Georgia

GEOGRAPHY, CLIMATE AND POPULATION

Geography

Georgia has a total area of 69 700 km². It is located in the Caucasus region and is bordered by the Russian Federation to the north and northeast, Azerbaijan to the southeast, Armenia and Turkey to the south, and the Black Sea to the west for a distance of 309 km. For administrative purposes, the country is divided into 11 regions (comprising some 67 districts) plus the capital city Tbilisi. It declared independence from the Soviet Union in April 1991.

The country can be divided into three physiographic regions: mountains covering about 54 percent of the total area, highlands about 33 percent, and valleys some 13 percent. The Caucasus Mountains form Georgia's northern boundary, their highest peak standing some 5 000 m above sea level. About 70 percent of the country lies below 1 700 m above sea level. Cropping is possible throughout the country up to 2 000 m. At higher altitudes, there are only pastures.

The total cultivable area, which according to Georgian statistics is equal to the agricultural area, was estimated in 1996 at some 3 million ha, or 43 percent of the country. About 2.2 million ha are forest, which, under the 1978 Forest Code, cannot be transformed into agricultural cropped areas. A process of land privatization has been under way since the end of the Soviet period. Agricultural production is generally small-scale, but commercial farming is progressively gaining importance. Of the total 3 million ha of agricultural land, some 0.7 million ha are owned and cultivated by private farmers; 0.3 million ha have been leased to farmers for short-term (3–5 years), medium-term (25 years) or long-term (49 years) periods; and 2 million ha are still owned by the state. Most of the state agricultural land is not cultivated. Only about 30 percent is rented, mainly due to the complicated orography, poor soil, distance from habited areas, and damaged irrigation and drainage systems.

In 2005, the total cultivated area was estimated at 1.07 million ha, of which 802 000 ha consisted of annual crops and 264 000 ha of permanent crops (Table 1). Water and wind erosion, environmentally degrading agricultural practices and other anthropogenic and natural processes have led to an almost 35 percent degradation of farmland (Government of Georgia, 2002).

Climate

Georgia, with an average rainfall of 1 026 mm/year, can be divided into two climatic regions:

- West Georgia, which has a subtropical humid climate, with mild winters and not very hot summers. The average precipitation is estimated at between 1 100 and 1 700 mm/year. Drainage of excess water is one of the main problems for

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agriculture in this part of the country. Average temperatures vary between 5 °C in January and 22 °C in July.

- East Georgia, which has a subtropical dry climate, with fairly cold winters and arid, hot summers. The average precipitation varies between 500 and 1 100 mm/year. About 80 percent of the rainfall occurs from March to October, while the longest dry period is about 50–60 days. Drought years are common. Hail occurs in spring and autumn. There is a need for irrigation in the areas where precipitation is less than 800 mm/year. Average temperatures vary between -1 °C in January and 22 °C in July.

Population

The total population is estimated at 4.47 million (2005), of which 48.5 percent is rural. The average population density is 64 inhabitants/km² (Table 1). Before independence, the population growth rate was about 1 percent per year, but since 1991 the growth has been negative. During the period 1992–2000 it was -1.5 percent and during the period 2000–2005 -1.1 percent.

In 2006, 93 percent of the population had access to improved sanitation (94 and 92 percent in urban and rural areas respectively) and 99 percent to improved water sources (100 and 97 percent in urban and rural areas, respectively).

ECONOMY, AGRICULTURE AND FOOD SECURITY

In 2007, the national Gross Domestic Product (GDP) of Georgia was US$10.2 billion of which agriculture accounted for 11 percent (Table 1). The total economically active population was 2 287 000 or just over 51 percent of the total population (2005), of which 52 percent male and 48 percent female. The economically active population in agriculture is estimated at 395 000, 40 percent of which is female.

