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ESTIMATING PEASANT FARMS INCOME AND THE STANDARD OF LIVING OF A RURAL POPULATION BASED ON MULTI-FACTORIAL ECONOMETRIC MODELING: A CASE STUDY OF UKRAINE

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Abstract

The paper deals with the influence of incomes from personal peasant farms on quality of life of the rural population in Ukraine. The estimation of impact of different factors on incomes from personal peasant farms in regional aspect of Ukraine, which is needed for understanding the main trends and directions of development of the given problem in perspective, is reflected in this article. In work was investigated dependence of average per capita average monthly income on the functioning of personal farms in households in the administrative regions of Ukraine from the effect of separate factors. In work was calculated matrix of pair coefficients of correlation between factorial and productive to signs for the studied model. According to the results of the study it is established, that all the selected factors showed a direct or inverse relationship with the change in the productive feature. In order to determine the density of the detected relationship, using a Microsoft Excel processor, we developed a multifactor correlation-regression model and calculated its main statistical characteristics. As a result, it was discovered that, there are now clear prerequisites for forming on the basis of mutually beneficial symbiosis, close, aimed at strengthening the private sector in the countryside, integration of personal farms with other agricultural producers, because of the fact that the population is depopulated, because and many other factors confirm the rapid exhaustiveness of extensive production methods that not only hinder further development. to the personal peasant farms, but also contribute to their degradation.

Key words: *peasant farms, rural population, income, standard of living, econometric modeling*

INTRODUCTION

The standard of living is one of the most important socio-economic categories, characterizing the position of a person in society, the possibility of meeting a person's needs and human development [3].

As a result of an acceptance of a course further, the economic countries of development on integration into the international European community occurred high-quality changes in approaches to determination of the category of the standard of living [5]. We consider it expedient to emphasize the significant increase in the importance and role of the standard of living of the rural population in the assessment of the social conditions of functioning of personal farms. It is well known that the concept of quality (standard) of life is being developed and used in the research of international organizations and many foreign scientists [1, 6, 7, 9, 15]. Quality of life indicators is quite widely used in the theory and practice of interstate analysis [2]. In particular, among the main results of the annual monitoring of the socio-economic development of countries [9] conducted by the Institute for Management Development International, Lausanne, Switzerland, within

the «World Competitiveness Project», one of the leading positions are measured in a ten-point scale, Quality of Life.

5It should be noted that the concept of «standard of living» is often interpreted as the degree of satisfaction of material, spiritual and social needs of the population. This definition characterizes the static of the studied category. However, living standards are a dynamic process that is influenced by many factors. On the one hand, the standard of living is determined by the composition and volume of the needs for various constantly changing benefits. On the other hand, it is limited to meeting the needs based on the market situation, income of the population, salaries of workers [3].

Central places in the system of scientific intelligence on living standards is occupied by household income and expenditure indicators. As income is the main source of satisfaction of the personal needs of the population in goods and services [13], their assessment is one of the priorities in the study of living standards. It should be noted that nowadays there is a significant increase in interest among scientists in the identified problems, which is confirmed by a considerable amount of intelligence in this area.

In our opinion, among the scientists involved in the development of these topics, it is advisable to note D. Bohynia [4], M. Vdovychenko [23], G. Kupalova [11], E. Libanova [12], P. Sabluk, M. Oraltyi [18], V. Yakubiv [24] and others whose scientific achievements have provided a solid basis for modern research, including our exploration. At the same time, a considerable amount of issues concerning the formation of regional peculiarities of the outlined issues in connection with their particular discussion and relevance continue to remain open for new scientific explorations.

MATERIALS AND METHODS

Construction of regression multi-factorial econometric model.

Step 1. Application of the regression of econometric modeling in the research

To determine the density of the identified relationship using the software Microsoft Excel, the multifactor regression model was elaborated and the basic statistical characteristics were calculated.

The equation of the regression contains one effective variable y and an unlimited number of factors – x_i . While researching of economic indicators from three to eight most significant factors carry almost all the information. Input of the additional variables makes it necessary to increase the number of totality of units (n~10x).

