

MINISTRY OF ENERGY OF GEORGIA

**KHUDONI ENVIRONMENTAL AND SOCIAL
IMPACT ASSESSMENT**

**PRELIMINARY ENVIRONMENTAL
AND SOCIAL SCREENING**

Draft report



December 2007

KHUDONI - PRELIMINARY ENVIRONMENTAL AND SOCIAL SCREENING

Draft Report

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ABBREVIATIONS

APRL	Association for the Protection of Land Owners Rights
AZE	Alliance for Zero Extinction
BTC	Baku – Tbilisi – Ceyhan Pipeline Project
CIS	Commonwealth of Independent States
ESIA	Environmental and Social Impact Assessment
GIS	Geographical Information System
HPP	Hydropower Plant
IBAs	Important Bird Areas
IPAs	Important Plant Areas
MOE	Ministry of Energy
NGO	Non-Governmental Organization
PRA	Participatory Rapid Appraisal
RAP	Resettlement Action Plan
SEA	Strategic Environmental Assessment
TOR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCD	World Commission on Dams
WGS	World Geodesic System
NEAP	National Environmental Action Plan
NBSAP	National Biodiversity Strategy and Action Plan
EU TACIS	European community's programme for co-operation with countries of eastern europe, the caucasus and central asia
OEDC	Organisation for Economic Cooperation development
NATO	North Atlantic Treaty Organisation
NREC	New Regional Environmental Center for Caucasus
CITES	Convention on International Trade of Endangered Species of wildlife fauna and flora
BD	Biodiversity
UNCCD	United nations Convention to Combat desertification
MEPNR	Ministry of Environment and Natural Resource Protection
EPA	Environmental protection Act
EIA	Environmental Impact Assessment
EA	Environmental Assessment
SEE	State Ecological Examination
IUCN	International Union for Conservation of Nature
FCG	Forest Code of Georgia
DoF	Department of Forests
GCCW	Georgian Center for the conservation of Wildlife
B.C.	Before Christ
CENN	Caucasus Environmental NGO network

1. Introduction

1.1 GENERAL

The Khudoni Dam and Hydropower Plant (HPP), located in the Zemo Svaneti (Upper Svaneti) Region is one of several major hydro power generation facilities planned under the Soviet Union to use the large hydro power generation capacity of the Enguri River Basin in western Georgia. While Enguri HPP and Vardnilesi HPPs cascade were completed, the upstream facility at Khudoni was only partially constructed.

Construction was halted for a combination of political, environmental and financial concerns, but is foreseen to be resumed by the Georgian Government.

The Consortium BRLi-ARS Progetti Assignment is in charge of the safeguard studies including preparation of the Environmental Impact Assessment (EIA) and its presentation to the Ministry of Energy, in liaison with the Environmental Management Plan (EMP) and the Resettlement Action Plan (RAP) for the Project.

The present Report is related to the first phase of this assignment: “Preliminary Environmental and Social Screening”. The Client is the Ministry of Energy of Georgia.

1.2 BACKGROUND TO THE PROJECT

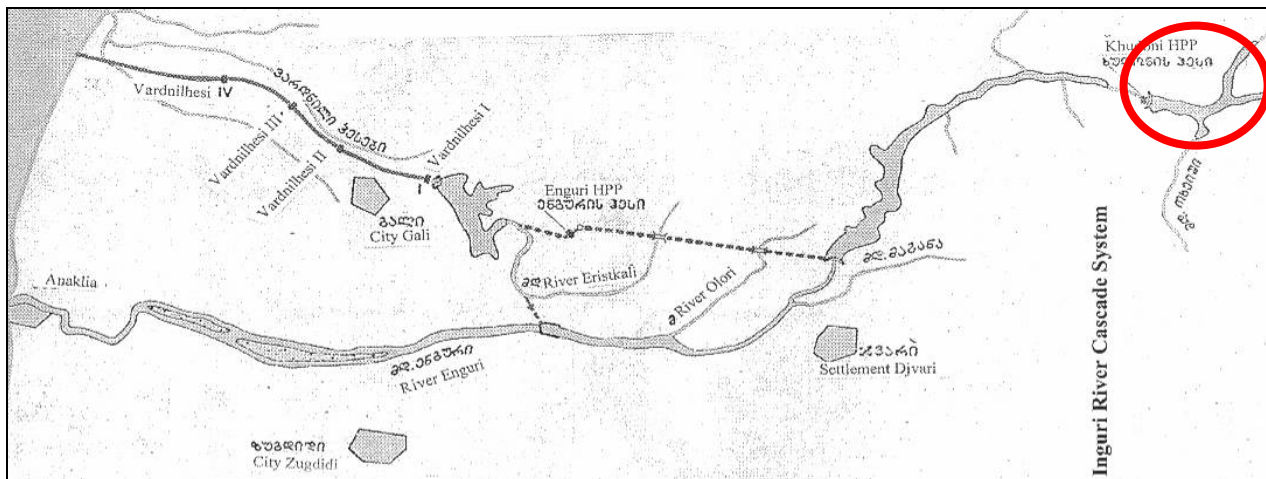
The Enguri River. The Enguri River (221 km long) is considered one of the most important river systems of Georgia. Its flow comes from various sources, primarily glaciers and snow. The river drains the upper valley of the Zemo Svaneti Region, then flows in narrow deep canyons, with rapids before passing through lowlands, finally discharging into the Black Sea.

