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AGROECOLOGY: CONCEPTUAL PRINCIPLES AND WORLD TENDENCIES OF SCIENTIFIC RESEARCHES

The main directions of scientific researches and conceptual basis of agroecology science are presented. Attention is focused on the evolution of the concept of "agroecology". The importance of agroecology science in the world scientific community is highlighted. The results of the study of agroecology science by domestic scientists are submitted. The expediency of further studies and researches of the main aspects of agroecology in the context of sustainable development is considered.

Keywords: agroecology, agrosphere, sustainable development, world experience.

Actuality of the theme of research. The negative tendency of environmental degradation in the agrosphere led to the emergence of new independent science – agroecology. Today the role of this science in solving the problems of sustainable development has key aspects, because in the today's realities there is worsening of socio-economic and political situation in Ukraine that negatively affects on the ecological condition of agrosphere **[**1**]**.

In the world scientific community a concept of "agroecology" has becoming increasingly popular and is a topical issue of scientific discussions. For example, in France 2015 year is announced a year of agroecology. Here agroecology is officially ratified by the French legislation, combining economic, environmental and social efficiency of agriculture activities and also reducing the consumption of energy, water, fertilizers, pesticides and veterinary medicine, and is guided by the motto "with the natural mechanisms rather than against them".

The new project of the EU concerning agroecological issues – ARC2020 was set up in 2010 ahead of the lastest reform of the Common Agricultural Policy (CAP) in order to: give civil society a strong voice in the current reform debate, prepare common actions across European borders and mobilise individuals and organisations beyond traditional stakeholder interests. In other words, ARC2020 is a multi-stakeholder platform that has involved over 150 civil society organizations all working on issues affected by the EU's CAP **[**2**]**. So this project aims at appropriate measures of natural resources management and rural development. Project measurements spread on EU countries and in each country is used an individual approach and relevant instruments of influence and public policy.

Analysis of recent research and publications. An important contribution to the development of agroecology made such foreign scientists: Bensin B.M., Gliessman S.R., Warner K.D., Wezel A., Monique Axelos, Michel Mench, Jean Tirole, Oliver Moore, Ewa Tendziagolska and national scientists – Sozinov O.O., Furdychko O.I., Popova O.L., Chernikov V.A. etc.

The aim of research is an analysis of the main aspects of scientific research in agroecology.

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The main material of research. World experience shows that agroecology combines different approaches in solving the urgent problems of agricultural production. Although agroecology originally was considered in terms of production and plant protection, but in recent decades environmental, social, economic, ethical aspects and issues of sustainable development are becoming more important. Today a concept "agroecology" means either a scientific discipline or agricultural practices, or relevant agroecological (environmental) movement.

The using of the concept "agroecology" can be traced back from the 1930s. By the 1960s, agroecology was mentioned only as a scientific discipline. Since that time began to develop different directions of agroecology. After the environmental movement in the 1960s that have occurred in connection with the industrialization of agriculture, agroecology started to develop rapidly and contributed to the agroecological movements in the 1990s. Agroecology as an agricultural practice emerged in the 1980 s and often intertwined with the corresponding ecological movements. In addition, the dimensions of agroecological researches have been changed over last 80 years **[**3**]**.

In the United States development of agroecology started from the works of agronomist Bensin (Bensin, 1930) and at the same time with the study of agricultural crop of physiologist Hanson (Hanson, 1939) and agronomist Klages (Klages, 1942). In this way, the basis of agroecology in the US was agronomy. In the opinion of Hecht (Hecht, 1995), the second step in the development of agroecology took place in the 1960 s and 1970 s and showed a gradual increase in the application of ecological methods in agriculture.

