doi: 10.18559/ref.2017.2.6

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

The main priority of achieving resource safety of agricultural production

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ABSTRACT

Resource safety of agricultural production is investigated as the main condition. Its dominant registers are land resources and fertility of soil. The bearing-out of nutritives is analyzed from soil together with the harvest of agricultural cultures. It shall be underlined that for providing maintenance of areas and fertility, it is crucial to maintain a balance between the bearing-out of nutritives from soil with the harvest of agricultural cultures and compensative bringing. The major directions of maintenance of the resource providing agricultural production are the following: increase of bringing of organic fertilizers, optimization of the structure of croplands, strengthening the responsibility of land users, development of ecological culture.

Keywords: agricultural production, unsustainable agriculture, mineral and organic fertilizers, land safety legislation, ecological culture of land use.

1. Introduction

Safety from Greek means to own a situation, which means to know whether the situation is threatening or not [Kharazishvili, Liashenko, Zaloznova, Kvilinskyi 2016, p. 108-119]. In agricultural production it predetermines the sufficient provision of necessary resources: material, labour, financial [Pająk, Dahlke, Kvilinskyi 2016, p. 109-122]. A special place among material resources belongs to earth – to spatial basis and the main means of agricultural production. In fact, first of all, providing the agricultural production by near-term resources depends on the state of fertility of earth. Therefore, the basis for resource safety of agricultural production is proper (sufficient) provision of land resources. If soil is in an improper state, then it is necessary to attach (but sometimes it is impossible) considerable labour efforts and to spend corresponding material resources (mineral fertilizers, lime, etc.), to attain the minimum productivity. The improper state of lands is predefined by the influence of different factors on them, both natural (excessive moisture, acidity, alkalinity) and anthropogenic (water and wind erosion, bearing-out of nutritives from soil by cultural plants, machine degradation). Thus, there is a danger of a loss of fertility of areas and a decrease in the level of productivity of the processed earth. It is noted in the clause 7 Law of Ukraine concerning the bases of national safety of 19 June 2003. In particular, it is marked that the threats to the national interests in the ecological field are: the inefficient, exhausting use of raw mineral-material natural resources, both unrefurbishable and refurbishable. Notice that earth is a refurbishable resource – to renew 1 cm of soil nature needs not less than a hundred (!) years. In connection with the above facts, the resource safety of agricultural production, especially its main means – earth, is always actual.

2. State of research

The problem of rational use and protection of agricultural earth has been investigated by many scientists. Among them there are: O. Budziak, P. Vedienichev, A. Dankevych, M. Kropyvka, P. Marakulin, I. Mykhasiuk, B. Paskhaver, V. Tregobchuk, M. Khvesyk, D. Shyian and many other.

In our view, sufficient attention was not given to the main problem of the resource safety of agricultural production – the balance between the bearing-out of humus and nutriti-

ves (first of all to nitrogen, phosphorus, potassium) with the harvest of agricultural cultures and their compensative bringing of the users of earth. Thus, the aim of this article is to research the balance between the bearing-out of humus, nutritives with the harvest of agricultural cultures and their indemnification, as well as the ground of directions of improvement in the level of the resource providing agricultural production.

3. The main provisions

The most valuable organic substance and biologically active part of soil is humus. It is referred to as the immune system of soil, because due to it the ground structure is kept and gets better, main functions are supported and the health of the ground environment is provided. As V. Sofiichenko and L. Dotcenko underline, humus activates natural resistance to vegetable diseases and wreckers and prevents mass development of pathogens [Sofiichenko, Dotcenko 2012]. These authors mark that Ukraine owns enormous reserves of fat lands, from which black earth makes up 60 % of plough-land (6.7 % of world supplies). But, if 100 years ago there were 4-6 % of humus in soils of Ukraine, then presently there are only 3.2 % (when content of humus becomes less than 2.5 % it is not black earth anymore). The circumstance that after the calculations of "Centrfertility" the annual negative balance of humus amounts to 0.5-0.7 t/ha causes an enormous alarm. Each five years the soils of Ukraine loses 0.05 % of total supplies of humus [Sofiichenko, Docenko 2012]. Notice, on the face of it, it is not as terrible, because in black earth the supplies of humus arrive at 300 t/ha (and on sod-podzolic soils – in several times less than). In the opinion of some researchers, literally for 30 years we can remain without humus. Many scientists talk about it. For example, an academician of the National Academy of Agrarian Sciences of Ukraine, M. Khvesyk and Doctor (Candidate) of Economic Sciences, A. Stepanenko claim that "100 thousands ha of fertile soil degrade in Ukraine annually". Compared to the end of the 19th century, the amount of humus in soils went down 6 times and diminished annually 8 million t. [Khvesyk, Stepanenko, 2014, p. 82].

