On new approaches to the development of organic agriculture in the arid landscapes of Inner Asia

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Abstract. The world population increased to 6 billion from 1.65 billion, during the 20th century. Therefore, providing high-quality provisions in parallel with such rapid growth has become a critical issue for decision-makers and authorities. Organic agriculture in Inner Asia has been considered an efficient way out of this situation. Followings are some advantages of the farming in Inner Asia that made the region a special area for agricultural goals: (1) remoteness from major industrial centers; (2) historical culture of adaptive animal husbandry and agriculture with minimal application of chemical fertilizers; (3) close location to the rapidly developing Asian region with its growing requirement for high-quality products; (4) providing Halal products that are so important in Muslim countries. Moreover, the agricultural boom not only can help to produce high-quality products but also may help for the development of the territory and preserving the traditions and culture of the area. Promotion of agro-tourism, environmental education, and tourism education to local people can be other advantages of agriculture expansion in the region. In this work, the data of statistical collections, comparative analysis, results of field expeditions, and analysis of legislative acts were used. A number of illustrative examples are given, which are already taking place in Mongolia in particular.

1. Introduction

The intensification of agriculture injunction with productivity growth leads to degradation of soil cover, soil fertility troubles, and deterioration of the products quality. Recent advancements in agriculture is carried out by increasing the human impact on the environment, the introduction of chemical fertilizers, and plant’s protection from different types of diseases. Nowadays, genetically modified (GM) crops and feeds are cultivated on millions of hectares of lands worldwide; however, the challenges and issues of the using GM plants and feed is taking on a huge scale [1], especially with the increase of the Earth's population. Every year, the problem of ensuring their food security by states becomes more and more urgent. Furthermore, the demand for high-quality food is growing with rising incomes in developing countries. Within the framework of sustainable development concept, the primary condition is the minimum impact on the environment and the renewable resources used. This course of sustainable development is called "green" economy, the process of transition to which is quite complex and requires detailed analysis. The main basis of this concept is considered to be the program, which was adopted by the United Nations Environment Programme (UNEP) in 2008 [2].
The development of organic agriculture and the transition to a green economy are labor-intensive, complex, and require an integrated approach. Although, the problem of organic agriculture development is solved at the state level [3], its effectiveness is most often determined by the integration of the efforts of many states, including the use of model polygons. The present paper is an attempt to investigate the new approaches for developing organic agriculture in the arid landscape of inner Asia where there are no chemical industries, and the indigenous population traditionally uses natural forage lands and pastures in agriculture [4].

2. Models and methods
The theoretical and methodological basis of the present study were the national and international works. So the question of the interaction of economy and ecology was considered international scientists as L. Brown, G Daly et al., E. Zarchin, V. N. Karakin [4] under the principle of adaptive environmental management include the return to past systems for sustainable use of resources. The data used in this study were obtained from different sources; statistical data, comparative analysis, field expeditions, and analysis of legislative acts.

3. Results and discussion
In recent decades, the part of food produced on the principles of a "green" economy has been increasing. More and more crops without the use of chemical fertilizers and other artificial regulators to improve the efficiency of crop and livestock products have been growing in world agriculture. Since 1999, the area of land allocated for organic agriculture has more than 6 times [5]. In contrast to the mass food products obtained in large industrial agricultural holdings, organic food has a higher cost, which is compensated by the quality of natural goods.

This specificity of the new branch of the agricultural economy determines the need to comply with certain conditions that must comply with international standards. It should be noted that organic food is not synonymous with the concept of environmentally friendly food, which can only exist in theory.

Agricultural landscapes in which high-quality products of agriculture or animal husbandry are produced should be located as far away as possible from industrial centers that can pollute air and water environment. Another condition for the production of eco-products is the creation of the most natural conditions for the habitat of livestock and primarily the use of natural pastures. From this point of view, Inner Asia can be the most consistent landscapes for this purpose. There is no influence of chemical and other industrial waste in the Inner Asia where the most productive pastures and arable lands of the Selenga river basin, the basins of Large lakes, the Altai-Sayan highlands. On the other hand, protecting the unique ecosystem of the Baikal Lake that is a part of world natural heritage, in most area of the Baikal region, the use of chemicals in agriculture has been prohibited by law for many decades [6].

It should be noted that the Mongolian-speaking peoples of the vast steppe have a long tradition of nomadic animal husbandry with the use of domestic animals maximally adapted to the harsh local conditions [7]. At the same time, arid plant ecosystems have a specific composition of microelements in the grass cover, giving livestock products unique qualities that are highly appreciated in the world market. [8] Equally important, this region has direct access to the countries of the Asia-Pacific region where new global financial centers are being formed, and the number of high-income and high-standard of the living are growing, which consumes more and more organic agriculture products.

