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## **SOCIAL INDICATORS OF SUSTAINABLE USE OF THE AGRICULTURAL LAND AND IT'S IMPACT ON FOOD SUPPLY IN UKRAINE**

### **1 INTRODUCTION**

Management of sustainable development, evaluation of the effectiveness of the means, assessment of the achieved level call for an indicative sustainable development model. The data can, among other things, set the food supply of the population.

The most authoritative foreign researchers of problem of sustainable development are J.H. Meadows, D.L. Meadows, J. Randers and W. Behrens [1-3], H.G. Daly [4], R.A.Konstanza [5], H. Brundtland [6], J. Forester [7] and others. Some aspects of the formation and implementation of the concept of sustainable development highlighted in the works of such Russian researchers, as T.A.Akimov [8], S.N.Bobylev [9], N.F.Vinokourov [10], M.F.Zamyatin, [11] A.I. Karyntsevoyi [12], M.N.Lukyanchikova [13], A.V.Malyavina [14], A.P.Moskalenko [15] and others.

Tikhonov A.G., Grebenyuk N., Tykhonenko O.V., Fedenko V.P. [16-20] and other scientists, developed system of indicators of sustainable development of agricultural land in Ukraine.

However, a single model that would allow to monitor the development of land use, to determine its level of sustainability and an indication of the process in the time still doesn't exists. The researchers did not determine the degree of

dependence between the level of sustainability of land use and the level of food supply of the population.

## 2 RESEARCH OBJECTIVE AND METHODOLOGY

The aim is to study indication of social status of agricultural land use and the impact of the latter on the level of food supply in Ukraine.

Research on indication of social status of agricultural land use held based on the previously reasonable indicators [21].

## 3 RESEARCH RESULTS

Environmental and economic problems in land use adversely affected the birth rate in rural areas: in 2014, compared with 1985, index has decreased by 34.4% (Fig. 1).

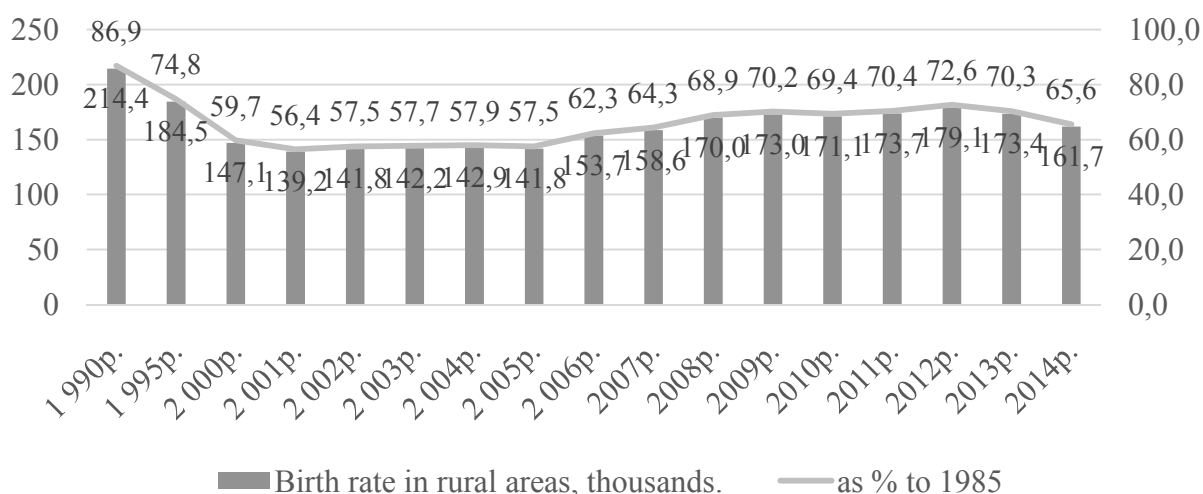


Figure 1 - Birth rate in rural areas of Ukraine  
Source: Calculated by author according to given data [22, 23]

It should be noted that the birth rate decreased continuously until 2001, then an increase in index, although a clear trend has not yet seen. Important is the fact that in most countries the general population birthrate observed the same trend. However, among the post-Soviet states Ukraine has the lowest value of the indicator.

