

NON-CONVENTIONAL AGRICULTURAL LAND USE IS THE BASIC FOUNDATION FOR ITS CAPITALIZATION AND SOCIALIZATION IN RURAL AREAS

Valentina TRETIAK¹, Valeriy LYASHYNSKY¹, Nataliia TRETIAK²,
Nataliia KAPINOS³

¹State Ecological Academy of Postgraduate Education and Management, 35 Metropolitan Vasily Lipkivsky Str., Kyiv, Ukraine, 03035, Phone/Fax: +380 44 206 30 37; E-mail: tretyak2@ukr.net

²Public Institution «Institute of Environmental Economics and Sustainable Development of the National Academy of Sciences of Ukraine», 60 Tarasa Shevchenka Boulevard, Kyiv, Ukraine, 01032, Phone/Fax: +380 44 486 90 48; E-mail: tretiaknatalia@ukr.net

³Sumy National Agrarian University, 160 Gerasim Kondratieva Str., Sumy, Ukraine, 40000, Phone/Fax: +38 (0542) 70-10-12; E-mail: natawakapinos75@gmail.com

Corresponding author: tretiaknatalia@ukr.net

Abstract

The article is devoted to the study of non-traditional agricultural land use, as the basis for rural development due to increased capitalization and socialization of land use. As a result, we analyzed the efficiency of agricultural land use in selected European countries and in Ukraine. A comparison of the added value created per area unit with the value of agricultural land is also presented, which noted that the capitalization and socialization of agricultural land use depends on the proportion of high-margin crops in the structure of crops production area. The authors present indicators of the effectiveness of the use of agricultural lands of Ukraine by agricultural enterprises, farms and households in monetary value. This allowed us to state that it is important for farmers and households to cultivate high margin crops, including niche ones. Since such crops, as a rule, are quite resource-intensive in cultivation and their production for large-scale farms is costly, and for small farms it is profitable, because it not only increases the profitability of land use, but also its value.

Key words: non-conventional agricultural land use, added value, high margin crops, crop yield.

INTRODUCTION

Increasing instability of land productivity, declining soil fertility on the planet with the growing demand for greening of the agricultural sector in accordance with new approaches to land use necessitate the change of the whole agricultural land use paradigm in rural areas.

It is known that in the countries of Eastern Europe for over 25 years, and in Ukraine over the last decade, more and more attention is paid to non-conventional farming, and in particular to organic farming. This comes in response not only to a concern for the state of the environment (in particular, improvement of the ecological stability coefficient of the land use) and profit of land users, but also by concern for people's health and improving global food security in general.

Today, when organizing agricultural land use,

it is necessary to rely on fundamentally new innovative solutions that provide not only a mandatory increase in soil fertility, but also provide capitalization (increasing the value) of land use. Such measures come as a direct consequence of the scientific and technological progress in intensifying land use and serve as a solution to the efficiency of agricultural production in rural areas, the development of rural territories and, in general, to increase the national economy and human health.

A successful solution to the posed problems of greening and capitalization of land use, in our opinion, is possible only on the basis of a change in the old paradigm based on intensification of agricultural production with use of broad chemicalization for growing traditional crops, to a new land use paradigm of growing non-traditional, more profitable and environmentally friendly crops.

Today, society pays great attention to environmentally friendly and cost-effective land use. Moreover, each of the authors reveals the essence of this issue through the prism of such well-known concepts as «environmental land use planning» [1; 9; 15], «organic farming» [2; 7; 11; 17; 18; 27], «alternative system of agricultural production» [3; 6; 8], «biological farming» [5; 18; 25] etc. Thus, the aim of the study is to substantiate a new paradigm of land use with the cultivation of non-traditional more profitable and environmentally safe crops as a basic basis for the development of rural areas through the prism of capitalization and socialization.

MATERIALS AND METHODS

To reveal the importance of capitalization and socialization, an analysis of the growth of agricultural land use efficiency in some European countries was conducted. As well as the added values created per 1 hectare of agricultural land and the total value of arable land.