The process of building a multifactorial regression model begins with the selection of all possible factors which influences the effective rate.

Then checking of factorial signs on multicollinearity is conducted and special statistical ratios to evaluate the adequacy of the correlation of the econometric model are counted. The coefficient of multifactor equation of regression reflects the conditional impact of certain factor on effective feature, namely the coefficient of multifactor equation of regression shows the impact of certain fixed factorial variable on the effective indicator in term of certain values of the other factors that may change with the shift of the effective indicator.

The coefficient of multifactorial regression equation reflects the net impact of the factorial variable if regression of the econometric model covers all factors which affect the efficient variable. Herewith, the total impact of factors allocated between them. But actually the number of factors is quite larger and it is impossible to take them into account in the model. It is proved that there are several important factorial variables among all the other and the influence of others is insignificant.

It is important that in the multiple regression equation its parameters describe a conditional net impact of a single factorial variable on the effective in term of fixed average values of other factors which are included in the model, but the rest factors, which are not included, are variable.

While constructing the multifactorial (multiple) regression equation the background information should be submitted in the form of numbers of one order that will enable to interpret the economic content of individual regression coefficients better.

However, it is impossible to determine the factors that influence the value of the effective rate the most, if it is based on partial regression coefficients. Therefore, it is advisable to calculate the β_i – coefficient, where *i* - serial number of the factor sign in this regression econometric models.

Partial β_i – coefficients are calculated as a product of the regression coefficient of this factor and the ratio of standard deviation factorial and efficient features. The coefficients that were received in such way show how much the value of resulting sign will change as for the standard deviation with the change of the corresponding factor to one standard deviation granted the fixed (average) value of the other investigated factors.

Step 2. The concept and definition of multicollinearity in econometric regression models

One of the classical assumptions of the regression statistical analysis is the absence of multicollinearity.

Multicollinearity is a phenomenon in which there is the relationship between the factorial signs that is close to the functional

$$(r_{x_i x_j} \longrightarrow 1, i \neq j).$$

To examine the model on the multicollinearity the symmetric matrix of coefficients of pair correlations is built.

	Y	x_1	x_2	x_3	…	x_n
Y	r_y^2	r_{yx_1}	r_{yx_2}	r_{yx_3}	…	r_{yx_n}
x_1		$r_{x_1^2}$	$r_{x_1x_2}$	$r_{x_1x_3}$	…	$r_{x_1x_n}$

where: r_y^2, r_{yx_1},... $r_{x_1x_n}$ – linear correlation coefficients (pair correlation) between the relevant factors and the effective indicators.

So, in order to detect possible multicollinearity, the phenomenon of existing of a close linear dependence or a strong correlation between two or more variables that negatively affects the quantitative characteristics of econometric model or even makes its construction impossible, the matrix of coefficients of pair correlation of factorial and effective features is built.

If the inequality for the constructed model is carried out: $r_{x_i x_j}$ >0.8 ($i \neq j$), then there is the multicollinearity in the model.

Step 3. Interpretation of indicators of the econometric regression model

The indicator for evaluating of the density of the correlation due to the multifactorial model is cumulative coefficient of determination.

The formula for its calculation is as follows:

$$R^2_{yx_1x_2x_3\ldots x_n} = \frac{Var(\tilde{y})}{Var(y)}$$

The total variance is determined by the formula:

$$Var(y) = \overline{y^2} - \overline{y}^2.$$

Theoretical variance is determined by the formula:

$$Var(\tilde{y}) = \frac{1}{n} \cdot (a_0 \cdot \sum y + a_1 \cdot \sum x_1 \cdot y + \ldots = a_n \cdot \sum x_n \cdot y) - \bar{y}^2 \cdot$$

Another indicator that is used to evaluate the density of the correlation in multifactorial regression models is cumulative (multiple) correlation coefficient, which is calculated using the formula:

$$R_{yx_1x_2\ldots x_n} = \sqrt{\frac{Var(\tilde{y})}{Var(y)}}$$

It is important that if multiple correlation coefficient is 0.8 or more, the relationship between the factorial and effective features can be considered as tight.

