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## **THE FORMATION OF ENVIRONMENTAL CULTURE OF FUTURE AGRONOMIC ENGINEERS IS A DEMAND OF SOCIETY AND THE STRATEGIC TASK OF HIGHER EDUCATIONAL INSTITUTIONS**

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*ecological education,  
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### **SUMMARY**

The article highlights the urgency of the problem in forming the ecological culture of the future agroengineers in the process of their professional training in higher agricultural educational institutions. The purpose, principles and tasks of ecological education are described too. The ecological culture of agroengineer is outlined on the basis of the analysis of scientific and pedagogical works and state legislation. The specifics of the definition the concept "ecological culture of agroengineer" is proposed. The factors influencing on the formation of ecological culture of agroengineer are substantiated in this article. It is proved that the achievement of the ultimate goal of environmental education is possible when the whole process of their training is related with the environmental issues. The structure of ecological culture of future specialists and a model of pedagogical influence on its formation on the principle of empowerment-pedagogics are presented. The ways of forming the ecological culture of future agroengineers in the process of their professional training and accordingly the task of higher agricultural educational institutions regarding the formation of the ecological culture of future agroengineers are proposed.

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### **RELEVANCE OF THE TOPIC**

The ecological situation that has developed now in Ukraine and the world requires a thorough research on the impact of the results of human economic activity, in particular on the field of agro-industrial production. The primary task of the students is to analyze the influence of educational structures on the formation of the ecological consciousness and youth culture, which acquires agricultural education.

Environmental education and education of future specialists in agro-industrial production is of strategic importance for the preservation of the environment, namely: soil protection from degradation, minimization of the impact of production processes on the environment, economic use of natural resources, production of environmentally friendly, quality products. Ecologization of the educational process in agrarian institutes plays an important role in the ecologically safe development of agro-industrial production and

therefore the study of the problem of forming the ecological culture of future agro-engineers is important and relevant.

### **THE PURPOSE**

The purpose of the article is the analysis of scientific and pedagogical works, state legislation on the formation of environmental culture of future agroengineers.

### **ANALYSIS OF LITERATURE**

Understanding of environmental education and education of student's youth is highlighted in the works of M. Bauer, P. Bachinskyi, G. Bilyavskiy, V. Verbitskiy, E. Gureyeva, E. Zhelibov, O. Matejuk, A. Nechos, T. Churilova, N. Yasinskaya and others.

The problem of forming an ecological culture of a person is disclosed in publications of V. Andrushchenko, G. Bachinskyi, V. Vernadskiy, L. Guberskiy, B. Kommoner, V. Krisachenko, J. Odum, A. Pechevi and other well-known domestic and foreign researchers, of the younger generation - in the works of G. Ponomarev, R. Roslavets, N. Kot, T. Vayda, N. Efimenko and others. The problems of ecological education and upbringing in universities are exposed in the studies of G. Beletskaya, L. Bilyk, L. Kurnyak, L. Lukyanova, A. Plakhotnik, T. Puzir, G. Pustovit, G. Tarasenko, O. Fedorenko, N. Fomin, M. Khomenko and others) as to the future specialists-agrarians are in the writings of S. Amelina, V. Bilonozhko, V. Hutsol, N. Demeshkant, O. Mitryasova, V. Onoprienko, K. Stetsyuk, L. Fenchakt and other scholars.

The analysis of scientific literature shows that such aspects as the problem, content, forms and methods of ecological education have already been widely disclosed, however not enough attention is paid to the problem of the formation the ecological culture of agroengineers in the process of their vocational training in higher agricultural educational institutions (HAEI).

### **PRESENTING MAIN MATERIAL**

The main environmental problem in the agroindustrial production (AIP) is to ensure that the development of science and technology focuses on the modernization of machinery and technology of agrarian production, increasing on this basis the productivity, stability and efficiency of agro-zoological ecosystems, minimizing the negative impact of agro-industrial production to the environment [1, p. 5]. In order to solve these problems, during vocational

training at HAEI it is necessary to form a training of agroengineers with a high level of ecological culture.

