

**Names of the contributor:** Ludmilla Kiktenko [Individual]

## **Assignment 6. Finalization of the project, the cost-benefit analysis**

### **Proposal of a new scenario. Sustainable farming for people and nature in the Chon-Aksuu river basin**

#### **Background**

Kyrgyzstan is a small country with the population approximately 5,5 mln., 2/3rd of which live in rural areas. Meat is the main national food, but its annual consumption per person is 20 kg less than it was in 1990 because of a mass poverty. Annual income per capita in Kyrgyzstan is 900 USD

In spite of the most population deal with the livestock and agriculture, the import of meat and meat products reaches up 26,3%. Ineffectiveness of ongoing farming practices, poor investments into the agriculture, bad infrastructure and poor state support to farmers are well known factors that cause development of people and territories and overuse of ecosystem services.

Valuation of ecosystem services for making development decisions is not practicing neither in Kyrgyzstan, nor in any other Central Asian state. Accordingly, the value of ecosystems is not understood by the governments and population and strongly underestimated.

#### **Context. The current situation in Chon Aksuu river basin**

The Chon Aksuu watershed in Kyrgyzstan as typical example of an ecosystems' reservoir in land locked countries. The river originates in Tien Shan mountain ranges, the area stretches over 309,000 hectares from the lake shores to high mountainpeaks (from 1600 m to 3600 m ASL) and includes a large range of ecosystems distributed along altitudinal belts: steppe, sub-alpine and alpine meadows, broad-leaved and coniferous forests, screes and others.

There are situated two villages with 13,000 inhabitants, the local authorities, forestry units, water users associations and pasture committees, the mushroom pickers association. The area is also attractive for summer tourists.

The main income source in this area is the livestock and agriculture which follows the nomadic/traditional way, limited use of technologies and science, no science, low yielding, labour efficiency and income. In total, there are 9000 cattle and 13000 small livestock heads which made 131% of pasture pressure. While contributing into a quick degradation of grazing resources in the river basin, the current model of the livestock breeding provide a very modest income to the local dwellers – approximately 450 USD per person per year (50 % of annual household income), that is not enough for living at all. Besides the livestock, the ecosystem services are also used by the local population for living, thus reaching up an average income per year per person up to 4,000 USD.

In spite of a crucial contribution of ecosystem services into the wellbeing of local population, the value of food and water for animals and people are hardly reflected in the market price of agriculture products. The value of regulating and supporting services, such as water quality, natural medicines and genetic resources are non marketed at all. There are no special tax for negative externalities or subsidy for positive externalities. Only water, land and recreation are somehow marketed.

Among the negative externalities there are: grazing pressure on grassland, non-grassland and forest ecosystems, harm of woodlands self-regeneration, water pollution and soil erosion, forest degradation, modification of its composition and a soil erosion, growing pressure in certain forest areas from recreational activities.

#### **New scenario. Sustainable farming for people and nature in the Chon-Aksuu river basin**

Taking into consideration a quick degradation of ecosystem services in studied area, economic activities of local dwellers must be reconsidered in order to find new, sustainable and more effective activities which development perspectives.

New farming model can improve the situation for the ecosystem services, dwellers and livestock, to introduce sustainable business practices and become a demonstration model for other farmers.

The project proposes construction of **five modern farms** equipped with special machines, equipment, bio- and advanced-technologies, including renewable energy sources and recycling technologies for 3,500 cattle heads each, and **one meat processing plant** with capacity up to 15,000 ton of daily production of meat products,

because of meat and meat products are highly demanded on local markets and have promising perspectives. High yielding cattle breeds will replace the unproductive cattle population. New farms will demand less workers, while the processing plant will create new jobs, but professional requirements will demand professional development of workers.

In order to increase the number of highly productive livestock breeding, ensure production of high-quality beef and increase profitability of the farms, the project will reduce turnover of the livestock and extend the production cycle of growing period of the milk and meat breeds up to 2.5 years to reach the live weight of 650-700 kg. For this additional 365-day period the cows will be again seeded thus ensuring two growing cattle heads. Such process will be circulated again and again.

