

## **Program for Creation and Strengthening of Capacities for the Adaptation to Climate Change in Coastal Areas of Cuba, through the Training of Trainers**

*Programa de Creación y Fortalecimiento de Capacidades para la  
Adaptación al Cambio Climático en zonas costeras de Cuba, a través de la  
Formación de formadores*

Jorge Alfredo Carballo Concepción<sup>1</sup>  [alfrebaggio@hotmail.com](mailto:alfrebaggio@hotmail.com)

Marta Rosa Muñoz Campos<sup>1</sup>  [martuli@flacso.uh.cu](mailto:martuli@flacso.uh.cu)

Arianna Rodríguez García<sup>1</sup>  [ariannarodriguez3004@gmail.com](mailto:ariannarodriguez3004@gmail.com)

Dariadna Barrios Tabares<sup>1</sup>  [dariadna.barrios@flacso.uh.cu](mailto:dariadna.barrios@flacso.uh.cu)

María Isabel Romero Sarduy<sup>1</sup>  [anamarycuba64@gmail.com](mailto:anamarycuba64@gmail.com)

Leyner Javier Ortiz Betancourt<sup>1</sup>  [leynerjob@gmail.com](mailto:leynerjob@gmail.com)

Amanda Olmo Infante<sup>1</sup>  [olmoinfamanda11@gmail.com](mailto:olmoinfamanda11@gmail.com)

<sup>1</sup>Latin America Faculty of Social Sciences, Cuba Program, University of Havana, Cuba

### **ABSTRACT**

To increase resilience to climate change in the coastal areas of Cuba through Ecosystem-based Adaptation, an essential element is the strengthening of competencies for the adaptation to climate change in governments, economic sectors, technical personnel and different population groups. For this, it is necessary to enable spaces for the creation and strengthening of capacities to adapt to climate change. In this sense, this article designs a Program for the Creation and Strengthening of Capacities for Adaptation based on the theoretical-methodological conception of Popular Education, Popular Environmental Education and the training of trainers from a gender perspective. As a result, it is seen that the articulation of actors is central to the implementation of the Program and the sustainability over time of the actions carried out in the territories.

**Keywords:** articulation of actors; popular education; gender mainstreaming.

### **RESUMEN**

*Para aumentar la resiliencia al cambio climático en las zonas costeras de Cuba a través de la Adaptación basada en Ecosistemas, un elemento esencial es el fortalecimiento de competencias para la adaptación al cambio climático en gobiernos, sectores económicos, personal técnico y los diferentes grupos poblacionales. Para ello se hace necesario habilitar espacios para la creación y fortalecimiento de capacidades de adaptación al cambio climático. En este sentido, el presente artículo diseña un Programa de Creación y Fortalecimiento de Capacidades para la Adaptación sustentado en la concepción teórico-metodológica de la Educación Popular, la Educación Popular Ambiental y la formación de formadores desde un enfoque de género. Como resultado se aprecia que la articulación de actores es central para la implementación del Programa y la sostenibilidad en el tiempo de las acciones realizadas en los territorios.*

**Palabras clave:** articulación de actores; educación popular; transversalización del enfoque de género.

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## **INTRODUCTION**

Programs for creation and strengthening of capacities are training processes that are implemented with the purpose of developing specific competencies in governmental and economic actors and in different population groups. In the context of climate change management, they are conceived as the process through which «society as a whole acquires the knowledge, skills and attitudes that will allow it to face the climate crisis with transformative actions to mitigate Greenhouse Gases (GHG) and adapt to the impacts of the climate phenomenon» (Ministry of the Environment of Chile, 2021).

One of the objectives of the plans, policies, programs and projects developed in Cuba has to do with the development of competencies that favor adaptation to climate change,

specifically in coastal areas that represent the most vulnerable to the impacts of the phenomena associated with these anomalies. For this purpose, the Program for Creation and Strengthening of Capacities for the Adaptation to Climate Change is designed, based on the training of trainers, from the assumptions of Ecosystem-based Adaptation and the Popular Education methodology, which is presented in this article. This methodological approach privileges the participation of people, guaranteeing the replicability and sustainability of training actions at a local level.

