

AGRICULTURAL REGIONING OF THE RUSSIAN FEDERATION

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Abstract. The aim of this article is to analyze the update allocation of agriculture on administrative regions of Russia. The main source of statistical information is the results of the "All-Russia agricultural census in 2006." The share of sown lands in total area of the region was chosen as a main indicator for agricultural regioning. There was made grouping of Russian agricultural region and defined the characteristic of agricultural production for each typical group.

Key words: agricultural zoning, allocation of agriculture, regions of Russia, strategic management of agro-industrial complex of Russia.

Agricultural regioning means the territorial organization of agricultural production, its importance in the economy at different stages of socio-economic development.

Scientific methods of agricultural regioning, which appeared in the late XIX — early XX century, are presented in scientific works of A. Doyarenko, A. Skvortsov, A. Chelintsev and B. Knipovich. Russian scientists have made significant contribution to the theory of territorial division of labor, industrial specialization of regions and their integrated development, theoretical and practical territorial regioning. Prof. A. Rakitnikov, prof. V. Kryuchkov and other scientists carry out agricultural regioning of Russia in the middle XX century for the theoretical and practical purposes [2].

Agricultural regioning is defined as the area where the complex natural and socio-economic factors lead to the formation of stable combinations of dominant and related types of agriculture. Specialization of agricultural area results from dominant types of agricultural production.

Every region of the Russian Federation has developed its own kinds of agricultural products, which determine specialization of this region. Differences in this specialization depend on agricultural produce transporting and capabilities of there storage, availability and quality of transport, capacity of processing enterprises, and the availability of manpower. But the determining factor in allocation of agriculture is natural conditions (level of heat, light, moisture, soil quality, etc.) [3]. Natural conditions in Russia vary with area from north to south, so the specialization of agricultural production also varies according to zones.

Allocation of agricultural regions is based on a large number of indicators: quantity and quality of land, a way of organizing production, production rate, and others. Thus, most

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scientific and research works study allocation of agricultural branches in Russia, without administrative boundaries. However, economic management, legal framework, monitoring of public food supply, most measures of regional policy are carried out inside of administrative boundaries. Therefore, allocation of agricultural activity in the country should be considered according to administrative regions.

The main source of statistical information is the results of the "All-Russia agricultural census in 2006" [4]. On primary data, the census researchers of All-Russia Scientific and Research Institute of Agricultural Problems (VIAPI) after A. Nikonov made the allocation of economic and resource classes of farm-producers [5], but not according to administrative regioning.

The aim of this article is to analyze the update allocation of agriculture on administrative regions of Russia. The object of this research is the Russian state regions. For the present moment (December, 2010) the Russian Federation, in accordance with Article 65 of the Constitution, consists of 83 regions — Federal Subjects. It is known that since December 2005, there were some changes in the Russian administrative-territorial system — some of the regions merged. The problem is either to take in to consideration data of Autonomous Districts together with the region they legally merged or separately? It depends on the size of the total area of regions and their agroclimatic conditions. Autonomous Districts which are bigger in territory than the regions they merged with and have different natural and climatic conditions must be considered separately. Otherwise, data of agriculture specialization of this region and the country as a whole will be wrong.

Thus, this study will consider and estimate data of Taimyrsky (Dolgano-Nenetsky) and Evenkisky Autonomous Districts, merged with the Krasnoyarsk region since 1 January 2007, separately. And the data of Autonomous Districts Komi-Perm, Koryak, Ust-Orda Buryatski and Aginski Buryatski be considered together with the data of the Perm and Kamchatka regions and Irkutsk and Chita regions respectively. Data of Federal Cities of Moscow and St. Petersburg will estimate and calculate with data of Moscow and Leningrad regions due to their small agricultural activity. So, these 83 regions of the Russian Federation have been selected for this analyzing.

There are some difficulties in defining statistical data of agricultural lands: how to select right indicators for classifying the region as an agricultural one (where most of the territory is allotted for agriculture) or fishing/hunting area (where agriculture is reduced to natural areas, including vast areas occupied by forestry, hunting and reindeer herding). It is known that the vast reindeer pastures are not included in the farmland; other activities (mining requires most of the land) do not occupy a significant territory of Russia or the region.

The basis of agriculture in Russia is arable farming. Various forms of grazing livestock husbandry (nomadic or distant-pasture) can, of course, feed the population which is engaged in it. But livestock husbandry for the market would require forage from the arable lands, at least as insurance against crop failure on pastures.