Accordingly decreased fertility rate in rural areas. It is characterized by the number of births per 1000 population. In 2013, it amounted to 12.3 against 13.8 in 1985, i.e. decreased by 10.9%. Over the 28 years analyzed, the fertility rate been declining annually by an average of 0.1.

Life expectancy at birth in rural areas decreased among men from 66 years in 1985 to 64.5 years in 2014, i.e. 2.3%. Reducing this figure is even more significant when comparing it with this indicator in Europe, where the indicator reaches 76-79 years.

Life expectancy at birth among women also declined, but fluctuations compared to 1985 minor from 73 to 75 years. Thus, life expectancy at birth in rural areas exceeds the given indicator for males by an average of 8-11 years. In any case, the difference compared with European highest rates of life expectancy at birth for women is 8-10years.

Positive points are decline in the infant mortality rate in rural areas in 2014 compared to 1985 levels of index has decreased by 47.5%. It is characterized by the number of infants' deaths under one year per 1,000 live births. In 1985 from 1000 infant died 15.8 persons, and in 2008, this number decreased to 8.3.

In general, rural mortality decreased somewhat: in 1985, it was 284,200 people, in 2014 - 240,600 people. However, among the 45 countries of the world Ukraine since 1990 has the highest overall rate of mortality.

Since the death rate in rural areas exceeds the birth rate, rate of natural population growth decreases. In 2014, the rural population fell by 78,900 people to 37,600 people in 1985. Reducing rural population exceeded the corresponding level in 1985 more than 2 times (Fig. 2).

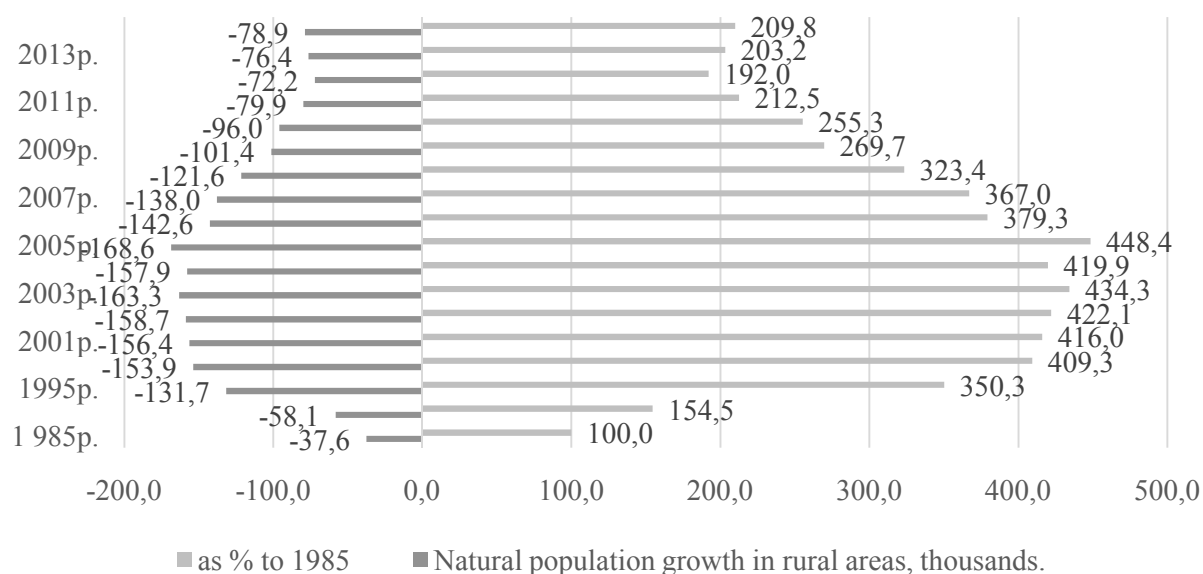


Figure 2 - The natural population growth in rural Ukraine

Source: Calculated by author according to the given data [22, 23]

