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TRANSFORMATION PROCESSES IN TRADITIONAL NATURE
MANAGEMENT SYSTEMS IN THE ALTAI MOUNTAIN REGION

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ABSTRACT

This article is devoted to the analysis of peculiarities and regularities of traditional nature management systems transformation of the Altai mountain region and characterize the main catalyst factors and modern trends of these changes.

The article shows generalized results of long-term researches that employed questionnaire methods (questioning and narrative interview), post-event analysis, transformational and cartographical methods. The methods used enabled study of spatial, functional, social and psychological aspects of nature management systems of the studied area shown in dynamics.

In the article the main stage and the major transformation factors of the traditional nature management systems in Russian part of the Altai Mountains were analyzed. Modern trends of these transformations are defined. The determining role of natural features of this territory in economic activity of local population is characterized. Also the major external and internal social and economic factors of change of systems of traditional environmental management are defined.

Keywords: traditional nature management systems, transformation processes, natural and social and economic factors, climate changes, Altai mountain region

INTRODUCTION

Altai is a vast mountainous country located in the geographical centre of the Eurasia. It is an important centre of biological diversity, as well as an exceptional cultural, geopolitical region and in the future, social and economic importance.

Altai is at the intersection of four major states of Eurasia - Russia, China, Mongolia and Kazakhstan. On the one hand, it makes it a very promising region for international cooperation in various spheres (from trade to the environment), and on the other – it determines its status as a potential conflict zone, that different states are interested in.

Today, all countries whose borders converge in Altai, express their interest in the development of good neighbour relations and enhancing economic activity in the region. The need to enhance borders transparency and the transformation of Greater Altai cross-border economic cooperation zone is constantly declared.

In the meantime, the Altai is poorly developed with an extremely low population density and poor social and economic infrastructure. At the same time it has a high natural resource potential (especially significant are ore, water, forest and biological and
tourism resources). Multi-ethnic population of the greater part of Altai has a traditional way of life and is heavily dependent on the natural environment of their habitat. The Altai Mountains cross-border location and its mountainous terrain contribute isolation of this territory, and the local traditions preservation and established ties.

However, the situation is changing. Nowadays, large-scale projects of the transport network development in Altai are implementing. In particular, now the pipeline and automobile road to China through the pass Çanas are being built. In the future, a railroad is probably created connecting the "two continental transport bridges": Trans-Siberian Railway (Moscow - Novosibirsk - Vladivostok) and the so-called Eurasian Railway (Shanghai - Beijing - Urumqi - Alma-Ata - Osh - and then built sections of the road through Uzbekistan, Turkmenistan, Iran, Turkey, Oman and Qatar). These projects can dramatically change the geopolitical and geo-economic role of the Altai region. From the "obscure corner of Siberia," it can turn into a "golden triangle of Asia" and become one of the world's centres of economic development in the XXI century [1].

All mentioned above determines the relevance of research to facilitate understanding of the internal and external processes that affect the political and social and economic situation in Altai. The social and economic basis of this cross-border region is regional nature management systems (NMS), most of which still can be classified as traditional.

The purpose of this article is to analyse peculiarities and regularities of traditional nature management systems transformation of Altai mountain region and characterize the main catalyst factors and modern trends of these changes.

MATERIALS AND METHODS

The article shows the generalized results of long-term researches that employed questionnaire methods (questioning and narrative interview), post-event analysis, geoinformational and cartographical methods. The used methods enabled to study spatial, functional, social and psychological aspects of nature management systems of the researched area in dynamics.

Since 2001 until 2016 every year we organized the expeditions to the Altai region. During these expeditions we were able to observe the transformations in the traditional nature management systems. Also, interviews and questionnaire survey of the Altai region population were conducted. In them took part more than 2000 people.

To identify trends of climate change in different parts of Altai long-term data of 12 meteorological stations were analyzed. To identify trends of climate change in different parts of Altai long-term data of 12 meteorological stations were analyzed. For areas with no meteorological station, the dendroindicative method (the study of climate change on the characteristics of annual growth rings of trees) was applied. In total, we analyzed more than 1000 samples of wood.

