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USE AND STATE OF LANDS IN AGRICULTURE OF RUSSIAN FAR EAST

UTILIZAREA ŞI STAREA TERENURILOR ÎN AGRICULTURA DIN ESTUL ÎNDEPĂRTAT AL RUSIEI

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Abstract: The theoretical and applied aspects of the agricultural land use are considered, estimates of land resources used in the agriculture and their regional differentiation under different agro-geographical conditions on the territory of the Far East agricultural zone are performed. The proposed approach to investigating the agro-potential allows to analyze and image its arrangement, condition and types and efficiency of its use. The quantitative and qualitative characteristics of lands used in the agriculture of the Far-Eastern are presented. The structural changes, dynamics and intensity in the agro-potential use are shown. The agro-ecological characteristic of the agricultural areas most favorable for agriculture is given.

Key words: land resources, agro-potential, agriculture, Far Eastern region, land use dynamics, lands involved into the agricultural turnover, types of agricultural land use, agro-ecological zoning
Cuvinte cheie: resurse de teren, potențial agricol, agricultură, regiunea Estului Îndepărtat, dinamica folosirii terenurilor, terenuri implicate în agricultura profitabilă, tipuri de utilizare a terenurilor agricole, zonare agro-ecologică

1. Introduction

By the land resources, we understand all properties and utilities of the land as the natural body which are capable to cover the requirements of a man and production. Therefore, each of kinds of economical activity uses a certain set of different properties of the land, i.e. different resources of the same natural body – land (Stepanko 1992). A kind of the land use is determined depending on a number of factors among which, first of all, it should be identified a role and place of region in the interregional division of labor and, as a result, its territorial specialization. In this case, it is necessary to take into account the natural conditions which restrict the use of land as a resource of the agricultural production. In addition to the natural factors which determine the differences in the

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land quantity and quality, a role of economical, historical and technical factors is very great. Therefore, only with consideration for an evaluation of their interaction, one can explain and determine a level of the true potential of the lands used in the agriculture, i.e. their actual productive capacity (Stepanko 1992).

2. Methodology

In order to solve problems considered in this article, the traditional methods of statistical accounting for presence and distribution of the agricultural holdings by types and land users and also geo-information technologies and field investigations were used. New conditions of economic management call for the use of new approaches to the agro-potential evaluation. Among them are, first of all, fixing of market value of land and compulsory taking into account of external factor of development (foreign investments, technologies, economy organization methods etc.) which influence on land value and agropotential estimate.

The proposed approach to investigating the agropotential use allows to analyze and image its distribution, state, types, dynamics and use efficiency and, on this basis, one can develop the principles of the sustainable development of the farm production in the region. In addition, the historical-geographical and cartographic methods were used. These are traditional methods for carrying out of similar investigations.

3. General characteristics of the district under study

A large quantity and diversity of mineral and forest resources under conditions of the underdeveloped processing industry determine the mining operations and wood production as the major specialization of the Far East. Such a position is also reflected in the land use organization and has a determining role in distribution of lands between different categories of land users.

The structural changes which have occurred in the production sphere during 1990s have left their traces on the land distribution. Comparing a dynamics of the functional structure of the land use for each administrative district in the Far East, one can conclude that, along with the similarity of the land use structure in the south regions, their similarity in the dynamic processes is also observed. The northern territories of the Far East are also characterized by their own similarity both in the land use structure and in its change which has occurred during the reform period.

The characteristic specialization of the Far East areas leaves also traces on the territory development intensity. As the developed territory, areas of lands involved in the economic use as well as those which nature was transformed by the economic activity are taken. In the Far East, these territories include all the agricultural holdings, homestead lands, lands of gardens, reclaimed areas, lands under clearing and burnt-out forests, lands of tree nurseries, lands under peatery, canals, collectors and trenches, under roads, passages and ravines as well as areas not restored after peat and minerals extraction.

For Magadan, Kamchatka, Sakhalin and Amur Oblasts, the development extent of territories was calculated with due regard for deer pastures which increases essentially this factor. Based on our calculations, the highest share of the land resources used in the economy falls on Primorsky and Khabarovsk Krais, Amur and Sakhalin Oblasts.