Accordingly, decreases rate of natural population growth in rural areas: in 1985 it stood at -2.1 in 2013 is -5.4 per 1000 population, i.e. decreased by two times. In global terms (among 45 countries), Ukraine for overall rate of natural population growth is the last.

Certainly, the growth of mortality rate in rural areas is due to many reasons. Even superficial analysis makes it possible to find out the main ones, and proves that in the country, which in the world believe "bread bins", the number of produced and consumed by villagers is constantly decreasing and in most types does not meet reasonable standards consumption. State Statistics does not publish data on food consumption in rural areas. Therefore, we used data characterizing food consumption on average in Ukraine. Of course, these data cannot be considered completely reliable for the category of the rural population because they include data consumption of the rich and the poor, children, working adults and the elderly. However, the general trend of food consumption observed clearly.

During the period from 1990 to 2014 in five of the ten groups of food products, consumption level decreased (Table. 1). Especially reduced per capita consumption of milk and fish - by 40.4 and 58.3%. Less than over the period decreased consumption of meat, bread and sugar - by 19.5, 33.1 and 37.0%.

Table 1 Consumption of basic foodstuffs in Ukraine per person per year, kg

Types of products	Year:						2014 - 1990	
	1990	1995	2000	2005	2010	2014	кг	%
	Meat and meat products	68,2	38,9	32,8	39,0	52,0	54,9	-13,3
Milk and milk products	373,2	243,6	199,1	226,0	206,0	222,5	-150,7	59,6
Eggs, pcs.	272	171	166	238	290	311	39,0	114,3
Bread products	141,0	128,4	124,9	123,0	111,1	108,4	-32,6	76,9
Potato	131,0	123,8	135,4	133,0	128,0	145,0	14,0	110,7
Vegetables and melons	102,5	96,7	101,7	118,0	144,0	163,1	60,6	159,1
The fruits, berries and grapes	47,4	33,4	29,3	36,0	48,0	54,0	6,6	113,9
Fish and fish products	17,5	3,6	8,4	14,5	14,5	10,8	-6,7	61,7
Sugar	50,0	31,6	36,8	38,0	37,0	36,5	-13,5	73,0
Oil	11,6	8,2	9,4	13,5	14,6	13,8	2,2	119,0

Source: compiled according to statistical yearbooks [22, 23]

Thus, rational nutritional standards followed in 2014 only for the consumption of eggs (107.2% of needs), vegetables (101.3%), oil (125.5%), potatoes (116.9%) and cereal products (107.3%). At the same in meat and meat products, for example, consumption level since 1995 does not exceed 68% efficient standards.

As for the consumption of animal products, including meat and milk - protein major carriers - for them even reached the minimum nutritional standards. In 2014, the consumption of these products was respectively 68.6 and 58.6% of rational nutritional standards.

Food consumption reducing reflects the state of crisis in the economy and particular in land use.

During 1990-2014 the volume of gross agricultural output (in constant prices of 2010) in per capita increased by 1.7% (Fig. 3). Should be mentioned, that the growth indicators relative to 1990 is also observed in 2011 and 2012 respectively, but the population is constantly decreasing.