The development of arable farming is best characterized by the size of the cultivated area. It reflects both the natural conditions of the region and economic opportunities for agricultural organizations. However, the size of the cultivated area depends primarily on the total territory of the regions, which varies greatly — for illustration, it's enough to compare the territory of the Republic of Sakha-Yakutia (18% of the total territory of Russia) and the Ingush Republic, which occupies 0.02% of the total territory. And neither natural nor economic factors exerted a decisive influence on the size and boundaries of a Federation Subject. Even the definition of Federal Districts in 2000 and the adjustment in 2010, so important for the state administration division, was held without taking into account

the economic potential of the territories, agro-climatic zoning and other factors. There are researches of new economical regioning, which should involve these factors, but till now they are in the stage of scientific proposals.

Thus, for correct comparison of the regions we calculate the ratio of total sown area to the entire territory of the region. For the beginning we define names of the region types according to the share of "agriculture" in these regions and use them for further analysis (table 1).

Table 1

Groups of regions of Russia in terms of agricultural development

#	Region type	Quantity of regions	Share of sown lands total area, %
1	"Arable lands"	8	>> 40,0%
2	"Agrarian"	19	20,0 — 40,0%
3	"Livestock husbandry"	15	10,0-20,0%
4	"Agrarian — industrial"	22	1,0-10,0%
5	"Fishing / hunting areas"	19	<< 1,0%

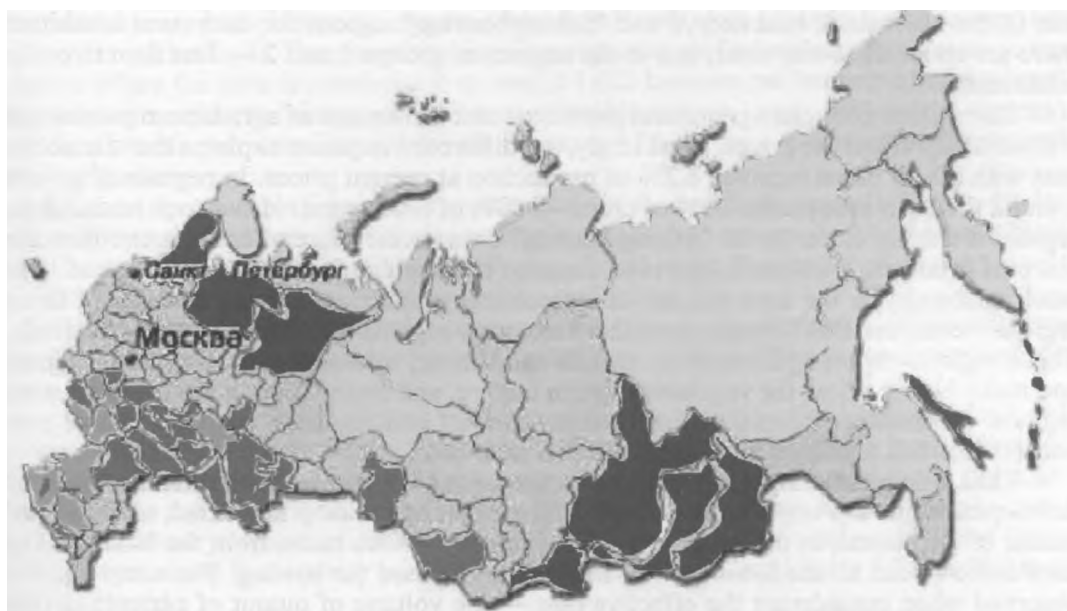
We represent these regional groups on the map of Russian territory (picture 1). Seven of the eight "Arable farming", regions which are the most planted areas, constitute a solid array on the south-west of the country. There are Belgorod, Lipetsk, Voronezh, Krasnodar and Stavropol regions and the Republic of Tatarstan, located separately on the boundary of the transition zones; 19 "agrarian" regions also form a solid mass in the south-west of Russia. "Fishing/hunting" areas constitute a solid array in the north and east. Between these "agrarian" regions and "fishing/hunting" areas, there are regions of the transition zones, consisted of regions of groups 3 and 4. The exceptions are enclaves in the transition zone — the Omsk and Altai regions included in group 2. In Federal Districts, there are "agrarian" zones in the west of the South, the north of the North-Caucasus, the south of Central, Volga and Ural Federal Districts

"Agrarian — industrial" regions, as a transition zone covers the south of the North-West, the south-west of Siberia and the extreme south of the Far Eastern Federal Districts.