To explore changes in the territory landscape structure used multi-temporal satellite images of the system "Landsat". In addition, the dynamics of the of nature management structure was studied with the use of statistical analysis. Statistical data characterizing economic activity of the Altai regions administrative districts in different years was analyze. For the same purpose the district land use maps, which are updated annually, was used.
RESULTS AND DISCUSSION

Traditional nature management systems are area-specific sets of forms, methods and principles of stable interaction between local communities and natural environment of their habitat which were formed as a result of evolutionary population adaptation to the natural conditions of the area and transferred from generation to generation as farming traditions. The traditional nature management peculiarity is its extensive character and self-repair ability of the ecosystems. The ecological balance is maintained by means of purposeful regulation of types and volumes of the anthropogenic landscape load. Traditional nature management runs through spiritual and material culture of the people and finds reflection in all areas of life. For example, ecological standardization principles in traditional nature management are enshrined in the community's religious and mythological consciousness through the system of the various taboos explained by legends and traditions.

Thus, specific regional systems of traditional nature management are defined by natural conditions of the area where communities live and result in people's adaptation to these conditions being captured in culture as farming traditions, spatial perception stereotypes and behaviour, as well as moral and ethical standards of nature interaction. Keeping it in mind it is important to consider natural features of the studied area.

Geographical features of the studied area. The Altai mountain country is located at the junction of the West Siberian plain, the Mongolian plateau and Kazakh hills. The average height of the Altai Mountains is 2500 m, and the maximum — 4507 m (Belkha). Height increases from north to south. Landscape structure is very diverse and is defined by multitude zonal and azonal factors. The combined effect of many natural differentiation factors within the Russian part of the Altai released several physiographic provinces, each having a specific landscape structure. In general, there are mountain semi-desert landscapes (Chui intermountain hollow) here, mountain steppes (dry, typical and meadow), mountain-forest (fir-spruce-aspen and pine-fir-larch larch forests, pine and birch forests etc.), mountain-meadow (high-grass subalpine meadows and woodlands of low-grass and alpine meadows), mountain tundra (grass, moss, shrub tundra), glacial-nival [2]. Also, there are transitional landscape types such as tundra-steppe that is a unique one.

The natural conditions diversity presented within this mountainous country defines also great biological diversity (Altai is included in the list of the most significant biodiversity regions of the world "Global-200"). The presence of isolated mountain valleys also helped to preserve many relict and endemic species in flora and fauna.

Traditional nature management systems formation in Altai. The environment features of different parts in Altai, as well as its political and ethno-cultural history here identified the development of several regional traditional nature management systems. All of them are based on age-old traditions of nature-uses of different ethnic groups, living in Altai. By the early 20th century four functional types of regional traditional nature management systems in Altai have been formed.

1. Traditional nature management system of distant-pasture cattle breeding is typical for the territories of Central, Eastern and South-Eastern Altai with prevalence in the population of the southern altaians (Altai-Kizhi, Telengits, Teleuts) and kazakhs. The nature management system based on nomadic cattle raising with hunting playing a subsidiary role was formed in the studied area not less than 4000 years ago and

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remained practically invariable till the beginning of the 20th century, as archaeological data confirm [3].

Sheep and horses prevailed in the flock structure. Thus, sheep were the main feeding source and horses were used differently as the main domestic animals. Besides, horses were required to break crust in winter pastures, where sheep could not be used.

Two-humped camels were also widely spread as agricultural animals in the Southeast Altai and most fitted nomadic life thanks to their strength, endurance and warm wool. Later (probably, only in the 19th century) people began to breed yaks here which were also adapted to harsh highlands conditions and could get forage out of the snow.

The animals were grazed all year round. Besides, there was communal and ancestral land ownership that resulted in the following: 1) the desire to maintain high quality lands for themselves and their progeny; 2) the lack of anthropogenic load overlays as a result of the use of one and the same plot by different users. The lands were zoned for farming needs according to their natural features (high altitude, direction, prevailing landscapes, etc.). Thus, winter, autumn-spring and summer pastures, hunting grounds, sacred places (or reserve areas) were usually distinguished.

