Investments and innovations in sustainable management of green economy in the Kyrgyz Republic (agricultural aspects)

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Abstract. Climate change, exacerbating water management and environmental problems, threatening public health, food safety and economic and social development, is a global concern. The adoption of green economy approach can provide the Kyrgyz Republic with a framework for strengthening the in-country and inter-regional cooperation. Faced with the climate change realities and the clear evidence of the fact that continued "brown economy" will only lead to further environmental degradation and ultimately threaten not only the economic growth but also the overall survival of the humanity, the public at large is becoming aware of the urgency and relevance of responding to these challenges. A growing number of influential opinions state that the "business-as-usual" approach cannot be practiced as before and some new ways must be found to drive the economic growth and development at the national, regional and global level. Against this background, the green economy approach is gaining traction in the Kyrgyz Republic, being considered as a very important contribution to the search for new ways to achieve sustainable growth viewed as the growth that meets the requirements of environmental sustainability and social justice.

1 Introduction

Sustainable development supposes integrated concurrence of three pillars: economic, social and ecological. The green economy concept that has taken shape within the past 20 years aims to secure more harmonious alignment between these components that would be acceptable to all groups of countries – developed, developing and transition economy states.

The green economy concept is gaining increasing public attention. It is actively discussed by experts, politicians and non-governmental organisations.

The green economy concept incorporates the ideas of many other directions of economic science and philosophy (feminist economics, postmodernism, ecological economics, environmental economics, anti-globalisation, theory of international relations, etc.) involving sustainable development issues. The proponents of the green economy

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concept believe that the currently prevailing economic system is imperfect. Although it has yielded some results in improving the living standards of people in general and especially of individual groups, the negative consequences of this system are significant: they include environmental problems (climate change, desertification, loss of biodiversity), depletion of natural capital, widespread poverty, shortage of fresh water, food, energy, inequality of people and countries. All of this poses a threat to present and future generations. The current economic model is referred to as "brown economy" [1].

Human survival and development requires transition to green economy – that is, a system of economic activities involving production, distribution and consumption of goods and services that result in improved human well-being in the long term, while not exposing future generations to significant environmental risks or ecological deficit.

The green economy concept is based on the relationship between the society and natural environment. The United Nations Environment Programme (UNEP) defines green economy as a tool that leads to improved human well-being and social equity and significantly reduces adverse environmental impact and ecological degradation risks. In simple terms, green economy represents a low-carbon, resource-efficient and socially inclusive economy. According to the UNEP Green Economy Report, income and employment growth in green economy takes place due to public and private investments making it possible to reduce carbon emission and pollution, to increase energy and resource efficiency and to prevent loss of biodiversity and ecosystem services [2].

Green economy is not only concerned with the growth of capital, renewal of labour resources and enrichment of related information, but also with renewal of land (natural resources) as a factor of production.

For this to happen in the economy, it is necessary:

1) to create due conditions and implement due actions for the earth surface to regenerate: to ensure ecosystem-related resilience of natural systems that sustain our existence;

2) to improve resource efficiency, thereby reducing the environmental impact on economic sectors and individual human activities.

The green economy concept implies:

1) public support and private investment towards spread of knowledge, realisation of initiatives, creation of technologies and industrial methods to reduce carbon emission and overall pollution;

2) creation of new green sectors of economy, green jobs based on green technologies, which implies advanced waste recycling, reduced energy consumption or use of alternative energy. Advanced processing of raw materials leads to lower production costs for green products and higher profits in green industries compared with the traditional ones and makes it possible to establish higher wages. This results in social incentives for labour migration to green sectors of the economy and poverty reduction;

3) increased energy efficiency which leads to reduced need for combustible fuel and lower carbon emission. This is an important condition for self-recovery of natural resources;

4) increased resource efficiency which leads to lower waste generation, lower environmental pollution; ensures sustainability of this economic sector in the long run; preserves due conditions for maintaining biodiversity, organic farming that facilitates access to local natural resources and reduces poverty; secures the development of ecosystem services for people in the countries that have lost them [3].

2 Materials and methods

It is clear today that any country can keep up with the global development only by changing itself, revising old approaches and methods of addressing economic, political, social and ecological problems and forming a modern model for country's sustainable development based on interconnection and interdependence of all these components.

