31.5	
Recursos naturales		88.2	
Proteger a la flora y fauna		70.3	
Funciones de la N		86.5	
Agua y los alimentos.		75.7	

Fig. 2 - Perception of the significance of ecosystem goods and services
Source: Own elaboration

When analyzing the results of the survey, presented in Figure 2, it was found that 77.5% of the respondents considered ecosystem goods and services as plants and animals; 90% considered them as nature; 31.5% as direct and indirect benefits provided by ecosystems; 88.2% considered them as natural resources, 70.3% as services dedicated to the protection of flora and fauna, while 86.5% considered them as functions of nature and 75.7% as water and food.

Thus, the concept of ecosystem goods and services as those direct and indirect benefits provided by ecosystems obtained the lowest percentage (31.5%), evidencing the low perception that exists about them.

As it is evident, they have a limited vision of ecosystem goods and services, reducing them only to water, plants and animals, without taking into account all the processes and functions carried out by ecosystems, which are essential for human well-being.

The truth is that the concept of ecosystem goods and services makes it possible to make an explicit link between the state and functioning of ecosystems and human well-being; this relationship can be direct or indirect and human beings may or may not be aware of its existence as reflected in the results.

On the other hand, the focus groups developed with 20 people yielded the perceptions of local stakeholders on each of the goods and services present in the representative ecosystems of the study area (Table 1).

Table 1 - Perception of each of the Ecosystem Goods and Services

Categories	Ecosystem goods and services	Perception
Provision	Food	Vegetables, cassava
	Medicinal products	Plants that heal
	Handcrafted products	Hat, broom, baskets
Regulation	Climate regulation	Climate change
	Air quality	Whether the air is clean or polluted
	Pest and disease control	Controlling animals that damage the environment
	Protection against extreme events	Hurricane protection
	Pollination	The work of the bees
	Carbon sequestration and storage	It is carbon dioxide
	Erosion control and conservation of soil fertility	Cares for soils and land

Support	Nutrient cycling	Food provided by nature
	Species habitat	Where animals live
Cultural	Recreation	Fun activities
	Scenic beauty	Landscapes
	Cultural and artistic information	Cultural manifestations and expressions

Source: Own elaboration

In fact, as shown in table 1, provisioning and cultural goods and services were better perceived than those of regulation and support. In this sense, important elements of the pest and disease control service were ignored, reducing them only to animals, when in fact ecosystems regulate diseases, both of plants, animals and humans.

Similarly, they limited pollination to the work of bees, which is a more complex process, since many of the crops that form an essential part of the food supply, as well as a high percentage of wild species, depend on pollinators to produce fruits and seeds.

Meanwhile, forests provide habitat for pollinators and in agriculture, the proximity of coffee plantations allows for more pollinators, which increases crop yields.

On the other hand, they did not perceive the role of terrestrial ecosystems in regulating the global climate, eliminating from the atmosphere the excess carbon dioxide that produces the greenhouse effect, ignoring that processes such as illegal logging, land use change (erosion) and forest fires cause carbon loss.

These results coincide with what was stated by PhD. Damaris Gallardo, coordinator in Pinar del Río of the international project "Incorporating multiple environmental considerations and their economic implications in the management of landscapes, forests and productive sectors in Cuba", in an interview with an expert on February 10, 2021. "There is a lack of knowledge on the part of local stakeholders of the functioning of ecosystems, of the magnitude of the goods and services they generate. This problem limits their level of awareness of the importance of ecosystem goods and services, as well as their capacity to formulate appropriate responses".

Meanwhile, in an interview with an expert on February 20, 2021, MsC. Mario Alberto Sánchez, director of Viñales National Park, said that the community is still not aware of the value of ecosystems, the role they play in their conservation and the difficulty of restoring them.

Therefore, the specialist added, it is still difficult to perceive their benefits, especially when they refer to intangible services, as shown in Figure 3, which identifies the ecosystem goods and services appreciated by the community.

Understanding how people consider and value ecosystem services is fundamental for their management, given that the values assigned are linked to the opinion people have of them.