The total fall in the river is about 2,600 m, the catchment area 4,062 km², the average long-term run-off about 5.35 km³ and the estimated hydro potential about 21 billion kWh (5.5 billion kWh have already been realized).

The Khudoni Dam and Hydropower Plant (HPP). The Khudoni Project proposed by the Georgian Ministry of Energy is located in a narrow gorge of the Enguri River, 32 km upstream of the existing Enguri arch dam (one of the highest concrete arch dams in the world) and the cascade system of HPPs. It is aimed at reducing the power deficit and adding export potential, providing additional hydropower generation by:

- Additional storage in the hydropower plant reservoir;
- Additional power generation from the added HPP;
- Increased useful life of the Enguri dam reservoir;
- Added power generation, by combined reservoir operation of the Khudoni, Enguri and the downstream cascade system of HPPs.
- The Khudoni dam and hydropower plant were started to be built on the Enguri River in 1979. But the Khudoni HPP construction was, however, suspended in 1989 due to political, environmental and seismic concerns.

Figure 1.1: Location of the Khudoni Project



However, due to importance and necessity of the Khudoni HPP for the overall power system of Georgia, and its contribution to reducing the existing power gap, the Georgian Ministry of Energy (MoE) has been making continuous efforts to undertake the Khudoni dam and HPP construction.

Preliminary Environmental Evaluations. In relation with the works completion in 1989, safeguard studies were carried out on environmental, ecological, resettlement and seismic aspects.

Preliminary investigations evaluated the ecological impacts as minimal because of Khudoni's location, being the uppermost reservoir in the overall system of reservoirs - already existing - on the Enguri River. Nevertheless, the current knowledge on the natural environment in this region seems to be relatively poor.

As for social issues, the evaluation of the extent of resettlement carried out in 1992 estimated that 6 villages – totalling approximately 1,000 people - could be affected by the Project.

This preliminary evaluation needs to be updated in order to meet the World Bank requirements.

Currents studies related with the new Khudoni HPP Project. The studies related to the New Project comprise 3 studies to be run in parallel, as separate assignments:

- **safeguard studies** – entrusted to the BRLingénierie – ARS Progetti;
- **technical studies** - entrusted to the Colenco Stucky JV;
- **strategic environmental assessment (SEA)** related to the Georgian power sector - entrusted to the South East Europe Consultants Ltd.

1.3 SCREENING PHASE OBJECTIVES

The following table provides the timetable of both technical and safeguard studies for the Khudoni HPP Project:

Tableau 1-1: Timetable of Technical and Safeguard Studies

Phases	Duration	TECHNICAL STUDIES	SAFEGUARD STUDIES
I	2 months	<u>Assessment of the existing</u> site & works, and existing documentation.	Preliminary Environmental & Social Screening
II	3 months	<u>Project definition</u> , i.e. study of alternatives (locations, types and sizes).	
<i>Decision on which alternative to pursue the feasibility study</i>			
III	7 months	<u>Feasibility study</u>	EIA & Resettlement Action Plan
<i>Decision to proceed</i>			
IV	4 months	Detailed specifications & design, Prequalification and preparation of bidding documents	No assignment

The present report concerning “Preliminary Environmental and Social Screening” is intended to provide an overview of the range and depth of issues to be subsequently studied in detail under the EIA to be undertaken in the following phase (Phase III).

This preliminary work, done in conjunction with the experts in charge of phases I and II of the technical studies, will enable formulation of a project that will integrate environmental concerns from a very early stage, both from the technical point of view and with regard to opinions of the key stakeholders obtained through consultation process.