One of the main indicators of development of agricultural production in the region is the volume of output of production; it depends on both agro-climatic zoning and the size of the region. In the analysis of decreasing ranking of Russian regions in total volume of agricultural products it appears that the average rank of all the diversity of regions 1 and 2 groups is 21 out of 83. It means that main agricultural producers are in this group. The average rank of the regions 3 and 4 group is 45. It is clear that the average rank of 19 "fishing/hunting" areas, despite of their greater total area, is 68.

Absolute indicators describing groups of regions are presented in table 2. "Agrarian" third (27 out of 83 regions), which occupies less than one tenth of the territory, provides more than seven tenth of sown area. "Fishing/hunting" regions, which occupy more than two thirds of the whole area, give only 2% of the Russian sown area.

The data in table 2 allow us to see that in the "arable farming" and "agrarian" regions the share of rural population is higher than the national average level (33-37%). In the "livestock husbandry" regions (mostly it's north-east of the country), on the contrary, the share of urban population is almost twice higher than the share of rural population (urbanization level is over 81%). In the «Livestock husbandry» and "fishing/hunting" regions the share of urban population is above the national average level. Absolute figures show



	Arable lands
	Agrarian lands
	Livestock husbandry
	Agro-industrial lands
	Fishing / hunting areas

Types of agricultural regions of Russian Federation

Table 2

Average size of agrarian regions

#	Groups of regions	Territory		Volume of agricultural production		Population (at 01.01.2007)			Sowing lands (spring of Y2006)	
		km ² , ths	% of total	RUB, bln	% of total	Share of rural population in the region, %	Population allocation, %		Hectares, mln	% to total
							rural	urban		
1.	«Arable farming»	438,5	2,6	435	25,4	37,7	21,4	13,1	19,1	17,5
2.	«Agrarian»	1250,9	7,3	561	32,7	33,3	31,3	23,1	34,2	53,8
3.	«Livestock husbandry»	694,5	4,1	264	15,4	17,8	17,2	29,4	9,4	12,6
4.	«Transitional»	3018,4	17,6	347	20,3	26,6	23,8	24,4	10,6	14,1
5.	«Fishing/hunting»	11695,9	68,4	105	6,2	22,9	6,3	11,0	1,5	2,0
6.	Whole Russia	17098,2	100,0	1711	100,0	27,0	100,0	100,0	74,8	100,0

that in the «Livestock husbandry» and "fishing/hunting" regions for each rural inhabitant there are about three city ones, and in the regions of groups 1 and 2 — less than two city inhabitants.

Correlation between agricultural producers and consumers of agricultural production will certainly affect the prices. Most likely, the difference in prices explains that the north-east with 2% of crops received 6.2% of production at current prices. In regions of groups 1 and 2 the ratio is opposite: 71% of crops — 58% of production. «Livestock husbandry» regions are again closer to the "fishing/hunting" ones — the share of crops is less than the share of products. We should, however, suppose that we didn't separate the share of livestock husbandry in the total volume of agricultural production. During analysis of those regions we can see that between them there are many regions which produce raw materials. These regions export hydrocarbons, metals and timber; inhabitants have higher incomes and make higher prices for vegetables, green culture, and fresh meat. In the south-western regions, representing the majority of "arable farming" and "agrarian" regions, a large proportion of urban residents grow vegetables on their own.

Thus, one can distinguish groups of its administrative regions with different levels of development and the importance of agriculture. Most of the crop is located, as shown by results of the census, in the south-west of the country. As we move from the Black Sea to the Pacific Ocean all the lower part of the territory is used for sowing. The same trend is observed when considering the effective rate — the volume of output of agriculture (for crop and livestock).

The reason for this concentration is the climatic conditions. It is on the south-west of the best climatic resources. However, the majority of consumers — the urban population live in «Livestock husbandry» and "fishing/hunting" areas, specializing in industrial production. A large proportion of urban population (half the urban population is concentrated in the centers of regions) the power of effective demand offset poor weather conditions. The policy of regional authorities also contributes to the production of some food in the region. This policy is the most effective in suburban areas. During its development in the XX century, agricultural science and practice have provided each region with a set of recognized varieties of suitable crops.

When the territorial analysis, from south-west to north-east of the country, change is evident not only in size but also the structure of crop lands. We first analyze the changes in the structure of agricultural land as a whole (table 3).