The specificity of the contradiction of the environmental culture of agroengineer is that in the minds of the specialist he is competing with the economic benefits from production, associated with obtaining the highest possible profit with the least cost of money, despite the harmful effects and environmental hazards of agro-industrial technologies to the biosphere and the environment.

In accordance with the Concept of the development of ecological education and upbringing in Ukraine [2] and the Law of Ukraine About the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2020 [3] the the main purpose of ecological education and upbringing is the formation of the ecological culture of the individual and society as a whole. So the formation of sound ecological knowledge and skills of environmental protection activities in the agro-industrial sector, environmental consciousness, thinking and values should become a priority in the preparation of agro-engineers capable of leading the society towards an environmentally sustainable development.

The problem of the formation the ecological culture of student youth is actively investigated in Ukraine but there is a disconnect of theoretical knowledge with solving practical problems. The low efficiency of environmental education is due to insufficient implementation in the educational process the innovative technology of education, aimed at forming the ecological culture of future specialists.

Ecological education is a set of components such as environmental knowledge, ecological thinking, environmental outlook, environmental ethics, environmental culture. Each component corresponds to a certain level (degree) of environmental maturity from elementary environmental knowledge, pre-school concepts to their deep awareness and practical implementation at higher levels. We distinguish conditionally the following levels of ecological maturity: initial (informative-preparatory), basic (basic- worldview), higher, profile-professional (worldview-mature) [2].

In our study the interest is the formation of profile-professional level of environmental culture of agroengineers.

The notion «ecological culture» is interpreted differently:

- it is a type of human life and its relationship with the environment, promoting a healthy lifestyle, sustainable socio-economic development, environmental safety of the country and every person. It is a means of self-organization of the essential human forces in the context of a particular natural environment [1, p. 52];

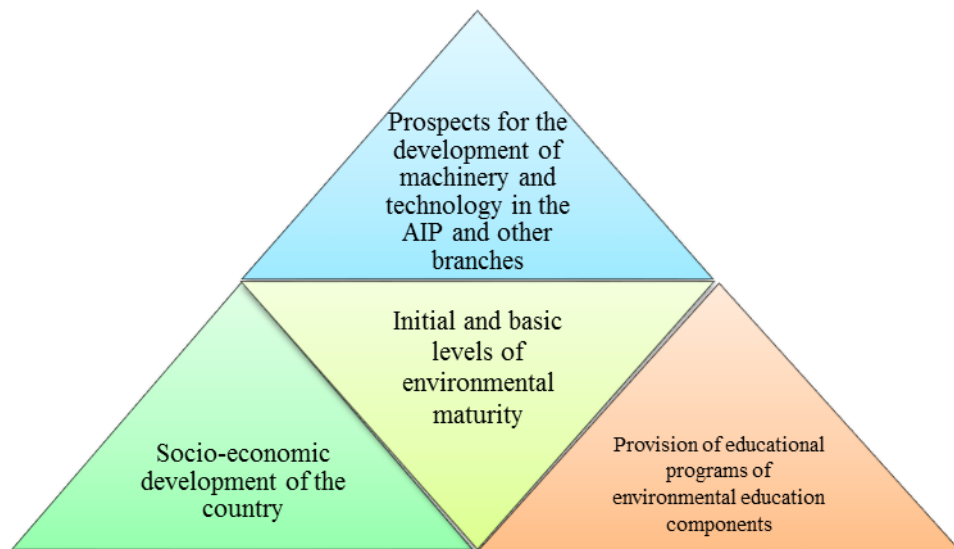
- the integral system, which is composed of: ecological knowledge; ecological thinking; a culture of deeds; a culture of ecologically justified behavior, characterized by the degree of transformation of ecological knowledge, thinking, culture of feelings into the daily norm of deeds [4, p. 16-17];
- a set of norms, views and installations that characterize the attitude of society, its social groups and personality to nature. The components of environmental culture include the following:
  - 1) intellectual (environmental knowledge and intellectual skills of worldview, possession of methods of causal thinking);
  - 2) personal (motivation, attitude and assessment, confidence in overcoming the ecological danger and the need to preserve nature);
  - 3) internal readiness (desire, intentions, the need to realize their positions in actions, activities on the protection of the environment) [5, p. 138];

