

ASERS

Journal of Environmental Management and Tourism

Quarterly

Volume XI

Issue 6(46)

Fall 2020

ISSN 2068 – 7729

Journal DOI

<https://doi.org/10.14505/jemt>

 **ASERS**
Publishing



Editor in Chief

Ramona PÎRVU

University of Craiova, Romania

Editorial Advisory Board

Omran Abdelnaser

University Sains Malaysia, Malaysia

Huong Ha

University of Newcastle, Singapore,
Australia

Harjeet Kaur

HELP University College, Malaysia

Janusz Grabara

Czestochowa University of Technology,
Poland

Vicky Katsoni

Techonological Educational Institute of
Athens, Greece

Sebastian Kot

Czestochowa University of Technology,
The Institute of Logistics and International
Management, Poland

Nodar Lekishvili

Tbilisi State University, Georgia

Andreea Marin-Pantelescu

Academy of Economic Studies Bucharest,
Romania

Piotr Misztal

The Jan Kochanowski University in
Kielce, Faculty of Management and
Administration, Poland

Agnieszka Mrozik

Faculty of Biology and Environmental
protection, University of Silesia, Katowice,
Poland

Chuen-Chee Pek

Nottingham University Business School,
Malaysia

Roberta De Santis

LUISS University, Italy

Fabio Gaetano Santeramo

University of Foggia, Italy

Dan Selişteanu

University of Craiova, Romania

Laura Ungureanu

Spiru Haret University, Romania

ASERS Publishing

<http://www.asers.eu/asers-publishing>

ISSN 2068 – 7729

Journal DOI: <https://doi.org/10.14505/jemt>

Table of Contents:

1	Motivational Attributes and Factors Affecting Spending of Cruisers in the Greek Islands Georgia PAPADOPOULOU	1301
2	Transnationalized Tourism: Hyper-Advantages from Global Competitiveness Denis USHAKOV, Elena ROBU, Olga BLAGORAZUMNAIA, Salam KABAHA	1316
3	Gastronomic Experience as a Factor of Motivation and Satisfaction in Coastal Destinations César VILLAGÓMEZ-BUELE, Mauricio CARVACHE-FRANCO, Orly CARVACHE-FRANCO, Wilmer CARVACHE-FRANCO, Mirian VILLAVICENCIO-PÁRRAGA	1328
4	Consumption of Impressions: A New Approach to the Formation of Tourist Attractiveness of Russian Territories Elena V. FROLOVA, Olga V. ROGACH, Tatyana M. RYABOVA, Natalia V. MEDVEDEVA	1338
5	The System of Indicators for Assessing the Effectiveness of the Regions in the Field of Tourist Services in Russia: Key Problems and Solutions Anton V. ROMANYUK, Roman R. GAREEV	1347
6	Resident Perceptions of Tourism at Eleko Beach, Nigeria Babasola BAMIRO, Oghenetejiri DIGUN-AWETO	1368
7	Improving the Technology for Training Personnel in the Service Sector Elena P. ZVYAGINTSEVA, Irina V. ZENKINA, Elena B. MANAKHOVA, Elena N. BORISOVA, Olga V. LYSIKOVA	1378
8	Experiential Tourism in Lake Toba Samosir District ALFIFTO, Endang Sulistya RINI, Yeni ABSAH	1385
9	Influence of Cognitive and Emotional Advertisements on Biosphere Reserve Image and Visitation Intention for Youth Anda ARKLINA, Kristine GRINBERGA, Nripendra SINGH, Agita LIVINA	1391
10	The Competencies of Human Talent Linked to the Development of Community Based Rural Tourism in the Province of Chimborazo Ecuador Magda Francisca CEJAS MARTÍNEZ, Silvia Marieta ALDAZ HERNÁNDEZ, Luis Alberto QUEVEDO BÁEZ, Mayra Fernanda QUIÑÓNEZ BEDÓN, Derling José MENDOZA VELAZCO	1400
11	The Impact of Memorable Halal Travel Experience SUMARYADI, Ratih HURRIYATI, Lili Adi WIBOWO, Vanessa GAFFAR	1407
12	Developing Geomorphologic Tourism in the Valleys of the Eastern Coast of the Dead Sea Ibrahim Kahlil BAZAZO, Omar Abedalla ALANANZEH	1416
13	Supporting the Tourism Industry in the Context of the Coronavirus Pandemic and Economic Crisis: Social Tourism and Public-Private Partnership Lyudmila V. SHUBTSOVA, Elena A. KOSTROMINA, Olga I. CHELYAPINA, Natalia A. GRIGORIEVA, Pavel V. TRIFONOV	1427
14	Enhancing Visitor Experiences at Digital Museum Concept in Jakarta Rachel Dyah WIASTUTI, Nurul Sukma LESTARI, Ika TRIANA, Anwari MASATIP, Ngatemin NGATEMIN, Bejo MULYADI	1435