TABLE 1
Basic statistics and population

Physical areas			
Area of the country	2005	6 970 000	ha
Cultivated area (arable land and area under permanent crops)	2005	1 066 000	ha
• as % of the total area of the country	2005	15.3	%
• arable land (annual crops + temp. fallow + temp. meadows)	2005	802 000	ha
• area under permanent crops	2005	264 000	ha
Population			
Total population	2005	4 474 000	inhabitants
• of which rural	2005	48.5	%
Population density	2005	64.2	inhabitants/km²
Economically active population	2005	2 287 000	inhabitants
• as % of total population	2005	51.1	%
• female	2005	48.1	%
• male	2005	51.9	%
Population economically active in agriculture	2005	395 000	inhabitants
• as % of total economically active population	2005	17.3	%
• female	2005	39.5	%
• male	2005	60.5	%
Economy and development			
Gross Domestic Product (GDP) (current US$)	2007	10 180	million US$/yr
• value added in agriculture (% of GDP)	2007	11	%
• GDP per capita	2005	1 430	US$/yr
Human Development Index (highest = 1)	2005	0.754	
Access to improved drinking water sources			
Total population	2006	99	%
Urban population	2006	100	%
Rural population	2006	97	%

WATER RESOURCES AND USE

Water resources

The country can be divided into two main river basin groups:

- The Black Sea Basin, in the west of the country. The internal renewable surface water resources (IRSWR) generated in this basin are estimated at 42.5 km³/year. The main rivers are, from north to south, the Inguri, the Rioni and the Chorokhi. The main stream of the Chorokhi rises in Turkey (the Corub River) and the estimated inflow from Turkey is 6.3 km³/year.
- The Caspian Sea Basin, in the east of the country. The IRSWR generated in this basin are estimated at 14.4 km³/year. The main rivers are, from north to south: the Terek and the Andiyskoye, which rise in the north of the country and flow northeast to the Russian Federation before entering the Caspian Sea; the Alazani, the Iori and the Kura, which rise in Georgia and flow into Azerbaijan in Lake Adzhinour, before flowing southeast in Azerbaijan and then entering the Caspian Sea. Two tributaries of the Kura River rise in Turkey: the Mtkvari, with an estimated inflow from Turkey of 0.91 km³/year, and the Potskhovi, with an estimated inflow from Turkey of 0.25 km³/year. The inflow of the Debet River, a southern tributary of the Kura River, is estimated at 0.89 km³/year from Armenia.

The renewable groundwater resources are estimated at 17.23 km³/year, of which 16 km³/year are drained by the surface water network (overlap). This gives a total of 58.13 km³/year for internal renewable water resources (IRWR). The total actual renewable water resources (ARWR) are 63.33 km³/year (Table 2).

In 1990, the total water abstraction was estimated at 3 km³/year from some 1 700 tube-wells. According to a recent assessment a further 7 km³/year could be abstracted in the future. Groundwater use was not greatly developed during the Soviet period, due to the emphasis on large-scale state-run surface irrigation schemes.

Georgia has 25 075 rivers exist with a total length 54 768 km; 99.4 percent of them are small rivers with a total length of less than 25 km. Hydrological studies are made of 555 rivers of the Black Sea Basin and 528 rivers of the Caspian Sea Basin. More than 17 000 rivers (total length 32 574 km) belong to the Black Sea Basin. There are about

TABLE 2
Water: sources and use

Renewable freshwater resources			
Precipitation (long-term average)	-	1 065	mm/yr
	-	74.23	10^9 m³/yr
Internal renewable water resources (long-term average)	-	58.13	10^9 m³/yr
Total actual renewable water resources	-	63.33	10^9 m³/yr
Dependency ratio	-	8.21	%
Total actual renewable water resources per inhabitant	2005	14 155	m³/yr
Total dam capacity	2004	3 414	10^6 m³
Water withdrawal			
Total water withdrawal	2005	1 621	10^6 m³/yr
- irrigation + livestock	2005	1 055	10^6 m³/yr
- municipalities	2005	358	10^6 m³/yr
- industry	2005	208	10^6 m³/yr
• per inhabitant	2005	362	m³/yr
Surface water and groundwater withdrawal	2005	1 621	10^6 m³/yr
• as % of total actual renewable water resources	2005	2.6	%
Non-conventional sources of water			
Produced wastewater		-	10^6 m³/yr
Treated wastewater	2005	9	10^6 m³/yr
Reused treated wastewater		-	10^6 m³/yr
Desalinated water produced		-	10^6 m³/yr
Reused agricultural drainage water		-	10^6 m³/yr

43 dams in Georgia, 35 of which are in the east and 8 in the west; their total reservoir capacity is estimated at about 3.4 km³. The water is primarily used for irrigation and hydropower generation and less for water supply. The largest dam, for hydropower is the Inguri dam, with a reservoir capacity of 1.092 km³. In 1995, hydropower supplied 89 percent of electricity. Some 31 dams have been built for irrigation purposes; they have a total reservoir capacity of 1 km³, of which 782 million m³ are active. The three largest irrigation reservoirs are: the Sioni reservoir (325 million m³) on the Iori River, the Tbilisi reservoir (308 million m³) on the Kura River and the Dalimta reservoir (180 million m³) on the Iori River.