Against the background of natural possibilities of organic food production in recent years, the Baikal Institute of nature management of the Siberian branch of the RAS actively promotes the idea of using the national "Baikal" brand of quality products in the food market. This pioneering product is the production of bottled Baikal water, conforming to international quality standards. The only obstacle to wide access to the world market of this product is the legal restriction in most developed countries of drinking water consumption from open sources. However, the coming global water crisis soon will open prospects for broader use of Baikal water, and primarily in densely populated Asian countries.
In addition, the proximity of the external export market allows the region to produce specific "Halal" products, which are focused on the countries of South-East Asia with a predominantly Muslim population. As a rule, Muslim regions of Asia and Africa, including the Russian Caucasus, have a high population density and little opportunities for grazing. Therefore, this market has great prospects.

The pioneer in this regard is Mongolia, which since 2017 annually ships trucks to 4 thousand tons of Halal meat products to Iran. At the same time, such export goods must comply with all the canons of religious products, slaughter rites and be controlled by special experts from the recipient country.

Unfortunately, recommendations for the production of organic products with religious specificity did not get enough attention from the Russian Economy. Thus, we can only support the initiative of Mongolian producers who have already taken practical steps to implement this idea, including the adoption of the national quality standard for "Halal" products (figure 1).

![Certificate of Halal Production](image1.png)

**Figure 1.** Certificate of Halal Production.

![Example of traditional dish “Horhog”](image2.png)

**Figure 2.** Example of traditional dish “Horhog”

Even more promising is the development of a new type of canned meat products "horhog" in Mongolia it offers a traditional national dish of the Mongols, which is cooked together with lamb in a special way on the fire uses a variety of plant ingredients (figure 2). As a rule, this dish is served only at the reception of distinguished guests and is prepared mainly in the field. In this case, the canned product combines the ability to demonstrate national dishes at home with the same "Halal" products and allows you to export goods that have no analogs in the world market.

High-quality meat products based on pastoral animal husbandry allow to produce here and "kosher" food using the entire set of natural foods in the natural landscapes of the region. With appropriate certification, the strict laws of "kashrut" can comply with beef and lamb, as well as high-quality fish products endemic species of the Baikal Lake. We can assume that in the near future the market of "Halal" and "kosher" products will actively develop and its leaders will have an absolute advantage.

Such factors give a special specificity to the concept of such products of organic origin, which combines the presentation of the quality comparable to the uniqueness of the "Baikal" brand, the national specificity of the culture of Buddhism and the traditions of Eastern cooking [10].

It should be noted that the international standard of organic food and especially the concept of "kosher" or "Halal" products has a strict system of certification and quality control of the original
product. In European countries, the consumer has the right at any time to visit the fields and farms where meat, milk, vegetables or fruits are supplied and make sure that the animals are healthy.

The production of organic food is often combined with the tasks of environmental education of the population. In the era of industrialization and the development of the digital economy, urban schoolchildren are increasingly moving away from understanding the basics of applied Economics. Therefore, in developed European countries, weekend tours are intensively developed where children can get acquainted with the basics of agriculture, the quality of natural meat and milk in nature. In Russia, the concept of rural tourism that represents the prospects of creating new jobs in rural areas is introduced by law.

In recent years, the production of medicinal plants used in Eastern medicine has become increasingly important in the Baikal region and Mongolia. Most of those are endemic plants and belong to the category of "red book" species, and therefore their harvesting needs special control. To produce organic food in the steppe landscapes of Inner Asia, such production is combined with ethnocultural tourism, where the consumer checks not only the quality of the goods but also gets acquainted with the nature, life and special culture of the nomadic peoples inhabiting the center of the Asian continent.

4. Conclusion
In the context of increasing international competition in the world agricultural market, there is a need to diversify agricultural products in accordance with new requirements. First, the emergence of a large number of people with a high standard of living determines the increase in demands for the quality of food and, first of all, its safety and increased taste.

Such requirements are met by food products obtained in conditions as close as possible to natural conditions, without the use of chemicals and GM plants.

The agricultural economy of Mongolia is actively developing the production of food products of religious direction, focused on countries with Muslim populations.

In addition to economic prospects, the development of the organic agriculture industry creates the basis for new tourism industry as agricultural tourism, where much attention is paid to educating children about the basics of agricultural production.

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