The Program will enable key actors in the territories (the government, the economic sectors, the technical personnel linked to the rehabilitation of mangroves, the hydrological and agroforestry flow, and the different population groups) to develop and/or strengthen their capacities, taking into account the specific characteristics, strengths and vulnerabilities of each territory.

Inclusion and gender approaches have been incorporated transversally. The importance of promoting the effective participation of everyone in an equitable manner is recognized, both in the program and training plan design, and in the implementation of training activities and in the monitoring and evaluation processes. The inclusion of these topics in the training plan will contribute to reducing the gaps identified in the gender evaluations carried out in these territories, and thus moving towards full equality between men and women.

## **DEVELOPMENT**

The program design is conceived in a flexible way and must be adapted to local contexts. It can be enriched by the work of the experts who will be leading the training processes. General objective: Developing capacities for the adaptation to climate change in trainers and key actors of coastal communities, from the assumptions of Ecosystem-based Adaptation and Popular Education, with an inclusion and gender approach.

Specific objectives:

- Raising awareness of the impacts of climate change in Cuba and adaptation and mitigation actions.

- Providing knowledge and skills for monitoring coastal and community ecosystems, with emphasis on the topics of mangrove ecosystem, soil management, water resources management, marine ecosystems management and invasive exotic species.
- Offering tools to reduce risks and vulnerabilities, through Social and Environmental Safeguards.
- Building a perspective of inclusion and gender equity in relation to the challenges imposed by climate change and the adaptation and mitigation actions implemented in the coastal areas of Cuba.
- Developing capacities for the basic analysis of socio-demographic and socio-economic dynamics at the national and local levels.
- Promoting the creative appropriation of the theoretical-methodological foundations of Popular Education.

#### Stages

1. Diagnosis of training needs through the integration of the results of public consultations.
2. Design of the Program and Thematic Training Plan, reconciled with stakeholders.
3. Implementation of the program that begins with the training of trainers process.
4. Creation and training of teams of trainers in the territories.
5. Design of modules based on the thematic axes of the Training Plan.
6. Implementation of modules and training and awareness actions with key actors.
7. Monitoring and evaluation of the program.

### **Conceptual and methodological framework of the program**

Adaptation is an adjustment process that occurs in natural systems in response to projected or real climatic stimuli and their effects. The latter can be moderated by human intervention (IPCC, 2018).

Based on this conception, Ecosystem-based Adaptation (EbA) is one of the adaptation options, which integrates the use of biodiversity and ecosystem services in strategies of adaptation to climate change. This approach seeks to reduce risks and vulnerabilities, by taking advantage of the capacities and opportunities of regions, nations, cities,

municipalities, communities and individuals to face climate impacts; as well as the mobilization of these capacities for decision-making (Tompkins et al., 2010 cited by Magrin, 2015).

Its use in the management of climate impacts along the Cuban coasts, considered very vulnerable areas, contributes to achieving greater resilience by integrating local conditions and protection needs with ecosystem services. In the Cuban case, it is supported by national policies under the State Plan to Confront Climate Change, “Life Task”.

EbA presupposes the promotion of participation in the design and implementation of projects. People must have the right to influence plans of adaptation, policies and practices at all levels, getting involved in both the identification of the problem and the search and implementation of solutions (Reid, Pérez & Ramírez, 2018).

In this case, they are Nature-based Solutions (NbS), taking into account their capacity to absorb or control the impact of climate change, through effective and efficient adaptation measures that do not depend on the environmental and economic expenses associated with the use of gray structures, such as breakwaters, dikes and other engineering solutions. NbS are privileged in Cuba as strategies of adaptation to climate change, particularly in its coastal area. The protection services provided by marine and coastal ecosystems are enhanced, as well as the participation of communities.