$$R^2_{yx_1x_2\ldots x_n} = \frac{a_1 \cdot Cov(yx_1) + a_2 \cdot Cov(yx_2) + \ldots + a_n \cdot Cov(yx_n)}{Var(y)},$$

or by calculating the coefficients using the formula:

$$R^2_{yx_1x_2\ldots x_n} = \sum_{i=1}^{n} \beta_i \times r_{yx_i}$$

Step 4. F-test for econometric regression models

To examine the materiality of the relationship according the coefficient of determination $R^2_{yx_1x_2x_3\ldots x_n}$ F-test is used (F – criterion).

The formula for calculating the F-test:

$$F = \frac{R^2_{yx_1x_2x_3\ldots x_n}}{1-R^2_{yx_1x_2x_3\ldots x_n}} \times \frac{n-m}{m-1},$$

$$k_1 = m-1;\ k_2 = n-m.$$

where:

m – number of factors in the regression econometric model;

n – the number of observations in the regression econometric model.

The actual value of F-criterion $F_{(1-\alpha)}$ $(k_1;k_2)$ should be compared with critical, which is included in the relevant calculation tables. If the inequality $F_{(1-\alpha)}$ $(k_1;k_2) > F_{tabl}$, is carried out, the relationship between effective and factorial features in the constructed regression econometric models is essential.

Thus, according to the results of the comparison of calculated value of F-test $F_{(1-\alpha)}$ $(k_1;k_2)$ in term of the degrees of freedom k_1 and k_2 and the adopted level of probability $(1-\alpha)$=0.95 with tabular (F_{tabl}) it is set that: $F_{(1-\alpha)}$ $(k_1;k_2) > F_{tabl}$, which is a confirmation of materiality of connection between the dependent and independent variables of the constructed multifactorial regression econometric model.

As a result, if all the parameters are typical for the econometric model, the indicators of connection are essential, then the constructed econometric regression model is adequate and can be used for further analysis.

RESULTS AND DISCUSSIONS

The globality and scale of transformations of the agrarian sector cause the need for the continuous analysis of their results for the purpose of timely and adequate corrections of the developed actions and optimization of innovations. Besides, the research of the existing patterns and relations of socio-economic processes that determine the formation of the standard of living of the population, in particular income from the functioning of personal farms, which under the current conditions of management provide the lion's share of agricultural resources, is an indispensable source of objective analytical information to forecast trends in the standard of living of the rural population in the future. Therefore, in our opinion, it does not lose its relevance to study the magnitude of the impact of factors on the volume of population income resulting from the functioning of personal farms, as well as outlining trends in the development of such income and determine their role in shaping the standard of living of the rural population, as is the publication purpose.

It is revealed that the volume of the population's income from the functioning of personal farms (PFs) is influenced by a whole range of factors. For the purpose of definition of extent of their influence on formation productive signs – the average monthly average per capita income from the functioning of personal farms (y) - it is carried out productive groupings of regions of Ukraine (Table 1) [calculations it is executed on the basis of materials: 8, 14-17, 19].

Moreover, the resultant indicator is calculated by summing the average monthly per capita monetary income from sales of products made in PF; cost of consumed products obtained from PF; as well as monetary evaluation of assistance from relatives and other persons with food products derived from PFs.

The study was based on statistical materials by administrative regions of Ukraine, since for the purposes of such calculations by administrative districts of a single oblast (region of Ukraine), no primary data are needed, and no survey of household income and expenditure at the district level is conducted by statistical authorities. In addition, the patterns that have been established as a result of grouping are, in our opinion, sufficiently scientifically substantiated and are not inconsistent with the requirements for the processing of empirical data by statistical methods.