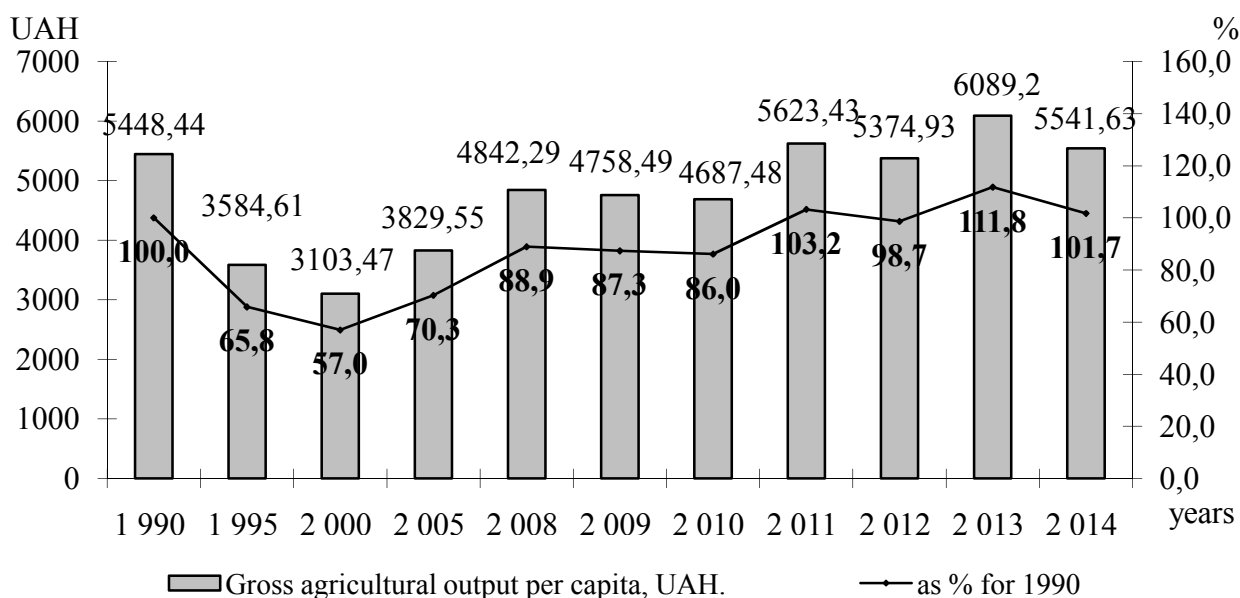


Figure 3 - Dynamics of gross agricultural production (in constant prices 2010) per capita in Ukraine

Source: Calculated by the author according to the Statistical Yearbooks [22, 23]

During the years of reforms has deteriorated state of social infrastructure. In Soviet times, the objects of infrastructure held mainly by agricultural enterprises. In the new socio-economic conditions, they find themselves without adequate

financing and management. There are certain stages in the development of infrastructure at which for some time it can function without additional investment, due to the potential of the system. However, there comes a time when the investments transform into the collapse and require much greater investment and efforts to restore it.

The evolution of the presence of toxic industrial waste in per capita are not consistent (Table. 2).

Table 2. Dynamics of the presence of industrial toxic waste in calculation per capita in Ukraine

Year	The presence of industrial waste per 1 person, kg	Growth rate, %
2000	53,9	100,0
2001	47,7	88,5
2002	39,2	72,7
2003	66,0	122,4
2004	60,2	111,7
2005	46,2	85,7
2006	43,1	80,0
2007	43,4	80,5
2008	50,5	93,7
2009	50,1	92,9
2010	31911,3	59204,6
2011	34704,5	64386,8
2012	35896,6	66598,5
2013	36525,2	67764,7
2014	26701,6	49539,1

Source: Calculated by the author according to the Statistical Yearbooks [22, 23]

In 2014 compared to 2000 the indicator increased by 495,000 times. It should be noted that the rapid growth rate observed since 2010. It is obvious that this indicator subtly responds to changes in output in industry: a positive expansion in the economic aspect of the industry has negative environmental and social impacts by using outdated energy intensive technologies.

To analyze indices of the socio-economic unit indicative model of sustainable land use is difficult because official statistics, most of them in a significant period does not provide, so the comparison was carried out, based on actual statistical data.