To calculate the monetary value of the indicators of the effectiveness of the use of agricultural lands of Ukraine by agricultural enterprises, farms, households, official statistical materials of the State Statistics of Ukraine were used and the share of these enterprises and farms by the area of agricultural land was presented.

The information and statistical base for the study are official materials and reports of FAOSTAT, the State Service of Ukraine for Geodesy, Cartography and Cadastre (State Geocadastre of Ukraine), the State Statistics Service of Ukraine (State Statistics Service of Ukraine), World Data Atlas data, and legislative documents of Ukraine.

In addition, the study materials were scientific foreign and domestic publications devoted to the subject of non-conventional agricultural land use in rural areas.

RESULTS AND DISCUSSIONS

In 2018, the number of people suffering from hunger every day exceeded 821 million, the

number of people who are victims of moderate or high food danger is 2 billion [4]. That is, today the price of fertile land, state control over its use and independence from food imports has become the price of food security (and hence the price of life and death) for the population of many countries. Therefore, the issue of agricultural land use in countries is a matter of national security.

According to FAO Production, the planet's land fund is 13 billion 435 million hectares, of which 36.2% is agricultural land (4 billion 868 million hectares in 1994). Agricultural lands of Ukraine occupy most of the land - 68.8% (41 511.7 thousand ha), of which arable land (ploughland) - 78.4% or 54% of the country, while for Europe this figure is on average is 35%. Ukraine in terms of agricultural land is one of the largest countries in the world.

Studying the trends in the efficiency of agricultural land use in European countries and in Ukraine, it can be stated that they are similar to Ukrainian ones in terms of crop yield growth (Table 1).

It should be noted that as the data in Table 1 show, the presence in Ukraine of a moratorium on the purchase and sale of land shares did not have a significant impact on the efficiency of agricultural land use. In addition, according to some studies, Ukrainian agricultural enterprises and farmers use on average 4 times less fertilizer per 1 hectare of agricultural land than in EU countries [13].

Agricultural land use, based on the cultivation of grain and oilseeds and the avoiding of growing perennial crops, which bring greater profitability, does not allow increasing the value of these land plots, which is an indicator of land use capitalization, to the level of European countries. For example, in comparison with European countries, the share of high-margin crops in the overall structure of production is several times smaller in Ukraine (Fig. 1) [13].

Since high-margin crops, for the most part, are highly costly, a larger number of the rural population is involved in their cultivation, and the level of provision of the population with work is an indicator of the socialization of land use.

Table 1. Characterization of growth trends in agricultural land use efficiency in Europe

Period	Average grain yield, c / ha								
	Bulgaria	Romania	Czech Republic	Poland	Slovakia	Hungary	Germany	France	Ukraine
2003			39.4	28.6	31.3	30.4	57.5		
2004			54.4	35.4	46.4	55.9	73.6		
2005			47.4	32.3	45.1	55.3	67.2		26.0
2006	35.7	31.0	41.6	26.0	39.7	51.0	64.9	68.0	24.1
2007	25.2	16.4	45.2	32.5	35.6	34.9	61.8	65.2	21.8
2008	41.0	32.5	53.6	32.2	51.8	58.0	71.2	72.5	34.6
2009	34.2	28.2	50.7	34.8	43.3	47.2	72.0	74.1	29.8
2010	40.2	33.3	47.0	33.9	37.4	47.2	67.2	70.7	26.9
2011	42.5	39.9	55.9	34.3	50.1	51.0	64.6	69.2	37.0
2012	36.7	23.6	45.3	37.1	38.3	37.6	69.6	72.6	31.2
2013	45.6	38.6	53.1	38.0	44.9	48.3	73.2	70.8	39.9
2014	48.6	40.7	62.2	42.7	60.4	59.0	80.5	75.6	43.7
2015	46.7	35.44	58.81	37.28	50.8	52.43	74.98	75.7	41.41
2016	48.2	39.71	63.17	40.34	64.3	64.87	71.82	56.87	46.52
2017	54.8	52.23	54.98	42.00	48.56	57.79	72.7	68.75	43.16

Source: generated by the authors using sources [6; 19; 20; 21; 28].

