



Factibilidad de la Estrategia Metodológica para la preparación agroecológica de la carrera Agronomía en Imías ***Feasibility of the Methodological Strategy for the agroecological preparation of the Agronomy race in Imías***

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Recibido: 21 de junio de 2021

Aceptado: 22 de diciembre, de 2021

Resumen

La investigación se fundamenta en el fortalecimiento de la preparación metodológica de los profesores de la carrera de Ingeniería Agrónoma, para la atención a la estrategia agroecológica. La misma pretende, evaluar la factibilidad de esta estrategia metodológica que garantice el adecuado ejercicio de la profesión desde la agroecología. Ofreciendo vías para dar tratamiento a la educación agroecológica sobre la base de referentes filosóficos, psicológicos y pedagógicos, se fortalece el trabajo metodológico en el departamento y se potencian los valores medioambientalistas en el Centro Universitario Municipal en Imías. Empleando métodos del nivel teórico, empírico y estadístico matemático.

Palabras clave: Estrategia metodológica; Agroecología; Valores medioambientalistas; Educación agroecológica.

Summary

The research is based on the strengthening of the methodological preparation of the professors of the Agricultural Engineering career, for the attention to the agroecological strategy. It aims to evaluate the feasibility of this methodological strategy that guarantees the proper exercise of the profession from agroecology. Offering ways to treat agroecological education based on philosophical, psychological and pedagogical references, methodological work in the department is strengthened and environmental values are promoted in the Municipal University Center in Imías. Using methods of the theoretical, empirical and mathematical statistical level.

Keywords: Methodological strategy; Agroecology; Environmental values; Agroecological education.

Introduction

Environmental protection and ecological problems have become one of the major political, economic, social and educational concerns of contemporary times worldwide, on whose solution and prevention the existence of life on Earth depends.

This environmental issue and the conception of sustainable development, has been the task of many scholars, for example, Valdés (2012), concludes:

To imply a type of development in all productive and social fields, that satisfies the basic needs of the current human generation, without endangering the needs of future societies to satisfy theirs, require wills, decisions and implementation of political, economic, scientific, technical and educational actions among others. (p. 48).

According to Bayón (2013), sustainable development has acquired a significant importance that goes far beyond keeping intact the environmental capital that produces a flow of income. The cultural aspect of sustainability to which importance is generally attached, recovers it when its value as an objective that includes development is recognized.

Therefore, the relationship of human beings with the natural environment is necessary and has been seen, until now, predominantly in biophysical terms, but there is a growing awareness that societies themselves create complex procedures rooted in their culture to protect and manage their resources. Hence the need to rethink the relationship between Education and the Environment, on the sustainable management of our planet.

In relation to what has been said so far about the interaction between Society and Nature, Núñez (1999) states: "the dynamizing role of the human being, in his double condition of natural and social element, since his action depends on the effect of these interrelations, is a sustainable form of development, which translates into a better quality of life" (p. 56). (p. 56)

That is why environmental education in this sector is necessary; however, it is not sufficiently emphasized, as it pursues a common objective: the sustainability of the agroecosystem in its relationship with human communities.

In Cuba there is a tendency to promote sustainable mountain development, endorsed in the Guidelines of the Economic and Social Policy of the Party and the Revolution (2011), in Chapter 5: Policy of Science, Technology, Innovation and Environment assumes Article 133 referred to:

sustain and develop comprehensive research to protect, conserve and rehabilitate the environment and adapt environmental policy to the new projections of the economic and social environment.

To this effect, Law 81 of the Environment (1997), declares among its principles:

The active participation of all social actors at both central and local levels, on the basis of coordinated action, founded on cooperation, co-responsibility and the formation of an environmental conscience, deepening the actions of education, dissemination and environmental information to the entire population, without distinction of sex, age or skin color. (p.13).

Although the university addresses issues related to the environment, it is not always possible to reach a clear understanding of the responsibilities that the institution has in this regard, so that the work carried out in the daily performance of teaching is insufficient.