- this is the process and the result of the formation the ecological consciousness of the individual, reflecting the inextricable unity between a set of knowledge, norms, ideas about nature, emotional-sensory and holistic attitude to it and the corresponding skills, abilities, needs of interaction and rules of human behavior in the surrounding world. Ecological culture is the knowledge of the basic laws and interconnections in nature and society, experiences and beliefs, an active and practical attitude to nature. This is a kind of "code of conduct" that underlies environmental activities [6, p. 113];

- a set of knowledge, skills, beliefs, guided by which a person realizes himself in the proper way, acts as part of the environment and as a subject responsible for himself, present and future generations of people for its condition. [7, p. 210];
- a certain program, objectified in activity, on the basis of which the subject of nature builds his historically specific process of interaction with nature. Ecological culture, drawn to two worlds - the natural environment and the inner world of man [8, p 55];

Taking into account the above interpretation of the ecological culture and the specifics of the professional activity of agroengineer we define his ecological culture as a set of interconnected professional and environmental knowledge, skills, thinking, own beliefs, consciousness, education, values, behavior, guided by which the specialist is responsible to the environment, is aware the consequences of his professional activities and takes care of the preservation and restoration of natural resources.

In order to comprehensively analyze the ways of forming the ecological culture of agroengineer we pushed away from the factors that directly affect him (fig. 1).



**Fig. 1. FACTORS AFFECTING THE FORMATION OF THE ECOLOGICAL CULTURE OF AGRONOMIC ENGINEER**

The secondary educational institution has a leading and most important role in environmental education and education of student youth.

The task of this education is to form a system of knowledge, views and beliefs that will provide public responsibility for the state of the environment, as the basis for the state's existence, and willingness to improve it by adopting the necessary environmentally sound solutions based on a new style of thinking and living in harmony with nature. This guiding idea has to evolve from elementary education to the end of school.

The basic components of ecological knowledge should be modern ideas about:

- the biosphere and its structural units, ecosystems, their biotic structure, genetic types, principles of classification; living substance and its role in biosphere processes; regularities of cycles of substances, energy and information;
- system «man – society – biosphere – space»; main types of anthropogenic influence on components of the environment and their negative consequences;
- the main global, state and regional environmental problems and ways of their solution; economic, legislative and normative principles of rational nature management; bases of state and regional ecological policy, etc. [2].

Ecological culture is provided not only by theoretical knowledge but also by practical skills which are expressed by:

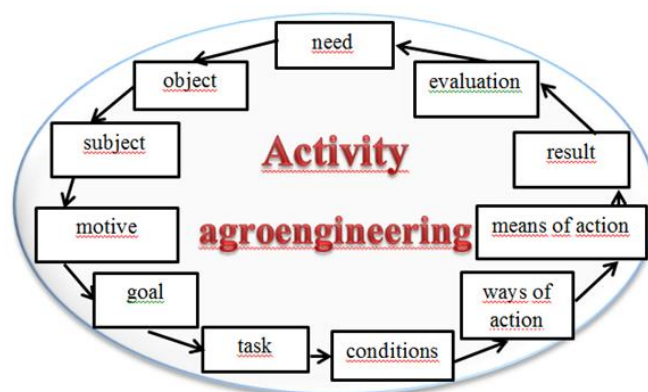
- the ability of people to consciously use environmental knowledge;
- formation of ecological skills in practical activity;
- implementation of the spiritual and ethical qualities of the individual;
- ability to empathize, to sympathize with nature;
- in the construction of competent, balanced, optimal relations with nature and society [1, p. 52].