Accordingly, the level of capitalization and socialization of agricultural land use in Ukraine is much lower than in EU countries. Comparison of added value created per area unit, which directly affects the value of agricultural land (Fig. 2) [16], for example, in Germany is almost 7 times higher than in Ukraine and in France - 6 times higher. Accordingly, the value of agricultural land in Ukraine is much lower than in France and Germany [16]. That is, the value of agricultural land is determined by the level of added value, which depends on the labour intensity and profitability of crops grown, rather than the purchase and sale of land shares.

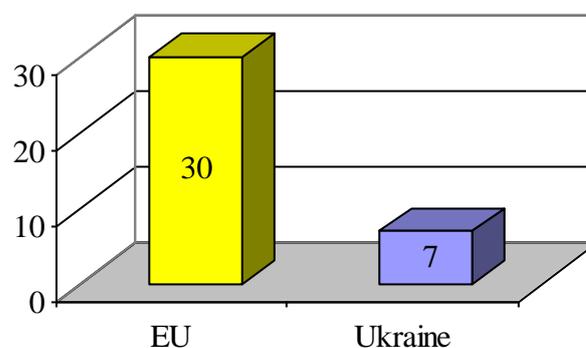


Fig. 1. Comparison of the share of high-margin crops in the structure of sown areas of Ukraine and EU countries, in %
 Source: [13].

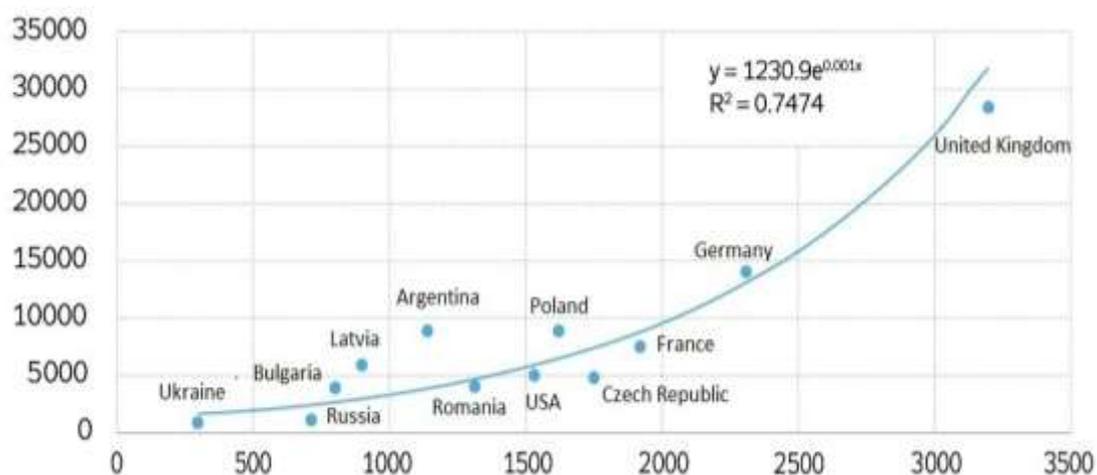


Fig. 2. Comparison of the added value created per 1 ha of agricultural land use value, in USA dollars.
 Source: [16].

A comparison of the level of added value created per 1 ha of arable land with the value of this hectare shows that the price of Ukrainian agricultural land is almost justified (Fig. 3). At the same time, it should be noted that in official documents it is underestimated,

as the data of the normative monetary valuation of lands are taken. In particular, we conducted studies of comparative productivity and value of agricultural land in Ukraine [23, p. 165] which show that their real value was 3744 US dollars, as of 2015.