This first part of the safeguard studies is designed to achieve the following:

- adjustment of the area covered by the study;
- establish the exact status of data, existing and available, and data that needs completing or updating;
- pinpoint the most sensitive components in the bio-physical, socio-economic and legacy (cultural heritage) environment;
- pinpoint elements of the Project that will cause high environmental impacts and highlight those that are likely to create conflicts and require more intense efforts in terms of consultation work;
- discuss different alternatives of the project in terms of potential environmental impacts;
- identify the first set of measures that could reduce or compensate for the significant negative impacts and improve positive impacts;
- make proposals for the communication strategy with local population and other stakeholders.

2. Description of the Project and Alternatives

This chapter gives a description of the different Project components (basic Project) that will interact and generate impacts on the natural and social environment.

The data presented was provided by Colenco-Stucky JV. Several information on the project and alternatives are still missing.

2.1 DAM AND HYDRO POWER PLANT

The salient features related to the Khudoni dam as designed in 1992 are given in the table below:

Tableau 2-1: Main Dam Characteristics (1992)

	1992 design
Dam type	Double curvature arch dam
Height	170.50 m
Crest elevation	670 m a.s.l.
Crest width	3.9 m
Base thickness	25 m
Bottom outlets	2 outlets / diameter = 3 m

Construction of the project was suspended in June 1989. Work completed in 1989 included:

- Temporary and permanent access road;
- Construction camp;
- Diversion works comprising a tunnel and upstream and downstream cofferdams;
- Partial excavation and foundation treatment of the arch dam including 84,000 m³ of concrete for a dam foundation socle;
- Excavation and partial concreting of underground works;
- 500kV substation.

The main features of the 2007-project of dam arch are the following (from Colenco-Stucky JV's executive summary of the phase II report):

- 202 m high RCC Arch-gravity dam primarily at the original location dam axis;
- A surface spillway on the left bank;
- An intake on the right bank primarily at the 1982 location;
- Incorporation of the existing underground works for the new electromechanical equipment for an installed capacity of 700 MW (3x234 MW)

2.1.1 Reservoir

Tableau 2-2: Main reservoir characteristics (from Colenco-Stucky JV's study)

Reservoir Surface Area	4 km ²
Area to be flooded	406 ha
Total volume at Full Supply Level	230 M m ³
Normal flooding level	700 m a.s.l
Minimum flooding level	645 m a.s.l
Maximum length of the reservoir	9 km

2.2 OFFSITE FACILITIES

2.2.1 Power Lines

No information transmitted from Colenco-Stucky JV

2.2.2 Roads

No information transmitted from Colenco-Stucky JV

2.2.3 Workers' Settlements

No information transmitted from Colenco-Stucky JV

2.2.4 Construction Materials

Construction materials suitable for concrete aggregate (foundation blocks on the left abutment and other concrete work up construction) are located at the borrow pit used for the construction of the Enguri Dam at approximately 35 km downstream the Khudoni site in the flooded plain downstream the Enguri dam.

Rock of suitable quality may be located just upstream the Khudoni dam site, within the reservoir.

A plant area suitable for proceeding and stock piling aggregate and a mixing plant should be layed out.

No complementary information transmitted from Colenco-Stucky JV

2.3 ALTERNATIVES

Information on alternatives are provided by Colenco-Stucky JV's Executive summary of the phase II Report .

The technical team undertook a review and evaluation of alternative conceptual layouts for hydropower development along the impacted Enguri river reach involving alternative dam locations and alternative dam types : 8 combinations of dam heights, type and location were studied in a technical and economic analysis.

The different dam site locations studied are:

- Basic option: Khudoni dam site historical location
- Option A: 5 km upstream khudoni dam site historical location
- Option B: 7,5 km upstream khudoni dam site historical location

The Khudoni project at the original location proved to be the best option from a technical and economical point of view.

The following Preliminary Environmental and social screening concerns **the basic option** with the Khudoni dam site historical location.

3. Legal and Institutional Framework

The objective of this chapter is to tackle the legal and institutional framework of the Project and environmental impact study, which will be further elaborated within the EIA (phase III of the safeguard studies).

3.1 GEORGIAN LEGISLATION & INSTITUTIONS

3.1.1 National Policy Objectives

After Georgia's Declaration of Independence (officially on 26 May 1991) and the country's new Constitution adopted in August 1995, the Soviet legislation has gradually been replaced by new laws that are largely based on European legislation and the principle of Rio Declaration and Agenda 21.

To address the most serious environmental challenges, efforts have been made to develop a suitable body of environmental legislation.

The State's environmental policy objectives for specific activities are further detailed in numerous planning documents among which are:

- The Programme for Social and Economic Recovery and Economic Growth approved in 2001 (Presidential Decree No.89);
- The interim paper on the National Plan for Poverty Reduction and Economic Growth approved in 2000 (Resolution No.1282);
- The National Environmental Action Plan (NEAP) adopted in 2000 (Presidential Decree No.191) and revised in ? as the most up-to-date environmental policy statement that has set out environmental priorities to address;
- The National Biodiversity Strategy and Action Plan (NBSAP) adopted in 2005 (Resolution No.27).