Editor in Chief

Ramona PÎRVU

University of Craiova, Romania

Editorial Advisory Board

Omran Abdelnaser

University Sains Malaysia, Malaysia

Huong Ha

University of Newcastle, Singapore,
Australia

Harjeet Kaur

HELP University College, Malaysia

Janusz Grabara

Czestochowa University of Technology,
Poland

Vicky Katsoni

Techonological Educational Institute of
Athens, Greece

Sebastian Kot

Czestochowa University of Technology,
The Institute of Logistics and International
Management, Poland

Nodar Lekishvili

Tbilisi State University, Georgia

Andreea Marin-Pantelescu

Academy of Economic Studies Bucharest,
Romania

Piotr Misztal

The Jan Kochanowski University in
Kielce, Faculty of Management and
Administration, Poland

Agnieszka Mrozik

Faculty of Biology and Environmental
protection, University of Silesia, Katowice,
Poland

Chuen-Chee Pek

Nottingham University Business School,
Malaysia

Roberta De Santis

LUISS University, Italy

Fabio Gaetano Santeramo

University of Foggia, Italy

Dan Selişteanu

University of Craiova, Romania

Laura Ungureanu

Spiru Haret University, Romania

ASERS Publishing

<http://www.asers.eu/asers-publishing>

ISSN 2068 – 7729

Journal DOI: <https://doi.org/10.14505/jemt>

15	Strategy of Tourism Development for the Middle-Sized Town: From Scenarios to Strategic Maps Inna LEVYTSKA, Alena KLYMCHUK, Biletska NATALIYA, Nataliia KOTSERUBA	1445
16	Multidimensional Scaling: Sustainability of Arabika Coffee Agro-Tourism in Kabupaten Bangli Bali I Dewa Ayu Sri YUDHARI, Dwidjono Hadi DARWANTO, Lestari Rahayu WALUYATI, Jangkung Handoyo MULYO	1455
17	Specifics of Consumer Behavior in the Youth Segment of Kazakhstan Tourism Kamshat MUSSINA, Lyailya MUTALIYEVA, Assel BAIMBETOVA, Darken SEIDUALIN, Gulzhan ABDRAMANOVA, Bota SHARAPAYEVA	1466
18	Pre-Purchasing and Post-Purchasing Travel Behavior on Social Media: The case of Kazakhstan Assem ABDUNUROVA, Maira USPANOVA, Rajibul HASAN, Zinagul SURAPBERGENOVA, Nuradin KUDAIBERGENOV	1475
19	State Regulation of the Tourism Industry for Attracting International Investment Liliya SHAYAKHMETOVA, Aigul MAIDYROVA, Marat MOLDAZHANOV	1489
20	A Study on the Role of Tourism in Destination's Disaster and Resilience Management Bipithalal Balakrishnan NAIR, M.R DILEEP	1496
21	The Improvement of Approaches to Service Activities Teaching Margarita A. KOZHEVNIKOVA, Liliya V. KUZNETSOVA, Svetlana V. SHERMAZANOVA, Victoria V. LOPATINSKAYA, Aleksandr V. SHEL'YGOV	1508
22	Competency of Human Resources and Customer Trust on Customer Satisfaction and Its Consequence on Customer Retention in the Hospitality Industry North Sumatra Yohny ANWAR, Kiki Farida FERINE, Nikous Soter SIHOMBING	1515
23	Geological Sites as a Safe Resort for Post-COVID-19 Tourism: The Case of Al Jabal Al Akhdar, Oman Galal M. H. AFIFI, Maged. M. F. NEGM	1520
24	Determining Quality Factors Contributing to Chalet and Resort Guest Lodging Satisfaction using SERVQUAL Dimension Analysis Muhd Khaizer OMAR, Nur Arnie Sazerin Shamsul AZMAN, Rosnani JUSOH, Anis ZAKARIA, Enio Kang Sufian KANG	1537
25	Sustainable Rural Development through Tourism Kaisar SAYABAEV, Aigul ZHOLMUKHANOVA, Anar NUKESHEVA, Danagul TLEUZHANOVA, Bakhyt ASSILOV, Ayagoz ZHANSAGIMOVA	1550
26	Bali is Dressing-Up: Ritual as an Identity Anak Agung Gede RAKA, Novi ANOEGRAJEKTI, Putu Ngurah Suyatna YASA, Sudartomo MACARYUS, Anak Agung Gede Raka GUNAWARMAN	1560
27	Coopetition as a Model of Tourism Participation Management in South Lampung Indonesia Dedy HERMAWAN, Simon Sumanjoyo HUTAGALUNG	1571
28	The Antecedent of Environmental Attitude Mohamad Irhas EFFENDI, Dyah SUGANDINI, Agus SUKARNO, Muhamad KUNDARTO	1581
29	Ecological-Agrochemical Land Evaluation and Classification under Organic Farming Oleg GORB, Ilona YASNOLOB, Tetyana CHAYKA, Oleksii ZORIA, Tetyana DUGAR, Pavel SHVEDENKO, Oleksandr KALIAN, Yevheniia LYPIL, Nataliia PROTSIUK	1588

Call for Papers Winter Issues 2020 Journal of Environmental Management and Tourism

Journal of Environmental Management and Tourism is an interdisciplinary research journal, aimed to publish articles and original research papers that should contribute to the development of both experimental and theoretical nature in the field of Environmental Management and Tourism Sciences.

