Natural, economic conditions, scientific and technical potential for the development of organic agriculture in Kyrgyzstan

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Summary . This paper provides a brief overview of the existing natural and economic preconditions, the scientific potential for the development of organic farming in ecologically clean areas and regions of the Kyrgyz Republic.

Background. The main agricultural activities in the Kyrgyz Republic are the production of cereal grains, vegetables, potato and commercial crops such as cotton, tobacco, sugar beet and livestock. The sustainability of the agriculture sector was severely affected by the large scale mono-cropping approach of the Soviet era. Intensive agriculture has caused environment pollution due to the excessive use of mineral fertilizers and pesticides.

In recent years, Kyrgyzstan has made substantial progress in implementing land and agrarian reforms. In 2010, more than 90 percent of the production of agricultural products came from the private sector. There are more than 286,000 peasant farms, organized in 700 different organizations, including 462 cooperatives. The market mechanisms of land use and the land registration systems have now facilitated, with constitutional support, the introduction of private land ownership.

Small peasant farms are the main producers of agricultural products. Agribusiness management practices have also improved.

Food security, as one of the main priorities of the state, can be achieved with sufficient production. Since 2004 in Kyrgyzstan the agri-products produced in an ecological way and in excellent climatic conditions start increasing. Due to the fact that Kyrgyzstan farmers generally use very low quantities of chemical inputs, Kyrgyzstan has great potential for "Organic Farming". Beside, there are large ecologically clean areas, which can be converted to organic farming in a relatively short transition period. So, Kyrgyzstan as a niche is the most suitable area for the cultivation of ecologically clean and tasty products, obtain a stable yields.

For the successful implementation of organic production, the farmers must use the practices and techniques that are specific to organic farming. It is the creation of conditions for the functioning of the soil biota, especially microorganisms that destroy organic compounds and releasing elements of plant nutrition. For weed and pest control are applied biological methods: introducing natural enemies and specific pathogens. Apply rotations, compiled with the cycle of the pest, soil treatment, leading to the destruction of weeds or deep placement of the seeds. The successful application of these methods in the end leads to the maintenance and enhancement of biological diversity drives the balanced biological cycles and soil biological activity.

Main chapter

Farmers are the driving forces in Kyrgyzstan, acting on the development of organic agriculture.

Organic farming is oriented on farmers. Some farmers believe that traditional farming methods are unproductive and harmful, and they are developing their own alternative methods to improve the health of the family, the economic viability of the farm and / or maintain confidence in their own abilities. For example, many farmers from Jalal Abad region grow cotton using the organic farming practices. However, they have a vested interest to increase the acreage under organic cultivation and by others, such as vegetables.

Organic farming is oriented on services. At the initial stage of the development of organic agriculture in Kyrgyzstan it is need in state financial support, especially in the transition period, when the produced products have not yet received the status of an organic product.
While the state has no financial sources to support farmers engaged in organic farming directly. However, in recent years in country special banks were founded giving the credits at special rates refund to all farmers engaged in agriculture. This possibility may use the farmers who grow organic crops. The consciousness of farmers is constantly changing every year toward better understanding to grow a healthy crop. The consumer has its own influence on organic production; organic farming focuses on the consumer and the market. Products are clearly identified as organic are subject to relevant certification and labeling. There is a category of people, especially in large cities of Kyrgyzstan, which have indicated the motivation to consume organic products and they are willing to pay a higher price for them. This group of consumers creates an initial niche for organic products in Kyrgyzstan, thus, for forming the inner market of such products. Products must be clearly identified as organic, undergoing relevant certification and labeling.

The prerequisites for the development of organic production in Kyrgyzstan.

Kyrgyzstan is a unique country with a rich natural and agro-biodiversity. On the whole the ecosystems in Kyrgyzstan less subjected to the influence of anthropogenic factors. Due to the economic crisis in recent years the use of fertilizers, pesticides and other chemicals has decreased, thus halt the loss of natural soil fertility.

There are many farms in Jajal- Abad and Talas regions have used such land-use practices as planting turnover, inter-cropping, symbiotic species, and cultivation of cover crops, organic fertilizers and minimum tillage. These practices contribute to the development of soil flora and fauna; improve the composition and structure of the soil, creating a more stable ecosystem in these farms. The Kyrgyzstan is a zone until free from Genetically Modified Organisms. The use of GMOs in organic farms is strictly prohibited at all stages of production, processing and sales of organic food products.

An appropriateness of the development of organic agriculture in Kyrgyzstan.

There is a need for restoring soil fertility and conservation of the environment, rural development and the standard life style of the rural population. The last 10 years a catastrophic degradation has occurred in the country, due to lack of knowledge and practice to conduct farming and to grow plants without agronomic approaches by owners. According to the Republican Soil Agrochemical station, only 0.2% of Kyrgyz farmers hand over on the soil analysis in the laboratory. As seen the farmers need the knowledge and tools to improve the quality of used land.

