

Relationship of production level and wages in agricultural organizations of NWFD

The article examines the dependence of wages on the economic condition of agricultural production properties in the enterprises of the North-west federal district. On the example of agricultural enterprises of the Vologda oblast it examines the impact of funds provision level and availability of labor resources on wages. It compares wages in agricultural enterprises of the region with the level of wages in the industry, justifies the directions of wages growth in the countryside. A model based on the econometric is developed enabling to determine the level of wages in the forecast period based on gross production, its marketability and funds provision of agricultural workers.

The Vologda oblast, agricultural organizations, production level, dynamics of wage, labor motivation.



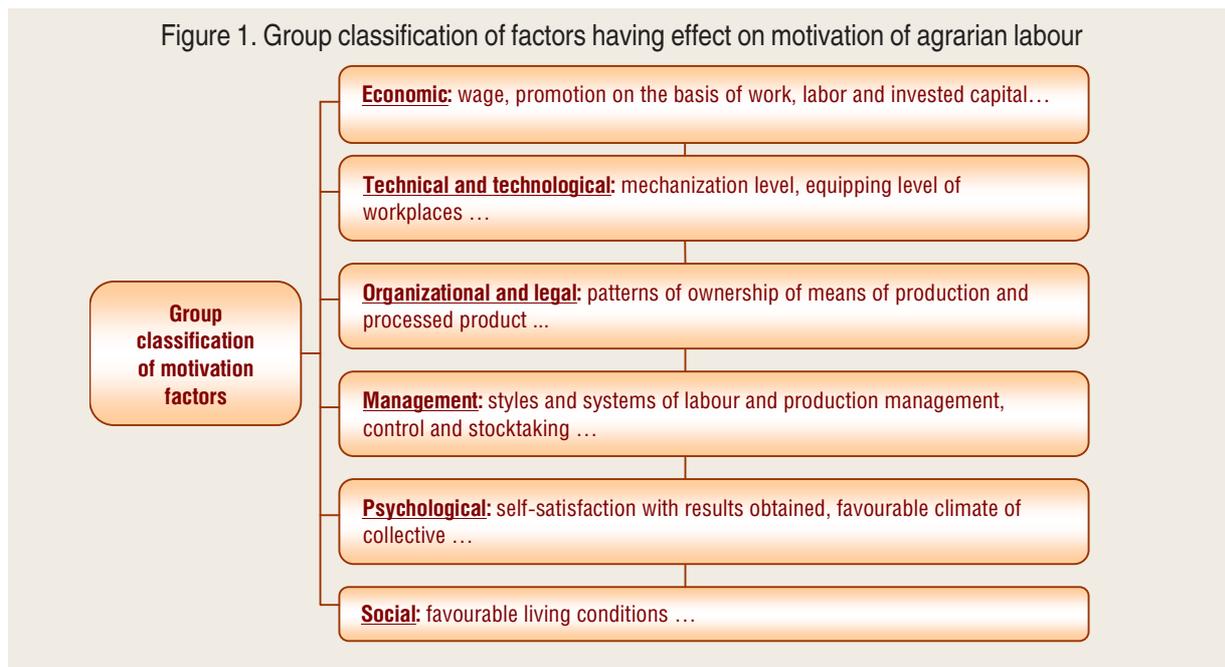
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Under the crisis on-going in agriculture for two decades one of the urgent problems connected with reduction of agriculture workers is lower motivation to agricultural labour. Higher motivation isn't impossible if the wage level remains very low on the labour market, if employers haven't possibility to encourage the work of their workers and if on all levels of management the well-thought-out policy isn't conducted to create optimal conditions for labour activity.

As for agriculture according to the opinion of A.M. Yugay such conditions (aimed also at formation of efficient mechanism of rise in motivation) can be created as a result of fundamental changes of the following *components*: 1) components having direct influence on financial interests of agricultural commodity producer; 2) attendant components; 3) components connected with satisfaction of social and living needs of people [9, p.23-25].

Ensuring of favourable social and living and external conditions is entrusted to the municipal and federal authorities of the RF. However most works connected with increasing the agricultural production efficiency and organizing the system of management of employees' labour motivation is implemented by the organization's management.