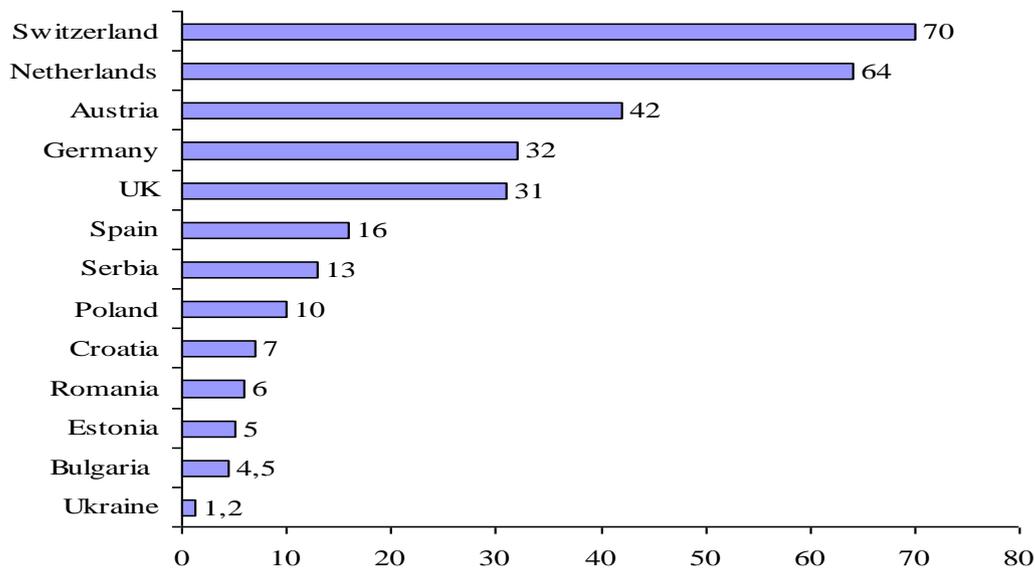


Fig. 3. The average value of arable lands in different countries, thousand US dollars.
 Source: [22].

Summarizing the above, it can be stated that the capitalization and socialization of agricultural land use depends on the share of

high-margin crops in the structure of sown areas.

Table 2. Dynamics of efficiency of agricultural land use by yield of main crops, c / ha

Crop	Year					Average value	± 2018 till 2000
	2000	2005	2010	2015	2018		
Agricultural enterprises							
Cereals and legumes	18.3	25.9	27.6	43.8	52.2	33.56	64.9
Sugar beet	171.0	255.4	281.5	448.2	518.8	334.98	67.0
Sunflower	11.8	12.8	15.4	23.0	24.1	17.42	51.0
Potato	109.1	147.8	171.0	198.6	252.0	175.7	56.7
Vegetables	88.3	154.5	207.0	363.4	427.4	248.12	79.3
Fruits and berries	10.9	16.0	38.2	70.8	106.2	48.42	89.7
Farms							
Cereals and legumes	15.8	22.0	21.9	33.4	41.1	26.84	61.6
Sugar beet	186.3	238.1	250.8	422.3	538.5	327.2	65.4
Sunflower	10.2	11.1	13.4	20.8	21.9	15.48	53.4
Potato	128.9	150.8	159.5	163.2	207.0	161.88	37.7
Vegetables	78.2	136.5	159.2	316.3	330.9	204.22	76.4
Fruits and berries	11.5	17.3	49.7	69.8	112.9	52.24	89.8
Households							
Cereals and legumes	26.9	26.4	25.0	33.9	34.4	29.32	21.8
Sugar beet	232.3	224.8	257.3	325.3	361.9	280.32	35.8
Sunflower	16.0	12.6	13.1	16.1	18.0	15.16	11.1
Potato	121.8	128.2	131.7	160.8	169.4	142.38	28.1
Vegetables	118.9	157.4	169.9	192.6	197.7	167.3	39.9
Fruits and berries	88.3	105.9	98.5	117.8	136.4	109.38	35.3

Source: [19; 20; 21].

In particular, the capitalization of land use depends on the profitability of crops grown, and socialization on the resulting added value. Consider the trends of efficient use of agricultural land in Ukraine by different forms of land use depending on the crops grown in the structure of sown areas, in particular the presence of high-margin crops in it (Table 2). The data in Table 2 show that crop yields are growing both in agriculture as a whole and in all forms of land use.

However, in monetary terms, the most effective is the cultivation of sugar beets and vegetables for all forms of land use (Fig. 4-6).

