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Non-formal environmental education, a fertile opportunity for sustainable Rural Development in the Molino Norte producing basin, Matagalpa

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SUMMARY

The present essay refers to the level of preeminence that environmental education possesses from its three dimensions (formal, non-formal, informal), nevertheless this study addresses environmental education from the non-formal level, as a generator of sustainability in the Water basin Molino Norte, Matagalpa, where it is proposed the creation of a training program based on sustainability theories, rural development, joint vision, social constructivism, participatory action, bio ecological-systemic theory, environmental concern and ecological behavior.

At present, there is a legal framework constituted in forums, summits, and assemblies; at the international, national and local level, where it is possible to sign agreements and commitments agreed by most of the nations of the world. However, it must be considered that, traditionally, environmental management models have been based on a reductionist approach to environmental problems, since they have been directed more towards the correction of environmental problems than towards prevention. In addition, the implementation of isolated actions, arising from nowhere, is clearly observed, and these must really respond to theoretical and practical foundations that allow the balance between the use of the natural resource and its conservation-protection, that is to say sustainable management of the resources of the territory, of Inclusive, equitable and sustainable way to improve the quality of life of its inhabitants.

INTRODUCTION

This paper aims to analyze the relevance and feasibility of a non-formal environmental education program as a strategy to contribute to the sustainable development of rural communities in the Molino Norte water production basin.

Environmental education is conceived as an emerging field of several proposals, with edges linked to the quality of life of the human being from different educational dimensions and always

in harmony with Mother Earth. According to Pope Francisco (2015) many things have to redirect their course, but above all, humanity needs to change. It requires awareness of a common origin, mutual belonging and a shared future for all. This basic knowledge would allow the development of new convictions, attitudes and ways of life. It highlights a great cultural, spiritual and educational challenge that will entail lengthy processes of regeneration (p.155).

It is therefore worth noting that the educational system of various countries and mainly Latin America continues implementing a generic curriculum with emphasis on formal education programs, without taking into account that the dimension of non-formal education has become a discipline which provides individual and collective transformational opportunities through the implementation of socio-educational processes that aim to improve the living conditions of various human groups, specifically in rural areas.

Pieck-Gochicoa (1997, quoted by Marum-Espinoza and Reynoso-Cantú, 2014), affirm that non-formal education has been constituted as an educational practice assumed as a compensatory activity of deficiencies of the formal school system and complementary to programs and policies aimed at rural development. It must also be considered as an important means to promote the country's educational development and, consequently, sustainable human development (p.143).

Non-formal environmental education in Nicaragua for many decades has been developed mainly in the rural area and is largely capitalized by non-governmental organizations, however, actions are short-term and unsustainable over time, since they manage to promote environmentally friendly behavior only during the projects, on the other hand, very few subsequent evaluations are carried out to analyze the impact of the developed actions.

Based on the preceding and considering the asserted by the Socio-environmental and Forest Development Program (POSAF), MARENA and Helsinki Consulting Group Ltd. HCG (2001) "the Molino Norte micro-basin is so important, since the Molino Norte River contributes 80% of the drinking water of the city of Matagalpa, Nicaragua's third most populous city" (p.2). There is an interest in contributing to the sustainable development of this territory through the design of a non-formal environmental education participatory program.

The micro-basin of the Molino Norte River is environmentally "fractured" and in an accelerated deterioration process due to seven main threats: Overuse of Agricultural and Forest Lands, Deforestation in Conservation and Protection Zones, Accelerated Erosion (massive and laminar), Torrents and Floods, Deterioration of Drinking Water Sources, Environmental Pollution and Disorganized Growth / Development (Urban, Infrastructure and Services).

These make the people of the basin, especially those of Matagalpa, living under the risk of "natural disasters", with serious disadvantages in terms of their productive potential and with scarce and poor quality water resources. (Socio-environmental and Forest Development Program (POSAF), MARENA and Helsinki Consulting Group Ltd. HCG, 2001, p.8).

Thus, the situation previously raised and corroborated by more recent studies indicate that, despite the interventions made, environmental conflicts and inadequate management of natural resources persist, which establishes the need to develop effective environmental education actions and efficient for the restoration and sustainable management of the natural resources of the territory.

In our country, the policy of the Government of Reconciliation and National Unity (GRUN), emphasizes the vision of an integral development of the human being through education, that is why the National Plan for Human Development 2012-2016 considers education as a fundamental right , providing a free education that will ensure that more and more people, especially the most impoverished ones, from rural areas and indigenous and Afro-descendant communities, so that they can enter schools at their corresponded age and they can continue with their progress.