A rationalization of the agricultural land resources should play a certain role in the expansion of food production volume on-site and thereby have an effect on the agricultural products market in the region. The possibilities to expand areas used in agriculture in the Far East are very limited [9]. Here, the development (assimilation) of new lands for agricultural purposes can be put into effect only after the expensive reclamation works will be carried out. To date, the all-round reduction in area under crop and agricultural holdings in whole has occurred in the most Far-Eastern regions as a result of the crisis situation. Putting of early derelict lands into the agricultural use will allow to solve partially a problem of the cultivated lands although these measures will also require the proper financial investments (Stepanko 2005a).

3.1. Structure of the land use for agricultural purposes

A distinguishing feature of the Far-Eastern region is its considerable superiority in area over other regions of the country. The supply of land of the region is 308.6 million ha.

A large extent from the north to the south, terrain features, position in relation to the sea and centers of atmospheric circulation determine sharp differences of the region's parts in natural conditions. Only the southern Far East is characterized by the conditions favorable to the multisectoral farm production.

To the agricultural enterprises of the region, 168.9 million ha of lands were allotted. About 75% of them fall to share of the reindeer farms. A share of the rest of agricultural land users is only 10% while that of the agricultural holdings is about 2% of the region territory.

The arable lands, like all the agricultural ones, are situated in the southern part of the region (about 95%). The maximum areas of arable land are in Amur Oblast (70%). To share of the north-eastern regions, only 5% of arable lands fall and these lands are basically used to manufacture goods with restricted keeping time and perishable ones. Territorially, the croplands are drawn towards a zone of intense economic activity with great concentration of population. A large part of the southern region territory with a flat relief suitable for tillage is already used. The arable land occupies here up to 65% of total area.

The croplands are markedly distinct in natural and efficient productive capacity. There are considerable differences in croplands amelioration degree that is determined by not only natural fertility but also by sizes of contoured sections, blockage with stones and erosion degree of land lots.

As to the Far East as a whole, the agricultural holdings cover 2.1 % of territory, 32.6% of lands are occupied with forestry enterprises, 8.7% of total area are covered by bushes and bogs and 41% are used as pastures for reindeers. On the

arable land, only 0.9% fall, and 96% of it is situated in the southern region: 26.3% in Primorsky Krai, 9.3% in Khabarovsky Krai and 60.6% in Amur Oblast.

The hayfields occupy 1069.7 thousand ha. The essential difference in the quality of this kind of grounds should be noted. By the natural characteristics, the haylands can be divided into water, dry and water-logged meadows which reflect generally the locations of such lands in the natural landscapes.

The water meadows occupy 122.7 thousand ha, 66 thousand ha of which are clear while 32.9 thousand ha were overgrown with bushes and low forests (4.7 thousand ha were subjected to the radical improvement), a share of the dry hayfields is 343 thousand ha and 87.7 thousand ha of them were subjected to the radical improvement and area of the water-logged ones is 303.7 thousand ha.

The hayfields occupy mainly the lower and more damped areas than the arable territories. A distribution of lands of this kind as well as all the agricultural lands is basically limited by natural conditions. 82% of hayfields fall on the southern Far East.

The grazing lands include mainly those areas which are unsuitable for tillage and hayfields. As opposed to croplands, the lands of other, non-agricultural land users are used as the grazing lands. The pastoral holdings are often situated within the forest lands.

In the structure of the agricultural lands, the pastures rank below croplands and hayfields in sizes. The grazing lands are subdivided into two basic types – dry and water-logged ones and, based on using type, into pastures for reindeers and for all other species of domestic animals. The reindeer pastures are allotted to the reindeer enterprises for permanent use and they include mostly different categories of lands (forests, lands under roads etc.).

3.2. Typology of the land use for agricultural purposes

The typology of the agricultural use of lands was broadly and fully covered in the modern Russian literature (Zvorykin, Lebedev 1968; Rakitnikov 1970). The methodical development of the land typification has started in the late 1960s in connection with the first experience of the land evaluation based on the differential rent. The elaboration of the land typology methods for areas of the Far East was begun by the agro-geographical group of the East Complex Expedition of the geographical department (Moscow State University).

There is an interconnection between the natural and economic boundaries because each natural type of lands proposes a quite restricted set of the use forms (Pokrovsky 1978).