3.1.2 Regional & International Cooperation

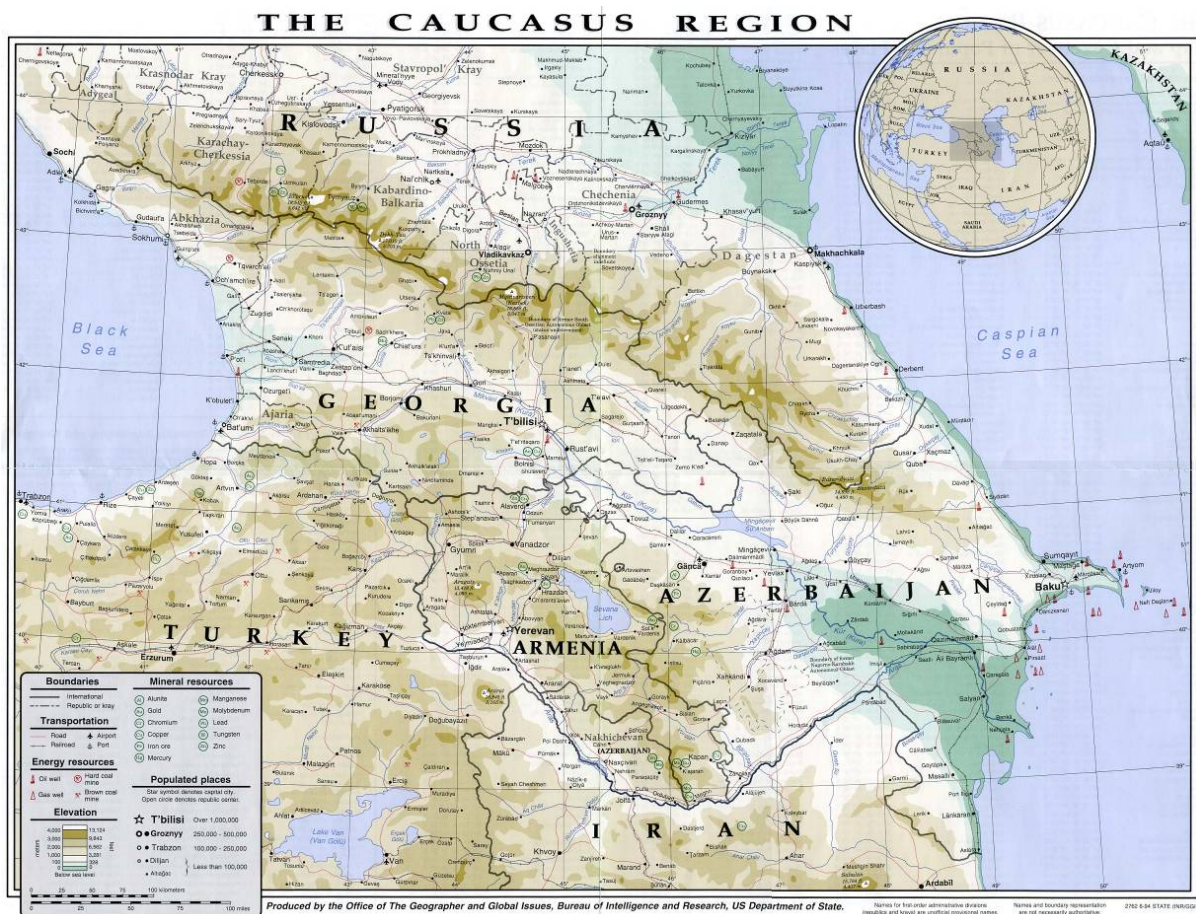
3.1.2.1 Regional Cooperation

Regional cooperation in the field of environment spreads over different levels:

- Georgia is one of the six countries (Armenia, Azerbaijan, the Caucasus part of Russian Federation, North-Eastern Turkey and part of North-Western Iran) composing the **Caucasus Region** and Ecoregion, historically and geographically interpreted as the isthmus between the Black and Caspian Seas;
- Georgia is also part of the **Black Sea countries** and involved in the Black Sea conservation;
- Georgia joined the Intergovernmental Environmental Council (IEC) of the CIS to coordinate activities in the field of environment with other states.

Also, the Regional Environmental Center (NREC) for the Caucasus has been established.