In this sense, it is necessary to commit to a paradigm shift in climate resilience in the coastal areas of Cuba, through the large-scale implementation in an integrated and sustained manner of an EbA approach that takes advantage of nature’s opportunities, accompanied by a strong process of capacity building and awareness of local people and actors at all levels to achieve sustainability.

Taking this into account, the program is based on the logic of Training of trainers, a process that has its theoretical and methodological foundations in Popular Education, Popular Environmental Education and Participatory Action Research.

Popular Education is epistemically framed within critical pedagogy and Freirean popular education. It attaches great importance to the dialogue between scientific knowledge and popular knowledge, to the relationship between theory and practice, to group work as a living scenario of the values and meanings that this conception promotes. In short, they are processes that favor the collective construction of knowledge.

*Popular education is a different pedagogy in content and form. It is a pedagogy of dialogue and not of monolithic discourse; of the question and not of the pre-established answers. It is a pedagogy of the group and solidarity, compared to those that reproduce individualism and competition. It is a pedagogy of freedom compared to those that reinforce alienation; of democracy and not of authoritarianism; of hope, compared to those that affirm historical fatalism. It is a pedagogy that, based on the philosophical foundations of Marxism, and its central core: revolutionary dialectics, accepts dialogue with the knowledge of the various social sciences and the different ideologies that promote liberation (...) It therefore appeals as part of the process of learning art, play, psychodrama and direct contact with practical experiences produced in social life. (Korol, 2005 cited by Romero, 2013)*

Therefore, people who facilitate and accompany the training processes build a relationship of horizontality with the participants, recognize their knowledge, contributions and motivations in order to achieve a different appropriation of knowledge, forming critical, active subjects, committed to their social reality.

Based on the socio-political foundations of Popular Education and the ecological approaches of Environmental Education, Popular Environmental Education (PEE) is defined as

*a political-pedagogical process that trains collective subjects with the capacity to influence politically in the environmental management of their territories from an inter- and transdisciplinary, participatory and dialogic approach that goes beyond the characteristic divisions of modernity, reinforcing the value of community identities and popular empowerment in the collective construction of knowledge, wisdom and strategies that harmonize with the socio-natural system, reverse the prevailing development models that cause destruction and allow the transformation of socio-environmental practices in pursuit of environmental rationality based on equity and respect for biodiversity. (Pérez, 2022, p. 23)*

In this sense, PEE starts from a holistic vision of the environment: it includes the natural, physical, social, cultural and economic aspects in a process of collective transformation, in which people are conceived as protagonists (REPEC, 1994 cited by Muñoz, 2003).

On the other hand, Participatory Action Research (PAR) is a paradigm that combines theory and praxis, which implies not only knowing reality, but also transforming it. It is a necessary methodological proposal, as long as there is interest in changing reality (Demo, 1993).

In PAR, dialogue occupies a central place, mainly between the academy and social actors in the communities. Dialogue understood in the sense of recognizing each other and talking on an equal footing, within an exchange not only of information, but also of feelings and values (Muñoz, 2003).

According to Hegoa's Dictionary of Humanitarian Action and Development Cooperation (Pérez de Armiño & Abrisketa, 2000), PAR is a «research and collective learning method of reality, based on a critical analysis with the active participation of the groups involved, which is aimed at stimulating transformative practice and social change». In a PAR, the process of generating knowledge is combined with that of action, always involving the group whose reality is addressed. It enables learning, the critical awareness of the population about their reality, their empowerment, the reinforcement and expansion of their social networks, their collective mobilization and their transformative action.

It is *research* because it aims to answer a series of questions following rigorous systematic procedures. It fulfills the academic commitment to generating knowledge while trying to avoid storing this knowledge or disseminating it in small, specialized circles. Special importance is given to the phase of return and sharing of results.

It is *action* because it is oriented towards change, towards the transformation of reality.

It is *participatory* because it is carried out by a group of people, not only from the academic environment, in a relationship of equals in which the classic position of supremacy of the researcher is broken.