To create efficient intraorganizational system of management of labour motivation A.M. Yugay, V.I. Eremin and Yu.N. Shumakov [3, 5] suggested taking into account up to six groups of motivation factors. The leading place is taken by economic factors having direct influence on interest in labour particularly **wage level** (*fig. 1*). It is generally determined by non-prestigious and heavy job in agriculture. E. David noticed "it is no wonder that the need for worker's own interest in production results is more in agriculture than in industry" [2, p. 157].



But the wage level in agriculture, in spite of higher growth rate in comparison with the whole economy, is still very low (*tab. 1*). For example, average monthly nominal accrued wages of agricultural workers in the North-west federal district by 2009 was by 20 – 47% (in the Murmansk region and the Komi Republic, respectively) below the average salary for all economic activities.

First of all, it is connected with the **end result of activity** and production potential of organization together with the influence on the wage level of the following groups of factors [4, p. 192]:

- condition of market economy;
- condition of labour market;
- life quality of population;
- institutional factors;
- heterogeneity of the workers.

Remuneration as an economic category has double effect on the production efficiency. On the one hand, it encourages the increase in productivity and serves as a pre-condition for increase in efficiency of enterprise. On the other hand, being one of the important items of material expenses in the production price pattern, it influences directly on efficient indices of enterprise activity [1].

On the basis of one can draw a conclusion that at present the problem of low wage and therefore low motivation for agrarian labour hasn't been solved because the agriculture production has high expenses and the organizations haven't with practical any possibilities for additional labour incentives. In I.G. Ushachev's opinion, such situation leads to the expert shortage in the agro-industrial complex of Russia [11].

According to the RF subjects rating that graded their level of agriculture production efficiency¹ the possibilities to encourage the labour of workers among the regions of the NWFD had the organizations of Leningrad region (*tab. 2*). It is proved by the data on the average monthly accrued wage in agriculture for 2009. It was 16,168 rubles when the wage by all kinds of economic activity of the region was 18,358 rubles [12]. In 2007 Leningrad region was taken the first place among the RF subjects against the wage in agriculture to the wage on the average in the economy of region, 9th place – on agricultural production efficiency.

¹ The rating was prepared by State Scientific Agency "All-Russian research institute of agriculture economy" for the purpose of comparative estimate of agricultural production efficiency in the RF subjects by its main indicators: production level, economic, financial and social parameters.

Table 1. The level of average monthly nominal wage of agriculture workers in the regions of the NWFD, rubles

Index	Average wages					
	2000	2005	2006	2007	2008	2009
<i>On the average by all kinds of economic activity of the NWFD</i>						
Murmansk oblast	3746.9	12509.6	15,162	18,581	23762.8	26,513
Komi Republic	3558.6	11612.1	14082.2	17077.3	20826.9	23685.9
Republic of Karelia	2,559	8730.3	10697.4	13342.1	16892.9	16892.9
Vologda oblast	2561.9	8827.9	10666.6	12913.9	16115.3	16,566
Pskov oblast	1470.7	5734.5	6,973	8950.5	11380.8	12,554
<i>Agriculture, hunting and forestry</i>						
Murmansk oblast	No data	7,664	9,414	11,395	14,275	15,164
Komi Republic	1,721	5732.9	7009.4	8683.8	11493.3	12619.5
Republic of Karelia	No data	6850.6	7980.6	9997.5	13536.7	13536.7
Vologda oblast	1,595	5,599	6,919	8,726	11,036	11,764
Pskov oblast	683	3,151	3,975	5,148	6,629	7,862
<i>Wage in agriculture of the NWFD to the average wage by all kinds of economic activity of the NWFD, in %</i>						
Murmansk oblast	...	61	62	61	60	57
Komi Republic	48	49	50	51	55	53
Republic of Karelia	...	78	75	75	80	80
Vologda oblast	62	63	65	68	68	71
Pskov oblast	46	55	57	58	58	62

Sources: Russian statistical yearbook. 2009: stat. bull. / Rosstat. – M., 2009. – Pp. 172-173; Sites of territorial authorities of State statistics federal service over Pskov, Murmansk oblasts, Republic of Karelia and Komi Republic; Statistical yearbook of Vologda oblast: stat. bull. / Vologdastat. – Vologda, 2009. – P. 102.