Table 1: The bearing-out of nitrogen with the harvest of agricultural cultures in Ukraine in 1995-2015 (thousand ton)

Types of agricultural cultures	1990	1995	2000	2010	2013	2014	2015
Winter wheat	971.0	511.0	312.8	518.9	693.9	751.9	830.0
Winter-annual rye	53.0	35.0	28.0	13.4	18.3	13.7	11.2
Winter-annual barley	41.0	20.7	12.7	67.6	60.5	70.3	68.9
Furious wheat	1.1	12.8	17.7	26.6	17.5	25.9	25.0
Furious barley	195.0	233.4	169.2	142.2	126.4	153.9	135.2
Oat	42.0	35.7	28.2	14.7	14.9	19.6	15.6
A corn on grain	142.0	101.8	115.4	358.6	978.5	854.9	699.8
Millet	11.0	8.8	14.1	3.9	3.4	5.9	7.0
Buckwheat	13.0	10.2	14.1	4.0	5.4	5.0	3.8
Rice	3.0	2.3	2.6	4.3	4.2	1.5	1.8
Grain-leguminous plants	21.6	103.6	43.0	39.1	24.6	31.7	33.1
Sugar beets(factory)	221.0	148.3	66.0	68.7	53.9	78.7	51.7
Sunflower	147.0	163.0	197.1	386.0	629.9	577.6	637.3
Rape	6.0	1.8	5.8	64.7	103.5	96.7	76.4
Soy	2.0	0.5	1.3	35.3	58.3	81.5	82.6
Long-fibred flax	1.4	2.3	0.4	0.0	0.1	0.1	0.1
Potato	84.0	73.6	99.2	93.5	111.3	118.5	104.2
Vegetables	22.0	19.4	19.2	26.8	32.6	31.8	30.4
Forage root crops	109.0	53.9	26.7	27.1	29.0	28.0	24.8
A corn on a silo and green feed	246.0	154.8	60.5	18.8	21.3	18.9	17.1
One-year herbares	19.0	13.1	11.0	16.2	16.2	17.1	16.6
Long-term herbares	94.0	74.3	43.7	55.1	58.2	66.7	53.1
Garden-stuffs and berries	15.0	9.5	7.3	8.7	11.5	10.0	10.8
Vine	1.4	0.8	0.9	0.7	1.0	0.8	0.7
Total	*2656.0*	*1790.6*	*1277.7*	*1994.9*	*3074.4*	*3060.7*	*2937.2*

Source: It is calculated on the basis of the data from: State service of statistics of Ukraine 2015, p. 134; State service of statistics of Ukraine 2016, p. 308; Reference book on the fertilizer of agriculture 1987, p.183.

D.Sc O. Budziak similarly asserts that "Presently the annual losses of humus are 600-700 kg on hectare of agricultural lands" [Budziak 2013, p.180]. Taking into account the minimum losses – of 0.6 t and the area of agricultural lands of Ukraine, then total losses will be within the limits of 25 million tons of humus a year.

M. Kyssil and N. Sprynchuk report that the average content of humus went down from 2.9 % in 1981-1985 to 2.7 % in 2006-2009 in the Vinnytsya region [Kyssil, Sprynchuk 2011, p. 67].