The vision of Kyrgyzstan's future is inextricably linked with the model of balanced sustainable development focused on: 1) improving the quality of people's life through creation of due economic conditions for decent work; 2) effective democratic governance; 3) favourable environment for living and health; 4) protecting civil rights and achieving gender justice; and 5) preserving and augmenting the nation's cultural and moral values [4].

The vision of green economy that has been formed by a number of international experts in the past few years is conceptualised as a new vector for sustainable development designed to secure more harmonious alignment of the three key components of sustainable development (economy, environment and social development) that would be acceptable to all groups of countries – developed, developing and transition economies.

The green economy initiative is based on three main principles: 1) assessment and promotion of natural services at the national and international level; 2) ensuring employment through creation of "green" jobs and development of appropriate policies; 3) using market mechanisms to achieve sustainable development.

Green economy mechanisms can be conceptualised as general provisions and policy measures aimed at accelerating and facilitating the transition to green economy (creating due conditions for application of specific instruments).

It should be noted that globally there are no clear-cut boundaries between mechanisms and instruments. Mechanisms can involve the use of specific instruments.

The mechanisms promoting green economy include:

- due institutional structure and management system (authorities and organisations);
- proper legislation (300 environmental legislation documents, public hearings to be held prior to proposing new legislation, specific legislation involving stakeholders);
- innovation policy (support of green innovations);
- support of small and medium-size enterprises;
- awareness-raising campaigns [5].

Since the green growth concept plays a certain role in the development of green economy, four basic mechanisms of green growth are also distinguished:

1. Analysis of public spending on the environment.
2. Strategic assessment of the state of natural environment in the regions.
3. Recommendations for sustainable development.
4. Green development reporting.

3 Results and discussion

Green economic development appears to be a promising vector for sustainable development of the Kyrgyz Republic in the long term.

The substantiating factors are: 1) the country has a huge natural-resource potential for low-carbon development, mainly due to hydropower potential; 2) the economic priorities of green economy (energy and agriculture), along with water resources, are the main drivers of economic growth in the regions and the country at large; 3) the poverty level of mountain territories (over 50%) and social tension can be reduced by creating "green" jobs [6].

The green economy model of the Kyrgyz Republic is based on four main components (priorities): 1) mountain ecosystems; 2) water resources; 3) hydroelectric engineering; and 4) agriculture [7].

Forests represent an important recreational and aesthetic resource necessary for the development of tourism. Ecological tourism appears to be one of the areas of local economic development and poverty alleviation in mountain communities.

Forests store carbon, thereby reducing the accumulation of greenhouse gases in the atmosphere. The potential of afforestation also appears to be a revenue generating opportunity for local mountain communities.

Mountain pastures (9 million ha or 48% of the country) traditionally form a basis of livestock development in Kyrgyzstan and represent an important source of income for rural residents who make up the majority of the country's population (65%). At the same time, according to different data, the areas of degraded pastures range from 30 to 50%.

The main cause of degradation of mountain ecosystems is unregulated overgrazing. While regulated grazing is a prerequisite for normal reproduction of herbaceous ecosystems, overgrazing leads to their degradation to the point of replacement by unproductive non-renewable wastelands (badlands). At present, the average productivity of pastures has fallen to 40 % of the norm, in near grasslands – to 10-20 %. The structure and breed composition of the herd is not conducive to the rational use of the pastures.

The subsoil of mountain ecosystems contains deposits of various minerals (gold, coal, oil, gas, mercury, antimony and other non-ferrous metals); their mining also makes a significant contribution to the economic development. For instance, gold mining accounts for 11% of the GDP, 40% – in industrial production and 48% – in the country's exports. However, the finite nature of mineral reserves requires the government to calculate the benefits and costs of their extraction over the long term, with regard for their retirement from the country's natural capital balance.

Kyrgyzstan's mountain ecosystems represent a rich potential for low-carbon "green" development (agriculture, hydroelectric engineering) which is currently underutilised and, at the same time, is one of the causes of high level of poverty among the mountain communities [8].

Now that the situation in the country has stabilised and returned to the rule of law, it is high time for Kyrgyzstan to reassert its position on sustainable mining development and create due conditions for increased international confidence in our country in order to attract investors to it.

The anthropogenic, human-induced factors exacerbate the effect of negative natural factors. The direct withdrawal of natural objects – cutting trees and shrubs, collection of medicinal and aesthetically attractive plants, hunting, fishing, grazing and haying – is complemented by indirect effects of environmental pollution and habitat destruction as a result of alienating land for pastures, roads, settlements, mining enterprises, water storage reservoirs, etc. [9].