Germany has a long history of agroecology as an educational discipline. From 1930 till now most of the studies of agroecology were conducted on the agrarian faculties. The starting point was applied zoology on issues concerning the plant protection (Freiderich, 1930), and later ecology of agricultural landscape (Tischler, 1950; Heydeman, 1953). France with assistance of Ministry of Agriculture and Sustainable Development of France in 2012 launched a new project "Agroecology", which aims at strengthening the position of agriculture in order to balance economic, environmental and social standards. The main goal is to attract French farmers to the process of sustainable agroecology formation till 2025.

In Poland agroecology is a modern approach to the sustainable agricultural practices, where agriculture focuses not only on economic aspects, but also takes into account the environmental needs of agrocenosis and surrounding areas. The modern farmer must possess a sufficient knowledge about plants and animals in rural areas and be aware about the relationship between living organisms and environment. Due to such methods, implementation of the rules of agroecology in agricultural practice will allow to receive safe and healthy food.

As well as in Ukraine, in Poland great attention is paid to agri-environmental education. In particular, the University of Agriculture in Krakow (Uniwersytet Rolniczy w Krakowie) opened a new specialty "Master of Science of agroecology". With the implementation of a training program a graduate will gain knowledge about the impact of agricultural activity on the environment, organic system of agriculture and food production, but also about rural development and multifunctional economic aspects of these processes, which increases employment opportunities in the institutions of the European Union.

To the opinion of prominent Ukrainian scientist, academician of the National Academy of Sciences and National Academy of Agrarian Sciences Sozinov O., agroecology is a science that aims to form a new philosophy of agrosphere. In this instance, this science not only decides problems of agricultural production and environmental preservation but also creates conditions for better life for the next generations and trevival of traditional spiritual values of the Ukrainian village **[**4**]**.

O. Sozinov is also a founder of the "agrosphere" concept in Ukrainian scientific space and his researches focuses on the fact that modern agrosphere is not only one of the many economic sectors, but also a part of the biosphere with its inherent patterns of energy and matter circulation and specific biota where human actions have a significantly greater impact than in the global biosphere on the Earth. In view of this, agrosphere simultaneously is natural and social category and occupies about 70 % of the territory of Ukraine. An integral component of agrosphere is rural area that in recent years is relevant theme and subject of scientific research **[**5**]**.

According to the opinion of Ukrainian researcher of the concept "agrosphere" Popova O.L., she points out that "application of the term "agrosphere" in economic science is caused by awareness of multifunctional role of agriculture in society, changing of principles of this industry development in the context of sustainable – socially, economically and environmentally balance progress. As a result, agrosphere become a voicer of agriculture functioning in accordance with modern requirements to this socially significant industry" **[**6**]**.

National sciences **[**7, C. 6**]** sum up that agroecological research is a special synthesis of environmentology (environmental science) and ecosozology (conservation science). Agroecology serves not only a sectoral of agricultural science which investigates agrosphere for the main needs of humanity but also studies general agri-environmental problems connected with nature conservation as an important component of sustainable development of environment.

In Ukraine agroecology (agricultural ecology) is accepted to be considered in the following aspects:

- independent branch of knowledge and already formed direction of ascientific researches which began from applied ecology and agronomy; studies the influence of environmental factors on productivity of cultivated plants, as well as the structure and dynamics of communities of organisms that exist on agricultural land;
- scientific discipline about agrocenosis which considers type or crop variety to be a central object by the sake of which agrocenosis are created;
- section of ecology that studies autoecology of agricultural plants and animals as well as cultures of ecosystems;
- section of ecology that examines the relationship between agricultural plants and animals with the environment.

In the "Guide directory of Agroecology and Environmental Management" established by the scientific staff of the Institute of Agroecology and Environmental Management of NAAS is submitted the following definition. Agroecology – a science that studies the possibility of rational use of agricultural lands for obtaining crop and livestock products with a simultaneous preservation of natural resources (soils, natural water, air, etc.), biodiversity and habitat protection of human and agricultural production from pollution. As a section of ecology, agroecology was formed in the

second half of the 20th century. Due to the sharp deterioration of the environmental situation in agroshpere, agroecology especially have been developing rapidly during the past two decades. By the way, ideas towards conservation of agricultural resources were actual even in the ancient times. Bolotov A.T. and Williams V.R. made an important contribution for the development of modern agroecology **[**8, C. 7**]**.