N. Solovianenko marks that middle (2-3 % and 3-4 %) contents of humus are on 16.4 millions of hectares (66.1 % of the inspected area) [Solovianenko 2012, p. 23]. The sandy and sandy-loam grain-size distribution, that is widespread mainly in the Polissya region, are with low and very low content of humus. The author underlines that much of them are located particularly in the regions of Volyn (87 %), Zhytomyr (61,4 %), Chernihiv (47,1 %) and Rivne (44,9 %). There are large areas with subzero content of humus also in the regions of Lviv, Chernivtsi, Donetsk, Zakarpattia, Kyiv [Solovianenko 2012, p. 23].

Unfortunately, these are a lot of such examples. We will try to give an explanation to such a state and analyse the bearing-out of nutritives with the harvest of agricultural cultures of all economies of population and bringing of corresponding fertilizers on its indemnification (tables 1-3).

The volumes of bearing-out of nitrogen by agricultural plants are calculated on the basis of corresponding norms and statistical data (table 1). Their general volume attained 2937.2 thousand t in 2015 (sunflowers make up for 22 % of this volume, corn – 23,8 %).

Thus, these two (!) agricultural cultures 'take' away from soil almost the half of total bearing-out. These phenomena arose up in recent years. In fact, although these two cultures are exported, they very exhausting for the soils of Ukraine.

Except for these two cultures, furious barley, soy, rape and potato have considerably taken away nutritives from soil, especially in the last few years. A similar situation takes place in the case of phosphoric and potassium fertilizers (table 2-3).

Table 2: The bearing-out of phosphorus with the harvest of agricultural cultures in Ukraine in 1995-2015 (thousand t.)

Types of agricultural cultures	1990	1995	2000	2010	2013	2014	2015
Winter wheat	334.0	175.6	107.5	178.4	240.5	258.5	285.3
Winter-annual rye	15.0	14.5	11.6	5.6	7.6	5.7	4.6
Winter-annual barley	33.0	16.8	10.3	54.7	49.0	56.9	55.8
Furious wheat	0.3	3.3	4.6	7.0	4.6	6.8	6.5
Furious barley	192.0	95.1	68.9	57.9	51.5	62.7	55.1
Oat	18.0	15.6	12.3	6.4	6.5	8.6	6.8
A corn on grain	47.0	33.9	38.5	119.5	309.5	285.0	233.3
Millet	3.0	2.4	3.8	1.1	0.9	1.6	1.9
Buckwheat	6.0	5.1	7.2	2.0	2.7	2.5	1.9
Rice	2.0	1.4	1.5	2.5	2.5	0.9	1.1
Grain-leguminous plants	49.0	23.6	9.8	8.9	5.6	7.2	7.5
Sugar beets(factory)	58.0	148.3	66.0	68.7	53.9	78.7	51.7
Sunflower	69.0	77.2	93.3	182.8	298.4	273.6	301.9
Rape	2.0	0.6	2.1	23.5	37.6	35.2	27.8
Soy	1.0	0.2	0.5	13.4	22.2	31.1	31.4
Long-fibred flax	0.4	0.9	0.1	0.0	0.02	0.02	0.02
Potato	37.0	32.4	43.6	41.1	49.0	52.1	45.8
Vegetables	9.0	7.6	7.6	10.6	12.8	12.5	12.0
Forage root crops	33.0	16.2	8.0	8.1	8.7	8.4	7.4
A corn on a silo and green feed	98.0	61.9	24.2	7.5	8.5	7.6	6.8
One-year herbares	10.0	7.0	5.8	8.6	8.6	9.0	8.8
Long-term herbares	28.0	21.8	12.3	16.1	17.1	19.6	15.6
Garden-stuffs and berries	9.0	5.7	4.4	1.2	6.9	6.0	6.5
Vine	1.4	0.8	0.9	0.7	1.0	0.7	0.7
Total	*1055.0*	*767.9*	*544.8*	*826.3*	*1205.6*	*1230.9*	*1176.2*

Source: It is calculated on the basis of the data from: State service of statistics of Ukraine 2015, p. 134; State service of statistics of Ukraine, 2016 p. 308; Reference book on the fertilizer of agriculture 1987, p.183.