Table 1. Dependence of average per capita average monthly income on the functioning of personal farms in households in the administrative regions of Ukraine from the effect of separate factors, 2018

Groups of areas behind income from functioning of OG, on average in a month counting on one person, UAH.	The number of areas in group, piece.	The average per capita income from functioning of OG, on average in a month, UAH.	production of gross agricultural products farms in all categories of	The average monthly salary in agriculture, UAH.	Share of persons employed in agriculture, hunting, forestry and fisheries in the total number of employees,%	Unemployment rate according to ILO methodology,%	Average per capita cash expenditures of households on food, on average in a month, UAH.	Share of remuneration as a part of total household resources, on average per month, per person,%	Retail turnover of enterprises for 1 person, UAH.	Gross regional product at the rate of 1 person, in the actual prices, UAH.
26.0–48.2	4	35.08	52.7	525.0	6.9	6.3	234.86	52.8	1,746.3	9,747.5
48.3-70.5	7	63.17	61.9	418.1	11.3	7.6	205.94	44.7	1,912.6	7,815.0
70.6-92.8	8	85.81	66.8	363.4	16.2	8.7	192.70	36.0	1,451.4	6,051.1
92.9-115.1	5	102.60	71.9	351.8	15.1	8.3	179.45	35.9	1,445.6	7,402.0
Together or on average	24	63.55	61.0	415.0	10.3	7.2	218.59	46.0	2,003.0	9,372.0

Source: Author's results based on [8, 14-17, 19].
Note: Data on the Autonomous Republic of Crimea is not available due to the occupation of this territory.

It should be noted that the following factors are selected among the factors: X_1 – the share of personal households in the production of gross agricultural production, in all categories of farms, %; X_2 – the average monthly wage in agriculture, UAH; X_3 – share of persons employed in agriculture, hunting, forestry and fisheries in the total number of employees, %; X_4 – ILO unemployment rate, %; X_5 – household cash expenditures on foodstuffs, on average per month per person, UAH; X_6 – share of wages in the total household resources, on average per month, per person, %; X_7 – retail turnover of enterprises for 1 person, UAH; X_8 – Is a gross regional product per person, at actual prices, UAH. The adequacy of the selection of factor traits was based on the need to form the most complete and rich picture of the factors that can affect the size of the population's income from the functioning of the personal economy.

The grouping results (Table 1) indicated the ambiguity of the relationship between outcome and factorial characteristics. In particular, in the section of selected groups it was found that from the 1st to the 4th group the average monthly per capita income from the functioning of PF increased by 2.9 times, the share of rural population in the total number of permanent population – 2.6 times, the share of employed in agriculture among the total number of employees – 2.2 times (from the aggregate tendency the indicator of group IV dropped slightly), the share of personal farms in the production of gross agricultural production in all categories of farms – by 36.4 %, the level was ILO methodology output – by 31.7 % (only the fourth trend fell slightly from the general trend). At the same time, from the 1st to the 4th group the average monthly wage in agriculture decreased by 49.2 %, the share of wages in the total resources of households - by 47.1 %, the average per capita money expenditures of households on foodstuffs - by 30.9 %, gross regional product per capita - by 31.7 % (slightly different from the general trend indicator of group IV), retail turnover per person – by 20.8 % (except indicator group II) out of trend).

Thus, it can be argued that all the selected factors showed a direct or inverse relationship with the change in the productive feature. In order to determine the density of the detected relationship, using a Microsoft Excel processor, we developed a multifactor correlation-regression model and calculated its main statistical characteristics. In order to identify possible multicollinearity – the phenomenon of the existence of a close linear dependence, or strong correlation, between two or more variables, which negatively affects the quantitative characteristics of the econometric model or in general makes it

impossible to construct it [10], a matrix of coefficients of pairwise correlation of factor and result traits was formed (Table 2).

Table 2. Matrix of pair coefficients of correlation between factorial and productive to signs for the studied model

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Y
X_1	1.000	-0.663	-0.186	0.470	-0.570	-0.368	-0.108	-0.543	0.387
X_2	-0.663	1.000	-0.488	-0.593	0.625	0.644	0.353	0.717	-0.635
X_3	-0.186	-0.488	1.000	0.388	-0.292	-0.677	-0.546	-0.448	0.636
X_4	0.470	-0.593	0.388	1.000	-0.489	-0.619	-0.590	-0.613	0.540
X_5	-0.570	0.625	-0.292	-0.489	1.000	0.609	0.260	0.640	-0.544
X_6	-0.368	0.644	-0.677	-0.619	0.609	1.000	0.537	0.689	-0.853
X_7	-0.108	0.353	-0.546	-0.590	0.260	0.537	1.000	0.461	-0.411
X_8	-0.543	0.717	-0.448	-0.613	0.640	0.689	0.461	1.000	-0.488
Y	0.387	-0.635	0.636	0.540	-0.544	-0.853	-0.411	-0.488	1.000

Source: Own calculations.