Ways of forming the ecological culture of future agroengineers in the process of their vocational training in HAEI may include:

- ecologization of all components of vocational training;
- direction of ecological preparation for practical solution of environmental problems caused by agricultural activities of agrarian enterprises;
- combination of classroom studies with direct communication with nature (excursions, ecological actions);
- inclusion in the structure of educational research and research works (seminars, coursework, diploma projects, etc.) issues on ensuring environmental safety specific types of professional activities;
- formation of a conscious attitude to environmental problems that arise when performing professional tasks.

The ecologization of various components of the training of future agroengineers should take into account the specifics of their professional activities.

We consider the activities of a specialist as a process of its interaction with the environment, so that it achieves consciously set goals in order to meet the needs and obtain the desired result (figure 2).



**Fig. 2.** STRUCTURE OF THE SPECIALIST'S ACTIVITY

Agroengineer is a specialist in the field of maintenance and repair of motor vehicles, machine-tractor units and agricultural machinery, assemblies, outfit plant and equipment,

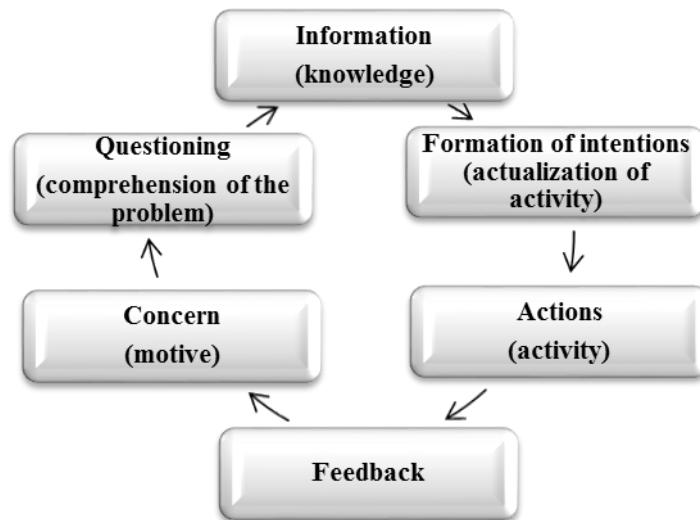
controls their technical condition by means of diagnostic equipment and devices, manages motor vehicles and machine-tractor aggregates, performs technological operations on the production and processing of agricultural products.

The ecological training of agroengineers should include: mastering the students knowledge of the principles of interaction of living organisms (first of all plant), the main sources of man-made environmental impact (conditions of soil erosion, ways of preserving natural reservoirs from the adverse effects of some field operations and maintenance of machine-tractor park), principles and methods of rational nature management, legal and social aspects of nature use and ecological safety, resource-saving and soil protection technologies of growing crops, ways to prevent or minimize emissions and discharges of pollutants from production, natural resource potential of the region and methods of land reclamation. Besides, the future agro-engineer must be able to analyze and predict the environmental impact of various activities, use the above knowledge in professional activities, in the process of fulfilling production tasks stick to environmental safety requirements.

Structural elements of the ecological culture of future specialists are the system of scientific knowledge, aimed at knowledge of the processes and consequences of human and society in nature, environmental values, knowledge of norms and rules of conduct in the environment and readiness for environmental protection activities, and therefore, so proceeding from above, we distinguish the following components of ecological culture:

- motivational (the set of aspirations for the knowledge of the processes and consequences of anthropogenic impact on the environment and incentive reasons);
- intellectual (concrete scientific knowledge, facts, concepts, regularities);
- reflexive (self-assessment of own knowledge, ecological value orientations, influence of own activity on the environment);
- professional activities (active participation in environmental activities, application of acquired skills and abilities for solving professional problems, ability to predict the consequences of nature transformation activities and prevent the development of environmentally hazardous phenomena).

Theoretical and experimental researches carried out in Ukraine during the last five years simultaneously with scientific researches in foreign countries testify the expediency of applying empowerment-pedagogy for forming the ecological culture of student youth. The essence of this pedagogy is to stimulate the students' learning activity by the scheme of empowerment-models (fig. 3).