As shown in Table 2, the most recipients of phosphorus is grain corn (233.3 thousand t in 2015) and sunflower (301.9 thousand t in 2015). These cultures together take away 45.5 % of phosphorus from soil. Winter wheat, furious barley also take away considerable volumes of phosphorus from soil.

A particular situation takes place when it comes to the bearing-out of potassium. Bearing-out of this feed element of sunflower attained 1274.6 thousand t in 2015. For comparison, in 1990 only 293.0 thousand t, that in 4.3 times less (table 3).

Table 3: The bearing-out of potassium with the harvest of agricultural cultures in Ukraine in 1995-2015 (thousand t)

Types of agricultural cultures	1990	1995	2000	2010	2013	2014	2015
Winter wheat	789.0	415.2	254.2	421.6	568.4	610.9	674.4
Winter-annual rye	35.0	33.8	27.1	13.0	17.7	13.2	10.8
Winter-annual barley	27.0	13.8	8.5	45.1	40.3	46.8	45.9
Furious wheat	0.3	7.6	10.6	15.9	10.4	15.4	14.9
Furious barley	192.0	224.8	162.9	136.9	121.7	148.2	130.2
Oat	35.0	31.2	24.7	12.9	13.1	17.2	13.7
A corn on grain	142.0	101.8	115.4	358.6	928.5	854.9	699.8
Millet	12.0	9.1	14.5	4.0	3.5	6.1	7.2
Buckwheat	16.0	13.3	18.8	5.2	7.0	6.5	5.0
Rice	0.7	0.5	0.5	0.9	0.9	0.3	0.4
Grain-leguminous plants	65.0	31.4	13.0	11.8	7.4	9.6	10.0
Sugar beets(factory)	221.0	148.3	66.0	68.7	53.9	78.7	51.7
Sunflower	293.0	326.0	394.1	772.0	1259.8	1155.3	1274.6
Rape	6.0	1.9	6.2	69.1	110.5	103.3	81.7
Soy	2.0	0.4	1.2	31.9	52.7	73.8	74.7
Long-fibred flax	0.6	1.0	0.2	0.0	0.02	0.02	0.02
Potato	134.0	117.8	158.7	149.6	178.1	189.5	166.7
Vegetables	29.0	25.9	25.6	35.7	43.4	42.4	40.5
Forage root crops	136.0	67.4	33.4	33.9	36.2	35.0	30.9
A corn on a silo and green feed	344.0	216.7	84.6	26.2	29.8	26.5	24.0
One-year herbares	10.0	7.0	5.8	8.6	8.6	9.0	8.8
Long-term herbares	83.0	65.5	38.6	48.6	51.4	58.9	46.9
Garden-stuffs and berries	17.0	11.4	8.7	10.5	13.8	12.0	12.9
Vine	1.8	1.0	1.1	0.9	1.3	1.0	0.8
Total	*2588.0*	*1872.8*	*1474.4*	*2281.6*	*3558.4*	*3514.5*	*3426.5*

Source: It is calculated on the basis of the data from: State service of statistics of Ukraine 2015, p. 134; State service of statistics of Ukraine, 2016 p. 308; Reference book on the fertilizer of agriculture 1987, p.183.

The considerable volumes of potassium are also 'taken' away by winter wheat and grain corn: 674.4 and 699.8 thousand t in 2015. They are also our 'export' cultures.

There arises a question after the analysis of tables 1-3: how to compensate the bearing-out of nutritives? There is a traditional answer – by bringing in minerals and organic fertilizers. However, the analysis of the corresponding data shows the deplorable state in this business. After our calculations, 18.7 % of the total bearing-out under harvest was compensated in all in 2015. Only 79 kg of nutritives are brought in on one hectare of sowing area. For comparison, it has to be noted that as early as in 2006 215.6 kg of nutritives were brought in on one hectare of plough-land in Greece, with 219.6 in Germany, 175.5 in Italy, 324.9 in Great Britain and 371.3 kg in Holland [Korchynska 2004, p. 33].