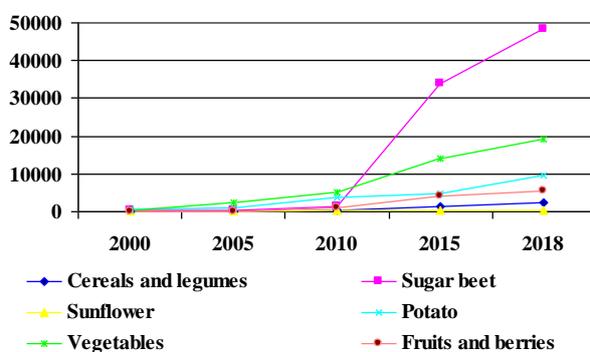


Fig. 4. Dynamics of indicators of efficiency of lands use by agricultural enterprises, thousand UAH / ha
 Source: calculated according to the data of the State Statistics Service of Ukraine.

At the same time, it is necessary to pay attention to the prospect of growing fruits and berries, which are becoming increasingly popular in European countries.

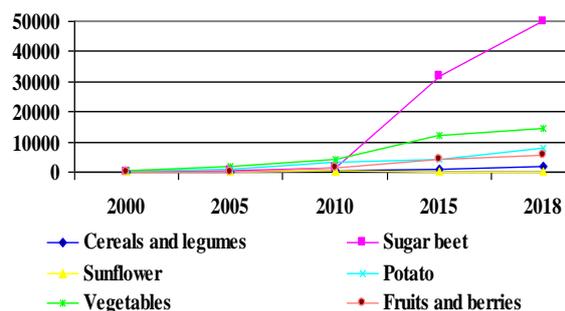


Fig. 5. Dynamics of indicators of land use efficiency by farms, thousand UAH / ha
 Source: calculated according to the data of the State Statistics Service of Ukraine.

The cultivation of high-margin crops is especially important for farms and households in terms of creating jobs in rural areas for rural development.

After all, almost 56% of enterprises have a size of land in use of 10 to 500 hectares, of which more than 70% are farms (Table 3).

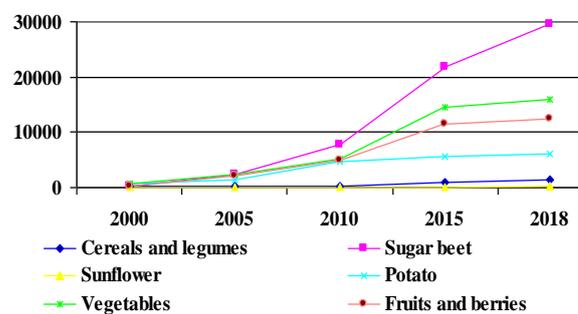


Fig. 6. Dynamics of indicators of efficiency of land use by households, thousand UAH / ha
 Source: calculated according to the data of the State Statistics Service of Ukraine.

Thus, the indicator from a social point of view is the employment of the population, and from an economic point of view - the profitability of growing high-margin (incl. niche) crops. At the same time, farms and households are the fastest to increase the capitalization and socialization of land use, respectively, and the market value of agricultural land.

In the market, niche crops are crops for which there is a situational or constant increased commercial or social demand, or products that cover a narrow segment of consumers [26]. For the conditions of Ukraine to niche crops we can include: flax, garlic, berries, and exotic or traditional but uncommon cereals (millet, sorghum, dinkel, rye, etc.), legumes, organic products.

An important feature of niche crops is that they are usually quite resource-intensive in cultivation (production) and their production in large farms is difficult, and at small farms is profitable.

In the world agri-food market the fastest growing niche crops are: kidney beans, peas, garlic, chickpeas, honey, asparagus (Table 4) [24].

Experts call tomatoes and grapes the most profitable crops, due to their widespread use in cooking. From 1 ha of vineyards one can earn \$ 6,250, and from 1 ha of planted tomatoes - more than 14.0 thousand dollars. It is tomatoes and grapes that experts call the most profitable crops for farmers around the world [14].