### **Training of trainers**

Based on the previously stated assumptions, the Program for Creation and Strengthening of Capacities for the Adaptation to Climate Change is implemented through the

«Training of trainers»; conceived as a process of innovation and self-organization at the local level in which local endogenous resources are used to build qualitatively superior practices.

This approach guarantees that the themes flow to the communities, through people with the possibility of conducting and replicating the content and knowledge, taking into account the specificities of the local contexts.

The program not only aims to create knowledge but also foster new skills, attitudes and values. Therefore, the goal is to provide trainers with competencies that allow them to act in their territories to raise awareness and train key actors, as well as generate learning communities where the population actively participates in the transformations that the project proposes.

The process includes the following stages:

1. Identification of the trainers who will be supporting the design, implementation, monitoring and evaluation of the program.
2. Training of trainers who will contribute to the socialization of the program and the creation of training communities in each of the territories.
3. Mapping of experts who will integrate the training communities and lead the training and awareness processes in the communities.
4. Preparation of the annual training schedule.
5. Design of training modules taking into account the program orientations, the strengths of local contexts and the identified training needs.
6. Carrying out thematic workshops for the experts who will teach the training modules, with the aim of homogenizing the content.
7. Evaluation of the training of trainers process.

### **Who would participate as trainers?**

The people who will assume the role of trainers are identified by the territories.

General criteria:

- Living and working in the municipalities where plans, policies, programs and projects are implemented.
- Time availability.
- Feeling motivated to be part of the learning community.
- Having a commitment to emancipatory change.
- Experience in the development of training processes.
- Motivation to participate in the learning community.
- Having information and general notions on the thematic axes including the training plan.

In addition, they must have competencies in the order of knowledge, skills, attitudes and values (Group of authors, 2017).

### **Guidelines for the design of training spaces**

For the design of each training course or workshops, it is proposed to take as reference Resolution 140/19 Regulation of Postgraduate Education of the Republic of Cuba, incorporating the theoretical and methodological logic of Popular Education.

How to design courses from the logic of popular education?

First moment: Integration and framing.

- Opening of the activity.
- Presentation of the group and the project, working hours
- Definition of group norms collectively
- Raising workshop expectations

Second moment: Our practices.

Starting from the practice of the knowledge that people have on the topic to be discussed. To do this, you can use: audiovisual aids, songs, use of participatory techniques such as brainstorming, brainstorming by card, sociodrama, etc.

Third moment: Theorization.

- Awareness raising
- Conference on the specific topic
- Thematic panels
- Audiovisual aids
- Questions, comments, reflections

Fourth moment: Return to renewed practice.

What was learned and the way in which the knowledge will be incorporated into future practice.

Fifth moment: Evaluation and closure. The program results framework must be taken into account.

- What was new?
- What was negative?
- What aspects should address in depth?

### **Evaluation of the training of trainers process**

In order to verify whether the objectives and expected results have been fulfilled, a group of dimensions and indicators are proposed to be taken into account in the evaluation of the process. It contributes to the general evaluation of the program, for which the methodological guidelines, techniques and tools must be taken into account.

**Table 1.** Dimensions and indicators to be taken into account in the process evaluation.

<b>Dimensions</b>	<b>Indicators</b>
Fulfillment of objectives	Creation of teams of trainers
	Fulfillment of expectations
	New learning (knowledge, skills)
	Usefulness of what was learned
Training methodology	Coordination styles
	Type of communication (dialogue or monologue)
	Types of participatory methodological resources

Training quality	Number of people who attend the training processes broken down by sex, age groups, disability status, etc.
	Level of satisfaction with the process experienced
	Perception of the quality and relevance of training
	Perception on organizational issues

### Thematic Training Plan

The Thematic Plan must be designed taking into account the training needs identified in the public consultation processes, as well as the knowledge and skills that the beneficiaries must possess and the main goals: local governments and economic sectors, technical personnel identified as key actors in the implementation of solutions based on nature and the population of coastal territories.

Table 2 shows the areas and courses proposed to make up the thematic training plan of the program. The content will be designed taking into account the target beneficiaries.