Journal will publish original research and seeks to cover a wide range of topics regarding environmental management and engineering, environmental management and health, environmental chemistry, environmental protection technologies (water, air, soil), pollution reduction at source and waste minimization, energy and environment, modeling, simulation and optimization for environmental protection; environmental biotechnology, environmental education and sustainable development, environmental strategies and policies, etc. This topic may include the fields indicated above, but are not limited to these.

Authors are encouraged to submit high quality, original works that discuss the latest developments in environmental management research and application with the certain scope to share experiences and research findings and to stimulate more ideas and useful insights regarding current best-practices and future directions in environmental management.

Journal of Environmental Management and Tourism is indexed in SCOPUS, RePEC, CEEOL, ProQuest, EBSCO and Cabell Directory databases.

All the papers will be first considered by the Editors for general relevance, originality and significance. If accepted for review, papers will then be subject to double blind peer review.

Deadline for submission:	29 th November 2020
Expected publication date:	December 2020
Website:	https://journals.aserspublishing.eu/jemt
E-mail:	jemt@aserspublishing.eu

To prepare your paper for submission, please see full author guidelines in the following file:

[JEMT_Full_Paper_Template.docx](#), then send it via email at jemt@aserspublishing.eu.



DOI: [http://doi.org/10.14505/jemt.v11.6\(46\).29](http://doi.org/10.14505/jemt.v11.6(46).29)

Ecological-Agrochemical Land Evaluation and Classification under Organic Farming

Oleg GORB

Akademia WSB, Poland

Poltava State Agrarian Academy, Ukraine

oleg.gorb@pdaa.edu.ua

Ilona YASNOLOB

Poltava State Agrarian Academy, Ukraine

ilona.yasnolob@pdaa.edu.ua

Tetyana CHAYKA

Poltava State Agrarian Academy, Ukraine

tetyana.chajka@pdaa.edu.ua

Oleksii ZORIA

Poltava State Agrarian Academy, Ukraine

oleksii.zoria@pdaa.edu.ua

Tetyana DUGAR

Poltava State Agrarian Academy, Ukraine

tetiana.dugar@pdaa.edu.ua

Pavel SHVEDENKO

Poltava State Agrarian Academy, Ukraine

shvedenko.pavlo@pdaa.edu.ua

Oleksandr KALIAN

Poltava State Agrarian Academy, Ukraine

oleksandr.kalian@pdaa.edu.ua

Yevheniia LYPPII

Poltava State Agrarian Academy, Ukraine

yevheniia.lypii@pdaa.edu.ua

Nataliia PROTSIUK

Poltava State Agrarian Academy, Ukraine

nataliya.protsyuk@pdaa.edu.ua

Suggested Citation:

Gorb, O. *et al.* (2020). Ecological-Agrochemical Land Evaluation and Classification under Organic Farming. *Journal of Environmental Management and Tourism*, (Volume XI, Fall), 6(46): 1588 - 1595. DOI:[10.14505/jemt.v11.6\(46\).29](http://doi.org/10.14505/jemt.v11.6(46).29)

Article's History:

Received 11st of May 2020; Received in revised form 8th of June 2020; Accepted 13rd of July 2020; Published 11th of September 2020. Copyright © 2020 by ASERS® Publishing. All rights reserved.

Abstract:

In modern economic conditions, economic components must be based on environmental components, especially for agricultural production, which ensures economic and food security of the country. Therefore, management system of agricultural enterprises has to be supplemented with environmental and agro-chemical components in order to improve and

increase soil quality. The peculiarities of ecological agrochemical farm lands' evaluation and certification in Ukraine were considered in the article. Their necessity for farmlands used for manufacturing organic raw materials and products was determined. Land classification and characteristics according to the degree of suitability for manufacturing organic products and raw materials are given: suitable, limited suitable, unsuitable lands. Indices of soil suitability for organic farming and their standards have been studied, namely: humus content; topsoil depth; particle size distribution; reaction of soil solution; the sum of absorbed bases (Ca + Mg); soil density; the content of mobile compounds of phosphorus, potassium, micro-elements, easily hydrolyzed nitrogen, nitrogen by nitrification power and mobile sulfur in the soil. Emphasis is placed on land suitability for organic farming, as important direction of agricultural production eco-balance. Agro-technological measures to improve ecological and agro-chemical condition of the soil used in organic farming are presented, considering sanitary-hygienic condition of the soil, its ecological stability and agro-chemical soil fertility. Interdependence and responsibility of farmers for soil condition as a result of their economic activities, the expediency of forecasting possible contamination of crops grown in the future have been mentioned. It is emphasized that the received information is entered into the ecological passport of farms, which implies the manufacturing of organic crop growing and livestock farming products at the level of world standards. The influence of ecological-agrochemical condition of land under organic farming on the quality of raw materials and products was determined. Forecasting the quality of organic farm products and raw materials according to their biological full-value condition and environmental safety is carried out by assessing the groups of indicators: qualitative assessment of farm's soil; ecological and agro-chemical certification of farm lands; environmental impact assessments of farming system and technologies of crop cultivation; ecological and agro-chemical assessment of lands for growing organic farm raw materials and products. Emphasis is placed on social responsibility of agricultural manufactures for products and soil quality. Thus, it is necessary to improve soil quality in Ukraine by introducing organic farming, which will ensure land management stabilization and strengthen their adaptability and enable to grow high-quality organic farm raw materials and products.