Table 3. The share of enterprises and farms in the area of agricultural land in 2018

	Number of enterprises		Area of agricultural land	
	units	percentage to total enterprises	thsd.ha	percentage to total area of agricultural land
Enterprises				
Enterprises, which had agricultural land including of land, ha	40,333	82.0	20,005.2	100.0
no more than 5.0	2,972	6.0	9.5	0.0
5.1 – 10.0	2,496	5.1	19.5	0.1
10.1 – 20.0	3,811	7.7	59.1	0.3
20.1 – 50.0	11,076	22.5	417.3	2.1
50.1 – 100.0	4,909	10.0	354.5	1.8
100.1 – 500.0	7,573	15.4	1,851.1	9.3
500.1 – 1,000.0	2,704	5.5	1,932.9	9.7
1,000.1 – 2,000.0	2,447	5.0	3,513.0	17.5
2,000.1 – 3,000.0	1,063	2.2	2,594.0	12.9
3,000.1 – 4,000.0	467	0.9	1,612.4	8.1
4,000.1 – 5,000.0	250	0.5	1,109.8	5.5
5,000.1 – 7,000.0	258	0.5	1,497.0	7.5
7,000.1 – 10,000.0	127	0.3	1,057.5	5.3
more than 10,000.0	180	0.4	3,977.6	19.9
Enterprises, which did not have agricultural land	8,875	18.0	x	x
of which private farms				
Farms which had agricultural land including of land, ha	30,441	91.8	4,707.2	100.0
no more than 1,0	147	0.4	0.1	0.0
1.1–3.0	1,195	3.6	2.7	0.1
3.1–5.0	1,430	4.3	6.1	0.1
5.1 – 10.0	2,301	6.9	18.1	0.4
10.1–20.0	3,498	10.6	54.4	1.2
20.1–50.0	10,432	31.5	394.8	8.3
50.1–100.0	4,160	12.6	298.4	6.3
100.1–500.0	5,111	15.4	1,193.3	25.4
500.1–1,000.0	1,216	3.7	855.6	18.2
1,000.1–2,000.0	670	2.0	925.1	19.7
2,000.1–3,000.0	167	0.5	406.9	8.6
3,000.1– 4,000.0	49	0.1	165.7	3.5
more than 4,000.0	65	0.2	386.0	8.2
Farms which did not have agricultural land	2723	8.2	x	x

Source: [21, p. 168].

Table 4. Trends in exports of niche agricultural products in the world, thousand tons

Crop	2000	2010	2016	± 2016 till 2000
Peas	3,384.7	4,481.4	6,264.8	185.1
Kidney beans	2,623.2	3,698.6	3,706.3	141.3
Oat	2,727.9	2,759.2	2,871.8	105.3
Chickpeas	753.1	1,188.1	2,395.2	318.0
Garlic	735.5	1,675.9	1,962.1	266.8
Sorghum	8,498.1	6,318.3	8,673.4	102.1
Rye	2,296.4	1,385.3	1,009.5	44.0
Honey	373.6	468.7	650.5	174.1
Asparagus	184.8	310.8	379.9	205.6
Millet	249.2	383.0	350.1	140.3
Mustard	265.6	249.1	267.1	100.6
Buckwheat	158.2	124.7	153.3	96.9

Source: [10].

Also, in recent years it has become very popular to grow raw materials (roots, leaves, flowers) of dandelion, one of the most common plants in our country.

The purchase price for dried dandelion flowers is 46 UAH / kg, dry leaves are estimated at 45-60 UAH / kg, and the most expensive was dried root: from 92 to 125 UAH / kg (Table 5) [12].

Thus, non-conventional agricultural land use is interpreted as a socio-economic category that exemplifies the relationship in the production of those crops which not only meet the needs of the population in food, but also provide jobs in rural areas, restore natural soil

fertility, increase productive potential of land resources and the level of their environmental friendliness.

Table 5. The most profitable medicinal plants in Ukraine

Plant	Part of plant used	Purchase price, \$ / kg
Rhodiola rosea (golden root)	Rhizome	180
Orchis maculata	Tubers	50
Astragalus dasyanthus	Root	45
Potentilla alba	Root	25
Milkweed	Root	20
Potentilla alba	Leaves	18
Centaurea cyanus	Flowers	17.5
Rosemary	Leaves	10

Source: [12].