The main natural factors of nature management development were pastures bioproductivity, presence of water sources convenient for watering and snow cover thickness during the winter period.

2. Traditional nature management system of hunting-fishing type is localized in taiga landscapes of the North-East and North-West of Altai, inhabited by northern altaians (Chelkans, Kumandins, Tubalars) and Russians. Traditional economy specialization of this NMS is hunting and fishing, and only partly agriculture and livestock as ancillary industries. Culture of taiga traders (hunter-gatherers) and fishers is most prevalent here. The need long-term presence in the taiga identified by many elements of traditional spiritual and material population culture. Settlements are located here in the valleys of large rivers (Biya, Lebed', etc.), and taiga lands for hunting and gathering wild plants were distributed among individual families. Each family had its own winter-abode and "labazes" (small economic construction on high stilts to store food, pelts harvested animals, etc.) in the taiga. Hunting objects were primarily fur-bearing animals (sable, squirrel, ermine, etc.), as well as ungulates — elk, maral (Altai red deer), roe deer, musk deer. Also hunted predators - bears, wolves, lynx. Fishing was very important in the economy. The main fishing objects here were salmon trout, grayling, white salmon, pike, walleye. Only the horses and dogs from all pets in this NMS were originally. When Russians settled in the area, grain farming and cattle-rearing also appeared. The situation of cattle-rearing corresponded entirely to the low level of grain cultivation: there is hardly one cow and one horse to one household. In addition, the truck farming (growing potatoes, vegetable and fruit crops) became widespread.

3. Traditional nature management system of agricultural-cattle-breeding-forest-trading type peculiar to compact residence territory of Russian Old Believers who settled at the end of the beginning of the XVII-XIX centuries in Uimon and Abay intermountain hollow, the Koksa river valley and the upper part of the Katun' river valley. They could connect the typical for Russians and for altaians population

1 religious movement of Orthodox Christianity
traditions of economic activities and established a comprehensive and effective nature management system, which optimal appropriate to natural resource potential of this territory. On flat areas of intermountain hollows and river valleys they grew wheat, rye, buckwheat and other crops. Also, a mandatory attribute of each household was extensive vegetable garden where they grew potatoes, vegetables, fruit and berry plants. Also Russian Old Believers engaged in livestock (cattle, horse breeding, beekeeping, rarely - sheep and goat). Typical economic sector of the Old Believers was maral-breeding for antlers. Great importance was also hunting, fishing and gathering wild plants (cedar nuts, wild berries, herbs).

4. Traditional nature management system of agro-industrial type was formed in hand settlement of Russian Altai, in the northern low-mountains part. In the population of this area is dominated by Russian. The forest industry and agriculture (cultivation of wheat, oats, a rye, hops, stall and pasturable cattle breeding, horse breeding, is more rare sheep breeding) were well developed here by the beginning of the XX century. Crafts, trade, carrying were important [4].

Soviet period. The Soviet period witnessed drastic changes in Altai; particularly, in the nature management organization. They were mainly related to the abolition of private, communal and ancestral land ownership and the beginning of people's settled life, as well as collectivization in the 1930s. In practice, planned economy had both positive and negative aspects. Among the positive ones were fixed purchase prices for collective and state farms produce can be noted, that opened development prospects, as well as boosting opportunities for sizeable enterprises. This contributed to the adoption of modern scientific achievements in nature management practice, growth of material and technical bases, mechanization and rising in labour productivity, in particular. On the other hand, the work in collective farms often deprived the population of personal initiatives and age-old traditional knowledge, since it was the higher authority that made decisions about how, where and what intensity to farm with. Besides, such farms management sometimes lacked efficiency, that led to unjustified colossal expenditures. For example, in the late 1980s Dzhazatoksky collective farm, in order to leave herds in the summer cattle camp instead of bringing them down the valley, delivered mixed feed then by a helicopter in winter. Moreover, the management of all collective and state farms aimed at "overfulfillment of the plan" by many times and the victory in the socialist competition, that particularly meant an increase in livestock population or excess of the allowable cut during logging etc. It promised various awards, but at the same time, led to the landscape degradation.