Keywords: land certification; soil evaluation; organic farming; ecological-agrochemical condition; soil quality; organic agricultural products.

JEL Classification: Q24; Q56; Q57.

Introduction

The development of organic farming in Ukraine has a stable dynamic to growth, which is characterized by the annual increase of manufactured organic products within 10-20%. Manufacturing organic products is represented almost in all regions except Luhansk region (Chayka 2014). At the same time, not all lands are certified as organic, suitable for organic farming.

The current state of agricultural lands in Ukraine requires the introduction of urgent measures to prevent and eliminate erosion, increase their deflation resistance, reduce acidity and restore humus. However, only responsible attitude of landowners and land users will ensure the effectiveness of these measures, as the pursuit of only economic component of economic activity leads to destructive exploitation of farm lands. Taking into account the present position of mankind in searching ways to overcome the destructive effects of human activities on agricultural lands instead of preventing them, it is now becoming important to introduce and spread organic farming system.

Organic agricultural production is a system of interconnected processes, which ensure the interaction of organizational-economic, social, technological and managerial measures aimed at improving the efficiency and stability of production, providing expanded reproduction of soil fertility, obtaining high-quality products by the introduction of alternative farming systems on the basis of their biologization, creation of specialized ecological enterprises.

The sense of such approach is that under transition to organic production it is necessary to control simultaneously the entire agro-ecosystem, but not its separate elements, including organization of production, land management, using of natural forage producing areas without making harm to biodiversity. At the same time, the main task of management must be the creation of such a system, which, on the one hand, reduces the impact of production technologies on the external environment, and on the other hand, increases production efficiency. This is possible when the investigated area will function as a single ecological-economic system.

Under these conditions determining soil quality for the purpose of conducting economic activity is topical for manufacturers of organic farm products. The known methods of agricultural land assessment are based only on establishing the conformity of a limited number of indices of sanitary-hygienic condition, soil ecological stability, agrochemical parameters of soil fertility, without considering land location and using agro-technologies.

Thus, agricultural production requires a new organization of production relations in arable farming and livestock farming, based on the rational involvement of natural resources, on the one hand, and the formation of management system for these relations, on the other hand. Increasing the efficiency of enterprises' functioning is

possible by specializing them in manufacturing organic farm products, as well as managing the rational using land resources through the introduction of adaptive farming systems.

1. Research Background

The questions of agro-ecological correspondence of agricultural enterprises with the requirements of organic agricultural production were investigated by such Ukrainian scientists as: V.A. Zhylykin, V.V. Makarenko, N.A. Makarenko, O.O. Rakoiid (2007). Practical experience of organic farming on the example of the private enterprise "Agroecology" of Shyshaky district, Poltava region was studied by such scientists and practitioners as: S.S. Antonets, A.S. Antonets, V.M. Pysarenko, M.M. Opara, P.V. Pysarenko (2010). At the same time, the absence of the corresponding regulatory-legal framework requires investigating the problem issues, which stipulates the urgency of our research.

The results of our research show that without a sufficient level of intellectual development of human resources involved in agricultural production, it is impossible to reorient production from consumer to ecological nature, restore and maintain fertility of farm lands, ensure the production of high-quality agricultural raw materials and products. The main constituent elements of the model of innovative development of Ukraine's agrarian sector are biological potential and scientific-educational system, which forms innovative thinking, generates innovations and provides agrarian sector of the economy with competent professionals, who are able to work with different types of innovations (Yasnolob 2017).

Under modern conditions, improving the level of employees' education is a priority task for both individual employee and agricultural enterprises, which must help improve employees' qualification level and train new professions. This will enable not only to improve the quality of farm products, their competitiveness in the world market, which will positively affect profitability and competitive position of agricultural enterprises, but also is a necessary condition for providing a model of innovative development of the agrarian sector, introducing energy efficient techniques and technologies (Yasnolob 2019).

2. Methodology

The aim of the research is to substantiate theoretically the necessity of ecological- agrochemical certification of lands used in organic farming with the aim increasing the level of their environmental safety and restoring their fertility. The task of the research is to determine the necessity of ecological-agrochemical evaluation and certification of lands used in organic farming.

Materials and methods of the research. Modern national theoretical-methodological approaches to the study and certification of farm lands were used. The research methods were the following: analytical, statistical, mapping, literary, theoretical-methodological.