In order to take benefit of the GRUN initiative, it is considered opportune to build a non-formal environmental education program that contributes to sustainable rural territorial development in the communities of Molino Norte, municipality of Matagalpa, which will allow the formulation of relevant actions from an innovative perspective for the knowledge development, personal judgment, sensitivity, problem identification and action; in such a way, that through each phase of the process an environmentally literate citizen is formed.

This work is divided into three parts. In the first, the main theoretical trends of sustainable development and environmental education are reviewed; in the second, some elements of non-formal environmental education are presented in rural contexts; in the third section, pedagogical and didactic foundations in environmental education are outlined, propitious for the construction of the program and finally the conclusions are presented.

1. Sustainable Development and Environmental Education

Faced with the accelerated process of expansion of social and environmental problems, nowadays, humanity is facing unprecedented challenges, including: achieving social and economic progress that enables a quality life and the well-being of the world's population, at the same time, solving an scenario of global environmental crisis originated by the current model of socioeconomic development, the accumulation of goods and individualism, seen as a consumer and exploitative of the resources that nature provides.

In this part it is worth noting that the concept of sustainable development has been discussed, however, there are several authors who aim at the satisfaction of needs within a harmonious scale with the situation and that is only achievable thanks to the application of an environmental education with all the psycho-pedagogical foundations necessary to achieve changes and challenges; Then, sustainable development refers to sustaining, maintaining an activity firm.

Sustainability appears as "the central unifying idea most needed at this time in the history of mankind" (Bybee, 1991, quoted by Vilches, Gil, Toscano and Macías, 2006, p.1). This is a new concept, which aims to mobilize collective responsibility to face the set of serious problems and challenges faced by humanity, betting on cooperation and the defense of the general interest (Vilches, Gil, Toscano and Macias, 2006, p.1).

The idea of a Sustainable Development, however, has nothing to do with this developmentalism and means, as Novo said (2006, cited by Vilches, Gil, Toscano and Macías, 2006, p. 3), "to have another view point, to contemplate the relations of humanity with nature from different approaches". It is a concept that starts from the assumption that there can be a development, qualitative improvement or deployment of potentialities, without growth, that is, without quantitative increase of the physical scale, without incorporating more energy and materials. In other words: it is growth that can not continue indefinitely in a finite world, but development is possible, possible

and necessary, because the present forms of life cannot continue, they must undergo profound qualitative changes, both for those (majority) living in precariousness as for the 20% who live more or less comfortably. And these qualitative changes imply a development (not growth) that will need to be designed and oriented properly (Vilches, Gil, Toscano and Macías, 2016, p.3).

Given this situation, there is the urgency to adopt a large-scale commitment to change and must be covered from the social and individual context, especially when the development of any technological action is directed to the solution of environmental problems, is aimed to failure if it is not taken into account the human element, responsible for both negative actions and also being a primary factor in solving them (Calixto and Herrera 2010, p 230).

Today, education is conceived as one of the basic needs of the individual. Thus, Delors (1996), in his report entitled "Education holds a treasure" poses the paradigm of lifelong learning as a backdrop, based on four pillars: learning to know, learning to do, learning to be and Learning to live together (p.34). It is also recognized that the concept of lifelong education is the key to entering the 21st century, a concept that goes beyond the traditional distinction between primary education and lifelong education and coincides with another notion often formulated: Of educational society in which everything can be an opportunity to learn and develop the capacities of the individual (p.35).

Nicaragua, within the Latin American framework and as a member of UNESCO, must respond to educational requirements as a key and decisive factor in development from various levels, dimensions, modalities, situations and contexts. It is for this reason that the expression of Arríen and Lucio Gil (2012, p. 7) is considered opportune: Education, both from its scientific dimension and from its pedagogical dimension, constitutes a large and rich nursery in which are incubated, processed, develop and innovate their theories, approaches, properties, possibilities and opportunities, which are always opened to reflection and action, in a permanent interaction of people. Education is an entity of great proportions, but its value and concrete future come alive in the teaching-learning process of each person.

Environmental education emerged in the second half of the twentieth century as a necessary proposal to address environmental issues. In this sense, Martinez (2012 p.1) presents a broad definition: Environmental education is a fundamental instrument to achieve the major objectives necessary for a sustainable development which proposes that the population acquire knowledge about the natural, cultural and social and contribute to the solution of environmental problems, while linking the human being with his immediate environment: hamlet, neighborhood, educational center, workplace, community, region, country and worldwide.