**Table 2.** Areas and courses that are proposed to make up the thematic training plan of the program.

Área	Course/module
Environment and Climate Change	Climate change and adaptation
Basic aspects and techniques, software, innovative tools and practical training actions for community monitoring in confronting climate change.	Mangrove ecosystems
	Soil management
	Water Resources Management
	Marine ecosystems management
Social	Invasive exotic species
	Inclusion, gender and climate change
	Tools for reducing vulnerabilities and increasing resilience
Training of trainers	Population and socio-economic dynamics
	Theoretical-methodological assumptions of Popular Education

## **Program monitoring and evaluation**

Evaluation is defined as an activity of reflection on action, based on systematic procedures, with the purpose of issuing well-founded and communicable evaluative judgments, as well as formulating recommendations (Nirenberg, 2009). It has a significant weight within the stages of the program to the extent that it allows us to verify whether the expected change is occurring in the beneficiaries.

At the same time, it provides the data and information necessary to carry out strategic planning and readjust the training strategy and planned activities, if necessary. Moreover, they help personnel to learn from the experience, which contributes to making more informed decisions (UNDP, 2002).

There are various typologies of evaluation, according to the evaluation practices defined by the purpose of the evaluation (effectiveness, impact, feasibility, etc.); the objectives (training, total or final, etc.); the type of data it handles (qualitative, quantitative, mixed); and the position of the evaluator, among others; as well as classifications according to the approach in relation to the different scientific paradigms (Lefèvre, 1999; Trochim, 2001). Within the participatory approaches to evaluation, more radical modalities can be found in political terms such as *empowerment*. In the evaluation from this perspective, unlike the *utilization-focused evaluation*, the notion of the evaluator as the sole professional depository of the knowledge and specific skills for conducting the evaluation disappears. It becomes a facilitator of the development of the capacities of the actors involved to conduct the evaluation themselves, use it effectively for social change and reformulate plans and strategies according to the results obtained (Fetterman et al., 1996; Minkler & Wallerstein, 2008).

The evaluation of the program must focus on the fulfillment of the objectives and therefore will be training and a posteriori. The first is what is carried out during the implementation of the program and allows us to detect weaknesses in its execution, with the aim of amending them, including proposals for improvement.

And the a posteriori evaluation is carried out after the program has been executed, it is an ex-post evaluation. It is used to receive conclusions about a project and/or to improve future programs or projects (ECLAC, 2019).

The evaluation will be carried out systematically during the implementation of the

program, and cuts will be made on a semi-annual and annual basis; while the a posteriori evaluation will be carried out at the end of implementation and during the years of project maintenance.

The main objectives of the evaluation are:

- To identify the scope and impact of the training actions implemented.
- To determine the level of relevance, effectiveness and sustainability of the program.

In order to determine the level of relevance, effectiveness and sustainability, it is proposed to take into account the following criteria:

### **Relevance**

- Correspondence of the modules designed and taught with the country's development policies and plans, the National Environmental Strategy and the State Plan to Confront Climate Change, "Life Task".
- Coherence with the objectives and expected results of the project.
- Adaptation of the program and modules to the characteristics of the context and the needs of key actors.
- Incorporation of inclusion and gender approaches.

### **Effectiveness**

- Inclusive nature of the program.
- Gains in terms of skills and knowledge.
- Transformations in perceptions and behaviors.

### **Sustainability**

- Consolidation of teams of trainers in the territories.
- Operation of the premises enabled for the development of the process.
- Involvement of key actors in the different stages of the program.

## **Tools for monitoring and evaluation**

The evaluation will use a triangular or mixed approach in which the results obtained from the application of different research instruments and techniques are integrated: questionnaires, interviews, focus groups and other participatory techniques.

Each one has its own benefits and limitations, the choice will depend on the proposed objectives, resources and time available. It is important to keep in mind that the data collected must correspond to the objectives and indicators of the program and must be collected with scientific rigor.

