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To cite this article: T Artamonova *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **395** 012118

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Introducing innovative farming methods in the adjacent territories of Russia and Kazakhstan

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Abstract. Attitude to nature is the basic value of the peoples of Eurasia. This is especially clearly manifested in the example of land use. The development of virgin lands in the adjacent territories of Russia and Kazakhstan led to the solution of the food problem, but with social and environmental consequences. Violation of the traditional integrity of human and natural being lies at their core. The authors argue that it is possible to restore the proportionality of their coexistence, including through the introduction of innovative farming methods as the basis for sustainable development of agricultural territories.

1. Introduction

The unity of peoples in Eurasia rests on the commonality of their socio-cultural constants. Contemporary theorists of Eurasianism distinguish the attitude to nature as a basic value among other things. “Nature is the true constant of culture, it recognizes the existence of a spiritual principle and the possibility of a direct impact on a person” [1, p. 154]. Such an attitude to the natural beginning was reflected not only in the mythology, rituals and legends of antiquity, but also in the socio-economic structure of various ethnic groups of Eurasia. This was manifested particularly vividly by the use of land resources. It is well known that the sedentary peoples developed a cult of land, but the nomads of Eurasia also had to build harmonious interdependence in the “man-pasture” relationship in order to survive the harsh conditions of the steppe. For centuries, the nomadic economy has developed environmental standards of existence [2]. Respect for the land has always been determined not only by the need for physical, but also spiritual and moral survival of human. And today, the state of the land is an indicator of balanced environmental management and the basis of the socio-economic development of territories.

The balance of natural and human beginnings was disturbed with the beginning of the industrial development. The peak of this activity in the adjacent territories of Russia and Kazakhstan fell on the period of developing virgin lands. As known, the USSR government adopted a resolution in 1954 on the development of virgin and fallow lands in various regions of the country, in order to solve the acute grain problem in the country. A total of 2.9 million hectares of virgin lands were plowed in Altai Region, 25.5 million hectares in Kazakhstan. In an effort to fulfill their plans, the regional authorities



plowed up the lands that were unsuitable for farming (sand, salt licks, soils with low humus, water protection areas). Having solved the food problem, at that time, the country's leadership could not foresee all possible social and environmental consequences, among which we can single out the destruction of the traditional integrity of the human and natural being. The restoration of proportionality of their coexistence today is possible, including through the introduction of innovative farming methods as the basis for the sustainable development of agricultural territories. The experience of developing virgin and fallow lands clearly showed the need to take into account the environmental factor when making economic decisions, forecasting long-term consequences for nature and society. Ignoring environmental aspects leads to economic and social crises.

2. Materials and Methods

When writing this article, we relied on the following methods: comparative analysis, as well as historical retrospective, descriptive, and analytical methods.

3. Results

Currently, in the agro-industrial complex of Siberia and Northern Kazakhstan, trends in land degradation and disturbances in the socio-ecological balance persist. A big problem for the regions is the increase in unused (waste) lands. In the Russian Federation, about 45 million hectares of arable land are considered abandoned, and it is 14 million hectares in the Republic of Kazakhstan [3, p. 26]. The continuing trend threatens to reduce agricultural production and depopulation of rural areas and consequently leads to problems with ensuring food security. Searching for new strategies for the restoration of land resources remains an urgent problem for the transboundary territories under consideration, which is due to the similarity of climatic conditions, historical genesis of these problems, and the experience of jointly solving them.

Already in the late 1950s, negative environmental consequences caused by the development of virgin land resources fully manifested themselves. For example, in the Altai Territory, only 1.2-1.4% of the 2.5-3.5% humus remained in the chestnut soils of Kulunda for about fifty years [4]. When plowing the land, the specificity of dry-steppe farming was completely ignored, the methods of land cultivation were mechanically transferred from the country's central regions. Terrible soil erosion in the 60s and dust storms that caused enormous environmental damage to nature were the result of this. In particular, as a result of wind erosion in the areas of the Kulunda steppe in 1963-1965, about 500 thousand hectares of arable land were taken out of processing, amounting to 658 thousand hectares of arable land in total [4]. In Northern Kazakhstan, 9 million hectares were taken out of economic circulation due to irrational land development by 1960 [5].

In the late 1950s, the regions began developing a number of protective systems. One of the first measures to protect the soil was the planting of forest shelter belts. As practice has shown, these measures have been effective only in conjunction with other protective measures. In 1960-70, the development of water and wind erosion was able to stop together with Kazakhstani scientists. Unfortunately, the problem could not be completely solved. As already indicated, at present, large tracts of land remain abandoned in both Russia and Kazakhstan. The effectiveness of their involvement in agricultural turnover remains a debatable moment.

Modern methods of scientific research, including the use of satellite imagery, provide more accurate scientific data. Thus, a group of scientists from Germany, Denmark, USA, Kazakhstan conducted a comprehensive assessment of changes in agricultural land use in the northern part of the Republic of Kazakhstan. As a result of large-scale research, scientists have concluded that only one-third of the 14 million hectares of abandoned land makes sense to engage in grain production. First of all, this is due to the low agro-climatic characteristics of such lands and the need to leave the rest of the land for cattle grazing, which is traditional for the region. Similar results were obtained by scientists on Russian abandoned lands. The main conclusion of the scientists was as follows: "It is necessary to concentrate on increasing the yield on the already cultivated lands and leave unproductive alone" [3].

Thus, an increase in soil fertility is a common problem in the contiguous territories of Russia and Kazakhstan under consideration. Currently, one of the most promising, but debatable methods of agrotechnology is organic farming. As practice shows, soil fertility increases with the introduction of organic farming methods.