In 2005, the total treated wastewater was estimated at 9 million m³. There is no tradition of treated wastewater reuse in Georgia.

Some wetlands have a primary environmental importance such as:

- central Kolkheti (33 710 ha), on both sides of the Rioni River mouth along the central part of the eastern Black Sea coast, in the regions Guria and Samegrelo near the city of Poti. The site contains many relicts and endemic species of flora and fauna. The area is a coastal alluvial plain, composed of quaternary deposits. The average water flow rate (over a long period) of the River Rioni (the largest river in the site) is 399 m³/second. Kolkheti State Reserve (500 ha) was established in 1947.
- Ispani (513 ha) in the autonomous Republic of Adjara, one kilometre from the Black Sea coast near the city of Kobuleti. The area supports rare mammal species and migratory waterbirds of international importance. The area is a coastal alluvial plain, composed of quaternary, lake-riverine and additional lake deposits, which have developed to a depth of 9–14 m.

Water use

Between 1985 and 1990, the total water withdrawal decreased from 4 600 to 3 500 million m³ because of the industrial decline since the end of the Soviet Union. During 2005 the total water withdrawal was 1 621 million m³, 66 percent of which came from surface water and 34 percent from groundwater (Table 2 and Figure 1). Agricultural water withdrawal accounted for 1 055 million m³ and water withdrawal for municipal purposes for 358 million m³. Industrial water withdrawal was estimated at 208 million m³ (Figure 2).

FIGURE 1
Water withdrawal by source
Total: 1.6 km³ in 2005

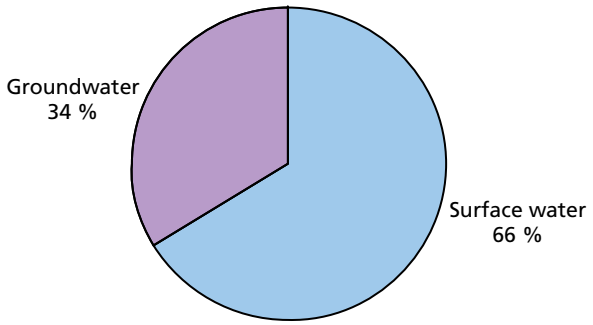
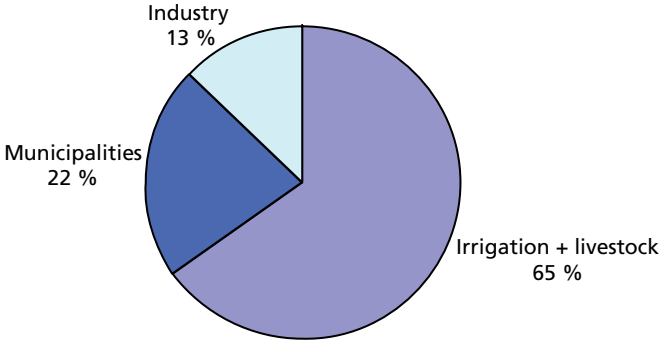


FIGURE 2
Water withdrawal by sector
Total: 1.6 km³ in 2005



International water issues

In 1925, an agreement with Turkey was reached on the use of water from the Chorokhi River, allocating half of the average surface water flow to each country. This agreement dealt only with water flow and did not consider

the sediment flow, estimated at 5 million m³/year. About 46 percent of these sediments form the sand beach and are an important resource, as tourism is of prime importance to Georgia's earnings. Turkey plans to construct a cascade of 11 dams on the Chorokhi River, which will affect the sediment flow and thus the beaches on the Georgian shore. Georgia is pressing for a reconsideration of the agreement, which should not only deal with the allocation of water but also address the issue of sediment flow.

In 1997, Georgia ratified the agreement between the Governments of Georgia and Azerbaijan on environmental protection. In 1998, Georgia ratified a similar agreement with Armenia. According to both agreements, the governments will cooperate in creating specifically protected areas within the transboundary ecosystems.

The implementation of the "Ecoregional Nature Protection Programme for Southern Caucasus" is part of the Caucasus Initiative, launched by the German Ministry of Cooperation and Development. The programme covers the three Caucasus countries, Georgia, Azerbaijan and Armenia, and will facilitate the protection and sustainable use of water resources in the region.