3. Results and Discussion

Ecological-agrochemical certification of farm lands is carried out using the materials of soil quality evaluation (appraisal) and the indices of their ecological-agrochemical condition, the results of which are reflected in the corresponding field passport. The form of field agrochemical passport is approved by the Ministry of Agricultural Policy and Food of Ukraine (Order of Keeping, 2011) and includes a minimal set of criteria sufficient to give an objective assessment of the agro-ecological condition of field soil cover.

The information of field ecological-agrochemical passport is necessary to determine the measures for the rational using of soils, restoring and increasing their fertility, improving their agro-ecological condition. Conducting regular certification (every 5 years) enables to determine the effect of economic activity on the state of soil quality (Yasnolob 2019).

Soil quality agrochemical evaluation is made using agro-ecological method and indices characterizing their internal properties, and is expressed in land quality scores. The standard soil with the highest indices of soil property is considered as having 100 scores, and other soils are graded relatively to the standard. The main sources of incoming information are soil report, soil maps, new data of soil agrochemical examination, materials of radiation examination and test results on soil contamination with heavy metals and pesticide residues (Sozinov 2006).

In order to make ecological-agrochemical evaluation of farm lands the corresponding regulatory-legal framework has been developed: the Guiding regulatory document "Ecological-agrochemical certification of fields and land plots" (2006), Methodical recommendations "The assessment of Ukraine's farm land suitability for the creation of ecologically balanced raw material zones and farms to produce food for children and dietetic food" (2018), Methodical recommendations "The assessment of farm land suitability for the requirements of special raw

material zones" (2016), Methodical recommendations for granting the status of special raw material zone and control over its using (2017), Methodical recommendations "Agro-ecological assessment of agricultural enterprises' concordance with the requirements of organic agricultural production" (2017), Methodical recommendations on complex agro-ecological evaluation of farm lands" (2018), The Order of keeping field, land plot agrochemical passport №536.

To determine the lands suitable for organic farming, in January 2018 the Cabinet of Ministers of Ukraine developed "The Order of establishing criteria of land quality, evaluating its suitability for manufacturing organic products and raw materials and determining zones of such production", the project that was not approved because its provisions contradicted the laws of Ukraine "About the production and circulation of organic farm products and raw materials", "About administrative services", "About basic principles of state supervision (control) in the sphere of economic activity", and "About the principles of state regulatory policy in the sphere of economic activity".

The nomenclature of indices for determining the criteria of land quality, its suitability for manufacturing organic products and raw materials in accordance with currently in force regulatory documents in the sphere of soil and environment quality was given in the project of the above-mentioned Order. As to the degree of suitability for manufacturing organic products and raw materials the following kinds of land are distinguished:

- suitable – farm lands, the ecological-agrochemical condition of which does not prevent from obtaining high-quality agricultural raw materials for manufacturing organic products;
- limited suitable – farm lands, the indices of soil fertility and eco-toxicological condition of which enable to obtain high quality raw materials for manufacturing organic products from only some crops, which are most tolerant to toxic substances;
- unsuitable – farm lands, on which it is impossible to obtain raw materials suitable for manufacturing organic products.

The reasons for classifying lands according to one of these categories are indices corresponding to ecological-toxicological and soil-agrochemical criteria of land quality, which are in congruence with the established requirements of values (Tables 1 and 2).

Table 1. Standards of indices of land (soil) suitability for organic production according to ecological-toxicological criteria

Indices	Standard criteria according to the degree of suitability	
	suitable	unsuitable
<i>Land location relative to the sources of contamination</i>		
From industrial enterprises and objects that may pollute the environment with toxic and dangerous emissions (compounds of heavy metals, polychlorinated biphenyls, dioxins, pesticides, radionuclides, etc.), km:		
in the direction of prevailing winds	> 30	<30
in other directions	> 15	<15
From the international, national and regional roads, m	> 300	<300
<i>The content of pollutants in soil</i>		
The density of contamination with radionuclides, Ki / km ² :		
with cesium-137	<5	> 5
with strontium-90	<0.05	> 0.05
The content of labile forms of heavy metals relatively MAC *	<1.0	> 1.0
The content of pesticide residues relative to MAC	<1.0	> 1.0

* MAC - maximal admissible concentration.