**Table 3.** Techniques most used for monitoring and evaluating the process.

Survey	It consists of a set of questions that aim to obtain standardized information from the participants. It is a useful tool to gather information about the training process from a considerable number of people.
Interview	It allows you to delve into the opinions and suggestions of the people who participate in the training. They can be individual or group.
Focus groups	Group of people who are selected based on different criteria to analyze their perception and criteria regarding a specific phenomenon.
Observation	Observation allows us to appreciate changes in behavior. Unlike the other methods, observation does not depend on what the training beneficiaries say about themselves or about others.

### **Indicators for monitoring and evaluating the program**

Below are the indicators to be taken into account in the program evaluation and monitoring process.

**Table 4.** Indicators to be taken into account in the program evaluation and monitoring process.

<b>Objectives of the program</b>	<b>Indicators</b>
Raising awareness about the impacts of climate	Number of training courses and actions carried out on climate change and EbA.

change in Cuba and adaptation and mitigation actions.	Number of trained people, broken down by sex, age groups (children, adolescents, youngsters, adults and older adults), disability status.
	Number of infocommunicative products on climate change and EbA, socialized in the communities.
	Level of appropriation of the acquired knowledge of men and women in a differentiated manner (high, medium and low).
Providing knowledge and skills for monitoring coastal ecosystems with emphasis on the topics of mangrove ecosystem, soil management, water resources management, marine ecosystems management and invasive exotic species	Number of training courses and actions carried out on mangrove ecosystem, soil management, water resources management, marine ecosystems management and invasive exotic species, broken down by sex.
	Number of people participating in marine ecosystem monitoring processes, broken down by sex.
	New skills acquired for the development of ecosystem links.
	Number of adaptation actions developed in communities and territories.
Building a perspective of inclusion and gender equity in relation to the challenges imposed by climate change and the adaptation and mitigation actions implemented in the coastal areas of Cuba.	Number of men and women who participate in the design of training courses and actions.
	Number of men and women who participate in the delivery of the training.
	Number of trained people, broken down by sex, age groups (children, adolescents, youngsters, adults and older adults), disability status.
	Number and type of venues dedicated to raising awareness on gender and inclusion issues.
Offering tools to reduce risks and vulnerabilities, through Social and Environmental Safeguards.	Number of training courses and actions carried out on social and environmental safeguards.
	Mastery of safeguards tools

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Developing capacities for the basic analysis of socio-demographic and socio-economic dynamics at the national and local levels in Cuba	Number of training courses and actions carried out on socio-demographic and socio-economic dynamics
	Mastery of the basic content of socio-demographic and socio-economic dynamics.
Promoting the creative appropriation of the theoretical-methodological foundations of Popular Education.	Type of methodological resources used. Presence of teams of trainers in the areas of project intervention

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## AS A SUMMARY

The Program for Creation and Strengthening of Capacities for the Adaptation to Climate Change in coastal areas of Cuba, through the Training of trainers presented is a flexible document, of collective construction, based on the identification of endogenous potentialities and contextualized according to territorial particularities.

Training techniques should vary taking into account different target groups.

In the process, the proposed evaluation and monitoring indicators must be taken into account, as well as adjustments according to the context.

This program must be focused on meeting the goal of beneficiaries of the plans, policies, programs and projects of each of the territories where they are implemented.

## REFERENCES

- Alejandro, M., Romero, M. I. & Vidal, J. 2012. *What is Popular Education?* Havana: Editorial Caminos.
- ECLAC. (2019). Evaluation of institutional strengthening training programs – The CONEVAL Case.