Measures are already being taken in support of the development of protected areas in Georgia. Within the Black Sea Integrated Management Programme, supported by the Global Environment Facility (GEF) and the World Bank, implementation of the system of protected wetland areas in the coastal zone of Georgia is in progress (Tsiklauri, 2004).

From 2000 to 2002, USAID, in collaboration with Development Alternatives Inc. (DAI), implemented the South Caucasus Water Management Project, designed to strengthen co-operation between water-related agencies at all local, national and regional levels, and demonstrate integrated water resources management. In parallel, between 2000 and 2006, the EU and the Technical Assistance Commonwealth of Independent States (TACIS) have developed the Joint River Management Programme on Monitoring and Assessment of Water Quality on Transboundary Rivers; its aim is the prevention, control and reduction of trans-boundary pollution impact. The programme covers four basins, including the Kura River Basin. In addition, regional organisations such as REC, Eurasia Foundation and numerous local foundations are promoting national and regional activities in the field of water resources management and protection (UNEP, 2002).

The main objective of the USAID/Caucasus-Georgia Strategic Plan (2004–2008) is to ensure continued support for the South Caucasus Regional Water Management Programme as a principal component of its regional conflict-prevention and confidence-building objectives. It hopes to maintain the dialogue between the three countries that has already contributed to confidence-building measures (USAID, 2006).

From 2002 to 2007, the NATO-OECD has developed the South Caucasus River Monitoring Project. Its general objectives are to establish the social and technical infrastructure for an international, cooperative, transboundary river water quality and quantity monitoring, data sharing and watershed management system among the Republics of Armenia, Azerbaijan and Georgia (OSU, 2008).

The project Reducing Transboundary Degradation in the Kura-Araks River Basin, currently being implemented by the UNDP Bratislava Regional Centre in collaboration with the Global Environmental Facility (GEF), has involved four of the basin countries: Armenia, Azerbaijan, Georgia and the Islamic Republic of Iran. Efforts are being made to involve Turkey in the project. The project preparation phase is 18 months and began in July 2005. It is co-funded by Sweden. The project aims to ensure that the quality and quantity of water throughout the Kura-Araks River system meets the short and long-term needs of the ecosystem and the communities relying upon it.

The project will achieve its objectives by fostering regional cooperation, increasing capacity to address water quality and quantity problems, demonstrating water quality/quantity improvements, initiating required policy and legal reforms, identifying and

preparing priority investments, and developing sustainable management and financial arrangements.

IRRIGATION AND DRAINAGE DEVELOPMENT

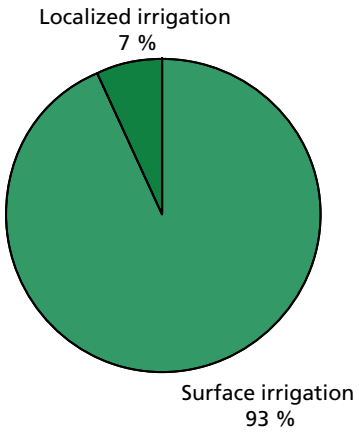
Evolution of irrigation development

The irrigation potential in Georgia is estimated at 725 000 ha. The country has a tradition of land improvement through irrigation and drainage. At the beginning of the twentieth century, the total irrigated area in Georgia was about 112 000 ha. Major investments were made in the irrigation sector during the Soviet period, resulting in a total area of about 500 000 ha equipped for irrigation at the beginning of the 1980s, mainly located in the more arid eastern part of the country.

During the 1990s, civil strife, war, vandalism and theft, as well as problems associated with land reform, the transition to a market economy, and the loss of markets with traditional trading partners, contributed to a significant reduction of the irrigated area. It has been reported that during the severe drought of 2000 only about 160 000 ha were irrigated. Almost all pumping schemes (about 143 000 ha) were out of order. As a consequence, Georgia's State Department of Melioration and Water Resources started a rehabilitation programme to renew the infrastructure of existing irrigation and drainage schemes and to establish Amelioration Service Cooperatives. About 255 000 ha are covered by these programmes.

In 2007, irrigation covered 432 790 ha, of which 31 500 ha equipped wetland and inland valley bottoms and 401 290 ha full or partial control irrigation. River diversion is the main source of water for irrigation and groundwater is not used for irrigation in Georgia. The main irrigation technology is surface irrigation (372 980 ha). Localized irrigation is practiced on 28 300 ha (Table 3 and Figure 3).