The following general considerations form the basis for typification. The types of land use can be identified with regard to their natural features since they are related, first, to general level of farming and organization of agriculture in whole and, secondly, to a general line of specialization in the regional scale and, in addition, to particular natural and economic conditions from the viewpoint of separate farms. As to the economic conditions, the

differences in transport facilities and, hence, in costs for transportation of manufactured goods to the places of their realization, for delivery of means of production for own needs, in provision of the farming industry with labor force, in material resources inherited from past periods as well as in the accumulated field experience are especially important.

The close relation to natural features of lands is only characteristic of distribution of different agricultural holdings, labor inputs and fixed assets needed to get over different discomforts (strip holding of production divisions, steep slopes of surface, low pliability to tillage etc.).

Therefore, the land use typification should be based on features characteristic of the lands themselves and performed, in principle, irrespective of the land productivity classes identified from natural signs.

The typification of the agricultural use of lands begins from the establishment of the product specialization of enterprises. To determine it, the shares of different branches are taken in the total cost of the products sold. The analysis of the structure of agricultural enterprises in the areas of the Far East showed that there are the following existing production types of specialization of the agricultural enterprises: dairy-vegetable; dairy-pig-breeding; dairy-poultry farming; meat-soya; meat; pig-breeding; cereal-soy; rice-planting; gardening; poultry farming; fur-breeding (Stepanko 2005b).

3.3. Agropotential of the Russian Far East

In the areas of the Far East, four types of land use were identified on the basis of a ratio of areas under the major crops and closely related to it character of agricultural methods, expenses in plant growing, provision with capital assets (Fig. 1).

I. Rice-planting. In the structure of sown areas, the cereal crops prevail (up to 70 % on average) and the areas under rice reach more than half the cultivation area, the areas under soya and fodder crops occupy 15% each while shares of potato and vegetables plantations are only 2% of total area each. The expenses for plant growing were more than 300 rubles per hectare while the cost of basic production assets reached more than 900 rubles per hectare of arable lands in prices of 1983.

II. Suburban. This type of land use is related to production of perishable and untransportable goods. In the structure of this type of land use, the considerable areas (more than 10%) were occupied with vegetables. The shares of cereals and fodder crops comprise 50 and 25 % respectively. About 15% of total area was intended for soy plantations. The material and money expenses reached about 150 rubles while the cost of basic production assets reached 230-250 rubles per hectare of arable lands in prices of 1983.

III. Cereal-soya beans. In the structure of sown areas for this type of agricultural land use, the cereal crops prevail, their area is as great as 45% while area under soya comes up to 30%. The fodder crops are concentrated within 25% of total area while areas under potato and vegetables are up to 5%. The material and money expenses in case of this land use type amounted about 100 rubles while

the cost of basic production assets reached 170-220 rubles per hectare of arable lands in prices of 1983.