However interrelation between the wage level and the level of agriculture production efficiency wasn't observed in all regions of the NWFD.

So it is interesting to find out how much the end results of activity and production potential of agricultural organizations influence on the wage level as well as to examine the structure of

Table 2. Rating places subjects based on the factors of agriculture production efficiency

Oblast	On the average over 2005 – 2007	In 2007
Leningrad oblast	4	9
Vologda oblast	15	23
Novgorod oblast	22	29
Republic of Karelia	13	31
Kaliningrad oblast	21	36
Arkhangelsk oblast	33	39
Komi Republic	32	40
Pskov oblast	62	67

Source: The RF subjects rating based on the level of agriculture production efficiency after the results of economic and financial activity of agricultural organizations in 2007 and on the average over 2005 – 2007 [Electronic resource]. – Access mode: <http://www.vniiesh.ru/>

wage fund and the wage as one of financial expenses items by way of example of the Vologda oblast organizations. The wage level in agriculture of the Vologda oblast was much more lower than in Leningrad and Murmansk oblast, the Republic of Karelia and the Komi Republic. At the same time the Vologda oblast followed the Leningrad oblast by the agriculture production efficiency.

Initially, we should consider the results of agricultural enterprises' operations in the region in terms of volume (*tab. 3*). During the period from 2000 to 2009 gross yield of potatoes decreased from 40.5 to 35.6 thousand tons and of vegetables from 16.1 to 14 tons. In the dynamics there is an increase in grain production by 6.8%. Livestock production has increased over the study period: livestock and poultry by 19.4%, milk by 21.4%, eggs by 16%. Based on comparison of the data in table 3, we can conclude that there is a significant strengthening of animal husbandry.

The analysis of economic activity of the Vologda oblast organizations in value terms (*tab. 4*) made it possible to reveal the tendency

Table 3. Gross production of staple in crop and livestock sectors on farms in the Vologda oblast, thousand tons

Indicators	2000	2004	2005	2006	2007	2008	2009	2009 to 2000, in %
Grain, weight after reworking	212.5	173.7	186.3	186.8	215.4	230.8	226.9	106.8
Potatoes	40.5	29.3	34.8	35.3	34.2	36.3	35.6	87.9
Vegetables	16.1	14.9	15.3	12.2	11.6	12.8	14.0	87.0
Livestock and poultry, slaughter weight	34.1	42.3	38.4	40.7	40.2	42.1	40.7	119.4
Milk	338.8	390.7	382.1	401.3	413.5	420.8	411.3	121.4
Eggs, million units	480.2	546.5	589.7	599.8	537.0	490.2	556.8	116.0

Sources: Statistical yearbook of the Vologda oblast. 2009: stat. bull. / Vologdastat. – Vologda, 2010. – P. 208.

Table 4. The indices activity of agricultural organizations in the Vologda oblast in comparable prices of the year of 2009*, thousand rubles

Years	Product produced (at cost)	Including product sold (at cost)	Proceeds	Gross profit	Net profit
2000	7,676877	7,448780	7,701938	253,163	966,972
2004	11,468518	10,050711	10,390911	338,640	488,708
2005	11,099470	9,947571	10,879340	938,695	846,194
2006	11,888288	10,518362	11,390758	872,396	222,816
2007	10,476044	9,140311	10,074396	936,254	833,087
2008	13,131254	11,072537	12,029345	956,808	1,054226
2009	13,027946	10,856914	11,632795	775,881	278,119
Average annual growth rate, %	106	104.3	104.7	113.3	87

* It was calculated from the data taken from consolidated annual reports of the Vologda oblast agricultural organizations.

of reduction in proceeds volumes above the production price. In this respect the year of 2009 was the most unfavourable one: sales proceeds refunded only 89% of the incurred cost. Data analysis of gross profit enables to conclude about its significant annual (except 2006 and 2009) increase (average annual growth rate made up 113.3%). First of all, it is explained by the reduction in specific weight of unprofitable organizations² as well as the changes of distribution relations system. Annual fluctuations in net income are illustrative of the volatile, crisis situation of the industry.