By synthesizing the authors' experience in educational work and the studies carried out through various texts, manuals, environmental strategies, masters and doctoral theses, methodological sessions and the diagnosis in the preparatory stage of the research, aspects related to the treatment of environmental issues were investigated and there are still insufficiencies such as:

1. Lack of demonstrative activities from the teaching department in the preparation of the professors of the Agricultural Engineering career for the curricular exit to the agroecological topics.
2. All the potentialities offered by the environment are not yet taken advantage of, to develop the content activities related to environmental education and in particular with the agroecological dimension.
3. Inconsistency in the preparation of students in the thematic referred to agroecology in its systemic conception that allows them to relate the effects of conventional agriculture with the main environmental problems of their surroundings.

Taking into account these deficiencies, the scientific problem is posed as follows: How to strengthen the methodological preparation of the teachers of the Agronomy Engineering course for the attention to the agroecological strategy?

In correspondence with the above mentioned, the objective of the research is focused on an evaluation of the feasibility of the methodological strategy for the strengthening of the agroecological preparation of teachers in the Agricultural Engineering career of the Imías municipality that guarantees the adequate exercise of the profession.

Development

Theoretical foundations that support the methodological work in function of the agroecological preparation of teachers in the Agricultural Engineering career

The contemporary use of the term agroecology dates back to the 1970s, but the science and practice of agroecology is as old as the origins of agriculture. As researchers explore indigenous agricultures, which are modified relics of older agronomic forms, it becomes increasingly apparent that many locally developed agricultural systems routinely incorporate mechanisms to accommodate crops to the variables of the natural environment, and to protect them from predation and competition.

Philosophical Foundations

The particularities of the Cuban social system have their philosophical foundations in the Marxist-Leninist postulates and in Martí's and Fidel's, so it is obvious to point out that the dialectical materialist conception is assumed as a philosophical support, from its methodological function, which allows perceiving the phenomena, processes and objects in their necessary interaction.

For the purpose of this research, it is appropriate to approach the scientific conception of the world and the theories of its development, because the environment constitutes a complex and dynamic system of political, ideological, social, juridical, ecological, economic and cultural interactions, which evolves through the historical process of society.

The Marxist-Leninist theory, as a social science, by conceiving the phenomena, objects and processes in dialectical interaction, unity and mutual conditioning, assumes the individual as an individual social being, but as the fruit of social relations, his personality definitely marked by the socio-cultural conditions in which he develops.

It is indisputable for this research, the use of the dialectical and historical materialistic method, precise to develop it as a logical, scientific and objective process. Hence, the study of the agroecological topics indicated in Higher Education is considered, based on the use of this method, as a process of organic unity and its corresponding interrelations.

Sociological foundations

It is conceived in the preparation of the education professional that facilitates them to influence in the formation of an agronomist capable of producing in a sustainable system, consequently, with the policy of the PCC from the principles that sustain our political, ideological, cultural and environmental alignment.

The training of agricultural workers presupposes the development of ethical results in the process of agricultural production, in correspondence of the ecological, socioeconomic and cultural characteristics of each locality, which makes possible the promotion of standards of coexistence in harmony with the ecological, economic, social and cultural environment in a conscious, reflective, creative and responsible manner.

This also considers the promotion of knowledge, skills and attitudes in future professionals to interact harmoniously with their environment, taking advantage of the contributions of scientific knowledge and accumulated in the agroecological culture, leading to the enrichment of their comprehensive training, according to the particularities of their context of action, based on the activities developed by schoolchildren both individually and in groups, mediated by communication in the process of socialization.

Psychological foundations

There are different psychological conceptions that diverge in terms of their approaches, currents and theories, regarding the teaching-learning process, in correspondence with the objective of this research, the transformation of the teacher is required from integrating a holistic vision in the close interaction with the social environment, so we assume the cultural-historical approach of Vygotsky (1987), which incorporates a solid dialectical and materialistic conception by nature.

For the interests of this research, the contributions of Vygotsky (1987), reflected in the concepts of internalization and externalization, gain significant relevance, which indicates a dialectical interaction between the social and the individual, not as a simple and passive act of cultural transformation, but in full interaction and transformation of reality and the subject himself, from the development of higher psychic functions, raised first at the interpsychological and intrapsychological level.

In the agricultural sphere, one of the aspects of greatest interest is the integral management of the ecosystem, so it is considered that the promotion of agroecological education is one of the appropriate ways to enhance the solution of these problems; education that requires will, decision and implementation of political, economic, social, technical and educational actions.