FIGURE 3
Irrigation techniques
Total: 401 290 ha in 2007



Most of the schemes are large-scale (Figure 4). The largest one are: the upper Alazani (41 100 ha), the lower Alazani (29 200 ha), the upper Samgori (28 100 ha), and the lower Samgori (29 200 ha). There is no private irrigation in Georgia. All irrigation schemes are managed by the State through its Department of Melioration and Water Resources. Though irrigation remains the responsibility of the State, the land irrigated can be owned either by private farmers or by the State but leased to farmers, cooperatives or agro-firms.

FIGURE 4
Type of irrigation schemes
Total: 401 290 ha in 2007

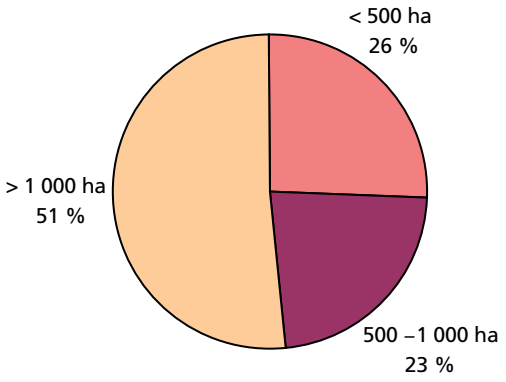


TABLE 3
Irrigation and drainage

Irrigation potential		-	725 000	ha
Irrigation				
1. Full or partial control irrigation: equipped area		2007	401 290	ha
- surface irrigation		2007	372 980	ha
- sprinkler irrigation		2007	0	ha
- localized irrigation		2007	28 310	ha
• % of area irrigated from surface water		2007	100	%
• % of area irrigated from groundwater		2007	0	%
• % of area irrigated from mixed surface water and groundwater		2007	0	%
• % of area irrigated from non-conventional sources of water		2007	0	%
• area equipped for full or partial control irrigation actually irrigated			-	ha
- as % of full/partial control area equipped			-	%
2. Equipped lowlands (wetland, ivb, flood plains, mangroves)		1996	31 500	ha
3. Spate irrigation			-	ha
Total area equipped for irrigation (1+2+3)		**2007**	**432 790**	**ha**
• as % of cultivated area		2007	40.6	%
• % of total area equipped for irrigation actually irrigated			-	%
• average increase per year over the last 11 years		1996-2007	-0.72	%
• power irrigated area as % of total area equipped		2007	21.9	%
4. Non-equipped cultivated wetlands and inland valley bottoms			-	ha
5. Non-equipped flood recession cropping area			-	ha
Total water-managed area (1+2+3+4+5)		**2007**	**432 790**	**ha**
• as % of cultivated area		2007	40.6	%
Full or partial control irrigation schemes	**Criteria**			
Small-scale schemes	< 500 ha	2007	103 770	ha
Medium-scale schemes		2007	90 350	ha
Large-scale schemes	> 1000 ha	2007	207 170	ha
Total number of households in irrigation				
Irrigated crops in full or partial control irrigation schemes				
Total irrigated grain production (wheat and barley)			-	metric tons
• as % of total grain production			-	%
Harvested crops				
Total harvested irrigated cropped area		2006	126 060	ha
• Annual crops: total			-	ha
- Wheat			-	ha
- Rice			-	ha
- Barley			-	ha
- Maize			-	ha
- Potatoes			-	ha
- Other annual crops			-	ha
• Permanent crops: total			-	ha
- Fodder			-	ha
- Citrus			-	ha
- Other perennial crops (bananas, olives, grapes, strawberries)			-	ha
Irrigated cropping intensity (on full/partial control irrigation: equipped area)		2006	31.4	%
Drainage - Environment				
Total drained area		1996	164 700	ha
- part of the area equipped for irrigation drained		1996	31 800	ha
- other drained area (non-irrigated)		1996	132 900	ha
• drained area as % of cultivated area			-	%
Flood-protected areas			-	ha
Area salinized by irrigation		2002	113 560	ha
Population affected by water-related diseases			-	inhabitants

The unfavourable location of plots, low soil fertility, the failure of old irrigation and drainage systems, desertification, secondary bogging, salinization and erosion processes contribute to the non-lease and non-transfer of land to private owners. In addition, the slow pace of registering land ownership is due to the fact that the existing system deals with owner registration only, which is an insufficient basis for the full exercise of land ownership rights and the conclusion of subsequent transactions. Moreover, land registration and the process of proving land ownership are time consuming as old Soviet data have to be checked thoroughly (Government of Georgia, 2002).