The analysis of production potential of agricultural organizations in movement (*tab. 5*) showed the following. Funds provision tends to increase. This is primarily due to the growth of

livestock production (in the structure of basic production assets the productive livestock increased from 7% in 2000 to 17% to 2008), to a lesser extent – with the renewal of agricultural machinery (the renewal coefficient for only some machines has increased up to 12.2% by 2008) [6, p. 28]. This conclusion is also proved by the value of average annual growth rate of energetic capacities (97.2%).

The table shows a decrease in both the general trend of the absolute number of employed in agricultural production and indicators of labor supply on farms (the average growth rate is 96.6%). This suggests the imbalance of funds provision indicators.

During the period from 2000 to 2009 there were changes in the share of wages as an expenses item of main economic indicators (*tab. 6*).

The share of wages in production costs has increased from 14% in 2000 to 21% in 2007. In crisis, it dropped to 19 – 20%. The share of wages in revenue ranged within 24 – 26%.

² According to the data of Vologdastat the specific weight of unprofitable organizations was 40% out of the total number of organizations at the end of 2000, and at the end of 2008 – 21%.

Table 5. The estimate of production potential of agricultural organizations in the Vologda oblast

Years	Area of agricultural land, thous. ha.	Accounted for 100 ha of agricultural land				
		cattle and poultry, head	main production funds, thousand rubles*	tractors, units	energetic power, HP*	annual average of workers, people *
2000	1,010	403.5	669	1	272.1	4.5
2004	973	436.6	836	0.8	210.1	3.6
2005	954	475.8	919.1	0.7	203.0	3.4
2006	923	499.9	1077	0.7	195.0	3.2
2007	788	516.4	1529.9	0.7	218.1	3.5
2008	738	534.8	2018.8	0.7	216.4	3.3
2009	709	589.9	2463.1	0.7	210.8	3.3
Annual average growth rate, %	96.1	104.3	115.6	96.1	97.2	96.6

* It was calculated on the basis of accountant reports of agricultural organizations.
Sources: Agriculture of the Vologda oblast in 2008: stat. bull. / Vologdastat. – Vologda, 2009. – P. 212, 57; Statistical yearbook of the Vologda oblast. 2008: stat. bull. / Vologdastat. – Vologda, 2009. – P. 203.

Table 6. The share of wages in the performance of agricultural enterprises of the Vologda oblast*, in%

Years	In gross products	In proceeds
2000	14	26
2004	18	24
2005	20	24
2006	21	26
2007	21	25
2008	19	24
2009	20	26

* It was calculated on the basis of the data taken from consolidated annual reports of the Vologda oblast agricultural organizations

The results of analysis make it possible to point to the same influence of two factors on the size of wage – sales proceeds and gross product production.

From the data of *table 7* it follows that the average monthly wage in agriculture of the region in 2009 was by one third lower than the economy average level over the region, and it was by twice lower that the wage in industry.