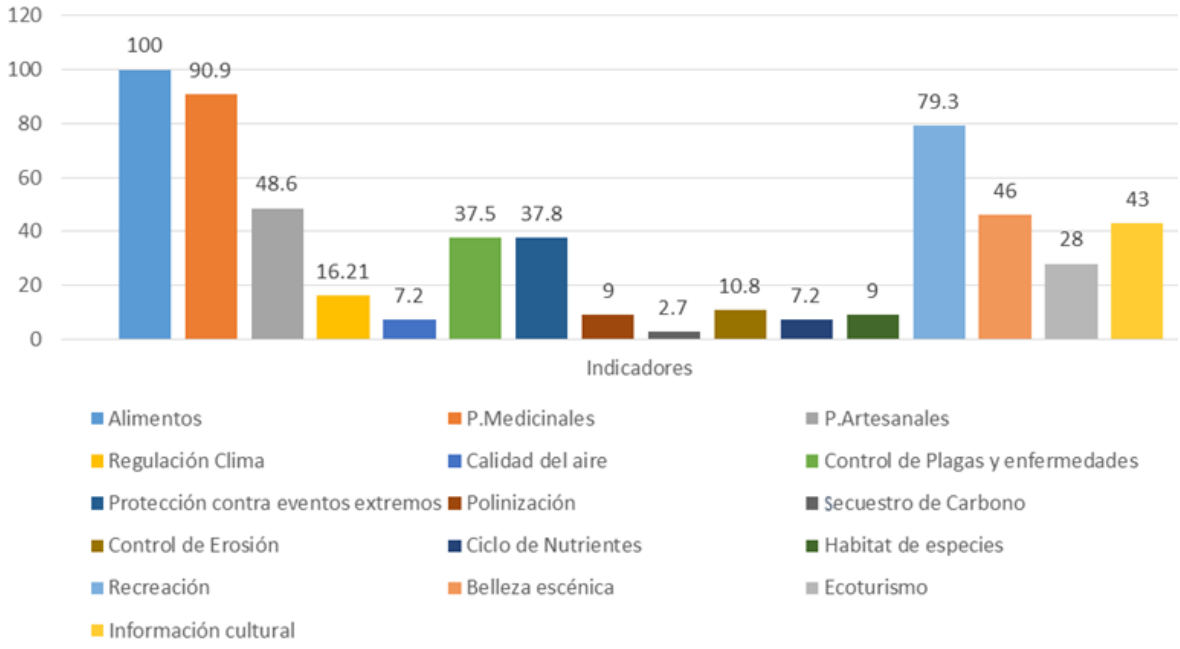


Fig. 3 - Ecosystem goods and services identified by the community
Source: Own elaboration

These results reflected that the social perception of provisioning services was the predominant one with 79.87 %, followed by cultural services with 65.4 %, regulating services with 17.6 % and supporting services with 8.1 %, the latter hardly considered by the respondents, when they are of vital importance as ecological processes that

maintain and adequately ensure ecosystems, by allowing the flows of provisioning, regulating and cultural services.

This coincided with the criteria of PhD. Yoel Martínez Maqueira, director of the Environmental Research and Services Center ECOVIDA, who in an interview with an expert on March 3, 2021, stated that the regulation and support services, since they are not used directly by the people, are hardly recognized by the communities.

It is evident that the predominance of the social perception of provisioning services over regulating and cultural services is associated with the place of residence of individuals, hence De Groot et al. (2010) mention that cities, unlike rural areas, are more demanding for regulating and cultural services because, in general, regulating services decrease with the increase of intensive land use and cultural services are reduced, depending on the degree of land conversion to other uses.

Taking into account the lack of knowledge about ecosystem goods and services, the director of Viñales National Park also pointed out a series of limitations and practices that influence their use and threaten their supply. He lists the following:

- Pollination in the agroecosystem is not taken advantage of, as this service is an essential contribution to food security, seed production and genetic improvement in forage species, increasing the quality and economic value of agricultural production and reinforcing the adaptation of the environment
- Poor management practices have exposed the soil to rainfall impacts, degradation of surface layers, reductions in infiltration and soil moisture, and loss of soil fertility and organic matter
- There are activities that are incompatible with the management category of the area that affect the conservation status of the area, such as extensive pig raising, the use of chemical fertilizers on crops and the expansion of agricultural areas towards the river streams

On the other hand, and based on the results of the survey and the focus groups, it was found that approaching the perceptions of ecosystem goods and services made it possible to understand that there are different stakeholders who appreciate them

differently and that factors such as age, gender, education, lifestyles, place of residence and different knowledge of the ecosystem influence their perception.

In relation to age, Briceño et al. (2016) and Martín et al. (2012) mentioned in their studies that younger people in general prioritize regulation and culture services more. These results did not coincide with those obtained in this research given that, in this case, all groups mostly prioritized provision services.

In the case of those under 30, they recognized a lower proportion of regulatory and support services compared to those over 40 who identified, to a lesser extent, cultural services in relation to the younger ones.