<https://observatorioplanificacion.cepal.org/sites/default/files/session/03->

[Dante%20Arenas- Evaluacion%20de%20la%20capacitacionVF.pdf](https://observatorioplanificacion.cepal.org/sites/default/files/session/03-Dante%20Arenas- Evaluacion%20de%20la%20capacitacionVF.pdf)

- Group of authors (2017). *Methodological guide for the monitoring and evaluation of local and community development projects with an equity approach*. Havana: Latin American Department of Social Sciences, Cuba Program.
- Demo, P. (1993) Participatory Research. Discussing successes and ambiguities. *La Piragua. Latin American Journal of Education and Politics*, 9.
- Fetterman, D., Kaftarian, S. & Wandersman, A. (Eds.) (1996). *Empowerment evaluation: Knowledge and tools for self-assessment and accountability*. Thousand Oaks, CA: Sage.
- Lefèvre P. (1999) *Acteurs et évaluation de projets de développements. Vers une approche pluraliste de l'évaluation*. Free University of Brussels.
- Magrin, G. O. (2015). *Adaptation to Climate Change in Latin America and the Caribbean*. Santiago, Chile: ECLAC.
- [https://www.cepal.org/sites/default/files/publication/files/39842/S1501318\\_es.pdf](https://www.cepal.org/sites/default/files/publication/files/39842/S1501318_es.pdf)
- Ministry of the Environment of Chile, (2021). *Creation and Strengthening of Capacities*. <https://cambioclimatico.mma.gob.cl/medios-de-implementacion/creacion-y-fortalecimiento-de-capacidades/>
- Minkler, M. & Wallerstein, N. (2008). *Community based participatory research for health: From outcomes to process*. San Francisco, CA: Jossey-Bass.
- Muñoz, M. R. (2003). *Popular Environmental Education for sustainable rural development*. Doctoral Thesis. Universidad de La Habana. Cuba.
- Nirenberg, O. (2009). *Evaluation and participation: conceptual guidelines for continuous management improvement*. <http://metodo3.sociales.uba.ar/wpcontent/uploads/sites/169/2014/10/Nirenberg-20091.pdf>
- Pérez de Armiño, K. & Abrisketa, J. (2000). *Dictionary of Humanitarian Action and Development Cooperation*. Spain: Institute of Development and International Cooperation Studies. <https://www.dicc.hegoa.ehu.eus>
- Pérez, M. A. (2022). *Theoretical-methodological conception of popular environmental education for the environmental training of Ecovida*. Doctoral Thesis. Study Center for the Improvement of Higher Education (CEPES). Universidad de La Habana

- UNDP. (2002). *Capacity development*. UNDP Basic Text.  
[https://www.undp.org/sites/g/files/zskgke326/files/publications/Capacity\\_Development\\_A\\_UND\\_P\\_Primer\\_Spanish.pdf](https://www.undp.org/sites/g/files/zskgke326/files/publications/Capacity_Development_A_UND_P_Primer_Spanish.pdf)
- Reid, H., Pérez, M. & Ramírez, O. (2018). *Ecosystem-based approach to adaptation: strengthening evidence and informing policy*. United Kingdom: International Institute for Environment and Development.  
<https://www.iied.org/sites/default/files/pdfs/migrate/17627SIIED.pdf>
- Romero, M. I. (2013). *The contribution of popular education training at the Dr. Martin Luther King Jr. Memorial Center to community self-development*. Doctoral Thesis. Universidad Central de Las Villas “Marta Abreu”, Cuba.
- Trochim, W. M. K. (2001). *The research methods knowledge base*. Cincinnati: Atomic Dog Publishing.

### **Conflict of Interest**

The authors declare that there is no conflict of interest.

### **Contribution by the authors**

Jorge Alfredo Carballo Concepción: Conceptualization, data curation, formal analysis, research, methodology, supervision, validation, visualization, original writing-drafting, writing-reviewing and editing.

Marta Rosa Muñoz Campos: Conceptualization, supervision, validation and visualization.

Arianna Rodríguez García: Conceptualization, data curation, formal analysis, research, methodology, supervision, validation, visualization, original writing-drafting, writing-reviewing and editing.

Dariadna Barrios Tabares: Conceptualization, data curation, formal analysis, research, methodology, supervision, validation, visualization, original writing-drafting, writing-reviewing and editing.

María Isabel Romero Sarduy: Conceptualization, methodology, validation, original writing-drafting. Leyner Javier Ortiz Betancourt: Research and visualization.

Amanda Olmo Infante: Research and visualization.