In this case, non-conventional agricultural land use should be considered in a five-dimensional coordinate system:

- economic (economic needs of land and soil use, the nature of land use, market of products and land lease, location of production, infrastructure development);
- technological (level of agricultural land use, the main criterion of which is the capitalization and greening of land use);
- social (social institutions of land use and land tenure, in particular, land system, land ownership, economic structure, reduction of unemployment, social infrastructure);
- environmental (natural resource potential, agroecological features of soil use, ecological condition of land, environmental restrictions);
- investment (aggregate investment resources per agricultural land area).

The main factors of non-conventional agricultural land use: knowledge and rational use of the laws of nature; soil fertility recovery, improvement of agronomic and biological properties, mainly due to non-traditional understanding of crop rotation (because the saturation of crop structure with marginal crops requires a new understanding of crop rotation); application of all types of organic fertilizers, limited use of mineral fertilizers taking into account the optimization of plant nutrition; ecological system of plant protection, differentiated soil treatment system, taking into account the requirements

of crops, soil and climatic conditions.

In addition, non-traditional agricultural land use contributes not only to increase the profitability of land use, but also its value, which, accordingly, leads to an increase in revenues from land tax to local budgets and job creation in rural areas.

CONCLUSIONS

Ukrainian rural regions have significant land potential for increasing non-conventional agricultural production. As a non-traditional agricultural land use is the basic basis for rural development through capitalization and socialization of land use, in Ukraine this area of organization of efficient use of agricultural land with state support can be developed by farms and households.. Since it is they who are typical in the Ukrainian realities of growing crops with high added value, and accordingly they can accelerate the process of capitalization and socialization of agricultural machinery and land use in rural areas. However, the development of non-traditional agricultural land use requires the application of a new paradigm for the formation of market-oriented levers to regulate land ownership relations in the production of high-margin, including niche crops. In addition, specially selected crops for existing and emerging, natural and climatic conditions which are based on following principles:

- taking into account positive changes (preservation of land fertility, improvement of biodiversity conditions, ensuring ecological stability of land use); comparative efficiency of land use before and after changing the type (subtype) of land use, in particular, on specialization in the production of niche crops by socio-ecological and economic indicators (increase jobs, environmental stability and increase capitalization of land use);
- evaluation of indicators over time with the aim of positive consequences in the systemic nature management.

REFERENCES

- [1]Agrell, P. J., Stam, A., Fischer, G. W., 2004, Interactive multiobjective agro-ecological land use