Source: data (Draft of the Order, 2018)

Table 2. Standards of indices of land (soil) suitability for organic production according to soil-agrochemical criteria

Indices	Standard criteria according to the degree of suitability		
	suitable	limited suitable	unsuitable
Humus content, %	> 2.0	1.0-2.0	<1.0
The depth of humus horizon cm	> 40	20-40	<20
Granulometric composition			
physical clay content, %			
Polissia	16-35	6-15	<5
Forest-Steppe, Steppe	21-70	11-20	<10
The reaction of soil solution (pH):			

Indices	Standard criteria according to the degree of suitability		
	suitable	limited suitable	unsuitable
salt pH	> 5.5	4.6-5.5	<4.6
water pH	<7.5	7.6-8.5	> 8.6
The sum total of absorbed bases (Ca + Mg), mg-equiv. / 100 g	> 20	10-20	<10
soil density, g / cm ³ : of loamy sandy soils	1.3-1.5	> 1.5 but <1.7	> 1.7
of medium and heavy granulometric distribution	1.1-1.3	1.3-1.5	> 1.5
The content of labile phosphorus compounds, mg / kg of soil:	> 100	50-100	<50
- by Kirsanov, Chirikov method	> 30	15-30	<15
- by Machigin method			
The content of labile potassium compounds, mg / kg of soil:			
- by Kirsanov method	> 120	80-120	<80
- by Chirikov method	> 80	40-80	<40
- by Machigin method	> 200	100-200	<100
The content of labile forms of microelements, mg / kg of soil:			
- by Krupsky-Aleksandrova method:			
manganese	10-100	<10	> 100
zinc	1-23	<1	> 23
copper	0.5-3	<0.5	> 3
cobalt	0.15-5	<0.15	> 5
- by Pochynka method:			
boron	> 0.33	<0.33	-
- by Grieg method:			
molybdenum	> 0.1	<0.1	-
Nitrogen content that is easily hydrolyzed, mg / kg of soil:			
- by Cornfield method	> 150	100-150	> 100
- by Turin-Kononova method	> 40	30-40	> 30
The content of nitrogen as to nitrification power, mg / kg of soil	> 8	5-8	<5
The content of labile sulfur mg / kg of soil	> 6	1-6	<1

Source: data (Draft of the Order, 2018)

Badly eroded, badly solodized, badly alkali-affected, salinized, and gley soils are unsuitable for organic production.

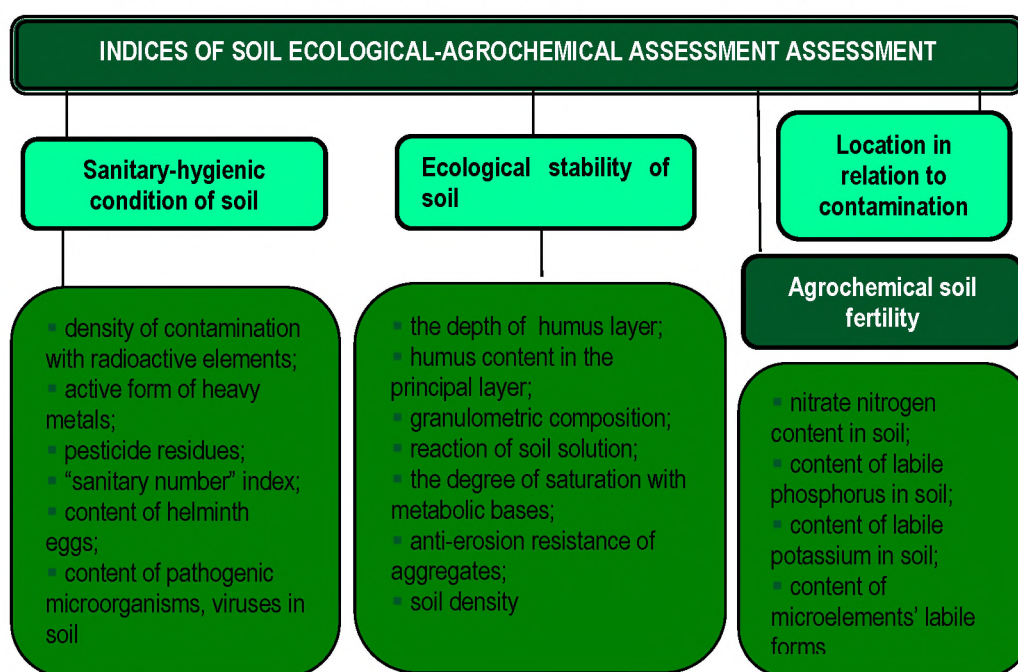
So, for organic farming it is necessary to use lands, which meet the criteria of their suitability. The rest of the land can be used in organic farming after conducting appropriate measures to reduce the consequences of industrial pollution and soil degradation (Table 3).

Table 3. Agro-technological measures to improve the ecological-agrochemical condition of soil

Agro-technological measures	Sanitary-hygienic condition of soil	Ecological stability of soil	Agro-chemical soil fertility
1. Phyto-remediation			
2. Zero-tillage of soil			
3. Mulching soil with stubble and nutrient residues			
3. Increasing the proportion of perennial grasses			
4. Vermi-culture			
5. Green manure crops			
6. Microbiological preparations			
7. Crop rotation			
8. Enriching soil with compost			

Source: developed by the author

Figure 1. The indices of soil ecological-agrochemical evaluation used in organic farming



Source: developed by the author

In Table 3, given above, ecological-agrochemical soil condition is characterized by the indices of its quality (Figure 1). Their assessment to test farm land suitability for organic farming should be conducted every five years, which will enable to identify problems in soil ecological-agrochemical condition and determine measures to eliminate them.