Table 3

The structure of agricultural land in all categories of farms, %

#	Groups of regions	Total of agricultural lands	From which					Really used agricultural lands	Fallow
			arable lands	deposit	gardens	hayfields	Pastures		
1.	"Arable lands"	100,0	79,1	1,8	0,8	2,3	16,0	90,2	21,0
2.	"Agrarian"	100,0	59,0	10,9	0,6	12,9	16,0	68,2	17,5
3.	"Livestock husbandry"	100,0	68,2	8,1	0,3	6,2	16,9	77,7	17,9
4.	"Agrarian — industrial"	100,0	46,8	10,0	0,5	10,5	32,2	67,5	32,1
5.	"Fishing / hunting areas"	100,0	20,3	15,4	0,3	19,2	44,8	59,9	42,1
6.	Whole Russia	100,0	61,0	8,3	0,5	8,3	21,8	75,2	16,3

At command-administrative system agricultural lands were given to farms enterprises not on the market basis. Despite of the decisive importance of administrative factors in the regions where the area is comfortable to stay, 0.1 -0.2 hectares per hectare of agricultural land are under roads, buildings, etc. In less comfortable areas to live (north-eastern regions) on 1 hectare of agricultural land there are in average 18 hectares of forests, wetlands and reindeer pastures.

Percentage of arable farmland in most regions of the first three groups is higher. Under hay meadows and pastures are assigned or very inconvenient, or important to the ecological environment of the earth. Especially clearly manifested in the "agricultural" regions — almost 80% of agricultural land are occupied by arable land.

The share of grassland in crop-rotation is growing to the north-east of the country: from the fifth part in the regions of group 1 more than to three-fifths in the regions of the latter groups.

In a downturn economy, not all land is used for legitimate purposes, and agricultural census revealed this phenomenon. The share of deposits, abandoned arable lands increases from the south-west to north-east of the country. Abandoned lands occupy in the "agricultural" regions less than 2% of the territory; in "fishing/hunting" areas, located mainly in the east of the country — one of each seven hectares. Share of really used agricultural lands also changes along the territory — from 9/10 in "agricultural" regions to 6/10 in "fishing/hunting" areas.

When comparing the data in tables 2 and 3 it seems to be a little difference between the area of arable land and crops. Sown arable land belongs to the fallow land. It is believed that the presence of fallow land gives relaxation and partially restores fertility. It is important in the case of the shortage of fertilizers, lack of equipment and lubricants.

Calculations show that in regions 1, 2 and 3 groups in 2006 every fourth hectare of arable land (17-21%) was "resting", in the "transitional" areas — almost every third, and more than 40% of arable land had status of "fallow" in the "fishing/hunting" areas. It is quite possible that next year, this part of the fallow land will go into the category of "deposit".

The analysis of the structure of crops by groups of regions (table 4) shows that "agrarian" regions have higher proportion of technical crops.

This is a maximum possible share which can be reached in rational crop-rotations. The area under potato and technical crops occupies minimum allowed by rational crop-rotations.

Table 4

**Volume and structure of sown areas of agricultural crops
in all the farms for the harvest of 2006**

#	Groups of regions	Sown area		from which			
		Ha, ths	%	cereals	Technical crops	Potato and vegetables	Forage crops
1.	"Arable lands"	19123	100,0	58,9	21,2	3,3	16,6
2.	"Agrarian"	34141	100,0	64,5	11,4	2,8	21,1
3.	"Livestock husbandry"	9410	100,0	54,0	2,0	4,8	38,5
4.	"Agrarian — industrial"	10540	100,0	42,2	6,0	5,9	45,9
5.	"Fishing / hunting areas"	1552	100,0	52,0	1,4	11,1	75,5
6.	Whole Russia	74766	100,0	58,4	11,8	3,8	26,0

In the “fishing/hunting” areas we have location of production of vegetables and potato (more than 11% of sown area of these crops in the country) and insignificant share of technical crops; proportion of grain and forage crops are lower than in the south-west, but higher than from the nearest neighbor regions, therefore, it enables the production of short-transporting agriculture products and supports livestock.

Analysis of allocation of sown areas along the territory of the country shows that 3/4 of cereals and 9/10 of technical crops used to be cultivated in regions of groups 1 and 2. Almost half of sown areas of technical crops are located in “agrarian” regions. So, from south-west to north-east regions with developed livestock husbandry replace regions with intensive production of crops.