In order to speed up the European integration processes in Ukraine, the role of agroecological science is very important. Based on the research results **[**9, C. 17**]**, the main five tasks of scientific researches in agroecology were marked, namely: environmental assessment and regulation of human and technogenic impact on natural resources agrosphere; ecological condition and optimization of the structure components of agrosphere; basis of environmental safety and agriculture; agro-ecological monitoring and scientific basis of environmental prediction of agrosphere; adaptation of agricultural production to the predictable climate changes.

Conclusions and recommendations for further researches. Today agroecology is an important area of scientific researches and topical issue of scientific debate. In the context of world experience it was found that the concept of agroecology has a long history of evolution and is now considered in the following three areas: science, environmental movement and agricultural practice. It is advisable to note that a significant contribution to agroecology science have also made Ukrainian scientists.

Література

1. Черніков В.А. Агроекологія / В.А. Черніков, Р.М. Алексахін, А.В. Голубєв та ін.; за ред. В.І. Чернікова, А.І. Чекереса. – К. : Вид-во "Колос", 2000. – 536 с.

2. Agricultural and Rural Convention 2020. **[**Electronic resource**]**. – Mode of access http://www.arc2020.eu / (access July 15, 2015).

3. Bensin B.M. 2009. Agroecology as a science, a movement and a practice. A review / B.M. Bensin et al. // Agronomy for Sustainable Development. – 2009. – Vol. 29, No. 4. – Pp. 503-515. **[**Electronic resource**]**. – Mode of access http://dx.doi.org/10.1051/agro/2009004

4. Созінов О.О. Агроекологія – філософія сільського господарства XXI століття / О.О. Созінов // Вісник аграрної науки : наук.-теорет. журнал НААН України. – 1997. – № 9. – С. 61-67.

5. Созінов О.О. Агросфера України у XXI ст. / О.О. Созінов // Вісник НАН України. – 2001. – № 10. **[**Електронний ресурс**]**. – Доступний з http://www.visnyk-nanu.kiev.ua/2001-10/3.htm

6. Попова О. Агросфера: соціоекономічний зміст і засади сталого розвитку / О. Попова // Економіка України : політико-екон. журнал. – 2012. – № 5. – С. 73-84.

7. Фурдичко О.І. Агроекологічні аспекти охорони навколишнього природного середовища на засадах збалансованого розвитку / О.І. Фурдичко, В.В. Лавров, В.В. Коніщук // Агроекологічний журнал. – 2010. – № 2. – С. 5-11.

8. Словник-довідник з агроекології і природокористування / за наук. ред. О.І. Фурдичка. – К. : ТОВ "ДІА", 2012. – 336 с.

9. Фурдичко О.І. Основні напрями наукових досліджень в агроекології / О.І. Фурдичко // Наукові доповіді Національного університету біоресурсів і природокористування України : зб. наук. праць. – К. : Вид-во НУБіП України. – 2014. – № 7. **[**Електронний ресурс**]**. – Доступний з http://nbuv.gov.ua/j-pdf/Nd_2014_7_26.pdf.

Гнатів Н.Б., Скаводіна Ю.І. **Агроекологія: концептуальні засади та світові тенденції наукових досліджень**

Розглянуто основні напрями наукових досліджень та концептуальні засади науки агроекології. Увагу зосереджено на еволюції поняття "агроекологія". Розкрито значення науки агроекології у світовому науковому просторі. Наведено результати дослідження науки агроекології вітчизняними вченими. Обґрунтовано доцільність подальшого вивчення та дослідження основних аспектів агроекології у контексті сталого розвитку.

Ключові слова: агроекологія, агросфера, сталий розвиток, світовий досвід.