To this end, priority is given to work on the construction of fundamental knowledge (knowing how to be, knowing how to live together, knowing how to learn and knowing how to do). Where environmental education in general and basic knowledge for sustainable development play an

important role, based on the implication of education in the promotion of sustainable development, as one of the great aspirations of today's society.

The agroecological approach considers agricultural ecosystems as the fundamental units of study, and in these systems, mineral cycles, energy transformations, biological processes and socioeconomic relationships are investigated and analyzed as a whole.

According to Martínez (2002), who states:

This gives rise to considering Agroecological Education as: the process through which people acquire the necessary knowledge for the development of agricultural work from an ecological perspective which requires that the development of agricultural work be developed under the conditions of maintaining the organism - environment balance. (p. 34).

This presupposes that if the objectives of environmental education in general, framed within the purposes of the Belgrade Charter (1975), are summarized in helping individuals and social groups to raise the level of awareness, knowledge, attitudes, skills and habits, capacity for evaluation and participation in society.

Agroecosystems have various degrees of resilience and stability, but these are not strictly determined by factors of biotic or environmental origin. Social factors, such as the collapse of market prices or changes in land tenure, can destroy agricultural systems as decisively as drought, pest outbreaks or soil nutrient depletion.

Pedagogical foundations

It is considered that, in the specific context of pedagogy, problems are understood as contradictions or discrepancies between the current state and the desired state, between what is and what should be, according to certain expectations arising from a given social and/or educational project. Its design implies a dialectical articulation between the objectives (goals pursued) and the methodology (ways to achieve them).

Various methods of agroecological analysis are currently being developed throughout the world. Four main methodological approaches can be considered as being used:

1. analytical description: many studies are being conducted that carefully measure and describe agricultural systems and measure specific properties such as plant diversity, biomass accumulation, nutrient retention and yield.
2. Comparative analysis: Comparative research generally involves the comparison of a monoculture or other cropping system with a more complex traditional agroecosystem.

Normative farming systems: these are often constructed with specific theoretical models in mind. A natural ecosystem may be limitless, or a native agricultural system could be reconstituted with much effort. Although agronomy has undoubtedly been the mother discipline of agroecology, it has been strongly influenced by the rise of environmentalism and the expansion of ecological studies.

From the pedagogical point of view, the pedagogical principles of Addine (2002) constitute theoretical references, for example: the principle of the unity of the scientific and ideological character of the pedagogical process, the principle of education with life, the social environment and work, the principle of the unity of the instructive, the educational and the developmental, and the principle of the unity between activity, communication and personality.

The agroecological environmental education of teachers is currently a recognized objective and even a priority in the Cuban educational system. It is a complex task that cannot be approached without contextualizing it in the general problems of the educational system, in curriculum design policies, in the specific characteristics of environmental education and in the characteristics of each educational scenario.

The purpose of this education for teachers is basically oriented to the change and adaptation of their way of acting to the new realities, providing them with principles, concepts and procedures that facilitate it, developing appropriate attitudes and results from the integration of theory and practice, which demands a reconceptualization in terms of the model of environmental training of university teachers to perform in different educational scenarios, taking into account the integration of elements of the environmental characteristics of these scenarios, the environmental educational needs, thus the methodological elements of the teaching-educational process.

Among the educational objectives of the agronomist's training is to assume a dialectical materialistic attitude with love for nature and the profession and to consolidate ethical, aesthetic, mortal, humanistic, solidarity, honesty and responsibility principles proper of a professional who has within his responsibility to produce food in quantity and quality without affecting the environment.

In this sense, it is of vital importance the integration of contents oriented to the agrosustainable development from the university in mountain conditions, since agricultural work is recognized as one of the main activities that maintain an unsustainable behavior of man towards the environment.

The most relevant criteria addressed, assume the agroecological environmental education of teachers, as a way for the complementation and deepening of knowledge and skills that would help to increase professionalism as a fundamental agent of change, to lead correctly the pedagogical process they lead, from a humanistic perspective and from the emerging paradigm of action - participation research. Therefore, it is considered necessary to deepen in the differentiation that this training should have from the characteristics of the different scenarios of professional performance of university teachers.