Also to improve the efficiency and profitability of agricultural production, ensuring the consumer market with safe, healthy, high-quality products, enhance the export potential of the state. There is need to improve the image of Kyrgyzstan as a manufacturer and exporter of high quality healthy organic products and to ensure a food security in Kyrgyzstan, to improve of the general welfare of the citizens of the country.

Scientific and practical potential for the development of organic farming (OA).

Last years a variety of organizations and services have been created in country financed by international donors (Helvetes , BioServis, GIZ, Biofarmer, Agricultural Service, AgroLid) They directly provide advice to farmers in the field, how to cultivate the land, how to protect plants from disease pests. There are "AgroLid "and "Agricultural Service" are the most active in these activities. They go to all areas of Kyrgyzstan, in particularly to organic farming lands to conduct the practical seminars and training courses inviting the scientists and well experienced practitioners. Through these services, farmers have started to take the soil samples of their fields for analyzes in laboratories. In addition, local authorities began to ask the laboratories to help to farmers to ascertain the condition of their land's soil. For example, during 2013 Phytopathology Laboratory of the Kyrgyz- Turkish University has analyzed the soil samples from many villages of Jeti-Oguz district (Issul-Kul region); in 2014 from the villages of Chui and Talas regions which are involved in organic farming. Farmers of indicated regions were awarded phytopathological certificates of soil contamination by fungal and bacterial diseases, nematodes and weeds; also they received concrete recommendations on how to improve soil conditions.

So, in Kyrgyzstan, there are certain scientific and practical potential that could be used extensively for the development of organic farming:

• Scientific research in the field of bio protection and plant biotechnology and modern technical base (Agricultural Faculty of the Kyrgyz- Turkish University) for the successful introduction of the OA .

• Biological agents for OA are produced in Kyrgyzstan (Agro Bio Center of KR).

• Scientific research of Kyrgyzstan to create a bio-fertilizers and recommendations for the improvement of soil for the successful introduction of the OA (National Academy of Sciences)

• International and local organizations that contribute to the formation and development of organic agriculture in Kyrgyzstan (Helvetes , BioServis, GIZ, Biofarmer, Agricultural Service, Agrolid etc.)

Specially Kyrgyz- Turkish Manas University is offering to farmers : phytopathology examination: diagnosis of diseases of cereals, vegetables, industrial crops and fruit crops.

Entomological expertise: the identification of pests of grain, vegetables, industrial crops and fruit crops. Garbology examination: the examination of seed samples of weed seeds, determining the species composition of weeds. Phytopathology examination of seeds. PCR analysis of samples of soil, plants and seed for the presence of GMOs and pathogens, advice on protection with /

crops or measures to protect from the harmful organisms and sale of biological products for use in organic agriculture to protect plants from diseases and pests , increase their resilience to adverse environmental factors and produce a healthy crop without chemicals; improving a classification of plant protection workers and technicians, holding them short –term training courses.

What are the barriers to the development of OA in Kyrgyzstan?

In Kyrgyzstan, there is still no legitimate legal framework with regard to organic agriculture: there are no existing state criteria for the separation of organic food from inorganic. It requires a preparation of the draft law on organic production and the introduction of legal regulations concerning organic agriculture in Kyrgyzstan. No accredited organizations on certification of organic products. There is a lack of government support during the transition to organic production. The need to change attitudes, lack of ecological thinking and education, innovative passive management structures, high level of poverty.

To enter a contribution to the resolution of the above the obstacles Plant Protection Department of Kyrgyz- Turkish Manas University according to own activity has implemented 2 projects related **t**o promote understanding and appreciation of biodiversity and to provide independent advice on biodiversity stewardship to governments, the private sector, and the public. The main purpose of projectS was to ground how proper use a complex crop rotations as a tool of organic production. We have promoted understanding that a crop rotation serves to manage weeds, soil nutrients, and soil and hence plant health, promote water infiltration and storage, discourage pest proliferation, and build soil. In our project we have built a local capacity for training farmers and rural residents who are interested in enhancing biodiversity in their farms and in producing healthy and safe crops without chemicals.

We have conducted a research and surveillance in these farms on entomological, zoological and phytopathological levels to identify and quantify biodiversity of natural enemies of pests and diseases during the growing season. We have organized regular excursions to experimented areas to show farmers the results of healthy crops and biodiversity of landscapes.

Finally, realizing that Organic will predominate in the future because of rising energy costs for 'fixing symptoms' created by ecologically dysfunctional production systems will demand more ecologically sound approaches. Thus, ecologically sound management will be advantaged when input costs become prohibitive, and when society rejects the costs externalized by contemporary farming.

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In section " Building bridges between traditional systems and future"