Role of irrigation in agricultural production, economy and society

At the beginning of 1997, irrigation water charges were introduced in Georgia, at a rate of US$3 per 1 000 m³. This figure was the same for all schemes in Georgia. The water charges covered about 12 percent of total O&M costs, the government budget covered 15 percent of the total, while the remaining 73 percent was not covered, resulting in the degradation of irrigation systems. In 1996, over 300 000 ha were estimated to be in need of rehabilitation. The current policy is for the government to pay for the O&M of the dams and headworks which have been constructed, while the O&M costs of the distribution and on-farm network are to be paid by irrigation users through a higher water charge.

No recent data for irrigation costs are available. In 1996 the average cost of irrigation development varied between US$3 500 and US$4 500/ha for surface irrigation, and between US$6 500 and 7 200/ha for sprinkler irrigation. Average O&M costs vary between US$55 and US$70/ha per year respectively.

In 2006, the total irrigated crop area was estimated at 126 060 ha, but no details for the different crops are available. In 1986, the major crops cultivated under full or partial control irrigation were fruit trees and grapes, pasture and fodder crops, vegetables, potatoes, wheat, maize and sunflower. Irrigated crop yields compared relatively favourably with rainfed crop yields, although the average difference is very small due to the good climatic conditions in the areas where rainfed agriculture is practiced. In 1986, in the full or partial control irrigation schemes, the average irrigated crop yields were 3.0 tonnes/ha for winter wheat, 2.9 tonnes/ha for maize, 4.8 tonnes/ha for grapes, 5.0 tonnes/ha for fruits and 12 tonnes/ha for potatoes.

Status and evolution of drainage systems

In 1996, the total drained area was estimated at 164 740 ha, consisting mainly of surface drainage. However, the infrastructure deteriorated drastically during the 1990s, reducing the drainage area to 65 000 ha.

Drainage has been developed mainly in the high rainfall region of western Georgia (Kolkhety lowland), on 132 940 ha out of a total of 164 740 ha for the whole country. The total area of the Kolkhety lowland where drainage infrastructure could be developed in the future is about 800 000 ha.

About 31 800 ha of full or partial control irrigation equipped areas are also equipped with a network of surface and subsurface drains (Table 3). About 31 100 ha of the equipped wetland and inland valley bottoms are also power drained. They are located in the coastal regions of west Georgia, in polder systems where electric pumps drain seawater and excess floodwater.

WATER MANAGEMENT, POLICIES AND LEGISLATION RELATED TO WATER USE IN AGRICULTURE

Institutions

The main institutions involved in water resources management are:

- The Ministry of Food and Agriculture with: (i) the Department of Melioration and Water Resources, responsible for planning, monitoring, and promoting irrigated agriculture. This department defines the water requirements for irrigation and

supervises the management of the irrigation schemes; (ii) the Hydraulic Design Institute (Saktskalproject), responsible for irrigation, drainage, flood control, land reclamation, hydroelectric and water supply schemes design; (iii) the Georgian Scientific Research Institute of Water Management and Engineering Ecology, responsible for research into all issues related to water.

- The Ministry of Environment Protection and Natural Resources with the Centre for Monitoring and Prognostication, responsible for the assessment of surface water quantity, including the Black Sea, as well as groundwater. The Centre unites several departments for monitoring quantity and quality of surface water and groundwater, namely: (i) the Department of Hydrometeorology, responsible for surface water quantity observations (except of the rivers of the Ajara Autonomous Republic and the Black Sea); (ii) the Department of Monitoring of Environmental Pollution, responsible for surface water quality (except of the rivers of the Ajara Autonomous Republic and the Black Sea); (iii) the Black Sea Branch (located in Batumi), responsible for surface water quantity and quality monitoring of the Black Sea and rivers from the Ajara Autonomous Republic.

Water management

During the Soviet period, many administrative units were involved in the management of the same irrigation scheme. With the institutional changes, every scheme is directly managed by one of the 48 administrative units of the Department of Melioration and Water Resources.