There have been important changes in the structure and territorial organization of the nature management. Mining (extraction of mercury, iron, tungsten, lime, etc.) was greatly developed. Forestry achieved a new level. In animal husbandry, the herd structure changed. Horse breeding has been a significant decline due to the spread of machines. Since 1950s goats began to play a more and more important role in the herd structure, which finally led to a pasture degradation on vast spaces [5].

Furthermore, there was transition from year-round grazing to farm animal housing in winter. Field husbandry came to be introduced in the land tenure system to produce forages. Irrigation systems were created in the Chuya and Kuray Steppes. Their functioning resulted in soil salinization in a number of places [4].
In addition, the structure of employment of the population of Altai changed dramatically during the Soviet period. If in 1898 nearly 87% of able-bodied population (except officials, clergy of the Russian Orthodox Church, military population, cab drivers and some others) were farm workers, only 62% were farm workers in 1989. It was connected with the employment increase in the social sphere and industry [6, 7].

**Post-Soviet period.** Upon the collapse of the Soviet Union in 1991, the majority of collective farms broke up. Ironically, no large business structures in nature management sphere were formed in the studied area in the competitive business environment. On the contrary, the period was marked by return to traditional forms of managing based on private ownership and public (often tribal) teams in order to manage together. Apparently, the main reason is great expenses caused by the elements of the area and defrayed by the government with its super liberal social system of the Soviet period. Nowadays, the prime cost of livestock products made here is too high to go into big business. Therefore, it was rational for the local people to return to low-cost traditional types and ways of nature management.

The employment structure has considerably changed again during 20 years of the new system of public relations functioning in Altai. Nowadays, it can be defined as "pseudo-post-industrial". Despite the reduction of public enterprises and social organizations, the number of people employed in the services sector increased. It occurred due to appearance of a considerable number of private entrepreneurs mainly doing small businesses (trade, taxi, public catering, etc.). Besides, many industrial enterprises went out of existence, as it was mentioned before, collective farms broke up, which also led to a decrease in the number of industrial and agricultural workers in the general employment structure. Many people working in agriculture (for example, those who graze joint herd together taking turns with their relatives) are not on the list of the employed. They are often officially unemployed.

In addition, unusual types of nature management typical, for example, tourism and recreation areas began to appear in the studied area. Particularly rapid tourist boom observed in most developed northern Altai with a predominance of the Russian population. Numerous tourist complexes created in the Katun' and the Biya river valleys and on the north shore of the Teletskoye Lake. Altai has developed into one of the main tourist regions of Russia. It created two of the seven Russian special economic zones for tourism and recreation at the federal level ("Altai Valley" and "Turquoise Katun'"). Annual tourist arrivals from 2001 to 2013 increased more than 10 times [8]. Construction of a direct road to China may increase the flow of tourists in a few more times. Development of tourism economy stimulates and related industries – transport, catering, food and souvenir industry, etc.

**Modern transformations factors of traditional nature management systems in Altai.** Analysing the cause-and-effect relations in the nature management systems transformation of the Altai's population, we clearly distinguish two groups of factors which are main catalysts of this process. The first group are environment change processes altering the natural conditions of managing and requiring adaptation of the population. The second group of factors unites various aspects of social and economic changes dealing with the Altai's nature management systems directly or indirectly.

At the present time, the main trend of the Altai environment change is climate warming that results in the landscape structure transformation of the area. Some areas (especially
(South-Eastern Altai) are characterized by current aridization of lands. It leads to production loss and decrease in stability of man impact. At the same time, decrease in snow cover thickness determines the possibility of a year-round snow grazing. Correspondingly, there is a gradual haylands conversion into grazing lands in the available part of the studied area. The wild animals loss during winter also decreases as it improves hunting conditions.