In addition, pairwise correlation coefficients provide an estimate of the relationship between dependent and independent variables. Thus, it is found that between the VIII and the II factors the even correlation coefficient is more than 0.7, which indicates a certain probability of the presence of multicollinearity between them (Table 2). Therefore, in order to identify the possible presence and elimination of the phenomenon of multicollinearity, we calculated the value of the variance inflation factor VIF (variance inflationary factor) for each variable:

$$VIF_t = \frac{1}{1 - R_t^2}$$

R^2 – determination coefficient for each i-th factor [13, p. 239].

As a result of the calculations, it is established that the magnitude of the variance-inflation factor in the studied model does not exceed the critical value ($VIF_I \geq 10$) which gives grounds for claiming that multicollinearity is absent among the studied features. Thus, all selected factors can be fully represented in the developed correlation-regression model.

So, the multiple-factor equation of linear regression we have is as follows:

$$y=0.893x_1+0.041x_2+2.744x_3+0.602x_4-0.016x_5-1.824x_6+0.007x_7+0.004x_8-4.033.$$

The scientific novelty of the obtained results is that, based on the analysis of the developed model, it is established that the increase in the share of employed in agriculture in the total number of employees by 1 % will cause an increase in average per capita income from the operation of personal farms by 2.74 UAH. per month; a 1 % increase in the share of remuneration in the composition of total per capita average monthly household resources will lead to a decrease in income from the functioning of personal farms by 1.82 UAH. per month. An increase in the share of personal farms in the production of gross agricultural production in all categories of farms by 1 % will cause an increase in the average per capita income from maintaining a private farm by 0.89 UAH. per month.

However, based on partial regression coefficients, it is not possible to determine the factors that most influence the average monthly per capita income from the functioning of personal farms. Therefore, it is considered appropriate to calculate the partial coefficients of elasticity (E_i) and β_i - coefficients (i –number of factorial signs).

The partial coefficients of elasticity are determined by the product of the regression coefficients of the respective factors for the ratio of the arithmetic mean factor and the resultant sign and show how many percent the average sign will change by changing the studied factor by one percent of its mean value at the mean factors [22]. The estimation of the obtained partial elasticity coefficients indicates a significant impact on the performance trait of all traits included in the model, only slightly lower for the IV and V factors (Table 3). According to the degree of influence, the first position is taken by the share of wages in the average per capita average monthly total resources of households: its increase by 1 % causes a decrease in the effective indicator by 1.004 %, the second – the share of personal farms in the production of gross agricultural products in all categories an increase of 1 % leads to an

increase of the effective indicator by 0.767 %.

Table 3. Statistical characteristics of the degree of influence of the studied factors on the average per capita average monthly income from the functioning of personal farms in the regional section of Ukraine

Factors	Average arithmetic	Average square deviation	Partial regression coefficients (a_i)	Partial coefficients of elasticity. (E_i)	Partial β_i - coefficients
X_1	64.20	15.05	0.893	0.767	0.591
X_2	402.28	93.80	0.041	0.221	0.169
X_3	13.10	5.22	2.744	0.481	0.630
X_4	7.90	1.42	0.602	0.064	0.037
X_5	200.50	32.99	-0.016	-0.043	-0.023
X_6	41.10	7.75	-1.824	-1.004	-0.621
X_7	1,626.56	378.87	0.007	0.144	0.110
X_8	7,406.60	2,179.30	0.004	0.423	0.409
Y	74.71	22.76	X	X	X

Source: Own calculations.