Developing an Integrated Water Resources Management Plan for Georgia is a complicated task at this moment, because first new water legislation, based on a basin approach, must be enacted.

Policies and legislation

The policy document "Concept of agrarian policy in Georgia" was adopted by presidential decree in 1997; it covers the following issues relating to irrigation:

- the main irrigation infrastructure will remain in the hands of the State, while the inter-farm distribution will be included in the privatization programme;
- there should be an increase in state investment in irrigation, soil protection, research, selection, breeding information and plant protection services, development of environmental protection for rural infrastructure.

While there is no separate policy document that directly spells out Georgian policy for protecting and managing water availability and quality, the Law on Water does outline a number of key principles that comprise a policy framework (UNECE, 2003). Some of these are:

- water protection is a major element of environmental protection for Georgian citizens, in view of both current and future needs;
- drinking water for the population is the highest priority of all uses;
- both groundwater and surface water are under state control;
- management of water varies according to hydrologic importance;
- a system of "user-polluter pays" is key;
- pollution is not allowed, although a definition of what constitutes pollution is lacking.

There are more than 10 major laws in Georgia that have significant influence on the protection and management of water resources and associated environmental concerns. The most comprehensive is the above Law on Water, which has been in force since October 1997 and was last amended in June 2000. The 96 separate articles of this Law cover a very wide and comprehensive set of issues, such as pollution control policies, protection of drinking water sources, licensing of water use and discharge, categorization and protection of resources, particular measures for the Black Sea, flood

control, and many others. All surface water, groundwater and near-coastal water is deemed to be under the control of the national government. Many of the provisions of the Law are supplemented by legislative orders and decrees, as well as by regulations of the Ministry of Environment Protection and Natural Resources, which specify necessary actions in greater detail. The Ministry holds overarching responsibility for implementing the Law on Water, although other ministries are key players on specific topics. The Law is implemented by personnel at the regional or municipal level. The Law on Water does provide for the licensing of water use and the discharge of pollutants, an approach that has been in place since 1999.

The government has prepared the national programme of harmonization of Georgian legislation (including water legislation) to EU legislation (Tsiklauri, 2004).

ENVIRONMENT AND HEALTH

Regardless of the fact that Georgia is a country with abundant fresh water resources, the current situation of the water supply is extremely complicated. This is largely due to anthropogenic contamination, deficit of drinking water and low sanitary standards of the water supply system. About 60 percent of existing water pipelines are depreciated. Their sanitary and technical conditions are unsatisfactory, resulting in frequent accidents and this, in turn, leads to water contamination. Due to water network damages, large quantities of water are lost. According to data for 1999, such losses amounted to 40 percent of the overall quantity of water supplied to households.

Due to the degradation of the water supply and sewerage infrastructure, the quality of drinking water often does not comply with human health and safety standards. Some 38 percent of the water pipeline system of the cities and regions belongs in the high-risk water pipeline category, in which the microbiological contamination index is high. The poor quality of water has resulted in several outbreaks of infectious intestinal diseases and epidemics (Government of Georgia, 2002).

In eastern Georgia there is a salinization problem relating to irrigation. Currently, 59 220 ha are severely salinized and 54 340 ha are moderately salinized. The poor quality of management and infrastructure of the irrigation systems has added to these problems during the past decade (UNECE, 2003).

PROSPECTS FOR AGRICULTURAL WATER MANAGEMENT

Small-scale irrigation is developing without any subsidies from the government. Groundwater irrigation is likely to increase in the future for small-scale irrigation schemes, but only in western Georgia where the shallow aquifers are located.

Future irrigation development is expected to be on a very limited scale, particularly for large-scale and medium-scale schemes, mainly because of the high opportunity cost and the shortage of funds. Flow regulation through dams would be needed for these schemes, but there is competition between hydropower and irrigation.

Drainage works might be carried out in the future, particularly in the Kolkhety lowland, with attention to ecological and environmental analysis. The eradication of malaria in this area would be one of the goals of these drainage works. However, opponents of this project propose halting land reclamation in the Kolkhety lowland and the creation of a national park.

Donors and international financial institutions have developed projects for the rehabilitation of irrigation and drainage. The "irrigation and drainage community development project", which started in 2002, is funded by the World Bank.

Finally, legislative acts need to be passed to ensure biodiversity protection and conservation, as well as to envisage the rational use of land resources (forests, water, mineral deposits) during territorial-spatial development planning (Government of Georgia, 2002)

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