In terms of gender, as can be seen in Figure 4, men mostly perceived regulatory and support services, while women perceived a greater number of cultural and provision services. As for support services, they are the most identified by both sexes.

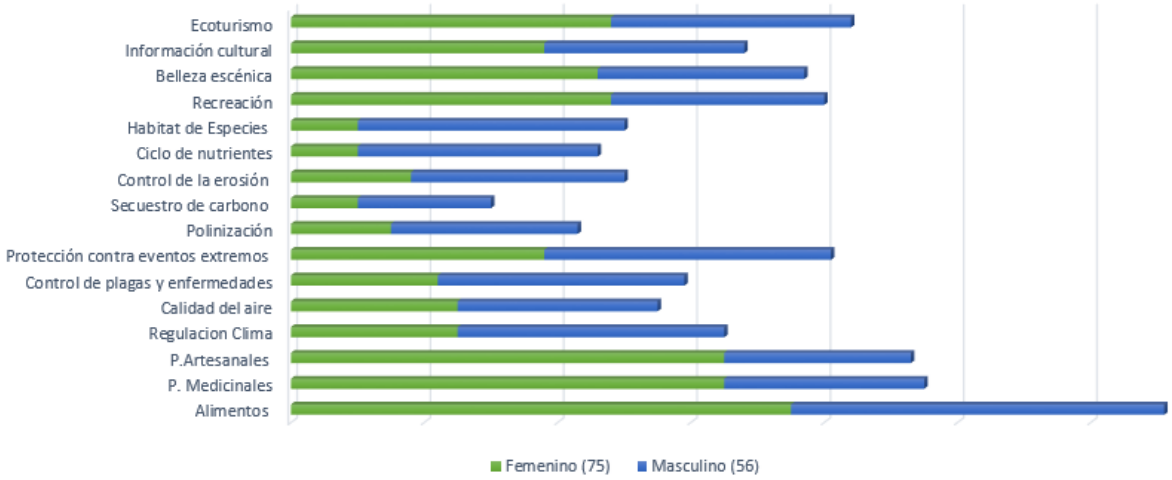


Fig. 4 - Type of service vs. gender
Source: Own elaboration

In this way, the community's perception of ecosystem services demonstrates the value they place on the conservation of the surrounding ecosystem, allowing for a better understanding of human-environment interrelationships, judgments and behaviors. With this knowledge, and through participatory construction, it is possible to analyze conservation actions consistent with local realities.

The recognition of differences among the population is an important factor in the establishment of conservation measures since it clarifies behaviors, knowledge about the environment surrounding local populations and highlights elements to be considered in conservation policies and strategies.

Based on these results, a sensitization program was implemented in an attempt to contribute to create positive changes in the community. The program consisted of six sessions, each lasting two hours and using experiential techniques, analysis, discussion, evaluation and closing.

Below is an illustrative table showing the topics, objectives and moments of the awareness program.

Table 2 - Content of the program for raising awareness of ecosystem goods and services

Subject	Content
Ecosystem goods and services	Introduction to the basic concepts of ecosystem services. Identify the ecosystem services provided by the ecosystems in the study area. Characteristics of BSE and the challenges associated with its management Reflect on the linkages between ecosystems and human well-being. Identify the main problems regarding the use and exploitation of BSE.
Ecosystem services and their relationship with gender	Reflect on gender analysis from an environmental perspective. Alternatives for sustainable development with a gender perspective. Reflect on the changes that are emerging in gender-environment relations, in accordance with economic and political processes.

	Determine the socioeconomic relationship of the different social segments with the environment and natural resources. Consider the roles traditionally assigned to women and men in the productive and reproductive spheres, as well as the new roles and insertions they are experiencing.
Environmental communication in the community context	Recognize the role of communication in social change. Reflect on the vision that has been held so far on communication for the environment.
Tourism	Antecedents of nature tourism. Global changes in the last 20 years. Classification of Nature Tourism. Identify the tourism potential of the community through its cultural and natural attractions. Prepare technical sheets for the survey of tourist attractions.

The implementation of the program constituted a learning and development scenario where the participants played a leading role in the process. The proposed actions allowed the joint participation of all the community stakeholders on the basis of taking advantage of the resources available in this context, aimed at improving the quality of life and promoting the exchange of information on the topics to be addressed.

After the application of different dynamics and resources of popular communication and pedagogy, an integration of all participants was achieved. The communicative flows transversalized the process; people experienced serenity to expose their criteria and obtained an active listening, which constituted the starting point to achieve the desired change.