If we look at the percentage of our areas in the national scale, we see domination of the south-west in cereals and especially in the technical cultures — respectively, three quarters and nine-tenths of all Russian land. Almost half (46%), industrial crops cultivated by the 8 most agricultural regions which components 1 group. So, from the south-west to north-east regions with high-intensity, labor-intensive crop productions are replaced by regions specializing in livestock. Further to the north-east silo-crops occupy a large proportion than in the “Agrarian — industrial”. Production of silage feeds provide daily herd of southern areas and suburbs, especially the Irkutsk, Khabarovsk, Buryatia, Yakutia, Komi, Arkhangelsk regions.

Analyses of the allocation of animal husbandry start with cattle breeding. Despite of the diversity of cattle species livestock breeds for dairy-beef. There is a variety of breeds of animals adapted to local conditions.

Cattle allocation is affected by such factors as food supply, the availability of workers and production costs and sales prices. Placement of cattle in relation to the grouping of regions is presented in table 5.

In “agricultural” regions every 100 hectares of farmland has 14-16 head of cattle, in which 6.5 cows. When moving to the north-east (3 and 4 groups) we can see regions with a sufficient number of hayfields and pastures. The temperate climate promotes with relatively high productivity, sufficient to feed a 23-24 heads of livestock, including 9-10 cows. In

Table 5

Number of cattle and poultry for July 1, 2006 in all categories of farms

#	Groups of regions	Number of cattle, th. of heads	% Of total	Including cows, th of heads	% Of total	Per 100 ha is really used agricultural land		Birds of all kinds, million heads	% Of total	Per100 ha of arable lands, th of heads	Share of population of regioning centers, % of total
						Cattle, heads	Including cows				
1.	“Arable lands”	4094	17,4	1605	16,8	14,8	5,8	112	28,7	4,64	10,0
2.	“Agrarian”	8471	36,1	3393	35,5	16,0	6,3	118	30,1	2,53	23,0
3.	“Livestock husbandry”	3562	15,1	1521	15,9	23,1	9,9	63	16,1	4,70	33,0
4.	“Agrarian — industrial”	3433	23,1	2304	24,1	24,3	10,3	82	21,0	5,27	27,0
5.	“Fishing / hunting areas”	1937	8,3	734	7,7	24,6	9,3	16	4,1	5,95	7,0
6.	Whole Russia	23487	100,0	9557	100,0	18,6	7,6	391	100,0	3,82	100,0

a weakly assimilated "fishing/hunting" parts of small animals (8.3% of the total population of the country) and concentrated with a high density of 24-25 animals per 100 hectares of farmland. Economic factors also "attract" cattle in these regions: more than 60% population live in regional centers and are not engaged in subsistence farming.

Egg and dual purpose chicken breeding is the largest share of Russian poultry industry. Rations consist of a 9 / 10 and more of the grain and mixed feeds on its basis. Therefore, the placement of poultry strongly depends on grain growing areas — in the south-west of the country (1 and 2 groups). High density of birds in the regions of the north-east (3 and 4 groups) is not as a result of population increase, but as a result of arable land reduction.

Forage is the main factor for allocation of beef cattle, swine, sheep and goat. National habits and preferences of the population greatly influence on placing these industries. So, more than 2/3 of number of pigs is allocated in 27 south-west regions (1 and 2 groups). The rest of plowing farmland share with cattle about 1 / 3 of sheep and goats. Goats, unlike sheep, almost all are in private farms and placed equally in regions.

The pig density (number of pigs per 100 ha of arable land) is more in the regions of 1 and 5 groups. They are placed in this way due to sources of their food and their economy.

When analyzing the density of sheep and goats on 100 hectares of grassland we can see that sheep are concentrated in a few regions, available in all selected groups. Yet more increased the average density is in 4 group. No significant difference in the density of goats is noticeable. Regions with the smaller density of sheep have the greater ratio for goats.

According to the census they were considered 5 forms of agricultural organizations (table 6): large, small, subsidiary, peasant farmers and individual entrepreneurs, which have agricultural activities. More than half of large and small agricultural enterprises work in the regions of intensive crop production — 1 and 2 groups, about one-third- in "livestock" areas, the remainder (slightly less than six stakes) — in the 5 group. In sparsely cultivated regions of the north-east (4 group) have more subsidiary farms than in the south-west. This is understandable: in this regions workers themselves must produce for own consumption herbs, milk and meat.

