

IMPROVED AGRARIAN PRACTICES – EFFECTIVE ENVIRONMENT PROTECTION MEANS

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Introduction

The recent changes in agrarian sector of Georgia revealed that privatization of land, fragmentation of households, collapse of the former management practices made farmers unable to develop intense farming, produce adequate farm product as well as ensure keeping to environmental protection measures by their own strength.

Proceeded from the mentioned circumstances one of the main trends of the following stage of agricultural reform in Georgia - strengthening of scientific and technical base of small farms - and reform of research, introduction of new practices, consulting and training grounded on national traditions and international experience as a tool for achieving this objective has been pointed out. In the light of this decision by initiative of the government of Georgia supported by the World Bank a joint project “Agriculture Research, Extension and Training (ARET) Project “ has been launched.

Agriculture Research, Extension and Training (ARET) Project

Project implementation period is 2001-2005. The project is funded by International Development Agency (IDA), Global Environmental Fund (GEF) and Georgian Government.

The project has three components:

- **Competitive Grant Scheme** – appropriate on-farm technology acquisition, adaptation and dissemination to enable the new farmers to better respond to the challenges of a privatized economy based on market principles; environmentally - friendly agricultural practices to reduce negative impacts on soil and water quality;
- **Reform of Agricultural Research System** - through preparation of a detailed implementation plan for high priority research fields.
- **Environmental Pollution Control Program** (manure storage and handling facilities and bio-gas digesters, as well as soil and water quality monitoring programs) on a pilot basis to reduce agricultural nutrient pollution of the Black Sea. The first stage of the program is to be implemented in Western Georgia , in river Khobistskali basin.

Main objectives

- Supporting cooperation among scientists and farmers to overcome concrete problems and optimization an on-farm technology dissemination;
- Supporting sustainable agriculture production, production growth and integration of scientists and farmers;
- In conformity with "The Black Sea Pollution Protection International Convention" (Bucharest 1992) support obligations of Georgia in terms of soil and water pollution control.

Program Implementation Area

The Black Sea basin protection and the issue of its rational use is the main priority for Georgia. The further development of the country greatly depends on the solving of this problem.

One of the major sources of the Black Sea basin (Western Georgia) pollution is agrarian sector: discharge of nutrients from mineral fertilizers, chemicals, pesticides and manure to the Black Sea. The pollution of the rivers of region with surface run off is increased by erosion processes, which are common to the region, as well as by increased unsystematic cutting of wood.

The area, Khobistskali basin in three districts of Western Georgia (Khobi, Chkorotsku, Tsalenjika), was selected for program implementation. Selection was based on following criterias:

- River Khobistskali is one of the main rivers of Black Sea basin (third by length). The main source of the river pollution is agricultural activity. River pollution from industrial enterprises and central waste water systems is practically negligible. Because of above mentioned shift of agricultural activities to environmentally friendly technologies will definitely minimize pollution levels;
- Water collecting basin is over -crowded by cattle and poultry causing pollution of soil, underground (inclusive drinking water wells) and surface waters with manure;
- Overused mineral fertilizers, chemicals and pesticides during many years caused pollution of soils, ground and surface waters as well;
- High humidity and improper soil cultivation caused erosion of agricultural parcels;
- As a result of intense usage of wood for cooking purposes (15-20 m³ per household annually) huge areas of forest are cut down.

Several site visits by Georgian and international experts, examination of maps and technical documentation additionally proved the advantages and efficiency of location choice. The natural location of river Khobistskali and river Chanistskali adequately reflect the environmental chemical and bacteriological pollution picture of administrative districts situated alongside their

water collecting basins. Quality of river Khobistskali before joining river Chanistskali reflects environmental pollution in Chkhorotsku district, quality of river Chanistskali before joining river Khobistskali reflects environmental pollution of Tsalenjikha district, and quality of river Khobistskali after joining with river Chanistskali reflects environmental pollution of Khobi district.

These natural conditions will significantly simplify quality monitoring scheme for soil, underground and surface run off and river water, as well as evaluation and analysis of collected data.