The proposal was eminently participatory and educationally based, providing local stakeholders with specific elements on ecosystems, their goods and services, gender equity, biodiversity management and sustainable local tourism. All of this was aimed at

the construction of a sustainable future perspective and the revaluation of local knowledge and capacities.

The program made it possible to identify and promote those social processes that allow the Valle Ancon community to recognize that biodiversity conservation is fundamental for their well-being and socioeconomic development.

Likewise, the work sessions allowed to conceive, organize and develop the necessary resources and tools to put into practice collective learning, thus contributing to transform reality in correspondence with the diagnosed local problems.

In carrying out the activities conceived, the stages of the educational process, sensitization, reflection and awareness were taken into account so that the target audience could build a vision of interaction with the environment.

After applying the program, local stakeholders learned about the importance of ecosystems and biodiversity, the variety of ecosystem goods and services and their contribution to the development of human life, as well as the importance of making efforts to conserve the environment.

In this sense, they learned about the magnitude of ecosystem goods and services, their threats and thus understood the changes in future scenarios, incorporating other goods and services into their discourse in a broader way, since they generally associated them only with food and timber.

In this way, they incorporated important elements on the role of pollinators in agroecosystems for production: pollinating insects, perspectives of use, as well as possible strategies to favor them in agroecosystems, through an agroecological approach, as well as on non-timber forest products such as medicinal plants and their properties.

The community acquired the theoretical bases on sustainable local tourism, introducing the participants to the basic definitions of tourism, types and effects it can cause, depending on its use and the benefits of implementing this activity from an ecological, social and economic perspective.

As a result, the project has paved the way for the development of an environmental conscience of respect and responsibility towards its surroundings and tourist attractions.

Therefore, local knowledge, together with scientific knowledge and the perceptions and interests of development, can be articulated with the objective of having solid tools that, in turn, include the different points of view for the planning and management of natural resources.

As a result of the implementation of the awareness program, community leaders were empowered so that the knowledge and tools acquired can be used to participate in dialogue with decision-makers on the state of ecosystems and natural resource management.

REFERENCES

Acosta Alcolea, G., Arozarena Daza, N., Vázquez Moreno, L. L., & Ramos Bravo, L. (2015). Percepción de actores sociales en el manejo de la biodiversidad del paisaje natural protegido Gran Piedra de Santiago de Cuba. *Ciencia en su PC*, (1), 43-58. https://www.redalyc.org/articulo.oa?id=181338814004

Aguirre Padilla, N. I., Alvarado Espejo, J., & Granda Pardo, J. (2018). Bienes y servicios ecosistémicos de los bosques secos de la provincia de Loja. *Bosques Latitud Cero*, *8*(2), 118-130. https://revistas.unl.edu.ec/index.php/bosques/article/view/499

Andrade, H. J., Segura Madrigal, M. A., & Sierra Ramírez, E. (2017). Percepción local de los servicios ecosistémicos ofertados en fincas agropecuarias de la zona seca del norte del Tolima, Colombia. *Revista Luna Azul*, (45), 42-58. https://revistasojs.ucaldas.edu.co/index.php/lunazul/article/view/3865

Angulo Valdés, J. A., & López Castañeda, L. (2017). Valoración de bienes y servicios ecosistémicos. Importancia para el manejo adecuado de áreas marino-costeras cubanas. *Revista de Investigaciones Marinas*, *36*(2), 24-41. http://www.rim.uh.cu/index.php/RIM/article/view/317

Arcos Severo, M., Gutiérrez Cedillo, J. G., Balderas Plata, M. Á., & Martínez García, C. G. (2020). Percepción social de los servicios ecosistémicos proporcionados por los huertos familiares en el Altiplano Central de México. *Ecosistemas*, *29*(3), 1959. https://doi.org/10.7818/ECOS.1959

Aznar Sánchez, J. Á., & Velasco Muñoz, J. F. (2016). Valoración de los ecoservicios en los agroecosistemas españoles: Un estado de la cuestión. *Observatorio Medioambiental*, *19*, 165-180. https://doi.org/10.5209/OBMD.54166

Briceño, J., Iniguez Gallardo, V., & Ravera, F. (2016). Factores que influyen en la apreciación de servicios eco-sistémicos de los bosques secos del sur del Ecuador. *Ecosistemas*, *25*(2), 46-58. https://doi.org/10.7818/ECOS.2016.25-2.06

Brito Mancero, M. Y., Moreta Escobar, M. S., Gavilanes Montoya, A. V., & Tapia González, Z. V. (2020). Importancia de los servicios ecosistémicos del recurso vegetal de la parroquia San Juan, cantón Riobamba. *Ciencia Digital*, *4*(3), 253-270. https://doi.org/10.33262/cienciadigital.v4i3.1333