Table 6

Number of agricultural enterprises on July 1, 2006 (units)

#	Groups of regions	Number of agricultural enterprises					Per 100 ha of arable lands				
		Large form	small form	subsidiary	peasant farmers	individual farmers	Large form	small form	subsidiary	peasant farmers	individual farmers
1.	"Arable lands"	5948	3608	1955	55979	4730	19,4	11,8	6,4	189,9	15,4
2.	"Agrarian"	9660	6941	3861	68219	15611	9,9	10,2	5,7	100,3	23,0
3.	"Livestock husbandry"	4810	3741	1821	35321	2675	21,3	16,5	8,1	156,3	11,8
4.	"Agrarian — industrial"	5655	4296	2074	77199	6950	16,9	12,9	6,2	231,1	20,8
5.	"Fishing / hunting areas"	1706	1819	1219	13260	1809	13,0	13,9	9,3	101,0	13,8
	Whole Russia	27779	20404	11029	253331	31827	16,5	12,2	6,6	151,1	19,0

The second half of the table 6 provides no basis to assert a noticeable difference. There are about 30 agricultural enterprises and 146 farmers per 100 ha of agricultural land in regions of 1 and 2 groups. In the zone of intensive animal husbandry there are 40 agricultural enterprises (i.e., farmers in these regions smaller than the average enterprises of the country) and 218 farmers. Finally, the poorly developed regions (5 group) have 36 agricultural enterprises and 15 farmers per 100 hectares. Thus, there is no evidence to sink the predominance of farm organizational form influences animal husbandry or crop production allocation. The size and the possibility of the spread of any form is not determined by specialization and profitability, and policies of the regional administration.

From the theory and practice of management it is known that it is impossible to effectively manage more than 30 objects at the same level of management. Thus, for analysis and management of economy of Russian Federation it is impossible to consider each region separately; it is necessary to have more or less homogeneous groups of regions. Thus, by the degree of development of agricultural production the Russian regions can be characterized as follows:

"Arable lands" regions use the resources most effectively. Total territory of these regions is not that large, but it includes almost 1/5 of the total sown area of the country and almost 1/4 of total volume of agricultural production of the country produced there; agricultural land is almost completely used, different types of crops are cultivated, a large share of land occupied by grain and technical crops. In such a regions most effective would be that kind of state support which aimed the increase of intensity of agricultural production (introduction of new varieties of crops, funding for big land reclamation projects, support of infrastructure projects) through targeted programs; to assist regions in entering the international market and other mechanisms of state management.

"Agricultural" regions which occupy 7% of the total territory of the country are managing more than half of the total sown area and more than 1/3 of livestock and poultry; these are the regions with high-intensity crop production, here we have the highest share of grain crops and significant share of cultivated forage crops; here most of large agricultural enterprises are concentrated. One of the directions of state support in these regions may be the promotion of the expansion of industrial crops and the implementation of less labor-intensive livestock industries. Mechanism of the regional management can be defined as state orders for certain types of agricultural products in the form of quotas.

"Livestock" regions are engaged in production of livestock and trading grain; the composition and intensity of crop production, comparing with the regions of previous groups, decreases. State regulation may be directed to die support of small and medium size enterprises in agribusiness, including in the form of regional production clusters.

State programs of supporting of regions' food self-supplying can support regional producers by mean of the increasing of consumer demand.

Crop production in the "Agrarian — industrial" and "fishing/hunting" areas is really focal. State support should be aimed at diversifying the activities of the remaining rural population: the maintenance of fishing/hunting activities (through licensing and quotation), the recovery of crafts, the development of agro-tourism and ethno-tourism based on agricultural production in order to maintain the living standard of small nations of the North and the Far East regions.

Thus, the proposed approach to agriculture regioning will allow to highlight the priorities in the development of agricultural production in different administrative regions, will provide a base for a system of forecasting and planning, for investment planning and for more effective strategic management of agro-industrial complex of Russia.

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Аннотация. Целью данной работы является анализ современного размещения сельского хозяйства по административным регионам РФ. Основным источником статистической информации являются результаты «Всероссийской сельскохозяйственной переписи 2006 года». Проведена группировка субъектов федерации (основной показатель «Доля посевной площади во всей территории региона»), представлена характеристика сельскохозяйственного производства каждой типической группы регионов. Предполагаемое зонирование позволит выделить приоритеты в развитии сельскохозяйственного производства по административным регионам, обеспечит базу для системы прогнозирования и планирования, инвестиционного проектирования и решения проблемы более эффективного стратегического управления АПК России.