Figures concerning land provision in rural areas looks fairly stable (Table. 3).

This is because population happens to decrease significantly along with a slight increasing the farmland area; in 2014 compared to 1990 the population in rural areas decreased by 20.7%, and the area of farmland increased by 0.3%.

Table 3 Indicators of socio-economic block of the sustainability of land use in Ukraine

Показники	Years:								2014 in% to 2000
	1990	2000	2005	2010	2011	2012	2013	2014	
land provision, ha/person	2,46	2,40	2,45	3,16	3,17	3,18	3,19	3,12	130,0
Economic activity in rural areas (Aged 15-70), %	-	60,3	64,1	67,5	68,1	67,7	68,5	61,8	1,5
Employment rate in rural areas (Aged 15-70), %	-	56,1	60,3	62,7	63,0	62,7	63,5	55,9	-0,2
Employment in rural areas compared to the total number of employed, %	17,1	11,8	6,9	4,0	3,6	3,6	3,2	3,4	-8,4
The level of average cash costs in rural areas for food, %	35,5	74,1	78,9	55,3	55,5	53,8	53,0	54,2	-19,9
The quintile ratio of differentiation of total income in rural areas (times), times	-	-	-	1,9	1,8	1,8	1,8	1,8	x
Share of population in rural areas with average per month cash income below the subsistence minimum, %	-	-	78,9	26,5	23,5	23,6	21,4	20,2	x
Investments per capita, UAH.	x	97,30	324,25	802,65	1189,21	1362,20	1345,51	410,55	1449,7

Source: Calculated by the author according to the Statistical Yearbooks [22, 23]

Positive dynamics is observed on indicator of economic activity. However, the level of employment in rural areas (aged 15-70 years) decreased. Finding the right way on these indicators is difficult. The exact number of employed in rural areas in current conditions almost impossible to determine, given the fact that not only the most employable, but in general most of all the available rural population (including pensioners and children) to some extent involved in production.

According to global trends of employment in rural areas compared to the total number of employees in Ukraine annually reduced: between 1990 and 2014 - an average of 0.4 points.

Particularly important is a decrease of proportion of the population in rural areas with average cash income per month, lower than the living wage, but

surprises the fact that even with a decrease in the indicator in 2014 compared to 2005 (by 58.7 in. N.) the number of such people, even according to official statistics, more than 20%. In addition, index of average cash costs in rural areas for food absolutely does not meet European standards - in Ukraine, it is 54.2%, and compared to 1990 it increased by 18.7 points.

The quintile ratio of differentiation of total income in rural areas has changed little. It should however be noted that this value is based on the results of official statistics, so we should keep in mind that the money income of the most wealthy population is hidden. Furthermore, in 1990 this index was not determined, so it is impossible to make appropriate comparisons.

#### **4 CONCLUSION**

Summarizing the indicators of the social development of the rural areas and its population, we can make such conclusions:

1) with twenty-six indicators that are taken for analysis, only four indicators of social unit (rural housing and its equipment, the infant mortality rate, the volume of gross agricultural output per 1 person) and four indicators of socioeconomic unit (land availability, investment per capita, quintile differentiation coefficient income, the level of economic activity in the rural areas) are better, compared to the value for basic years, and others - eighteen - worse;

2) Birth rates are falling across rural areas, as well as the natural growth and life expectancy at birth; increases mortality. The crisis of the rural economy has led to a significant reduction of the rural population. Reduced output of major agricultural products in per capita and consumption of food for half the indicators does not meet reasonable standards; has deteriorated level of availability of cultural institutions and arts;

3) environmental and economic development of the land use did not provide improved social indicators; it did not lie the positive foundations for future generations;

4) the state of social development of rural population and rural areas do not meet the requirements of sustainable land use;



5) the level of food security of the population is closely correlated with the level of sustainability of agricultural land use.

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