In the legal order, in Cuba, environmental protection and the work on Environmental Education are included in the main political and social documents of the nation, such as the Constitution of the Republic, the Legislation and in the programs, methodological guidelines, textbooks of the different levels and types of education of the Ministry of Education, the Law of the Environment (1997), among other documents.

Didactic foundations

Taking into account Fuentes (2001), who states:

Didactics of Higher Education has as its object the process of formation of professionals, which is defined as the process that consciously develops in institutions of higher education, through the relationships of social character that are established among its participants, with the purpose of educating, instructing and developing future professionals, systematizing and recreating in a planned and organized way the culture accumulated by humanity, thereby responding to the demands of society" (pp. 91-93).

The educational process has an essentially social character and is developed as a system, to form all members of society in its broadest sense, involving the formation of cognitive, affective and volitional traits of the personality. Such a process cannot be left to the spontaneity and inspiration of those who intervene in it and much less of those who direct it.

Didactics studies the personal and non-personal components. Research analyzes the non-personal or didactic components. The objective is the guiding category. It is defined as the pedagogical model of the specialist's social task in which knowledge, skills and results, level of depth and level of systematization are specified. They are closely related to the content.

The content is the part of the activity of the professional's object of work that must be assimilated by the students in order to achieve the objectives. It should be emphasized that the system of skills is supported by the experiences assimilated through the modes of action in the practical process

and require training. In addition, the system of values and attitudes should be included, in a special way, as a disposition to action and ideal formations and models to be reached of what is positive for the person who solves a need.

Regarding teaching methods, it should be taken into account that, in Higher Education, in correspondence with the training of specialists, reproductive and productive methods should be combined according to the objectives set and the types of classes to be developed. The growing tendency for universities to be centers for the production of knowledge makes it necessary to use methods that collaborate with this.

Characterization of the current state of the treatment of agroecological contents in the methodological work in the Agronomy Engineering course.

It was considered necessary to determine indicators, which allowed a qualitative and quantitative assessment of the behavior of the problem to be investigated, allowing a comparative analysis of the results, these indicators are presented below:

1. Level of methodological preparation of the teacher.
2. Adequate use of methods, procedures and means of teaching in the learning of the subject Agroecology.

In correspondence with the rest of the components of the professional's model, the environmental dimension is approached from the preservation and conservation of the environment.

In this sense, it was possible to summarize that:

- There is a correspondence between the different components of the model of the professional in reference to the introduction of the environmental dimension and the positions assumed for its treatment.
- The environmental dimension in the model of the professional agronomist is characterized by addressing environmental issues from the profession, directed towards the preservation and conservation of the environment, with some elements related to sustainable development.

The analysis carried out in relation to the results obtained in the application of the different diagnostic instruments and the comparison between them, allows to arrive at generalizations and for this analysis the proposed dimensions and indicators were taken into account.

Indicator: students' performance.

- Knowledge in relation to the inclusion of agroecological topics in the profession is still insufficient, considering that this aspect is not sufficiently addressed in the different activities developed.
- Insufficient participation in teaching activities related to environmental impact assessment.
- The participation of students in practical activities related to environmental impact assessment is insufficient.

Indicator: Performance of professors.

- There is insufficient use of the potential of the content system for the treatment of agroecological topics in the curriculum.
- Scarce methodological preparation of professors to strengthen agroecological preparation in the training process of the agronomist engineer.
- Poor interdisciplinary treatment by professors in relation to agroecology.
- Scarce knowledge of environmental problems from the profession.

In a general sense, it was found that although the professors state that they have the necessary qualities and attitudes for the methodological work from their different ways, the analysis of the results of the instruments applied show that the methodological action of the group has not been systematic, the motivation, implication and responsibility to assume the methodological work has not been constant, the communication capacity is insufficient and the possibilities for team work have not been used to their full extent.

Taking into account the indicators that were evaluated from the application of the instruments, it was possible to detect that:

- The treatment to the contents, regarding the level of updating and the use of their potentialities to contribute to the significance in the students' learning and to the formation of values, was also very limited.
- It was observed that independent work activities were very restricted, as well as those aimed at contributing to the development of skills and metacognitive processes.
- The questions addressed to the students had a fundamentally reproductive character.
- The means used by the teachers were insufficient to represent the content objectively and with the necessary scientific rigor.

Evaluation of the feasibility of the methodological strategy designed for the Agronomy Engineering career in the municipality of Imías.