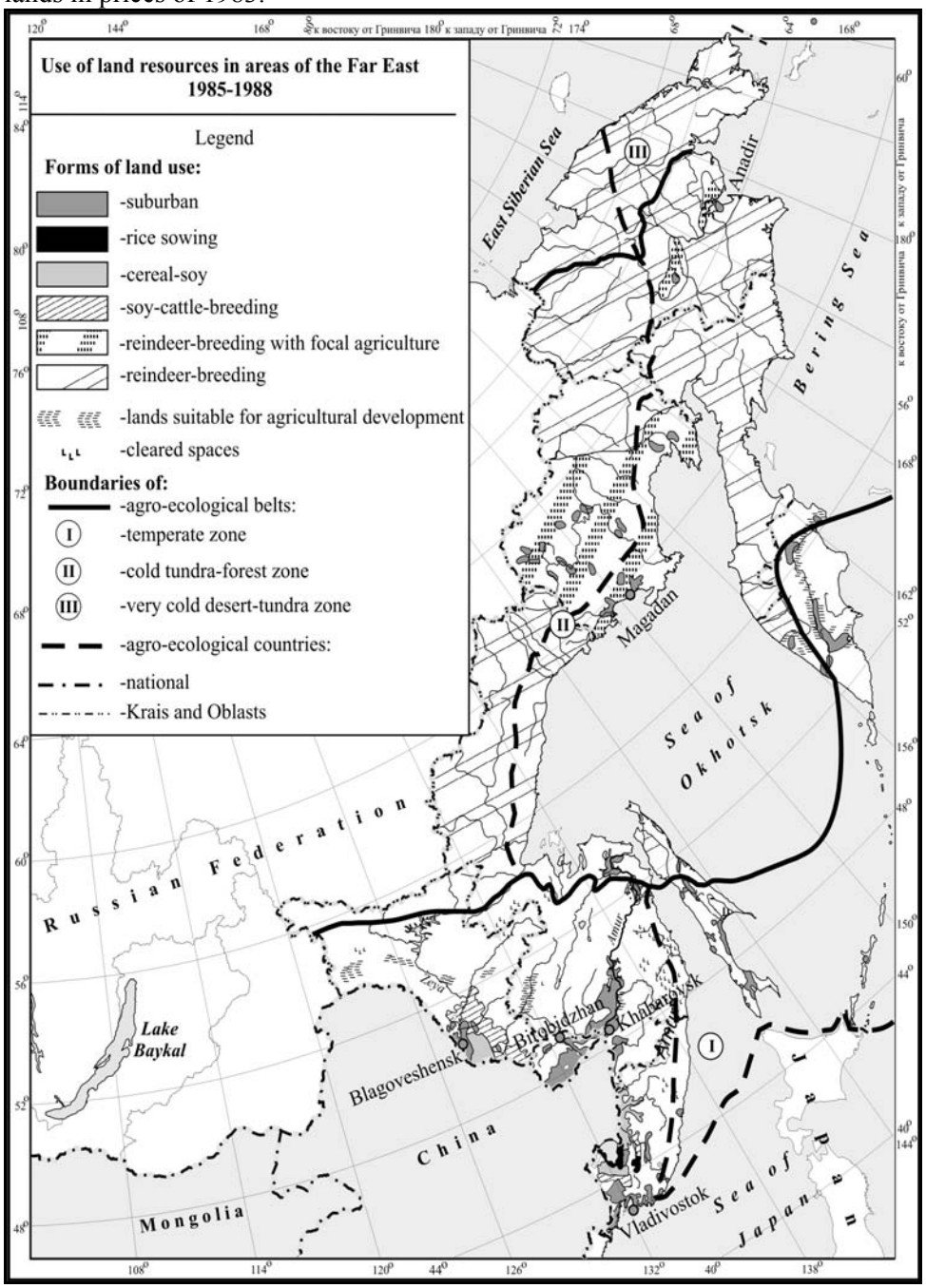

Fig.1. Land use in the different areas of the Far East in 1985-1988

IY. Soya and cattle-breeding. 60% of sown areas for this form of land use are occupied with fodder and cereal crops. Areas under soya beans reach 40%. The material and money expenses in case of this land use type amounted about 90 rubles while the cost of basic production assets reached 180-200 rubles per hectare of arable lands in prices of 1983.

Alongside with these intense forms of land use, in the northern Far East, a less intense form of land use – reindeer breeding – is found. It is represented by the reindeer breeding proper and reindeer breeding with focal farming. The farming on these territories is presented by not great areas of agricultural holdings near the settlements which are used by residential population to produce vegetables and dairy foods.

The territorial differences in suitability of the land use in accordance with availability and quality of natural resources for the agricultural production are given in the scheme of the Agro-ecological zoning of the Far East (see Fig. 1).

As per such a zoning, all the territory was divided by kinds and degree of suitability of lands for using in the agricultural production. The principal criterion is a behavior of farming plants on one or another type of lands. As the basis for identifying the districts, a distribution of one or another physico-geographical component and certain model of the relation between the ecology of crops and this landscape component were used.

The works related to the regional analysis of natural conditions were begun by P.I. Koloskov (1925). The most important results of the subsequent works were obtained in connection with evaluation of natural resources. When elaborating the zoning scheme, the methods and approaches of the mathematical statistics were used along with traditional ones for separate territories.

Within the Far East, three natural zones were identified (see Fig. 1):

I. Temperate zone with different types of vegetation during the spring-summer-autumn period. At the heights of up to 150- 200 m above sea level and at the greater heights in the southern part, the intensive vegetable and potato growing is possible everywhere; within the middle zone, soya beans and spring cereal crops are grown while, rice sowing and fruit-growing are characteristic of the southern part.

II. Cold, tundra-forest zone with the prolonged spring-summer vegetation of natural plants. In the open ground, a cultivation of early-ripening varieties of potato, vegetables and some fodder crops is possible; the grain farming is unprofitable.