Other climate warming consequences are the increase of the upper and the lower zones of forest and intensive deglaciation. All these lead to territorial and structural changes in nature management of local population. Thus, some low ridges gradually began to look like Alpine and subalpine meadows (where cattle was driven to during summer) as a result of forest vegetation expansion. Intensive deglaciation leads to a temporary increase in water content of some rivers and to decrease of others. Degradation of tundra provokes development of numerous, mechanically "turning on" natural processes which consequences are difficult to predict (from formation of thermokarst basins to ice crust formation in winter). Environmental instability caused by global climate changes increases the number of natural disasters – fires, floods, mudflows, landslides, etc. The settlements system changes as well [9].

In social and economic factors of nature management systems transformation in Altai there are several basic aspects: 1) the government regulation of the economic activity; 2) the changing of the economic, geographical and geopolitical position of the region; 3) the changing of the market conditions; 4) the changing of the traditional consciousness of local population.

Basic transformations in nature management in Altai caused by the public opinion were those connected with the Post-Soviet legislative changes (return to the concept of private enterprise, in particular) and, especially, the land reform defining the right of land use on a leasehold or private ownership basis. Besides, land shares distribution among former employees of collective farms was of great importance. Nowadays, owners of these land shares joint in public teams and graze their own herds on these lands.

The change of economic, geographical and geopolitical position of Altai is first of all connected with the improvement of its transport accessibility, that allows to sell local produce to quite remote markets, and use its territory and resources for services making (for example, touristic and recreational ones) to the population of other regions and countries. The geopolitical value of the Altai Mountains is also changing as a result of Russia's international interaction with the neighboring countries of China, Mongolia, Kazakhstan. The interaction vectors make Altai an important region for cross-border cooperation and a boundary outpost at the country's frontiers.

In market economy conditions, the change in demand for certain products often brings about change in nature management systems, too, bringing them a new and more favorable specialization. Fur trade, goat breeding, bee keeping and other types of nature management of the Altai population greatly depend on the market demand.

The shift of the traditional consciousness of the local population is caused by social and economic integration and globalization, as well as distribution of the so-called "mass" anthropogenic and consumer culture leading to degradation and sometimes dying out of the spiritual and ecological original culture of an ethnus. People no longer accept moral and ethical norms and principles of their ethnus (including nature management).
although they can still identify themselves with it. When there is neither guidelines regulating managing, nor inner aim to maintain the environment quality for the future generations, the traditional character of nature management is no longer a question. The consequences of new technologies and consumerism expansion are not unimportant which encourages the further purchase of goods and services in population. However, an increase in population needs employing traditional nature management leads to most serious ecological consequences, since preservation of the management forms (for example, distant-pasture cattle tending) results in its intensification (livestock size), which in turn leads to a drastic increase of landscape load and rapid degradation and transformation of natural complexes. It is fair to say that traditional nature management is only possible having traditional needs.

CONCLUSIONS

To sum it all, the following main conclusions can be highlighted:

1. Altai traditional nature management systems evolved over centuries and proved to be the most adapted to the local environmental conditions. This experience should serve as a basis for sustainable region development.

2. The main transformation factors of nature management traditional systems: a) climate change, having different manifestations in the parts of Altai (the South-Eastern and Central Altai – the aridity, and in the North-Western part – humidcola) and the natural landscapes structure transformation; b) changing economic-geographical and geopolitical position (e.g., through the construction of a gas pipeline to China and creation a major tourist-recreational zones); c) market conditions (changes in demand for produce of local farms products cause them to change their specialization and management methods), globalization processes that determine the changes in social and psychological stereotypes and the diffusion acceleration of innovations.

3. The main transformation tendencies (and the they results) of traditional nature management systems of Altai Mountains are included there are spatiotemporal farming shifts caused by climatic changes (the structure of farming areas, location of summer and winter pastures, as well as seasonal nature management organization are in transition); the farming specialization is changing as a reaction to the change of market conditions (some traditional types of nature management disappear whereas new types appear, for example, tourist services, amberat gathering, etc.); a consumer attitude to nature develops as connected with the intensity of man impact on the environment and causes dying out of traditional principles of ecological regulation and consumption of resources.

4. New approaches are necessary for the adaptation of traditional nature management to climate change.

5. International logistics and tourism should contribute to finding a compromise between the extensiveness of the traditional economy and market efficiency.
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