Figure 3.1: Georgia in the Caucasus Region



3.1.2.2 International Agreements

The Republic of Georgia has been quite active in ratifying international instruments of relevance to the environmental protection. Regarding the purpose of the Study, some of them could be mentioned:

■ **Nature and Biodiversity Protection**

- ▶ Convention on Biological Diversity (CBD)
- ▶ Ramsar Convention on Wetlands
- ▶ International Trade in Endangered Species of Wild Flora and Fauna (CITES)
- ▶ The Convention on the Conservation of Migratory Species of Wild Animals (CMS - Bonn Convention)

■ **Climate Change**

- ▶ United Nations Framework Convention on Climate Change
- ▶ Montreal Protocol on Substances that Deplete the Ozone Layer
- ▶ Vienna Convention for the Protection of the Ozone Layer
- ▶ United Nations Convention to Combat Desertification (UNCCD)

■ **Pollution and Hazards**

- ▶ EUR-OPA Major Hazards Agreement

- **Cultural Heritage**

- ▶ European Convention for the Protection of the Architectural Heritage of Europe
- ▶ European Convention for the Protection of the Archaeological Heritage of Europe

- **Public Information**

- ▶ The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters

3.1.3 Institutional Framework for Environmental Protection

Legislative and executive powers in Georgia are mainly centralized.

The Parliament is the major body involved in passing laws, and concerning environmental issues the key actor is the Commission on Environmental Protection and Natural Resources of the Parliament.

Ministry of Environment Protection and Natural Resources (MEPNR) is the main authority responsible for governing and implementing decisions on environmental policy and management.

The MEPNR is headed by the Minister, and is also composed of Deputy Ministers, several departments and subordinated institutions, as shown in the figure 2.

The Department of Licenses and Permits is in charge of ecological examination of the project presented by the investor, preparation of the state of ecological examination, conveying and defining of conclusions.

The sub-agency: Inspectorate of Environmental Protection is in charge of enforcement of the requirements of environmental permits.

For development of the Khudoni HPP Project, other potentially involved sectoral ministries and/or institutions are:

- Ministry of Energy (in charge of the Project and supporter of the Study)
- Ministry of Culture, Monuments' Protection and Sports
- Ministry of Agriculture
- Ministry of Labour, Health and Social Affairs
- Ministry of Economic Development (in charge of Urban Planning and Construction)
- Ministry of Refugees and Resettlement
- Ministry of Justice (in charge of Land Management)

3.1.4 Legal Framework for Environmental Protection

Like most former CIS-countries, the Republic of Georgia intends to establish a new set of modern laws to replace the old Soviet legislation. During the past years the process of drafting and adopting new legislation has progressed considerably.

The Law on Environmental Protection (1996) or the Environmental Protection Act (EPA) establishes the general legal framework for comprehensive environmental protection and for use of natural resources. It covers a wide range of issues, including environmental standard setting, licensing of activities connected with the use of natural resources, issuing of environmental permits, keeping the State registries of environmental information and monitoring.

It is a framework law that outlines a number of other laws in the field especially with regard to laws on Environmental Permits and the State Ecological Expertise as well as provisions on Environmental Impact Assessment.

The EPA provides for important rights, such as the right of citizens to access to information and involvement in procedures like EIAs, and mechanisms, such as permit and EIA procedures and economic mechanisms, which promise to provide for a system of enforcement tools.

3.1.4.1 Key Legal Acts Relevant to the Protection of Environment

- A selection of Georgian **key legal acts** in the field of protection of environment and related to the Project are presented hereafter (non-exhaustive list):
- Constitution of Georgia (August 24, 1995)
- Framework Law for Environmental Protection
 - ▶ 1996 Law on environmental Protection [or Environmental Protection Act (EPA)]
- Nature and Biodiversity Conservation
 - ▶ 1996 Law on Protected Areas System (upgraded in 2003)
 - ▶ 1996 Law on Wild Fauna Protection
- Natural Resources Conservation
 - ▶ 1999 The Forest Code (FGC, in the process for upgrading)
 - ▶ 1997 Law on Water (in the process of upgrading 2008 ?)
 - ▶ 1994 Law on Soil Protection
 - ▶ 1998 Law on Ambient Air Protection
 - ▶ 1994 & 1996 Mining Act (Law on Mineral Resources)
- Environmental Protection
 - ▶ 2005 Law on Licenses and Permits (upgraded from the 1996 version)
 - 2002, Regulation on Environmental Impact Assessment
 - 2005, Decree of the Government n°154 of 01 September 2005 (as amended on 03 February 2006) on the adoption of rules and conditions for issuance of permits for impacting the Environment
 - ▶ 1996 Law on State Ecological Examination (SEE)
 - 2003, Regulation on rules to carry out State Ecological Expertise (14 August 2003)
 - 2003, decree of the Government n° 38/N of 24 February 2003, Standards of Quality of the State of the Environment – [Ministry of labour, Health and Social Affairs]