III. Very cold, desert-tundra zone with the short-term summer vegetation of plants. The considerable areas are occupied with the cold mountain deserts. The cultivation in the open ground is practically impossible due to shortness of the vegetation period and low summer temperatures of air and soils.

The territorial analysis of agro-ecological conditions in the southern Far-Eastern region allowed to conclude that this territory is most favorable for multi-sectoral farming and cattle-breeding. A wide spectrum of natural conditions was beneficial for development here of different branches of the agriculture. In view of a number of objective reasons, the transformations of the territorial distribution of

the agriculture branches occurred also on this region territory. A presence of maximum quantity of the agriculture branches in the southern regions allowed to consider, in full, a general dynamics of maximum number of the agricultural land use types.

3.4. Territorial differentiation of agropotential of the southern Far East of Russia

The territorial differentiation of the southern Far East agro-potential (Fig. 2), its estimate and characteristic are given on the basis of the agro-ecological taxons identified on the map of agro-ecological zoning (Deinekina, Karakin, Stepanko et.al. 1979).

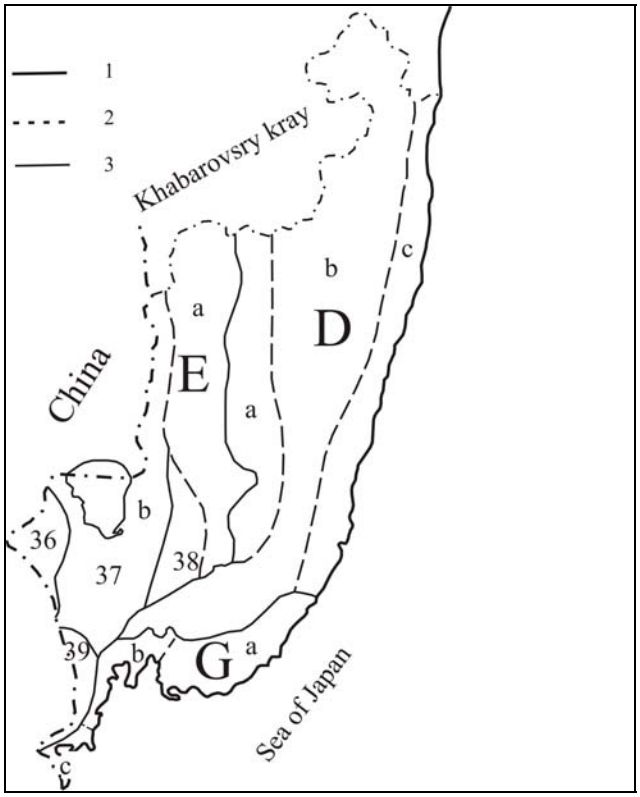

Fig. 2. Agro-ecological zoning of the southern Far East (Primorsky Krai).
Boundaries of: 1 Oblasts; 2 – provinces and zones; 3 – districts

Sikhote-Alin Oblast (D) includes the Sikhote-Alin mountain system. The low population density, mountain relief, small areas suitable for the agricultural occupation, severe climatic conditions are unfavorable for modern farming. Differences in the climate, relief and vegetation allowed to identify here three provinces: West Sikhote-Alin (D-a), Central Sikhote-Alin (D-b) and Coastal (D-c).

West Sikhote-Alin province

The highest agropotential is characteristic of flood-plain soils with a light mechanical composition. However, the area of flood-plain soils is insignificant. On

the different predominant portion of territory, different types of the mountain-taiga soils are found. The agriculture is actually absent.

Central Sikhote-Alin province

The agriculture is actually absent. In perspective, along with traditional use of territory by the smaller people, a use of not great areas in the Bikin and Bolshaya Ussurka rivers' valleys is possible for the field and meadow food production, potato growing and, with restrictions, vegetable growing.

Coastal province

The agricultural holdings are located in the floodplains. They do not almost experience an overwetting owing to the light mechanical composition of the floodplain soils. The favorable hydrothermal properties of the floodplain soils and quite moderate climatic conditions in the province and, especially, its southern areas allow to grow here some cereal and fodder crops, potato and early-maturing vegetables. However, there is little lands suitable for agricultural use within the province and they are scattered in the form of specks.