2. Non-formal environmental education in rural contexts

Previously, a dissertation was presented about the hopeful element in which environmental education has been constituted, although in itself it will not have the desired results, for it, in this section it is associated with another component of great scope and concern in the present world, That is, to the non-formal dimension in rural contexts or spaces.

Thus, non-formal environmental education was defined by the Secretariat of Urban Development and Ecology (SEDUE, Mexico) as "the one that is developed parallel or independent to formal education and therefore is not enrolled in the programs of the cycles of school system and

although the educational experiences are sequential, they do not constitute levels that prepare for the next nor is it certified and can be directed to different population groups". However, the activities should be systematized and programmed to achieve the proposed objectives (Sánchez, 2009, p.36).

Also, environmental education has clear objectives achieved through specific methods in which the recipients are well defined and delimited and it is feasible to establish a monitoring of the tasks for the evaluation of either the applied methods or the objectives (Sánchez, 2009, 36).

In general, the difference with formal environmental education is that in the formal education the educational program is covered under a training and accreditation certificate by an official institution that will support a certainly recognized level; non-formal environmental education is understood as "the transmission of environmental knowledge, skills and values outside the institutional educational system, which entails the adoption of positive attitudes toward the natural and social environment, translate into actions of care and respect by biological and cultural diversity that promote intro and intergenerational solidarity.It is recognized that environmental education is not neutral, but is ideological, since it is based on values for social transformation" (Phaedrus, 1996, cited by Sánchez, 2009, pp. 36-37).

UNESCO (2007, cited by Sánchez, 2009, p.37), states that the main objectives of Non-Formal Environmental Education are:

Encourage participation and involvement in decision-making, personal leadership skills and action-oriented learning, not only as the acquisition of skills, but also as a commitment to participation.

- Move from thoughts and feelings to action.
- Promote cooperation and dialogue between individuals and institutions.
- Promote different ways of seeing things, facilitating the exchange of views.
- Create a state of opinion. Prepare for changes.
- Stimulate and support the creation and strengthening

In this way, it is affirmed that Environmental Education and Popular Education are closely linked. Both are complementary and identify in the approach of local participation, in the rescue of knowledge, in the process of collective reflection and the proposal of alternative solutions, since the non-formal dimension will serve as a stage for the development of permanent space Protection and management of our nature (Chacón-Ortiz, 2015, page 22)

It is recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which recognizes and promotes non-formal education as a tool for empowerment and social transformation (Hoppers, 2006, quoted by Chacón-Ortiz, 2015, p.22).

“The rural world has transformed radically, extensively and qualitatively in a vertiginous way in the last decades, forcing that its traditional school must resignify, not only in the territory in which it is, but in the educational system” (p.2).

The educational system of several countries, and mainly in Latin America, implements a curriculum that does not respect the contextual characteristics of each student, is perceived then, "The

abyss between what the education system teaches and what students need to learn is simply unacceptable. This educational dysfunction is so damaging to our youth, to the productive sector, and to the future of our nations that we can not continue to accept theories, justifications and elucidations of the 'specialists' who insist on keeping the superfluous in the curriculum, instead of replacing it with the essential" (Lacki, p. 5).

Education is considered the axis that transversals development, therefore, at the global level, it is determined key to preparing young people to face the rapid technological, economic and labor changes of their societies.

From this new logic, education must nourish a human development closely linked to the struggle for the rights of the planet, both from its natural resources, its biodiversity, its human diversity expressed in the capacity and wealth of each person, as well as their Anthropological, social and cultural vision.

According to Lucio Gil (2010), education is required to tackle, from content, competences and values that are oriented, as a priority, to contribute constructively and creatively to overcoming the serious gaps of deterioration suffered by our nature (p. 357).

3. Pedagogical and didactic foundations in environmental education

The training proposal that makes it possible for the inhabitants of the community to know and understand environmental conflicts and to solve them, must have general pedagogical and didactic foundations of environmental education based on all the scientific arguments currently posted as successful theories in combination with the experiences of life that the community has.

The aforementioned action must seek deep and solid changes about awareness and action in each beneficiary of the program. As stated by DANIDA (2001, cited by Mendieta, 2008, p. 47), citizens of Central American countries have no training or awareness of the need to protect the environment, which may be due to the limited implementation of actions for Environmental Education and the use of inadequate didactic strategies to achieve the expected impact in the improvement of the environment.

3.1. Social Constructivism

Environmental education, in the context of contemporary pedagogy, is considered as a theoretical, methodological and practical model that transcends the traditional educational system and reaches the conception of environment and development.