■ Environmental Security

- ▶ 1995 Law on Transit and Import of Hazardous Waste
- ▶ 1998 Law on Nuclear and Radiation Safety
- ▶ 1998 Law on Hazardous Chemical Substances
- ▶ 1998 Law on the Sea Area of Georgia

■ Land Use and Land Acquisition

- ▶ 1997 Civil Code (defines the legal regime on land holding)
- ▶ 1999 General Administrative Code
- ▶ 1997 Civil Procedural Code of Georgia (defines key procedures for expropriation)
- ▶ 1999 Law on rules for expropriation of ownership for necessary public need (*modified in December 2006*)
- ▶ 1996 Law on ownership rights to agricultural land
- ▶ 2005 Law on registration ownership rights to immovable property
- ▶ 1997 Law on the reimbursement of a substitute land cultivation costs and the payment of damages in cases of allocation of agricultural land for non-agricultural purposes

■ Protection of Cultural Heritage

- ▶ 2007 Law of Georgia on Cultural Heritage
 - 2005, Governmental Decree (No.140) on the rules of issuing the construction permits and on conditions of licensing.
 - 2005, Governmental Decree (No.215) on the rules of issuing the permits for works on historical and cultural sites and on conditions of licensing.

3.1.4.2 Environmental Standards

The environmental protection standards are designed with a view to ensure ecological balance in the environment. In the Article 29 of EPA the standards of environmental quality and maximum permissible levels of emission of harmful materials and pollution by micro-organisms are listed (but not quantified) and are supposed to be defined in five-year cycles by the regulation "on Standards of Quality of the State of the Environment" which is elaborated and approved by the Ministry of Labour, Health and Social Affairs, in compliance with the MEPNR. The last decree is n°38/N dated 24 February 2003.

3.1.5 Key Procedures and Provisions Related to Environmental Issues in Georgia

3.1.5.1 Environnemental Assessment Procedure in Georgia

The protection of environment and biodiversity outside protected areas is addressed by the "Law on Environmental Licenses and Permits" and the "Law on State Ecological Examination".

According to these laws, the Khudoni HPP project is listed among project types for which a **complete procedure** is required, comprising:

- Impact assessment (EIA);
- State Ecological Expertise (SEE);
- Public participation in decision-making.

GENERAL SCHEME FOR ENVIRONMENTAL ASSESSMENT PROCEDURE IN GEORGIA

The environmental assessment procedure for projects like the Khudoni HPP consists of two main stages: the Environmental Impact Assessment (EIA) and the State Ecological Expertise (SEE).

- First stage is the “**Environmental Impact Assessment**” (EIA). The EIA, as an international standard for environmental assessment of projects, was introduced into the Georgian regulation system in 1996. At this stage, frames for the EIA (screening and scoping) are already set. The project proponent (= investor) plays a major role. He is responsible for conducting and organizing the EIA process (Law on State Ecological Expertise, art 8-2 ; Regulation on EIA, art 15). He hires a relevant competent consulting company for undertaking EIA report. He has to fund the whole EIA process (Regulation on EIA, art 17). Finally, he applies for an environmental permit by submitting the application (EIA report and other documentations) to the Environmental administration.

Note: In the Georgian regulatory framework, EIA is to be understood in the narrow sense as a part of the whole procedure for issuing an environmental permit, whereas in most countries EIA is to be understood as the whole procedure.

- Second stage is the “**State Ecological Expertise**” (SEE). The SEE is inherited from the Soviet standards relating to environmental assessment introduced in the '80s. Environmental administration plays a major role in this process. The State Ecological Expertise is conducted and organized by MEPNR or its local bodies, whose responsibility is to: (i) set up a commission of independent experts, (ii) provide necessary information for the process of expertise, (iv) cooperate with other relevant executive bodies in all matters related to environmental assessment.

Box 3.1: Procedure for issuing of Environmental Permits in Georgia

- **(Preliminary scoping & screening)** No specific regulation in Georgia
- Environmental Impact Assessment (EIA)
 - The Investor is responsible for the EIA process
 - An EIA report is prepared by a relevant consulting company
- Application for the Environmental Permit
 - Written application prepared by the Investor (EIA report + other required documents)
- Public consultation
 - Information in the press (within 10 days upon submitting an application)
 - Public review of EIA report and written remarks (within 2 months upon reception of application)
 - Possibility or the public to carry an independent EIA
- State Ecological Expertise
 - Organized by an environmental administration body
 - Commission of independent experts
- Decision & Delivering of Environmental Permit
- **(Post-project monitoring)** No specific regulation in Georgia

PUBLIC INFORMATION & PARTICIPATION

The Georgian legislation provides a legal basis for public participation in the decision-making processes, and improves the public rights to receive timely and accurate information.