Khanka-Ussuriisk Oblast (E) covers the developed agricultural lands of the Khanka-Ussuriisk plains, wide river valleys and low-mountain sections along the national boundary between Russia and PRC. The differences in the climates of submontane and plain territories allow to identify here two provinces: Submontane (E-a) and Khanka-Ussuriisk (E-b).

Submontane province

In the agriculture, the plain territories of river valleys (Ussuri river and its tributaries, Pavlovka and Otkosnaya rivers, Bolshaya Ussurka river and its tributary Marevka and Bikin river) are used. The croplands are everywhere used to grow the fodder, cereal crops and soya beans. On the sizeable territories, potato and, in part, vegetables are grown.

The lands suitable to farming are incompletely used currently. The use of new and derelict lands for farm production requires a carrying out of a number of the reclamation works accompanied often by considerable expenses.

The *Khanka-Ussuriisk* province includes the territories of the Khanka and Ussuri plains, broad valley of Arsenyevka river, graded slopes of the Zapadny, Siny and Porganichny ridges and Chernye mountains. The heterogeneity in the territory relief allowed to identify there the following districts: Pogranichny (36), Khanka (37), Arsenyevsky (38), Chernogorsky (39).

Pogranichny and *Chernogorsky* districts occupy the low-mountain sections of the ridges of the same names. The territory of the Pogranichny district is covered with the undersized grassy-shrub vegetation. The agroclimatic conditions on these territories are quite favorable for the cultivation of many crops including heat-loving ones. But the mountain relief and related to this practically full absence of lands suitable to farming prevent from the agriculture development. However, there are favorable conditions for the bee-farming. The forests of these places, especially ones in the Chernogorsky district, are rich in the bee plants. In addition, not great lots of land can be used to grow buckwheat and other bee plants.

Khanka district

The favorable agro-geographical conditions, together with the orography, on the district territory have favored to its agricultural development. Here, all the crops grown in the southern Far-Eastern region – cereal ones: paddy, wheat, barley, buckwheat and oats; technical crops – soya beans, sugar beet, sunflower; vegetables – tomato, cucumbers, cabbage, beetroot, carrot, garden radish etc.; watermelons, melons and gourds and some orchard crops are successfully cultivated.

Arsenyevsky district. The agro-climatic conditions are favorable for farming activity and provide a possibility to grow here all the crops cultivated in Primorye including paddy.

The flood-plain soils are best from the agricultural point of view. Along with them, the meadow soils with heavy mechanical composition located on the terraces above the floodplains are extensively distributed. Despite the fact that these soils rank below the floodplain ones in the natural fertility, just the same, they provide the important reserve for the agriculture. In perspective, these territories can be a reserve for the further paddy production expansion.

South-Primorsk Oblast (G) is situated on the extreme south of the Far-Eastern region. The diversity of natural and climatic conditions allows to identify three provinces: Partzansk (G-a), Razdolnensk (G-b) and Khasan (G-c).

Partizan province

The majority of the agricultural enterprises have the livestock-vegetable specialization. According to its agro-climatic factors, the province falls into the category of the most favorable territories on which production of soya beans, sunflower, wheat and different vegetables including late-ripe ones is possible and, on the slopes of river valleys, a gardening and viticulture are prospective.

Razdolnensk province

The agriculture is represented by dairy farming, production of fodder and vegetable growing. Agro-climatic factors of the province are favorable for the suburban farming and soya beans cultivation.

Khasan province

The agriculture on the province territory is weakly developed. Here, the fodder crops, melons and gourds and vegetables are cultivated and there are conditions for gardening. In addition to the dairy farming, a breeding of animals for furs is widely distributed. In early 1990s, there has been a sharp decrease in the total number of fur-bearing animals by virtue of economical conditions.

4. Conclusion

The territorial analysis of the agro-ecological conditions of above taxonomic units in comparison with ones situated in other regions of the Far East allowed to conclude that the southern Far East territory and, specifically, Primorsk Krai territory are most favorable for the diversified farming and cattle raising. The wide spectrum of natural conditions has contributed to development of different branches of the agriculture. In view of a number of objective reasons, the internal

transformations of the agriculture branches themselves as well as a change in their territorial distribution have occurred. A presence of maximum number of the agricultural branches in the southern regions allowed us to consider in full the general dynamics of maximum number of the agricultural nature management types.

Achnowledgement

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