This results in fragmentation and shrinking of habitats, reduction in the number of species and their reproduction. Many of them are on the brink of extinction. Particularly dangerous is the reduction of forest areas which have halved in the last half-century. At the same time, at least half of the country's species diversity is concentrated in the forests.

The formation of Kyrgyzstan's water runoff became possible due to the existence of glaciers and other natural ecosystems in the country – mountains, steppe, meadows and forests – undisturbed by man; the water is characterised by high natural quality and purity. It is the natural ecosystems and glaciers that provide mobilisation, protection, preservation and purification of Kyrgyzstan's water reserves.

The water resources accumulated by the country's mountain ecosystems are a source for: 1) consumption by the population as drinking and irrigation water; 2) development of the energy sector; 3) development of agriculture; and 4) development of other productive sectors of the Kyrgyz economy [10].

The electricity produced in the Kyrgyz Republic is generated from renewable sources, which makes the country's hydroelectric engineering sector many times more attractive for green investors concerned about preserving the natural capital for future generations.

The electric power grid provides 100% access to electricity for the population, with a 5% share in the country's export structure. The physical and moral deterioration of equipment has reached a level (over 70%) that creates high risks for sustainable functioning of the sector. The number of accidents and failures of energy equipment is excessive, especially during seasonal peak overload. In order to restore the fixed assets of the industry, a mechanism for shifting the taxation of energy enterprises towards target-oriented principles and the introduction of "green taxes" seems to be advisable.

The quality of corporate governance at power engineering enterprises remains poor. The problem of sustainable electricity supply in winter in the northern areas, the period of seasonal overload peaks, remains insufficiently addressed. The absence of internal high-voltage power ring connecting South and North makes the problem quite acute.

The demand for electricity in the Central Asian region, as an issue of special concern, and the potential of Kyrgyzstan's water resources create due conditions for their joint development with the neighbouring Central Asian countries (Uzbekistan, Kazakhstan) through direct investments in large energy projects [11].

The Kyrgyz Republic is an agrarian country with 66% of the population living in rural areas where the poverty level is significantly higher than in urban areas depending on agricultural production. Poverty in the rural areas is particularly high, and the government believes that creating due conditions for rapid growth of production in the agricultural sector can yield very good results in terms of activated employment and poverty reduction in these areas.

However, there is a backlog of problems in agriculture that hinder its development. Kyrgyzstan's level of self-reliance in basic foodstuffs is not sufficient. The area of degraded agricultural land, including arable lands and pastures, is growing. The water resources are not used efficiently, water losses are excessive.

The state support for seed farming and stock breeding, plant health care and veterinary medicine, land reclamation and other services necessary for agricultural production is limited. Field changing and crop rotation are disarranged; the crop structure and farming level need improvement. All of this hinders the growth of crop and livestock productivity [12].

Access to finance remains a significant problem for rural producers despite the governmental support. The problem of collateral security for granted loans limits access to bank credits. Land plots cannot yet serve as collateral since the land market in Kyrgyzstan has not yet been properly established.

The agricultural sector is developing without regard for the principles of environmentally sustainable growth. It has low production potential, low efficiency and low adaptability to the changing climate conditions. At the same time, agriculture (16.1%) is a second source of greenhouse gas emissions after the energy sector (74%). At the same time, agriculture and forestry also play the role of absorber of carbon dioxide coming from the atmosphere.

This sector has been the country's national economic priority. And in terms of poverty reduction, the agricultural sector is a number-one priority since it employs for the most part the poorest people (over 70%) with low qualification and education, who were not able to find a job in other higher-income sectors.

Today, the growing prosperity of the civil society inevitably entails an increasing need for recreation and culture, with the traditional prevalence of ecotourism, recreational hunting, fishing as well as sporting and wellness activities in the natural setting.

The above material makes it possible to conclude that transition to sustainable development necessitates incorporation of the environmental factor in the system of key economic development indicators. The underestimation of the environmental factor in decision-making is largely connected with the failure to include important indicators, such as monetary reflection of natural capital and environmental degradation, in the range of traditional development factors.

4 Conclusion

This article discusses possible innovations within the framework of sustainable management of agrarian aspects of green economy in the Kyrgyz Republic.

It is planned to achieve long-term financial sustainability and create attractive investment environment through the tariff policy reform which is supposed to cover all substantiated costs, exclude cross subsidies and promote market orientation of the country's energy sector. The success of realisation of the new tariff policy will directly depend on adequate social protection measures covering the low-income population, along with the extensive public awareness-building.