- planning: The Bungoma region in Kenya. *European Journal of Operational Research*, 158(1):194-217.
- [2] Alim, I. D., Lup A., 2019, Organic Farming: from Definitions and Concepts to the Agricultural Business and Even Politics. *Scientific Papers Series Management, Economic Engineering in Agriculture and rural development*, Vol. 19(2):11-16.
- [3] Altieri, M. A., Anderson, M. K., 1986, An ecological basis for the development of alternative agricultural systems for small farmers in the Third World. *American Journal of Alternative Agriculture*, Vol. 1(1):30-38.
- [4] Analytical report GROWFORD Institute, 2019, Land market: existing threats to Ukraine and necessary precautions. Institute for Global Research of Optimal Ways for Development. 56 p.
- [5] Ander-Clarke, C., Hodges, R.D., 1987, The environmental effects of conventional and organic | biological farming systems. I. Soli erosion, with special reference to Britain. *Biological Agriculture & Horticulture*, 4(4):309-357.
- [6] Batte, M. T., Bacon, K. J., Hopkins, J. W., 1998, Measures of economic and environmental performance for alternative agricultural production systems. *Journal of production agriculture*, Vol. 11(4):428-438.
- [7] Burghelea, C., Uzlău, C., Ene, C.M., Topor, D., 2016, Prospects for organic farming in Romania, *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, Vol. 16(1):73-78.
- [8] Clark, M., Tilman, D., 2017, Comparative analysis of environmental impacts of agricultural production systems, agricultural input efficiency, and food choice. *Environmental Research Letters*, Vol. 12(6):064016.
- [9] Dudych, H., Dudych, L., 2018, Assessment of the Ecological Sustainability of Agricultural Land Use in the Territorial Structure of Region. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, Vol. 18(4):87-92.
- [10] FAOSTAT. Trade. Crops and livestock products. Retrieved from. www.fao.org, Accessed on 18 September 2019.
- [11] Guthman, J., 2014, *Agrarian dreams: The paradox of organic farming in California* (Vol. 11). Univ. of California Press.
- [12] Lavnikovich, D., 2019, Earn on the grass. Why mint is more profitable to grow than wheat. <https://www.dsnews.ua/agro/zarobotat-na-trave-pochemu-myatu-vyrashchivat-vygodnee-chem-04032019110000>, Accessed on 2 June 2020.
- [13] Lyvch, D., 2019, In anticipation of the market. Who owns the Ukrainian land, Reanimation package of reforms/ <https://rpr.org.ua/news/v-ochikuvanni-rynku-komu-nalezhyt-ukrains-ka-zemlia/>, Accessed on 5 May 2020.
- [14] Maksimova, M., 2016, Experts have named the most profitable crops in the world. <https://replyua.net/world/38597-eksperty-nazvali-samye-pribylnye-selskohozyaystvennye-kultury-v-mire.html>, Accessed on 2 June 2020.
- [15] Marten, G. G., Sancholuz, L. A., 1982, Ecological land-use planning and carrying capacity evaluation in the Jalapa region (Veracruz, Mexico). *Agro-Ecosystems*, 8(2):83-124.
- [16] Martyniuk, M., 2019, The optimal scenario of land reform, *Mirror weekly*. Ukraine, Vol. 26. <https://dt.ua/macrolevel/optimalnyy-scenariy-zemelnoy-reformy-.html>, Accessed on 5 May 2020.
- [17] Padel, S., Lampkin, N. (Eds.), 1994, *The economics of organic farming: an international perspective* (pp. 201-222). Wallingford: Cab International.
- [18] Penfold, C. M., Miyan, M.S., Reeves, T.G., Grierson, I.T., 1995, Biological farming for sustainable agricultural production. *Australian Journal of Experimental Agriculture*, 35(7):849-856.
- [19] State Statistics Service of Ukraine, 2011, *Statistical publication Regions of Ukraine*, State Statistics Service of Ukraine, Part II, Kyiv.
- [20] State Statistics Service of Ukraine, 2015, *Statistical Yearbook Agriculture of Ukraine for 2014*, State Statistics Service of Ukraine, Kyiv.
- [21] State Statistics Service of Ukraine, 2019, *Statistical Yearbook Agriculture of Ukraine for 2018*, State Statistics Service of Ukraine, Kyiv.
- [22] The Verkhovna Rada of Ukraine, 2017, Resolution of the Cabinet of Ministers of Ukraine “Some issues of management improvements in the area of use and protection of state-owned agricultural lands and their disposition”, <https://www.kmu.gov.ua/ua/npas/250068882>, Accessed on 22 April 2020.
- [23] Tretiak, A.M., Tretiak, V.M., Kovalyshyn, O.F., Tretiak, N.A., 2019, *Land market economics: basic principles of theory, methodology, practice*, SPOLOM, Lviv, Ukraine.
- [24] Udova, L.O., Proykopenko, K.O., 2018, Niche crops - new prospects for small businesses in the agricultural sector. *Agricultural economics*. No. 3, 102-117.
- [25] Vergunst, P., 2003, *Liveability and ecological land use* (Vol. 373).
- [26] Volodin, S., 2017, Methodical bases of fastplant-technologies for the fast production of niche cultures. *Agricultural and Resource Economics*, Vol. 3(4):43–56. <http://are-journal.com/are/article/view/134>, Accessed on 29 May 2020.
- [27] Watson, C. A., Atkinson, D., Gosling, P., Jackson, L. R., Rayns, F. W., 2002, Managing soil fertility in organic farming systems. *Soil use and management*, 18(1):239-247.
- [28] World Data Atlas. Knoema, <https://knoema.ru/atlas>, Accessed on 11 May 2020.