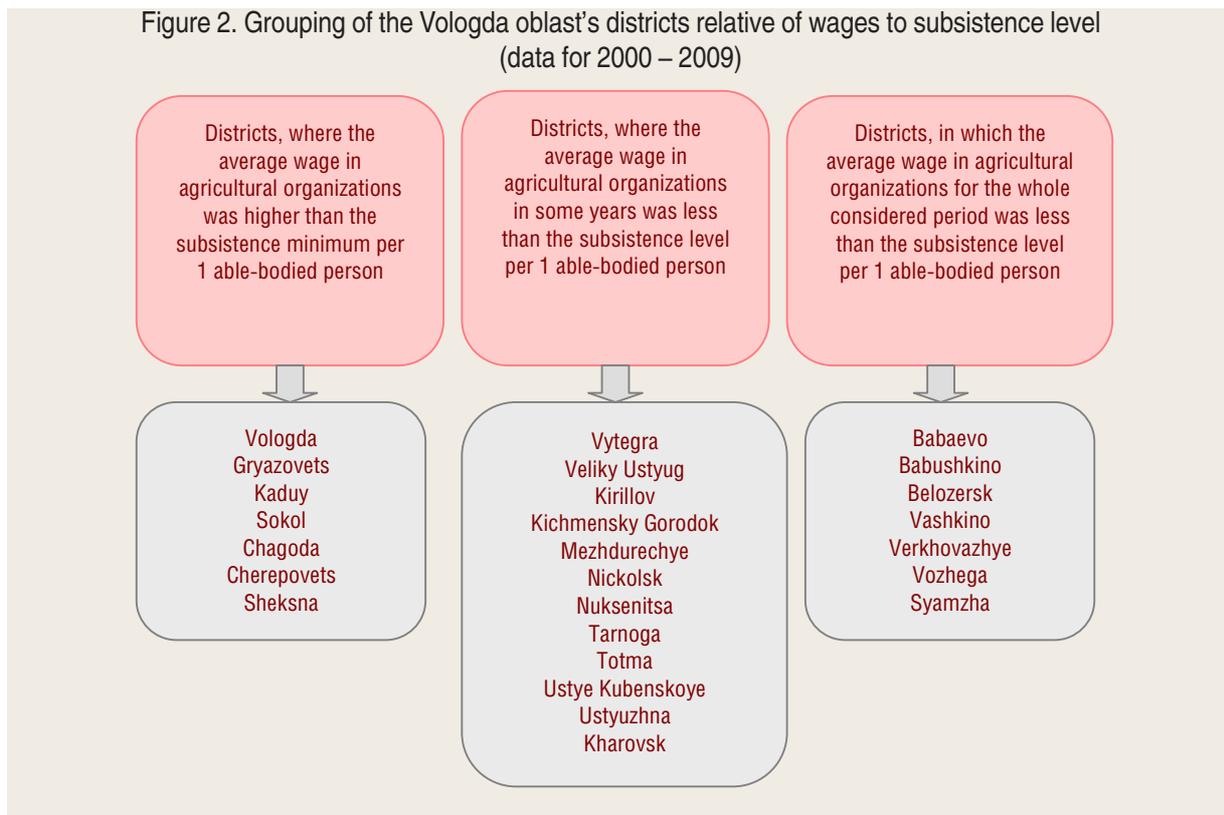
While over the region the wage level meets the living wage standards on the average per an employable person, in some districts it was much lower even in relatively stable years (*fig. 2*).

In this respect the most favourable situation emerged in Vologda, Gryazovetz, Kaduy, Sokol, Chagoda, Cherepovetz, Sheksna municipal districts which are notable for advantage position close to the larger centers

Table 7. The level of average monthly nominal accrued wage of workers in the Vologda oblast, rubles

Denomination	The average monthly wage					
	2000	2005	2006	2007	2008	2009
The whole economy	2,562	8,828	10,667	12,914	16,115	16,566
Agriculture (exclusive of hunting and forestry)*	1,269	5,070	6,426	7,889	10,361	10,801
Industrial productions	3,420	11,420	13,505	16,451	20,063	20,922
Wage in agriculture of the region, in % to the average wage	50	57	60	61	64	65
to the wage in industry	37	44	48	48	52	52

* It was calculated on the basis of accounting documents of agricultural organizations.
Sources: Statistics year-book of the Vologda oblast. 2009: statistical bull. / Vologdastat. – Vologda, 2010. – P.100;



of product distribution and, respectively, they have more profitable production. In comparison with other kinds of activity the wage in agriculture is low, while the number of agricultural organizations are reduced because of bankruptcy and other factors, it has led to the organizations' labour force being reduced by 48%. The least retrenchment of workers took place in the organizations of Kaduy (10%), Vologda (25.1%), Sokol (25.2%) districts.

According to the results of sample surveys, the wage level in the agricultural organizations of Vologda region essentially varies with the category of workers and doesn't depend on the organizational and legal form of organization (*tab. 8*). In some organizations the difference in wage of employees and workers engaged in agricultural production makes up 2.5 times, workers and hired workers engaged in auxiliary processes – 1.5 times.

Bonuses and remuneration in the structure of the wage fund of agricultural organizations are low; they are only 17 – 18% annually and almost equal to the regional coefficient (*fig. 3*).

The enterprise self-dependence in fixing its size, with setting the piece-rate and official rate of pay, with giving the workers the bonus for work results and work quality. These changes contributed to a little degree to the increase in labour productivity, wage level and, as a result, workers' interest [8, 4].

The situation in the sector became worse because of past due balance on wage payment. The debt was 1.5% out of the wage fund as of January 1, 2005, and 0.5% – as of January 1, 2009.