Today, a group of scientists from Kazakhstan are actively studying organic farming methods, since Kazakhstan has a great potential for this. Since the area of arable land, on which mineral fertilizers are applied, is only 14%, and the area of arable land treated with herbicides is 31%. It is equally important that Kazakhstan imposed an official ban on the cultivation of genetically modified crops. The main coordinator of the Center for Traditional Knowledge Dissemination Talgat Absattar believes that there are several stages in the development of agriculture. In the 21st century, the model of organic farming replaces intensive agriculture. Organic farming is better, safer, and more sustainable [6]. Also, a return to organic farming allows one to restore the traditional attitude of the Eurasian people to the land as a basic value.

Responsibility to the land determines the specifics of agriculture; therefore, precision agriculture comes to replace the classical extensive agriculture. It includes a system of auto-driving machine and tractor units, differentiation of seeding rates and fertilizer doses, using plant protection products, yield mapping [7]. This direction has been successfully implemented in a number of farms in the Kuryinsky, Kosikhinsky, Kytmanovsky, Mamontovsky, and Rebrikhinsky districts of the Altai Region, as well as in the steppe regions of Kazakhstan, with the support of the Scientific Production Center named after A. I. Barayev [8]. The training class of precision agriculture was opened in the Altai State Agricultural University. It is equipped with modern equipment, which allows future specialists to master the subtleties of technology.

Consequences of the irrational use of land resources are also among the reasons for the outflow of rural population, which may threaten the depopulation of rural areas, leading to a decrease in the level of development of agricultural resources. This is a common problem of the cross-border territory of Russia. In 2001-2013, the entire Kazakhstan frontier (Omsk, Novosibirsk, and Altai Regions) lost population due to rural migration. Rural population decreased there by 14.5%, while the urban population decreased by 0.3%. [9, p. 22]. The Altai Region lost the most of its rural population. So, the share of the rural population of the Altai Territory decreased by 20% over the last 26 years. In numerical terms, it is from 2130 thousand people in 1989 to 995 thousand people in 2015 [10, p. 77]. Despite some different trends, in general, there was an increase in the rural population in Kazakhstan. But still, in some areas of North Kazakhstan, West Kazakhstan, Pavlodar and Akmola regions, the number of villagers decreased from 11 to 20 percent.

Also, changes in the social sphere are reflected in the value-ideological attitudes of the population of the adjacent territories of Russia and Kazakhstan. The transformation of sociocultural constants is reflected in the results of a sociological study of the life values of the Kazakh and Russian population of the East Kazakhstan region. The study was conducted by the employees of the Department of Ethnosocial Studies of the Institute of Philosophy and Law of the SB RAS (Yu. V. Popkov was the Head of Complex Research). So, in order of importance, such an indicator as “the value of living in rural areas” occupies one of the last places (22% in Kazakhstan, 17.1% in Russia). Thus, traditionally agrarian territories are no longer attractive for the majority of the population of the region. At the same time, “preservation of land, nature, resources” is among the top ten priorities and ranks 4th in importance both among the Kazakhs and Russians (Kazakhs – 74.5%, Russians – 77.8%) [11, p. 237-244]. This indicates that the value of nature remains an important dominant worldview, but it does not find its realization in the field of agriculture.

4. Discussion

Scientists at the Eurasian National University named after L. N. Gumilyov (Astana) and the Kazakh National Agrarian University (Almaty) of the Republic of Kazakhstan, when developing methods for integrated environmental assessment of landscape productivity, argue that it should be based on the fundamental laws of wildlife, including private assessments of soil and vegetation productivity. Based

on these principled positions, they determined the biological productivity of the natural system of Northern Kazakhstan [12, 13]. The transition to more economical resource-saving systems for autumn processing is a logical stage in the overall development of the technological process, which has become possible due to the emergence and development of new concepts in the field of tillage. Altai scientists came to the conclusion that with extensive agriculture, productivity depends on soil fertility and weather conditions by 50-60%, and it is with intensive agriculture by 30-35% [14].

The question of international cooperation in solving this problem was discussed at the International Congress of the Eurasian Federation of Soil Science Society “The Soil Resources and Environment Conservation”, held in October 2018 in Almaty. The congress was organized by the Eurasian Federation of Soil Scientists Societies, the Kazakhstan Society of Soil Scientists and the Kazakh Research Institute of Soil Science and Agrochemistry named after U. U. Usmanov. Scientists from 27 countries from leading universities, research institutes, and the Eurasian Soil Partnership Assembly (ESPA) urged governments to give priority to solving the problems of soil degradation and desertification, to expand cooperation between the International Society of Soil Science and the Global Soil Partnership in the field of rational use of land and water resources. Scientists noted that at present, the scientific search for innovative solutions to fundamental, applied, methodological directions in soil science and environmental protection are priorities throughout the world [15]. Despite the controversial positions, it is obvious to scientists in Russia and Kazakhstan that contemporary farming systems must become highly adaptable, meet environmental requirements, creating conditions for the development of balanced land use and increasing soil fertility.

5. Conclusion

In conclusion, we can conclude that the development and introduction of innovative farming methods is important not only for solving agro-ecological and food problems, but also for preserving traditional values. For centuries, people living in the adjacent territories of Russia and Kazakhstan have developed traditions of commensurate coexistence. Today, within the framework of sustainable development, the most important task is to return to these principles on the basis of modern science-based technologies that contribute to an increase in yields on already cultivated lands.

The crisis of modern civilization has shown that only those peoples who preserve the vital forces of nature and their spiritual unity with it, will restore and improve traditions of sustainable management, have a chance to survive and develop organically in the future.

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