The project also offers to establish a **Consultation service for farmers** equipped with specialists and technologies to provide in-field and on-line support, consultations, seminars and practical experiments on soil science, diagnostic and rehabilitation, restructuring of the land composition, using the compost and dung, cultivation method, crop rotation, e.t.c., biotechnology, pesticides and herbicides, etc. In certain time, this service will be able to support introduction of environmental standards and specific development/management plans on farms.

The project will improve the livelihood of pastoralists dealing with the cattle, of those interesting to improve their knowledge and skills in order to work on new farms and the meat processing plant as specialists.

## **Research**

### Method and approach

The research used the stated preference method: Choice experiment and it was conducted through questionnaire and collection of additional useful data. The research was focused on the main income source for dwellers - stock raising.

Because of very limited available information and data on studied area, no scientific calculation of ecosystems values, no available analysis and trends of the cattlestock-income-ecosystems degradation nexus, no exact number of the livestock, etc., the research used available data and estimated figures. Valuation of provision services of ecosystems used replacement costs for food and water for livestock and people.

In general, 13 households (pastoralists) and 3 land managers were questioned in order to ensure consideration of the demand and supply sides. In order to understand the valuation of ecosystem services by respondents, they have been asked to rank the importance of ecosystem services.

Cost-benefit analysis was used to assess whether a scenario of sustainable farming for people and nature in the Chon-Aksuu river basin is worth for implementing compared to doing business-as-usual.

Discount rate for the cost-benefit analysis is based on annual inflation figure stated by the government – 8%.

### Results

The population in the Chon Aksuu river basin is growing, the market demand on meat is growing as well, the degradation of ecosystems is obvious and there is no long-term opportunity to continue ineffective livestock breeding, so a new scenario is needed.

The implemented research and the cost benefit analysis proved that a transfer from traditional way to the farm-based cattle breeding is possible and even profitable after seven years of its development. Calculated cost of **Sustainable farming scenario** is ~USD 111 mln, with a discount rate of 8 %.

There were a few variations across pastoralists: more wealthy farmers are ready to invest up to 70,000 USD (bank credits) and prefer to run the own farms, more poor ones are ready to share business and debts (if state guarantee on the ownership), but the overall tendency remains the same: people are ready to have new business practices, to raise their own capacities and support study of their children on new professions needed. But all groups of dwellers have less enthusiasm speaking about their possible contribution in recovery/saving the biodiversity, thinking that the nature will recover itself or the government should take care.

To understand potential of a proposed farming model, only few indicators have been changed for the cost benefit analysis: increased number of cattle heads from 9,000 to 20,500 and its live weight from 350 to 600 kg per head, milk production from 2000 to 4000 liters and sheep productivity on 0,5%. All those increase happened because

of more productive cattle breed and improved knowledge of the cattle breeding. Such change cause 4 time increase of income of local dwellers.

The Economic Net present value, with 8% of discount rate and 7 years of lifespan, makes 43,3, that proves profitability of the proposed scenario.

The excel sheets with the research/calculation tables are attached.

#### Findings of the research

There are many specific issues that strongly influence the costs and even reality of the proposed scenario. For example, if such cattle farms can be placed in mountain areas, construction costs of farms and plant with certain capacities, costs of relevant equipment, operational costs of those objects and their trends after the construction, relevant cattle breeds and their costs, minimum breeding livestock, tracks relevant to high mountain areas, load capacity and number, costs of livestock fodder, and many others. Beside, the market analysis is also needed.

The cost benefit analysis proved that the proposed project demands much more time for start up and achieving profitability, then it was initially planned – 7 years (in stead of 3 years initially planned).

Cost benefit analysis also proved that replacement of low productive cattle population on high yielding breeds must to take place, otherwise the project has no sustainability.

#### **Conclusion**

The proposed scenario is possible for realization, but demands further calculations and involvement of thematic experts in order to identify best alternatives: capacity of farms, equipment, technologies and transport, cattle breeds, production circle, breeding livestock, cattle products, markets, transportation, etc., including professional characteristics of workers.

Additional efforts to valuate other ecosystem services, as well as consultations with stakeholders are also needed.

In order to make such scenarios feasible, the government has to provide certain support to businessmen and farmers which are ready to participate and contribute in such initiatives. It can be tax preferences, moratoriums, grants for new technologies, etc.

The authorities should also take care about establishment of the consultation services for farmers and incentive tools to prevent the negative externalities.