In addition, Georgia ratified the "Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters" (Aarhus, 1998).

Principles

The principles of public information and public participation are clearly set up in the Georgian regulations:

- Constitution of Georgia (August 24, 1995) establishes that "individuals have the right to complete, objective and timely information on their working and living conditions." (art. 37, alinea n°5).
- Law of Georgia on the Protection of Environment (Dec 10, 1996), in Chapter I ("General regulation"), introduces two principles: (i) "principle of participation of the public in the decision-making process" when taking important decisions related to the implementation of the activity; (ii) "principle of availability of the information": information on the state of the environment will be transparent and available to the public.
Those obligations are resumed in the "EPA" and a detailed procedure for public participation is also included in other adopted laws, especially in the "Law on State Ecological Examination".
- The Law of Georgia on Environmental Licenses and Permit (15 October 1996, upgraded in 2005) gives the regulatory framework of public information and participation, especially for the Category 1 projects. "Participation of the public in the decision-making is an essential procedure of the issuance of an environmental permit" (art 7).
- The General Administrative Code of Georgia also contains such principles. It clearly defines "freedom of information" (section III) and obliges governmental agencies to provide all relevant information to the public.

Process

Both the Investor and the administration have to take account of views expressed by the public in the process of EIE study preparation as well as in decision-making. The duty and role for each stakeholder (Investor, administration and public representatives) are as follows:

The Investor is obliged to ensure public participation by conducting a public review of the EIA and by ensuring the availability to the public of the research material obtained in the EIA.

Article 15 ("Terms to conduct public review of the EIA") : "the investor is entitled to conduct a public review of the EIA in the course of the EIA ... to ensure publication of information on the date and place of a review". "The review may be conducted in public. Every interested representative of public can attend the review. The review may be conducted at the administrative centre of the district where the fulfillment of the activity is proposed".

The MEPNR, after receiving the application from the Investor, is obliged to carry out the following procedure:

- publish, within 10 days upon reception of the application, an information communicated to the press about: (i) the project ; (ii) date and place for the public review.
- accept and review remarks referred in writing by the representatives of the public, within 45 days after this communication has been published,
- carry out, not later than 2 month upon reception of the application, a public review related to the fulfillment of the activity, with representatives of the investor, MEPNR, local administrations and public.
- prescribe three months as a maximum period for the examination by public representatives of the valid documentation on the project, kept at the MEPNR.

- take into account the opinion of the public when taking decision on the issuance of a permit.

The Public representatives "are entitled to deliver the investor their opinions and remarks .."; (2) "...the investor is obliged to get to know the written opinions and remarks ... send by the representatives of the public and take their arguments into consideration in the registration of valid documentation"; (3) "Representatives ... are entitled to, on their expenses, carry out an independent EIA, which results are to be taken into account in the decision making". (4) If the public representative considers his rights have been violated he is entitled to apply for the court. (Article 16 "Participation of the representative of public to the EIA").

The only cases where the Investor is entitled not to give information are: (i) the required information includes an official, industrial or commercial secrecy; (ii) appropriate research related to the EIA has not yet been completed, the information is not improved and does not describe the real situation.

Note: the law and regulations are considered as too generic (CNEE, 2002). They do not provide proper consultation with the affected communities and/or the general public neither at the stage of EIA preparation nor during the decision-making process. Often, neither the Investor nor the MoE execute these general provision properly.

However, the public involvement in the EIA process is limited to the information provision and consultation. Usually, the public has no opportunity to influence the decision-making process (poor knowledge about the planned project brought up for discussion, lack of knowledge on decision-making procedures, inadequately provided information...).

3.1.5.2 Dispositions for the Protection of Natural Areas

PROTECTED AREAS

According to the "Law on Protected Areas System" (1996, upgraded in 2003), the Georgian protected areas are classified in six categories corresponding to those of IUCN.

Tableau 3-1: Classification of the Georgian protected areas

Type of Protected Area	Management Types and Permitted Activities	IUCN Category
State Reserve	Strict Protection	I
National Park	Ecosystem Conservation; Recreation	II
Natural Monument	Conservation of Natural Features	III
Managed Reserve	Preservation through Active Management	IV
Protected Landscape	Ecosystem Conservation; Recreation	V
Multiple Use Territory	Sustainable Use of Natural Ecosystem	VI

Additionally, the Law also allows for the creation of protected areas under the international designations, including "Ramsar Sites", "Biosphere Reserves" and "World Heritage Sites".