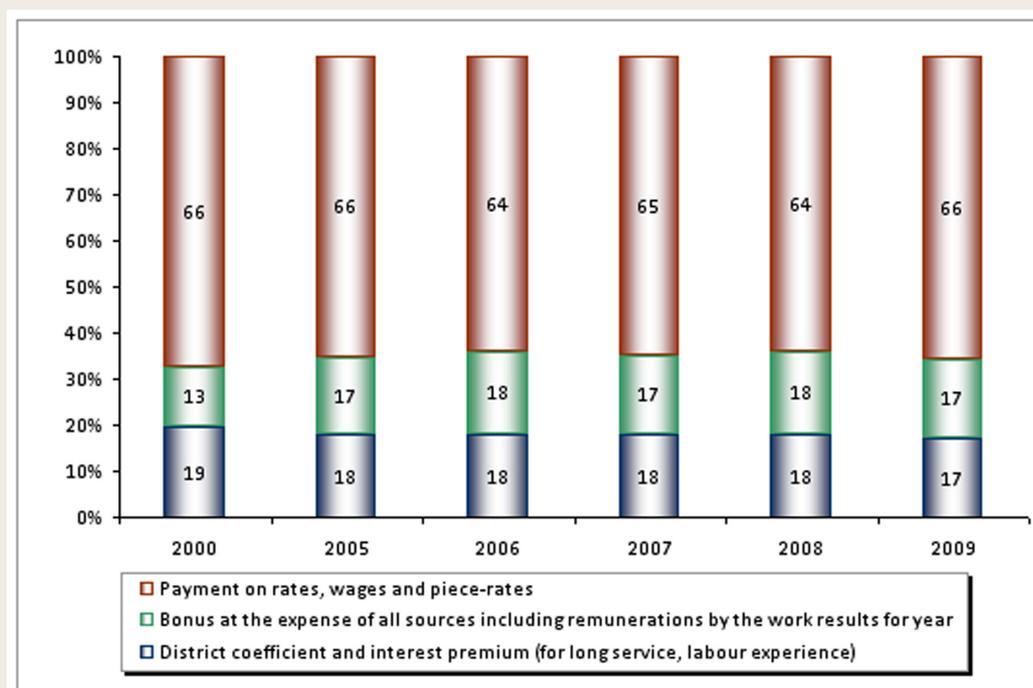
According to the appraisals of M.N. Ivanova, the head of economy policy management of the Department of Agriculture, Food Resources and Trade of the Vologda oblast, at the present time the effective measures are the measures connected with regulation of workers' wage, and they are taken only in some organizations of Vologda municipal district of the region. This makes it possible to conclude that the recommendations on working out the regulations of labour remuneration and qualifying evaluation of workers prepared

Table 8. The average monthly nominal accrued wage of workers of agricultural organizations in the Vologda oblast (on the basis of sample surveys), rubles

Denomination	On the average over the region	District					
		Ustyuzhna		Velikiy Ustyug		Vologda	
		11	22	1	2	1	2
In organization, in total	10,801	3,250	11,898	3,882	13,536	5,861	19,874
Workers engaged in agricultural production, in total	10,858	3,250	12,231	3,871	14,373	5,861	20,617
Including: regular workers	10,285	1,750	11,599	3,875	15,657	6,083	19,011
among them: tractor drivers	10,799	–	15,583	3,875	14,667	4,667	18,156
machine milking operators	10,669	–	13,994	–	–	–	–
cattlemen	7,834	–	8,807	–	–	–	–
pig-breeding workers	13,546	–	–	–	–	–	–
sheep- and goat-breeding workers	2,889	–	–	–	–	–	–
poultry-keeping workers	16,578	–	–	–	14,848	–	22,717
horse-breeding workers	7,622	–	–	–	–	–	–
Employees	13,896	3,750	16,366	5,361	12,597	6,533	28,318
among them: executives	18,689	5,500	22,370	5,458	24,283	8,083	49,386
experts	12,371	–	10,738	5,167	8,103	6,188	24,603
Workers engaged in ancillary industrial enterprises and crafts	10,168	–	7,048	3,903	13,500	–	16,357
Workers engaged in housing-and-communal and community services	10,524	–	–	–	–	–	18,217
Workers engaged in commerce and public catering	10,463	–	–	–	8,519	–	15,280
Workers engaged in building	16,865	–	–	–	–	–	30,778
Workers engaged in other kinds of activity	7,980	–	–	–	–	–	17,792

It was calculated on the basis of the data taken from consolidated annual report and annual reports of the Vologda oblast agricultural organizations.
Note: 1 – the lowest wage level in district; 2 – the highest wage level in district.