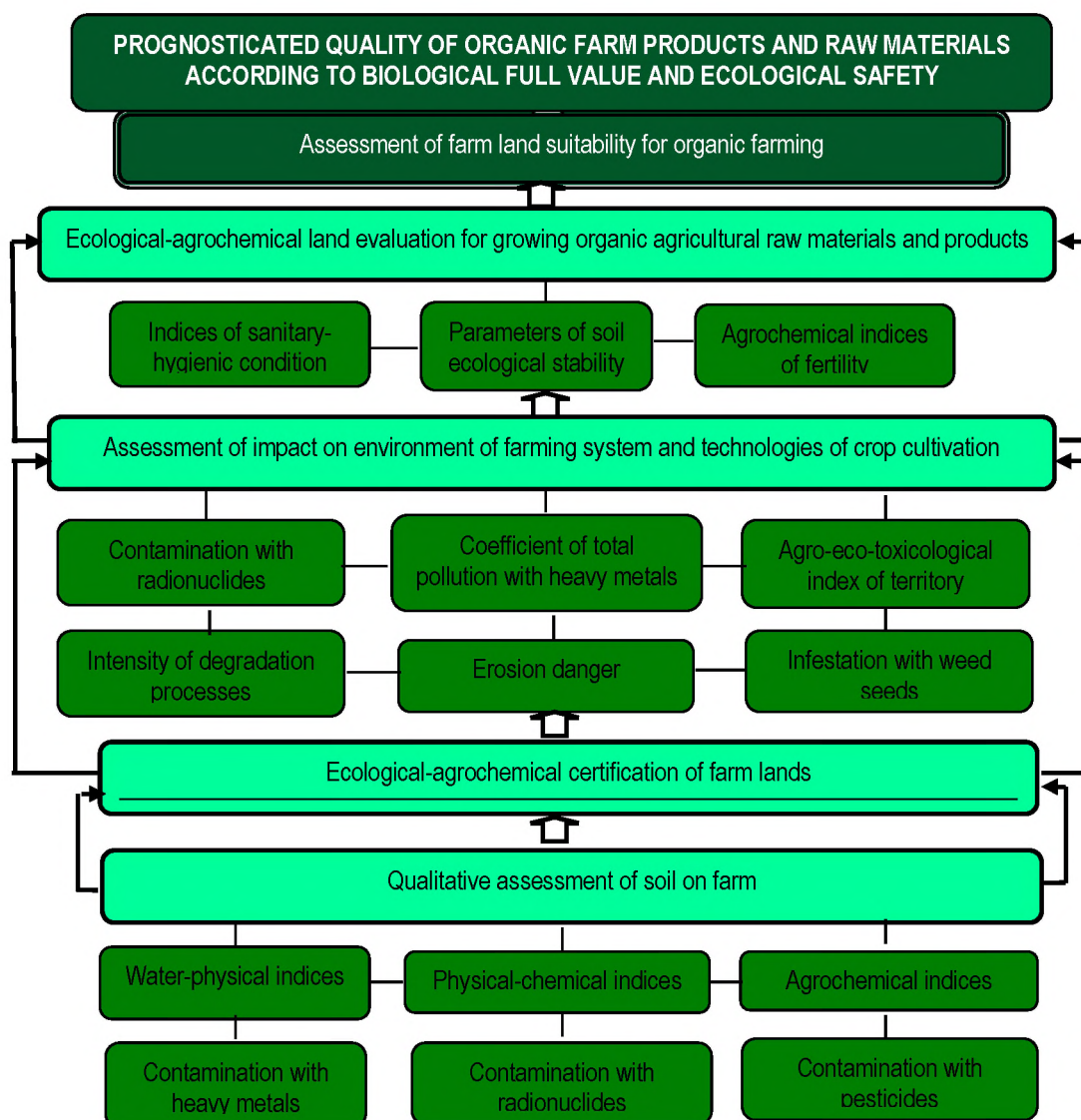
At the same time, the indices of soil ecological-agrochemical evaluation are insufficient to determine its impact on plant growth and productivity. To characterize the soil it is necessary to involve a wider range of indices and criteria, which are interrelated and interdependent with each other (Yasnolob 2019). High quality (clean) soil, along with ensuring the productive component, must maintain the quality of the environment and not threaten human health.

One of the goals of organic farming is maintaining and developing soil quality and fertility. This is achieved by farmer's dependence on land and, on the contrary, soil condition depends on the farmer and the kind of economic activity chosen by him (her) (Yasnolob 2018). To identify farm lands suitable for organic farming it is necessary to conduct their evaluation in a specialized laboratory.

Based on the level of contamination with radionuclides, heavy metals, pesticides, detected in soils the forecast is made as to possible contaminating the products grown in the future (Figure 2). If the forecast determines the contamination below the maximal admissible concentration, the products can be considered ecologically safe without additional analytical testing in each batch, but with possible operational control. This information is entered in ecological passport of farms, indicating the manufacturing of ecologically safe crop growing and livestock farming products corresponding to the world standards.