Abbott (1999, in Paye (s.f.), p.2) states that constructivism argues that learning is mostly active. A person who learns something new incorporates it into their previous experiences and their mental structures. Each new information is assimilated and deposited in a network of knowledge and skills that previously exist in the subject. As a result, we can say that learning is neither passive nor objective, on the contrary, it is a subjective process that each person is constantly changing in the light of their experiences.

3.2. Participatory Action

The participation of the population as the principal agent of any social transformation determines the effective change of the situation that lives. According to Bru and Papagoite (2003, p.1)

Participation deepens democracy and facilitates social articulation; It introduces the perspectives of the different social actors (the silent majority, grassroots sectors, active minorities, economic agents and institutions) in the field of planning and intervention and allows to guide and manage in a complementary way, those planning processes that have clearly identified the Interests of citizens. Participatory methodologies, as additional tools for professional work at the micro-local level, such as a neighborhood, district or municipality, can contribute to achieving the "ultimate goal" of community integration and social cohesion. Citizen participation is a means to improve the quality of life.

The involvement of the population, collective or group can adopt two basic forms, although between both poles can be established a whole series of possibilities according to each particular situation. Thus, it can participate in the entire process, in the selection of the problem or object of study, research design, fieldwork, analysis of results and critical diagnosis, preparation of proposals, debate and decision making, planning and execution of activities And evaluation of an action. Or, in a partial way, that is to say, participating in some of the phases, for example, in the design, but not in the realization of the research to, once obtained the results, discuss and analyze possible proposals of action.

3.3. Biological-Systemic Human Development

The application of Bronfenbrenner's (1987) human development approach is proposed, based on a critical theory of human development in which the individual is considered to be the product of a set of interactions among its members.

The fundamental postulate of Bronfenbrenner is that natural environments are the primary source of influence on human behavior so that observation in laboratory settings or clinical situations offer us little of human reality (Torrico, Santín, Andrés, Alvarez- Darden and Lopez, 2002, p.2).

Relationship with practical, coexisting, social and political aspects of its environment Ecological Environment: The one where the development of the individual takes place and in which, a series of events occur that affect him.

Environmental concern and ecological behavior

The study of environmental concern is closely linked to the possibility of explaining and predicting environmental behavior. Therefore, environmental concern, considered as a cognitive process that predisposes to initiate pro-environmental behaviors, will be more readily understood if the concept of biological or environmental behavior is known, as well as the determinant variables associated with such conduct.

The natural response refers to those actions that involve a deliberate implication and have certain useful consequences on the protection of the environment (Hess et al., 1997, Suárez 1998, Corral-Verdugo, 2001, cited by González, 2002, p.25). The concept would encompass a whole series of human actions or activities that have a relevant influence on the nature and intensity of environmental problems (Cone and Hayes, 1980) and the quality of the environment (Castro, 2001), such as actions Resource saving, reduction, recycling and reuse of products, responsible consumption and avoidance of pollution and deterioration of natural ecosystems and built environments.

Therefore, through this study, the non-formal environmental education program for the rural communities of Molino Norte, Matagalpa, will be formulated, specifying precise and pertinent curricular elements in order to achieve the objective conceived: competences, contents, methodologies, didactic strategies, Resources and the evaluation process, in addition to this, the training approach of the environmental trainers who will be in charge of the program.

CONCLUSIONS

Appropriating theories and combining them with everyday experiences that support the Main reason to be of the Environmental Education, from an endogenous perspective that achieves the internal capacities of local communities, will result in the interpretation of the environment in which they live and define the best Educational and social strategies for the conservation, protection and sustainable management of their natural resources, without neglecting theories of human development.

The community leadership in the prevention and resolution of environmental conflicts will be strengthened from an overall vision and adaptive management of the basin, which contribute to broaden the environmental perception from the information, commitment and motivation of relationship between human being and environment, until reaching the behavioral change, giving a special place to the rural education, from the practice of action research and the creation of strategic alliances.

It is intended to build a consistent, relevant and feasible non-formal environmental education program that reflects all the curricular elements in an interrelated way, with an accessible vocabulary to all its beneficiaries, suggesting practices that allow raising the environmental culture of the inhabitants, to achieve behaviors in favor of environmental protection and the improvement of their quality of life. It should be noted that the principle guiding of the whole process, from its planning, execution, and evaluation, is proposed from the methodology of Environmental Literacy; In addition, it contemplates the preparation of training to the trainers and a pedagogical accompaniment plan with their respective methods, techniques and evaluation instruments, as much of the learning as of the impact of the program.

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