It should be noted that, under the realities of today, the main cause of social insecurity for workers is the low levels of labor income, which are not able to counteract poverty from the point of view of minimum wage guarantees and targeted assistance [21]. This, explains the existence of a significant interdependence between wages and income from the operation of personal farms.

Among other indicators that have the most significant positive impact on the growth of average monthly per capita incomes from the functioning of personal farms, it is advisable to allocate the III, VIII and II, their increase by 1 % leads to an increase in the effective indicator by 0.48 %, 0.42 % and 0.22 %.

Partial β_i – coefficients are calculated as the product of the regression coefficient of a given factor and the ratio of the standard deviation of the factor and the resultant traits. The coefficients thus obtained show which part of the root mean square deviation will change the value of the resultant sign with the change of the corresponding factor by one standard deviation with a fixed (mean) value of other investigated factors [22].

Based on the analysis of β_i – coefficients, as well as the results of estimation of partial coefficients of elasticity, it is established that the indicators of the share of remuneration in the composition of average per capita total resources for the average per capita aggregate total resources, forestry, and fisheries in the total number of employees (Table 3). Factors 1 and 8 also play a significant role in the formation of a performance indicator.

It is worth noting that since the multiple correlation coefficient is 0.92, it is advisable to recognize the correlation between factor and result traits as dense. The analysis of the coefficients of determination shows that the average per capita average monthly income from the functioning of PFs in the region by 83.9 % is determined by the variation of selected factors and 16.1 % by the action of factors not taken into account in the model.

By comparing the calculated value of the Fisher test ($F_{(1-\alpha)}(k_1;k_2)$ =10.44) in term of the degrees of freedom k_1=9–1=8 and k_2=25–9 =16 and the adopted level of probability (1–α) =0.95 with tabular (F_{tabl}=2.59) it is set that: is carried out, the relationship between effective and factorial features in the constructed regression econometric models is essential. By comparing the calculation ($t_{(1-\alpha)}(16)$ = 9.14) and tabular t–Student's Criterion (t_{tabl}=2.58) at the accepted probability level (1–α) = 0.99 the significance (materiality) of the multiple correlation coefficient is confirmed, as $t_{0.99}(16) > t_{tabl}$.

CONCLUSIONS

Summarizing the results of the study, it should be noted that personal farms, which by their socio-economic essence combine the owner and the employee in one person, having lost the subsidiary character and demonstrating the dynamism, adaptability to difficult economic conditions, lead to the formation of a new type of owner in the countryside, and therefore in our opinion, policies need the most support. We believe that a significant increase in the economic value of personal farms traces the role of the system of determining factors:

- under current economic conditions, private farms are the dominant model of overcoming the risk of poverty, unemployment and insecurity and one of the main sources of income for the rural population;
- personal farms have become the center of labor activity of the rural population, and as long as each new share of the extra labor

spent will be paid back by an additional amount of income, the household members will prefer to increase the exploitation itself [20] in their own farms. In addition, the level of value of work of each household member and the availability of alternative employment opportunities determine the feasibility of employment in personal farms;

- since private farms, operating on the principles of self-financing, show lower dependence on the rise in price of energy and other material resources, due to the low capital intensity and availability of labor resources, there are opportunities for further increase in their agricultural production;
- however, the low level of technical equipment of personal farms does not provide for the possibility of intensification of agricultural activities with the use of scientific and technological progress, so in the case of increasing the size of land resources, increasing production in personal farms is possible only due to extensive factors.

Based on these points, we believe that there are now clear prerequisites for forming on the basis of mutually beneficial symbiosis, close, aimed at strengthening the private sector in the countryside, integration of personal farms with other agricultural producers, because of the fact that the population is depopulated, because and many other factors confirm the rapid exhaustiveness of extensive production methods that not only hinder further development. to the personal peasant farms, but also contribute to their degradation.