Thus, the quality of grown organic farm products begins with the quality of soils, which also has a positive effect on their productivity. This stipulates the necessity for the manufacturers of these products to treat the land that they have chosen for the production with care, make the appropriate agro-ecological analysis of its composition, keep ecological passports. It will also enable manufacturers to improve production technology, reduce the dependence on natural-climatic conditions and, accordingly, will lead to increasing the profitability of activity and financial stability.

Figure 2. The effect of ecological-agrochemical land condition under organic farming on the quality of raw materials and products



Source: developed by the author

Conclusion

Our studies showed that ecological-agrochemical soil evaluation and certification precedes organic farming. Such evaluation has to be conducted according to the following criteria: ecological-toxicological, sanitary-hygienic, ecological stability, agrochemical soil fertility. At present, these issues have not received regulatory support, which does not enable to ensure the high quality of manufactured organic raw materials and products. The currently in force project of "The order of establishing the criteria of land quality, evaluating its suitability for manufacturing organic products and raw materials and determining zones of such production" does not contain indices that affect plant growth and productivity. For this it is necessary to involve a wider range of indices and criteria, which are interrelated and interdependent with each other, which is the subject of our further research.

References

- [1] Antonets S.S. *et al.* 2010. *Organic Farming*. Poltava: Publishing house of Poltava State Agrarian Academy, 200 p.
- [2] Chayka, T.A. 2014. Agro-Ecological Zoning in Organic Farming of Ukraine. *Bulletin of Kurgan State Agricultural Academy*, 2: 27–31.

- [3] Draft of the Order of establishing the criteria of land quality, evaluating its suitability for manufacturing organic products and raw materials, and determining zones of such production, developed by the Cabinet of Ministers of Ukraine [electronic resource]. Available at: <http://minagro.gov.ua/node/12447>
- [4] Gorb, O. *et al.* 2017. The Formation of the Management System of Ecological, Social, and Economic Development of Rural Territories Using the Experience in European Union. *Journal of Environmental Management and Tourism*, 8(3): 516-528. DOI: [https://doi.org/10.14505/jemt.v8.3\(19\).03](https://doi.org/10.14505/jemt.v8.3(19).03)
- [5] Makarenko, N.A., Rakoiid, O.O., Zhylykin, V.A. and Makarenko, V.V. 2007. *Agro-Ecological Assessment of Agricultural Enterprises' Correspondence to Requirements of Organic Agricultural Production*. Methodical recommendations. K., Logos, 37 p.
- [6] Order of Keeping Agrochemical Passport of Field, Land Plot, Approved by the Ministry of Agricultural Policy and Food of Ukraine of 11.10.2011 № 536.
- [7] Sozinov, O.O. 2006. *Ecological-Agrochemical Certification of Fields and Land Plots: a Guiding regulatory document*. K., 37 p.
- [8] Yasnolob, I. *et al.* 2018. Intellectual Rent in the Context of the Ecological, Social, and Economic Development of the Agrarian Sector of Economics. *Journal of Environmental Management and Tourism*, 8(7): 1442-1450. DOI: [https://doi.org/10.14505/jemt.v8.7\(23\).13](https://doi.org/10.14505/jemt.v8.7(23).13)
- [9] Yasnolob, I. *et al.* 2018. The Innovative Model of Energy Efficient Village under the Conditions of Sustainable Development of Ecological Territories. *Journal of Environmental Management and Tourism*, 9(3): 648-658. DOI: [https://doi.org/10.14505/jemt.9.3\(27\).25](https://doi.org/10.14505/jemt.9.3(27).25)
- [10] Yasnolob, I. *et al.* 2019. Energy Independence and Energy Efficiency of Populated Areas in the System of Management. *Journal of Environmental Management and Tourism*, 10(3): 538-549. DOI: [https://doi.org/10.14505/jemt.v10.3\(35\).09](https://doi.org/10.14505/jemt.v10.3(35).09)
- [11] Yasnolob, I. *et al.* 2019. Human Factor in the Creation and Development of Energy Independent and Energy Efficient Rural Settlements. *Journal of Environmental Management and Tourism*, (Volume X, Fall), 5 (37): 1029–1036. DOI:10.14505/jemt.v10.5(37).10
- [12] Yasnolob, I. *et al.* 2019. The Formation of the Efficient System of Ecological Enterprise. *Journal of Environmental Management and Tourism*, 9(5): 1052 – 1061. DOI: [https://doi.org/10.14505/jemt.9.5\(29\).17](https://doi.org/10.14505/jemt.9.5(29).17)

ASERS



Web: www.aserspublishing.eu

URL: <http://www.journals.aserspublishing.eu/jemt>

E-mail: jemt@aserspublishing.eu

ISSN 2068 – 7729

Journal DOI: <https://doi.org/10.14505/jemt>

Journal's Issue DOI: [https://doi.org/10.14505/jemt.v11.6\(46\).00](https://doi.org/10.14505/jemt.v11.6(46).00)