Bringing of organic fertilizers is a wrong idea. The part of the fertilized area amounted to only 2.5 % in 2015, and brought in only 0.5 t on one hectare of sowing area. In general, agricultural production became exhausting for us.

Even in 1990, when the volumes of bringing mineral fertilizers were three times more than the level in 2015, and organic in 26.8 times, their volumes were insufficient.

Obviously, there occurs a question after such an analysis – are there possibilities to improve this situation? In our view, there are.

First of all, it is an increase in bringing of organic fertilizers. A considerable reduction in the population of domestic animals took place. As early as in 1995 there were 17.5 million

heads of livestock in the country (that number included 7531 cows, 13.1 million heads of pigs, 4.1 million heads of sheep and goats), and in 2015 there were only 3750 thousand heads of livestock (that number included 2167 cows, 7079 thousand heads of pigs, 1325 thousand heads of sheep and goats). The only population that increased from 149.8 million heads in 1995 to 204 million heads in 2015 is the population of birds, mainly chickens (State service of statistics of Ukraine, 2016, p. 327).

If you calculate the coming out of dung from keeping the domestic animals [Reference book on the fertilizer of agriculture 1987, p. 51, 54, 57] and their amount (State service of statistics of Ukraine 2016, p. 327), then the charges of dung on all sowing areas in 2015 would make up 3 t. The most opportunities to increase the number of „potential" dung can be achieved by the growth of livestock in households.

The second way of indemnifying bearing-out of nutritives is the observance of proper organization of the use of land; in other words, optimal correlation of agricultural cultures in crop rotations. There are considerable violations without regard to the corresponding documents (Government of Ukraine 2010) – every fifth hectare of sowing areas is occupied with sunflower in last years (table 4).

Table 4: The structure of sowing areas of Ukraine in 1990-2015 (%)

Types of agricultural cultures	1990	1995	2000	2010	2013	2014	2015
Total sowing areas	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Grain crops	45.0	45.7	50.2	56.0	57.2	54.3	54.8
including winter wheat	23.4	17.2	19.6	22.7	23.0	21.7	24.9
furious barley	6.8	13.3	13.4	11.2	9.6	7.2	6.6
a corn on grain	3.8	3.8	5.0	10.1	17.3	17.2	15.3
Industrial crops	11.6	12.1	15.4	27.1	27.8	31.0	31.0
including sugar beets	5.0	4.8	3.2	1.9	1.0	1.2	0.9
sunflower	5.1	6.5	10.8	17.0	17.8	19.4	19.0
rape	0.3	0.2	0.8	3.4	3.6	3.2	2.5
soy	0.3	0.1	0.2	4.0	4.8	6.6	8.0
Potato, vegetables, melons and gourds	6.4	7.0	8.4	7.3	6.9	7.0	6.8
including potato	4.4	4.9	6.0	5.2	4.9	4.9	4.8
Forage crops	37.0	35.2	26.	9.6	8.1	7.7	7.4
including forage root crops	1.9	1.6	1.1	0.9	0.8	0.8	0.8
a corn on a silo and green feed	14.3	11.2	7.1	1.8	1.4	1.3	1.1
One-year herbares	8.0	9.3	6.5	2.2	1.7	1.5	1.5
Long-term herbares	12.3	12.6	11.0	4.6	4.1	4.1	3.8
Area of clean fallow land (% of all sowing area)	4.4	5.1	11.8	5.4	3.5	3.0	2.3

Source: It is calculated on the basis of the data from: State service of statistics of Ukraine 2015, p. 129; State service of statistics of Ukraine 2016, p. 313.

It is necessary to notice that scientists have emphasised that in steppe districts it can be almost one third of sowing areas.

Specific gravity of areas of one-year and long-term herbares diminished fourfold (from 20.3 % in 1990 to 5.3 % in 2015). The herbares satiate soil nitrogen-fixing bacteria, improving the structure of soil.

Also the negative phenomenon is an increase of areas of grain-crops from 45 % in 1990 to 54.8 %. There is no need to follow an extensive way, but the intensive one. For this purpose, a very important thing for soil is corn gross collections that make up for more than half of grain-growing. The areas of rape and soy increased sharply, which is exhausting for soil as well.

