

- Former structural elements serving the agriculture sector are either abolished or restructured in a way that doesn't always functioning properly; (institutional)
- Lack of scientific studies dedicating to the assessment of climate change impact on land degradation and agriculture. Not availability of contemporary software tools for monitor and forecast anticipated in future problems; (lack of local capacities)

2.3 Recommended solutions for Agriculture

Transforming an agricultural production system into a system that is more resilient to climate change such as integrated farming is a longer term adaptation strategy which may be supported by public good subsidies. This, for example, could include subsidies for the TTD (Technology Transfer and Deployment) of insurance, irrigation or new crop varieties. Transfer of advanced agricultural technologies and revival of traditional technologies/measures having in consideration the climate change impact and new political and economical circumstances is principle recommendation given by the project which should be accompanied by facilitation of the community based agriculture management.

2.4 Technology action plan, project ideas, and other issues in Agriculture

2.4.1 TAP for implementation of new approach for wind-breakers development

Wind breaker is not a new technology for agriculture sector of Georgia and it has been intensively using since 1960s. However, most of windbreakers are destroyed during the energy crisis years. Technology has very high initial costs, depends on local biodiversity, availability of water resources for irrigation (at list from the beginning) and accurate investigation of territory and wind directions. Maintain costs are not very high but problem is protection from fires (population has practice to burn the agricultural residues and pastures when fire easily spreads to adjacent windbreakers) and cutting. Population still has not enough understanding of the function of wind-breakers for productivity of their own lands. In past all these problems have been avoided by centralized political system. The owner of this technology was "Kolmeurneoba/Kolkhiz". Newly emerged problem after the decentralization of the system is ownership. New approach in the process of rehabilitation of wind-breakers should be implemented. Following actions should be taken for full operationalization of this technology:

- Replenishment of damaged wind breakers taking into consideration of new circumstances (changes in wind directions and speeds caused by climate change, selection of variety of plants, etc.);
- Sharing experience (best practices) of other countries in the planning of rehabilitation of damaged wind-breakers;
- Mapping of new sites for establishment of new windbreakers and optimization of rehabilitation process;
- Establishment of enabling environment (ownership, wind breakers protection and soil protection) considering the new political and economical realities;
- Awareness raising among the farmers on the role of wind-breakers in the protection of soils from wind erosion.
- Establishment of service centers for agriculture sector;
- Strengthening the cooperation between agriculture and climate change services.

2.4.2 TAP for drip irrigation technology

Following additional actions, to the establishment of enabling environment considered in the barrier section, are identified for operationalization of drip irrigation systems in Kakheti region, Georgia.

- Highly skilled irrigators should be trained to ensure optimal regime of irrigation (taking into consideration the soil humidity, vegetation and sowing dates) and the maintenance of the system;
- Irrigation plan should be developed based on assessments made for division of total irrigated territory into parcels to be irrigated by different watering regime and technologies.

- Cost-effectiveness of utilization of new water sources should be assessed. In particular, Alazani-Agrichai artesian basin underground water resources should be assessed for inclusion into the southern section of Alazani basin irrigation network. These resources are abundant and are featured by high quality;
- Inventory of these resources along with the temporarily closed down wells should be conducted.
- High cost of technology is one of the barriers to dissemination of drip irrigation technology. This barrier should be neutralized by using this irrigation system for watering of sufficiently expensive plants which have high marketing value.

2.4.3 TAP for soil erosion technology (USLE method)

This TAP is based on the idea of piloting of the process and assessing the current demand on such technology and feasibility of the idea. These actions listed below are for assessment of feasibility of the technology in this most vulnerable region.

- Assess the current status of erodibility of soils in the pilot villages
- Assess the current climate change impact on the intensification of water erosion of arable lands and pastures in the pilot villages
- Assess the economical losses per ha caused by the aggressive water erosion of arable lands
- Prepare recommendations for each household and each plot on water erosion preventive measures
- Mobilize and train (awareness raising) the most vulnerable local communities for implementation of pilot measures and implement recommended measures
- Evaluate the demand on consultancy in agriculture and elaborate options of demanded service.

In case the feasibility of technology is not proved the main barriers should be identified to the idea and new action plan should be developed or technology should be denied.

2.4.4 Brief summary of project ideas for international support (Details in Annex III)

Several technologies advanced and well practiced in the past have been considered in agriculture sector for two main directions- land degradation and irrigation. Three types of technologies are finally recommended by the TNA project based on stakeholder consultations and technology prioritization processes. Wind-breakers are recommended against the wind erosion in East Georgia, USLE method is recommended against the water erosion in West Georgia and drip irrigation is recommended as an advanced technology not disseminated yet in Georgia. Two project proposals have been prepared as a result of TNA process: proposal for rehabilitation of irrigation systems and proposal for the piloting of soil water erosion technology. Proposals are provided in Annex III.

2.5 Summary

Agriculture sector is declared by the Government as first priority in the nearest several years. Introduction of advanced technologies and latest best practices in the management of the sector are fundamental principles in this process supported by the Government. First step has been already done and service centers for agriculture sector have been established in each region. However, without solid knowledge of technologies and relevant capacities these centers couldn't be sufficiently effective. These service centers are considered by the TNA stakeholders as main target group /recipients. All results and proposals obtained by the project will be communicated to the beneficiaries (farmers and local population) through the service centers. Special training programmes and capacity building activities should be provided to these centers. Existence of such centers will increase the feasibility of proposals recommended by the TNA.