REFERENCES

[1]Ayvazian, S.A., 2003, On the methodology of measuring the synthetic categories of quality of life of the population. Economics and mathematical methods, 39 (2): 33-53.
[2]Artemenko, V.B., 2002, Methods of integral assessment of the quality of life of the population in management of regional development. Regional Economics, 1: 166-177.
[3]Bida, L.S., 2019, Economic activity of Volyn population in 2018: Statistical Collection. Lutsk: Main Department of Statistics in Volyn Region. 307 p.
[4]Bohynia, D.P., 2003, Labor Market Competitiveness in the System of Social and Labor Relations. Kyiv; NAS of Ukraine, Institute of Economics. 214 p.
[5]Boiar, A.O., Shmatkovska, T.O., Stashchuk, O.V., 2018, Towards the theory of supranational finance. Cogent Business & Management. 5(1):1-12. http://doi.org/10.1080/23311975.2018.1482594, Accessed on Nov. 24, 2019.
[6]Community and Quality of Life: Data Needs for Informed Decision Making. 2002. National Academy Press. Washington, D.C. 191 p.
[7]Dziuba, I.V., 2004, Category of living standards of the population: a modern approach. Statistics of Ukraine, 1: 68-73.
[8]Grygorovych, N.V., 2019, Labor of Ukraine 2018: Statistical Collection. Kyiv: State Statistics Committee of Ukraine. 352 p.
[9]Human Development Report 2004: official website of the United Nations Development Program (UNDP): http://hdr.undp.org/reports/global/2004. Accessed on Dec. 14, 2019.
[10]Kostirko, I.G., Bitter, O.A., Petryshyn, L.P., 2007, The solvency of the population and the efficiency of agriculture. Lviv: Ukrainian Technologies. 160 p.
[11]Kupalova, G.I., Chetveryk, V.M., 2013, Statistical-economic analysis, estimation and prospects of development of personnel of agricultural enterprises. Kyiv. 211 p.
[12]Libanova, E.M., 2006, Human development in Ukraine: opportunities and directions of social investment. Kyiv: Institute of Demography and Social Research of NAS of Ukraine. 355 p.
[13]Luginin, A.E., Belousova, S.V., Belousov, O.M., 2005, Econometrics. Kyiv: Center for Educ. Lit. 252 p.
[14]Malikova, I.Y., 2019, Development of personal farms in transition economy. Economy and State, 10: 53-55.
[15]Osaulenko, O.G., 2019, Ukraine in Figures 2018: Statistical Reference Book. Kyiv: State Committee for Statistics of Ukraine. 239 p.
[16]Osipov, I.I., 2019, Costs and resources of Ukrainian households in 2018 (according to a sample survey of living conditions of Ukrainian households). Kyiv: State Statistics Committee of Ukraine. 380 p.
[17]Prokopenko, O., 2019, Gross agricultural output of Ukraine (at comparable prices in 2017) for 2018. Final data: Statistical bulletin. Kyiv. 24 p.
[18]Sabluk, P.T., Orlatyi, M.K., Bulavka, O.G., 2002, Material well-being of rural residents. Kyiv. 369 p.
[19]Streliuk, S.V., 2019, Distribution of Volyn Region Resident Population by Sex and Age: Statistical Collection. Lutsk: Statistics Department in Volyn Region. 101 p.
[20]Sodoma, R., Skhidnytska, H., Shvorak, A., Shmatkovska, T., Zhurakovska, I., 2018, Peculiarities of agrarian receipts as a modern financial tool. Economic annals-XXI. 169 (1-2): 46-49. https://doi.org/ 10.21003/ea.V169-09. Accessed on Nov. 16, 2019.
[21]Statistical Yearbook of Ukraine for 2018, 2019. Kyiv: State Statistics Committee of Ukraine. 578 p.
[22]Vavilina, N.D., 2013, Quality of life: essence, evaluation, formation strategy. World of Science, 3: official website: http://mir-nauki.com/PDF/ 03MN313.pdf. Accessed on Nov. 28, 2019.
[23]Vdovychenko, M., Nesterets, M., 1996, Income of rural population and its social protection. Ukraine: aspects of work. 1; 34-37.
[24]Yakubiv, V., Poliuk, M. 2019, Innovative methodologies for estimating the personnel of agricultural enterprises in Ukraine. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development. 19 (1): 617-624.