It is important for the balanced land-tenure that all land users observe the corresponding legislation. For example, clause 30 of the Law of Ukraine on the protection of earth from 19 June 2003 sets such norms in the industry of earth protection and recreation of fertility of soils: maximum possible contamination of soils; quality of soils; optimal correlation of agrarian lands; indexes of degradation of earth and soils. The norms of optimal correlation of agrarian lands are set in clause 33 for the prevention of an excessive anthropogenic influence on lands, including excessive plouphing up of agrarian lands. The norms of optimal correlation of agrarian lands include: optimal correlation of agricultural earth with natural reserve, nature protection, sanative, historic and cultural, re-

creational role, as well as earth, forest and water funds; optimal correlation of plough-land and long-term planting, hayfield, pastures, as well as lands under field-protecting forest belts in agrarian landscapes [Verkhovna Rada of Ukraine, 2003].

Summarizing, what shall be marked is the sharp necessity of keeping to lands protecting legislation, in particular, in part of optimising the organization of the use of land.

Large possibilities are opened in the field of recreating the fertility of soils at the use of green manure crops. In V. Grekov and PhD V. Dacko's opinion, green fertilizers accumulate nitrogen and humus, first of all. Nitrogen from the air is taken by legume bacteria. 150-250 kg/ha of general nitrogen come in soil at harvest of 350 cwt/ha, which may be compared to bringing 30-40 t/ha and leaving it to rot. In particular, the green mass of lupine leguminous culture achieves 150-200 cwt/ha in autumn, which may be compared to bringing to rot 20 t on hectare. One-year rape gives 80-160 cwt/ha of roots and nourishing bits and pieces with the humification coefficient of 0.15-0.25 [Grekov, Dacko 2008].

The global experience shows that turnip, cabbage, lupin, phacelia, mustard, buckwheat, long-term herbares (alfalfa, clover, melilot), leguminous (vetch, peas, forage bobs), cabbage (rape, radish oily), grain (rye, sudanese grass) and different mixtures (for example, vetch + oat, vetch + rye, peas + oat) are grown on a green fertilizer. In this connection, the scientific centers of Ukraine recommend to sow green manure crops. However, if the sowing area of our country occupies more than 27 million ha, then the areas of sowing green manure crops, based on our data – only a few hundreds thousand ha, and although charges for their sowing are 2 – 4 times less than ordinary manure fertilizer.

In this aspect the best situation is with ploughing nourishing leavings, in particular, stubble. As V. Sofijchenko and L. Dacko underline, in obedience to these regional centers of "Oblderzhrodiuchist", agrarians plough straw on an area of 5.5 millions annually, thus forming 2 million t of the same organic substances. There are possibilities to expand this area to 10 millions ha.

As regards the optimization of the structure of sowing areas, certain work is conducted. For example, from the data of round table, organized Volyn ODE and by corresponding scientific institutes table, Ltd "Pyatydni" (with the area of agricultural lands amounting to 16 thousands hectare) had the taken crop of winter wheat of 127 cwt /ha. A predecessor was peat (!). As may be seen, it is a persuasive argument for optimising the structure of sowing areas, with a sharp increase of areas under green manure crops.

An important element of Ukrainian fertility, main direction of smoothing the balance of bearing-out and bringing in mineral and organic substances are the reserves of peat and sapropel.

In Ukraine, there are 1512 deposits of peat, 503 of which are developed, with a general area covering 639.5 thousands ha. The supplies of peat are estimated to be 1853 million t, with the basic supplies amounting to 1160 million t (1056 deposits) in the regions of Volyn, Rivne, Chernihiv, Zhytomyr and Sumy. We obtain only 713 thousand t, and thus, only 19 % are spend on fertilizers. For comparison we will mark that the world does not have a considerable success in this regard: getting of peat is 26-28 million t, with 5.5 million t being obtained in Finland and Spain, and 4 million t in Germany [Peat and Sapropel of Ukraine].