Priorities for Adoption and Dissemination of Environmentally Friendly Agrarian Practices

The Environmental Team has developed the following priority list in implementing the use of Environmentally Friendly Agrarian Practices in three selected districts of western Georgia (Khobi, Chkhorotsku, Tsalenjikha):

- Priority 1:** Use of no-tillage and reduced tillage with crop rotation
- Priority 2:** Contouring with crop rotations and strip cropping
- Priority 3:** Comparison between organic and inorganic farming (use of manure against mineral fertilizers; cultivation against use of herbicides for weed control; use of bio-insects against synthetic chemicals);
- Priority 4:** Use of buffer strips and grass waterways
- Priority 5:** Introduction of new crops
- Priority 6:** Reduces use of mineral fertilizers and herbicides (conduct experiments to make comparisons between different rates, timings and methods of nitrogen fertilizer applications)
- Priority 7:** Use of subsurface drainage on flat lands
- Priority 8:** Use of optimal irrigation if needed during the growing season
- Priority 9:** Use of surface run off collectors for water pollution control
- Priority 10:** Use of bio methods for protection to minimize insect and weed damage
- Priority 11:** Development and testing of crop and water quality computer simulation models as management tools for making economic and policy decisions
- Priority 12:** Demonstrative use and introduction bio-stimulators for crop increase of crop production
- Priority 13:** Demonstration and introduction of bio-technologies of cattle breeding.

Reduction of environmental pollution from manure

The traditional method for utilization of agricultural waste (manure, wet manure) is to collect it in open area (unprotected from rain) and use of stored waste as a fertilizer. The method is very inefficient. Unprocessed manure cause pollution of soil and water, creates the threat of potential spots of epidemic and infectious diseases. In addition drained pollutants in lower layer of the soil (isolated from air) produce greenhouse gases (methane, carbon dioxide, nitrogen oxides).

The most efficient method against polluting from animal waste (manure, slurry) is construction and exploitation of improved design manure storage facilities and bio-gas digesters. These constructions from one hand help to collect and mature an unprocessed manure and produce natural fertilizer and from the other to reduce pollution of soil, ground and surface water. The bio-gas digesters produce a gas fuel which will improves living conditions of farmers and prevent from cutting nearby woods.

It is also very important, that implementation of described technology in line with environmental benefits will reduce farmers costs for fuel and chemical fertilizers.

During the project implementation period (2002-2005) 700 improved design manure storage facilities and 200 bio-gas digesters will be constructed.

Action plan for Implementation of Environment Protection Programme in first year of the program

1. Three demonstrative projects on implementing environmentally friendly agricultural technologies will be implemented in 33 farms of 24 villages of all three districts. This will cover the area amounting to 2423 hectares .
These envisage the following:
 - Biological methods for protection agricultural crops from hazardous organisms- 15 farm, 8 villages, 15 hectares;
 - Integrated technologies of land protection from erosion- 5 farms, 5 villages, 8 hectares;
 - Evaluation of the quality of the soil and preparation of recommendation for increasing the fertility – 2400 hectares.
2. Improved manure storage facilities will be constructed in 60 farms of 13 villages, the produced natural fertilizer will be used on 32 hectares.

3. Bio-gas digesters will be installed in 14 farms of 7 villages of all tree districts. 30-40 m³ produced gas will be consumed by farmers daily. Biomass as a natural fertilizer will be used on 16 hectares.
4. The quality monitoring of soil, underground, surface run off and river water pollution will be carried out in all three districts, which include the following activities:
 - quality monitoring of the soil pollution (1.2 m layer) -30 farms in 8 villages;
 - quality monitoring of the pollution of ground water and drinking wells-30 farms in 8 villages;
 - quality monitoring of the pollution of rivers – 4 rivers (Khobistskali, Chanistskali, Ochkhomuri, Choga), 20 hydrological sections.

During the first year of the project implementation 107 farms and their 500 household members in 44 villages will benefit. Environmentally friendly agricultural practices will be implemented on 2471 hectares of land area. This activities on the one hand will have a positive impact on agricultural efficiency and increase of agricultural production, on the other hand will minimize the erosion process, and will reduce soil, groundwater and river pollution. In general project activities will improve environmental state of the one part of Black Sea Basin.