**Fig. 3. MODEL OF PEDAGOGICAL INFLUENCE IN EMPOWERMENT-PEDAGOGY**

The student's action begins with the emergence of a need and motive that prompts her to find information for solving the problem. After understanding the information he chooses a way of action and begins to act. The reflection of the results of action creates a motive for a new stage, and the whole chain repeats itself again. So the spiral of empowerment works: providing the future specialist with motivation and inspiration for action. At the same time the most diverse forms of encouragement for environmental activities should be used such as the creation of environmental internet projects, youth environmental organizations, flash mobs, etc.

It is advisable to consider the process of forming the ecological culture of agroengineers in the «life-long learning» as the world trends in the development of scientific and technological progress generate both positive and negative environmental factors, which should be the subject of systematic study and integration into activity.

The use of mass media to increase the effectiveness of environmental education and environmental activity of the population is very important, related to the efficiency of the media, as well as their ability to influence practically to all the population of the country, shaping public opinion and attitudes towards one or another processes, objects and phenomena.



## CONCLUSIONS AND SUGGESTIONS

Consequently, on the basis of our research, we identified the following tasks of higher agricultural educational institutions in relation to the formation of the ecological culture of future agroengineers:

- integration of scientific knowledge of educational disciplines of all cycles of professional training into ecological education, because each of them has its own ecological potential;
- introduction of modern technologies, methods, forms, means, methods of purposeful formation of the ecological culture of future specialists;
- introduction of programs for informal and formal continuous ecological education and their implementation in the educational process with the purpose of independent acquisition of knowledge and skills, acquisition of own practical experience, self-directing of the person on the way of ecologically-minded behavior;
- ecologization the process of development the professional competencies in the process of their professional training under the influence of educational-research, environmental and educational and enlightening activities.

## REFERENCES

1. Hutsol V.: Formation of ecological culture of students of Agrarian University by means of distance learning: diss. ... candidate of ped. sciences: [special.] 13.00.04 «Theory and methods prof. Education». Vinnytsia State Ped. University under the name of Mikhail Kotsyubinsky, Vinnytsya (2013).
2. Concept of ecological education of Ukraine, <http://shkola.ostriv.in.ua/publication/code-148B3B2021C2C/list-B407A47B26>, last access 2006/10/04.
3. The Law of Ukraine «On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period until 2020», <http://zakon2.rada.gov.ua/laws/show/2818-17>, last access 2010/12/21.
4. Sapon S.: The role of «Eco School» in upbringing of environmental schoolchildren's culture. Methodical manual. MMK, Vinnitsya (2016).
5. Cherdymova E.: «Ecological Consciousness» and «Ecological Culture» in the Model of Ecological Education. Proceedings of the Samara Scientific Center of the Russian Academy of Sciences 12(3), 137-140 (2010).
6. Kurnyak L., Kurnyak O.: Ecological education of students of higher educational institutions. Collection of scientific works of Khmelnytsky Institute of Social Technologies of the University "Ukraine" (5), 109-114 (2012).
7. Yurchenko L.: Ecological upbringing and education as one of the decisive factors in the regulation the quality of the environment. Philosophical peripeteia 561, 210 (2002).
8. Dubovyi V., Dubovyi O.: Ecological culture: a manual. D.Grin, Kherson (2016).

9. Bondar O.: Environmental education for sustainable development in questions and answers: scientific methods for teachers: Bondar O. (ed.). D.Grın, Kherson (2015).

10. Volodymyr Ivanyshyn, Ulyana Nedilska, Veronika Khomina, Rita Klymyshena, Vasil Hryhoriev, Oleg Ovcharuk, Taras Hutsol, Krzysztof Mudryk, Marcin Jewiarz, Marek Wróbel, Krzysztof Dziezic: Prospects of Growing Miscanthus as Alternative Source of Biofuel / Renewable Energy Sources: Engineering, Technology, Innovation: ICORES 2017, 801-812, (2018). DOI 10.1007/978-3-319-72371-6\_78