Figure 3. The wage fund structure, in %



in 2003 and in 2004 by the officials of the Department as well as the goal-oriented support for agricultural producers were not enough to provide assistance in making the effective system of labour motivation management in the Vologda region agricultural organizations.

All of the above makes it possible to conclude that the average monthly nominal wage of employees in agricultural organizations in the region is unlikely to increase significantly in coming years. To confirm the hypothesis of insignificant growth of this indicator a correlation and regression analysis was made; based on this analysis the forecast of wages level in the industry for 2010 – 2013 years was made.

Analysis of data for 2005 – 2009 characterizing the results of activities and the production capacity of 50 organizations of the region (both well-functioning and unprofitable), allowed to establish a cause-effect relationships of several factor variables with the level of wage. The closest relationship of wages is identified with the receipts from sale of production per 1 employee (correlation coefficient is 0.52) and labor productivity ($R = 0.51$). The relationship between average monthly wage and rate of organizations' funds provision ($R = 0.42$) is revealed.

Multiple regression equation, expressing the dependence of wage level on the selected factors, has the following form:

$$Y = 5.383 + 0.0047 X_1 + 0.0037 X_2 + 0.0011 X_3,$$

where y – the average monthly salary, thousand rubles;

X_1 – receipts from sale of production per 1 worker, thousand rubles;

X_2 – gross production received per 1 worker, thousand rubles;

X_3 – basic means of production per 1 worker, thousand rubles.

Positive values of this equation suggest that the increase in each of the factors leads to increased wages. So, on the basis of the identified relationships we can argue that, *ceteris paribus*, increase in per employee revenue from sales of 1 thousand rubles will provide an increase of average gross wages by

an average of 4.7 rubles, labor productivity – by 3.7 rubles, basic means of production – by 1.1 rubles.

Multiple regression coefficient is 0.591, indicating a moderate degree of dependence of employees' wages of the Vologda region's agricultural organizations on the chosen factors. The aggregate index of multiple determination $R_{x_1..x_3}^2 = 0.35$ shows that the wage level variation by 35% is caused by the factors analysed.

The predicted wage level (favourably) in the agricultural organizations of the Vologda region is calculated on the basis of the data of average annual growth rate of equation parameters over the period of 2010 – 2013 and it is represented in *table 9*. It shows that in agriculture it won't be possible to reach the level of average monthly nominal wage by the whole economy of the region (by 2013 the level of average monthly wage by all kinds of economic activity of Vologda region will be able to go up to more than 25,000 rubles when the growth rate being the same one).

According to the unfavourable prediction based on the reduction in growth rate of indices of end results of organizations' activity in 2008 – 2009 the wage level of agricultural enterprises will increase to a small degree and this will make the situation worse than ever.

The study showed that because of a projected lag of industry wage behind the average wage in the region we should not expect motivation increase due to the inertia of agriculture.

In this regard, the main directions of development of agricultural production are:

- enhancement of state support to agriculture. In Russia it is in the value of agricultural produce is 6%, in the EU – 37%, in the USA – 18%, Norway – 72% [10, p. 38];

Table 9. The predicted average monthly nominal wage level in the agricultural organizations of the region for the period from 2010 to 2013

Index	Year			
	2010	2011	2012	2013
Average monthly wage accrued per a worker, rubles	11,715	13,180	14,995	17,230

- establishment of equivalent prices for agricultural and industrial products consumed in the manufacturing sector, as well as reasonable interest rates on loans;

- accretion of fixed assets in organizations, as agriculture relates to the industries that need to improve technical capacity of production more than any others;

- increasing production culture in organizations;

- addressing social problems in rural areas: preservation and development of schools, medical stations, dramatic expansion of housing, roads and utilities.

It is this way that will provide increasing levels of production, wages and motivation of agricultural labor.

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