Sapropel (rotten silt) is applied for a native improvement of earth, for its recultivation, readjustment and optimization of the ground processes. Bringing sapropel in soil improves its mechanical structure, moist absorptive and water-retaining capacity for airing, assists the development of useful microflora of soil and favourably operates on the water and air mode during 2-3 years, as well as increases the level of humus, nitrogen and microelements in soil. The action of sapropel may be observed even up to 14 (!) years.

There are 274 deposits of sapropel, the supplies of which are estimated at 97.2 million t, with 190 deposits located in the Volyn region, supplying 71.8 million t. The Volyn region obtains 200 thousand t of sapropel in 8 deposits [Peat and Sapropel of Ukraine].

In addition, for the receiption of organic fertilizers it is possible to use lacustrine and river silt. There are 63119 rivers (63028 of which are small rivers) and 8073 lakes in Ukraine. There are large backlogs of organic "production", moreover mineral fertilizers worsen soil without it.

In the light of the above facts, a question arises here – do the earth users have money and motivation to implement works on the "creation" of organic fertilizers? In our view, they do.

As PhD O. Pelenychak marks, from the data of the Educational scientific institute of economy and natural resources of ecology of land-tenure, Ukrainian agrarians get 79 % of their income due to natural fertility of earth, and only 21 % as a result of introduction of technologies

[Pelenychak 2012, p. 32]. Thus, there must be a proper attitude towards the protection of the main means of production. The analysis of the statistical data in 2015 shows that the level of profitability of the operating activity attained 43.1 %. For comparison: in 2010 – 24.5 % in 2011 – 24.7 %, in 2012 –22.8 % in 2013 – 11.7 %, in 2014 – 21.4 % [State service of statistics of Ukraine 2016, p. 327]. Thus, though small, yet there are financial possibilities to increase the volume of earth protection works.

It is especially necessary to mark the attitude of agrarians toward the protection of earth, especially agricultural holdings that concentrated large areas – 24 % of croplands, and assume predatory exploitation of the agrarian lands [Kvesyk, Stepanenko 2014, p.82].

A. Dankevych, a doctor of economic sciences, notices that the most widespread index in the agrarian sector is an analytical index of EBITDA - income to the contribution of charges on interest payment and taxes and accrued depreciation. As a comparative analysis of efficiency of work of the biggest 20 agroholdings in a plant-grower testify, with the index adopted on the average amounting to 300 USD.

And how much do the agricultural holdings spend on the protection of fertility? Scientists have already written about the necessity of revivals on landed arrays that lease agricultural holdings of the stock-raising sphere. It would be good, if there also appeared national and agroholding fight for organics, mastering of deposits, lakes with a sapropel, ponds with a silt.

Obviously it is urgently needed to grow green manure crops, as the present commercial course of agriculture is a way to complete the exhaustion of earth, and a correct way is the way of high ecological culture of land-tenure. It is needed to leave fertile, but not exhausted earth descendants.

4. Conclusions

On the basis of the above facts it is possible to recommend the following:

1. For the "production" of organic fertilizers it is needed to sow earth green manure crops, to use peat and sapropelic fertilizers, pond and river mules, take a maximum advantage of the possibilities of modern plant-grower. It will substantially decrease the negative balance to humus. Mineral fertilizers should be applied only with the organic ones.

2. To renew the optimal structure of sowing areas in crop rotations. It would be expedient at a grant of earth in a lease to assert the plan of organising the use of land,which means an optimal duty of agricultural cultures. It would allow to accumulate corresponding useful substances in soil, to barrier it from tiredness of soil which substantially promotes the provision of earth users with landed resources and improves the resource strength of agricultural producer safety.

3. To strengthen state control after keeping to land protective legislation. To apply the norms of responsibility for a failure to observe the rules of protection and rational use of agricultural earth.

4. To form the ecological culture of land-tenure,i.e. to search and apply the new forms of influence on the users of earth on soil fertility. To encourage this work in every way. To mark the fields of an exemplary and kind state. Expediently, on occasion, to disentitle land-tenure. It will allow to increase the resource strength of agricultural production safety.

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