Codato, D. (2015). Estudio de la percepción social del territorio y de los servicios ecosistémicos en Alto Mayo, Región San Martín, Perú. *Espacio y Desarrollo*, (27), 7-31. https://doi.org/10.18800/espacioydesarrollo.201501.001

de Groot, R. S., Alkemade, R., Braat, L., Hein, L., & Willemen, L. (2010). Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecological Complexity*, *7*(3), 260-272. https://doi.org/10.1016/j.ecocom.2009.10.006

Hernández Félix, L., Molina Rosales, D., & Agraz Hernández, C. (2017). Servicios ecosistémicos y estrategias de conservación en el manglar de Isla Arena. *Agricultura Sociedad y Desarrollo*, *14*(3), 427-449. https://doi.org/10.22231/asyd.v14i3.644

Marín Muñiz, J. L., Alarcón Hernández, M. E., Silva Rivera, E., & Moreno Casasola, P. (2016). Percepciones sobre servicios ambientales y pérdida de humedales

arbóreos en la comunidad de Monte Gordo, Veracruz. *Madera y Bosques*, *22*(1), 53-69. https://doi.org/10.21829/myb.2016.221477

Martín López, B., Iniesta Arandia, I., García Llorente, M., Palomo, I., Casado Arzuaga, I., García del Amo, D., Gómez Baggethun, E., Oteros Rozas, E., Palacios Agundez, I., Willaarts, B., González, J. A., Santos Martín, F., Onaindia, M., López Santiago, C., & Montes, C. (2012). Uncovering Ecosystem Service Bundles through Social Preferences. *PLOS ONE*, *7*(6), e38970. https://doi.org/10.1371/journal.pone.0038970

Melgarejo Carreño, V. A. (2019). *Valoración de los servicios ecosistémicos en agroecosistemas: Contribuciones de la economía ecológica* [Doctorado en Agroecología, Universidad Nacional de Colombia]. https://repositorio.unal.edu.co/handle/unal/76581

Muhamad, D., Okubo, S., Harashina, K., Parikesit, P., Gunawan, B., & Takeuchi, K. (2014). Living close to forests enhances people×s perception of ecosystem services in a forest-agricultural landscape of West Java, Indonesia. *Ecosystem Services*, *8*, 197-206. https://doi.org/10.1016/j.ecoser.2014.04.003

Portela Peñalver, L., Rivero Galván, A., & Portela Peñalver, L. (2019). Valoración económica de bienes y servicios ecosistémicos en montañas de Guamuhaya, Cienfuegos, Cuba. *Universidad y Sociedad*, *11*(3), 47-55. https://rus.ucf.edu.cu/index.php/rus/article/view/1221

Rangel Cura, R. A., Durán Zarabozo, O., Gómez País, G., Ferro Azcona, H., Barranco Rodríguez, G., Celada, M. S., Abraham Alonso, A. N., Cuadrado, L., Herrera Oliver, P., & Vilamajó Alberdi, D. (2013). Valoración económico-ambiental de recursos naturales seleccionados en la cuenca del río Guanabo, La Habana, Cuba. *Revista Iberoamericana de Economía Ecológica*, *20*, 45-55. https://ideas.repec.org/a/rib/revibe/rev20_04.html

Rodríguez García, L., Curetti, G., Garegnani, G., Grilli, G., Pastorella, F., & Paletto, A. (2017). Valoración de los servicios ecosistémicos en los ecosistemas forestales:

Un caso de estudio en Los Alpes Italianos. *Bosque*, *37*(1), 41-52. https://doi.org/10.4067/S0717-92002016000100005

Valencia Estrada, J., Rodríguez Pineda, J. M., Arias Mendoza, J. J., & Castaño, J. M. (2017). Valoración de los servicios ecosistémicos de investigación y educación como insumo para la toma de decisiones desde la perspectiva de la gestión del riesgo y el cambio climático. *Revista Luna Azul*, (45), 11-41. https://revistasojs.ucaldas.edu.co/index.php/lunazul/article/view/3864

Villamagua Vergara, G. C. (2017). Percepción social de los servicios ecosistémicos en la microcuenca El Padmi, Ecuador. *Revibec: Revista Iberoamericana de Economía Ecológica*, *27*, 102-114. https://raco.cat/index.php/Revibec/article/view/335096

Conflict of interest:

Authors declare not to have any conflict of interest.

Authors' contribution:

All authors reviewed the writing of the manuscript and approve the version finally submitted.