The methodological strategy that has been designed represents a system of actions of the teaching-learning process, interacting in its three dimensions (curricular, extensionist and socio-political) having as a goal the preparation of teachers for the transmission of knowledge of agroecology in the students of the Agricultural Engineering career. The evaluation of the results of the controls to the teaching process allowed identifying the following weaknesses:

1. The teacher's management to improve the quality of training from an integral perspective is still considered to have limitations.
2. The methodological work carried out in the discipline is insufficient for the efficient implementation of the environmental curricular strategy.

That is why this new strategy is designed, which is supported by different forms of methodological work, giving vital importance to workshops, taking into account that it is a new form of organization that aims to achieve the integration of theory with practice and from the pedagogical point of view, it is dynamic and the participants jointly analyze specific problems in order to transform conditions of reality, also in the field of reflection and action in which it is intended to overcome the separation between theory and practice.

For the feasibility of implementing the strategy, the methodological triangulation method was used, based on observation, criteria of users and specialists, which made it possible to cross-check the information derived from the results obtained. The sample selection criteria were based on the following indicators:

1. Appropriateness of the strategy.
2. Actual usefulness of the strategy to strengthen the agroecological preparation of the agricultural engineering teachers.

The results of the processing of the user criteria method applied to directors, heads of departments and professors of the Guantánamo University who live in the branch and work with the career, behaved as follows:

100% evaluate that, with the use of the strategy, the exit to the system of objectives of the career, the subject, the unit and the classes is made viable; while they consider that it favors the work of the teacher in the treatment to the development of professional skills.

The users consider that the elaborated strategy favors the systematization of contents of Unit No. 14; as it makes the direction of the teaching-learning process feasible, since its use benefits the performance of independent work and stimulates creativity in the students.

When evaluating the real possibility of inserting the strategy in the treatment of agroecology, in the production process of the territory, 100% agree with the achievement of this possibility.

The results on the practical implications of the strategy allowed us to contrast that:

- The users, mostly state that it makes possible to treat different problems of labor practice, during the linkage to the productive entities; likewise, it makes viable the treatment to other problems of the territory as, for example: sustainable development and the exit to the prioritized programs.

When evaluating the methodological usefulness, it was possible to corroborate:

- The users express in very much agreement and agreement that the contents are inserted in a systemic way according to the demands of the program, which guarantees the dynamic and harmonic character of the training process, in correspondence with the dialectical-materialist philosophical conception.
- When evaluating the actuality and scientificity of the inserted contents, the users consider the validity of these, from a perspective of broad approach both in the contents themselves and in the technical language used.

Assessments made by the specialists, referring to the validity of the strategy.

The group of specialists that issued conclusive opinions regarding the strategy was made up of 6 agronomists working in the scientific-productive activity of the University in the Faculty of Agroforestry and 2 in teaching.

The evaluation of the relevance of the strategy yielded the following results:

- 100 % of the specialists consider very much in agreement that there is systemic relation of the contents referred to in the strategy, which guarantees its dynamic conception, thus as correspondence between the treated contents and those of the performance.
- The specialists consider very much agree and agree that there is a close relationship between the contents of the unit and the questions considered for the evaluation.
- 100% of the specialists consider that the contents dealt with are current and truthful, while most of them agree in the categories of strongly agree and agree that the strategy has recognized scientific and methodological rigor.

Conclusions

The theoretical study carried out evidenced the current conceptions of the methodological preparation of teachers for their insertion in the current agroecological context, favoring the systematization of a new approach in the preparation, but multiple insufficiencies are reflected in this process in relation to the teachers of the Agronomy Engineering career since Universalization. The systematization of the theoretical foundations raised allows affirming that agroecology classes should have a theoretical-practical-experimental character, which served as support for the methodological strategy. According to the results of the initial diagnosis, limitations were evidenced in the treatment of agroecological training from the methodological work to direct the teaching-learning process in a productive way. The interconnected actions of the methodological strategy have a dynamic, systemic and integral character from a perspective of comprehensiveness and approach. The results of the methodological triangulation (criteria of users, specialists and pedagogical observation) made it possible to corroborate the usefulness and implementation of the methodological strategy to strengthen the agroecological preparation of the teachers of the Agricultural Engineering course in the municipality of Imías.

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