The current tariffs will be balanced in the long term with regard for all aspects of social development, including access of the impoverished population to these services, taking into account the financial sustainability objectives for power engineering enterprises, due stimulation of the real sector of the economy and the designed energy conservation policy.

The first conceptual extension of the present analysis framework concerns the relationship between innovations and green (or sustainable) growth. The Green Growth Strategy [13] notes that the existing production technologies and consumer behaviour patterns are assumed to yield positive result only up to a certain point or boundary beyond which the depletion of natural capital has negative consequences for the overall growth. Innovations, extending this boundary, can help to reduce the dependence of the national growth on depletion of natural capital. Innovations and related creative destruction process will also result in appearance of new ideas, new entrepreneurs and new business models, thereby contributing to the creation of new markets and, ultimately, new jobs. Thus innovations play a key role in promoting the green growth.

The first important aspect of interconnection between innovations and green growth relates to measurement of productivity and its impact on possible trade-offs and synergies between innovations and green growth. When assessing productivity, it may be useful to consider not only such sequels as output of goods and scope of services expressed in terms of the GDP, but also the external impact or "negative" result such as air pollution and carbon dioxide (CO_2) emission into the atmosphere [14].

The combination of efficient instrumental policies that valorise externalities causing negative outcomes and promote R&D along with the introduction of new technologies, on the one hand, with efficient education policies, on the other hand, will help to achieve the necessary technological progress that will make it possible to mitigate the negative consequences without loss of revenues at a country level. Moreover, while green innovations may have some negative short-term effect on the (traditionally measured) economic growth rates, such effect will be compensated by significant benefits through achieving long-term economic sustainability, since green innovations will make it possible to avoid long-term consequences of environmental challenges such as potentially catastrophic climate change.

This is, as a matter of fact, where the potential trade-offs and synergies between innovations and green growth lie. One of the key questions is how the orientation towards green innovations through toughened environmental policy will affect the overall economic level of technological progress which is measured by macro-financial indicators growth

rate. On the one hand, the proponents of the so-called Porter hypotheses argue that ecological policy can promote incentives toward innovation and encourage firms to pursue efficiency gains discussed earlier. On the other hand, the policy that encourages redirection of innovative resources towards reduction of environmental impact – which is not taken into account in traditional productivity measurement – may lead to overall decline in measured productivity growth since fewer resources are allocated for "productive" innovations [15].

Another argument sometimes voiced in favour of green innovations is that the potential incremental effects from green innovation may be greater than from other forms of innovation, as the market is still underdeveloped and the potential for future innovations and growth can be truly significant. Overcoming barriers to green innovations, such as the prevalence of existing technologies and systems, the regulatory framework supporting the dominant actors, or access to capital, is likely to lead to new surge of innovations comparable to those specific of other major technological revolutions observed earlier. The growing interest of the private sector in more efficient use of resources can also underpin the promotion of green innovations.

Governments need to consider how innovations and the relevant policy influence other public goals and address additional measures to be undertaken to ensure achievement of the overall political goals, for instance, those relating to economic growth, employment, income distribution, public health and environment.

More targeted policy measures are often needed to remove a range of barriers to innovations. An appropriate complex of measures may include tax incentives for investment in R&D; direct government support through grants, subsidies and innovative tenders; measures towards facilitating collaboration and networking; indirect incentives through public procurement and other measures to stimulate demand. Such measures can strengthen innovation markets and facilitate their focusing on specific challenges and opportunities, such as green growth. Many measures include regional or local-level policies. In addition, introduction of innovations needs well-informed, dynamic and educated consumers whose role can be taken into account, when developing specific consumer policies. Specific application of different measures to promote innovations will vary depending on the national context. It may also depend on the involved sector or technology as well as on specific objectives of the innovation.

Given the wide range of policy measures that affect innovations, it is important to ensure a relevant comprehensive range of governmental measures; these measures should not be initiated by the central government only, but should be handled by the central government on a par with regional and local authorities who are increasingly involved in innovation-related activities. The development and realisation of innovations policy also requires appropriate resources of the public sector, which includes strengthening trust in governmental activities and securing support of political actions by interested parties.

The competent and well-considered use of the green economy concept can tangibly contribute to the transformation of Kyrgyzstan into a small montane green-colour "Asian dragon".

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