PROVISIONS FOR FOREST MANAGEMENT

The forests in Georgia are managed under the provisions of the Forest Code.

The Forest Code of Georgia (FCG), 1999, sets out the framework for a reorientation from central planning to a more market orientation, with both institutional and policy reforms, and a legal basis for new organizational, management and financing rules under economically, ecologically and socially acceptable conditions.

The Code introduces the possibility to dedicate long-term use rights of state forests to public or private stakeholders. It also permits (art.9) multiple forms of forest ownership (state, community, church and private) to be defined within the Law on Privatisation of the Georgian Forests, but the process has not yet begun.

The FCG outlines and improves regulatory and oversight responsibilities between the MEPNR and the Forest Department. The Department does no more undertake direct commercial harvesting, its functions now being devoted to control and management.

The State Forest Fund is managed using a registry system comprising of the state forest fund monitoring, cadastre and forest inventory (art.23,24 & 25) and according to 10-year management plans.

FCG AND FOREST PROTECTION

The State Forest Fund comprises of: (i) areas already classified as “*protected areas*” (some of them before 1999) and managed by the Department of Protected Areas (art 14 & 15), and (ii) “*Usable State Forests*” for which the FCG defines 3 special protection regimes for areas with particular functions: “*resort forest*”, “*green zone forests*” and “*forest with special soil and watershed regulation functions*” (art.20).

Assigning of these categories is made on the basis of a request submitted by the Ministry of Environment, containing regulations and management rules prepared by the Department of Forestry and Protected Areas (art.43).

Title III (“Forest Protection”) regulates the protection of the Georgian Forest Fund with the following goals: (a) “keeping natural balance of forests’ ecosystems, improving age structure, species composition and condition of forests, establishing sustainable and highly productive forest stands; (b) increasing soil productivity, preventing soil erosion, ... landslides, avalanches and other processes worsening condition of soil; (c) conserving virgin forests, protecting relict, and indigenous and other valuable species”

Title IV (“Forest Use”) defines: (i) conditions for different types of forest use: timber extraction, management of forest plantations, production of secondary wood-products and non-wood forest resources; (ii) the short-term and long-term licensing systems; (iii) rules of timber extraction on steep slopes. “*Slope limit for timber extraction from forests in Georgia is 35°*” (art.68), and for slopes between 30° and 35° (art.69), forest use is allowed only: “*upon special study of possible effects*”, “*using cable roads or in case of thinning using animal power for transportation*” and “*with guaranteed forest restoration immediately following forest use*”.

From the standpoint of soil-protection and water-regulation there is a ban on cutting of regular use in the following forests:

- Riparian forests;
- Forests within 300 m of timberline (i.e. subalpine areas);
- 100-ha forest patches in open areas;
- Forests within 200 m of the tracks of avalanches and flashfloods;
- Forests dominated by relict, native, valuable wooded species or useful (e.g. honey-bearing, farm seeds) species;
- Forests on >35° slopes;
- Forests within 1 km of resorts or mineral springs and sources (this distance is limited by watershed boundary);
- Bank-protective forests within 300 m of rivers, lakes, reservoirs and canals;
- Forests within 100 m of cliffs, screes, landslides, and karsts;
- Forests within 100 m of railroads and roads.

3.1.5.3 Expropriation for Necessary Public Need Procedure in Georgia

EXPROPRIATION PROCEDURE IN GEORGIA

According to the Law of Georgia "Procedure for Expropriation of Private Property for Absolute Public Necessity" (adopted: 23 July 1999; modifications adopted: 12 December 2006).

The expropriation is carried out on the basis of the Decree of the President of Georgia and the Court Decision.

The Khudoni HPP project is concerned by works for which expropriation can be carried out:

- Construction of the road and/or highway;
- Construction of the electric power transmission and/or distribution facilities;
- Cabling of the telephone lines;
- Construction of the buildings and/or objects for public necessity;
- Mining operations.

The Decree of the President of Georgia describes the inevitability of Expropriation for Absolute Public Necessity and the subject (organization or person = Expropriator) empowered to carry out the expropriation.

The decision regarding the expropriation is reached only by the Court. The Court Decision determines the State authority or public/private agency, empowered to carry out the expropriation.

The Court Decision should also determine a detailed description of private property to be expropriated and instructions for adequate compensation to the owner.

The Expropriator must inform all owners of the property after the publication of the Decree of the President. The information should be published in the national and local newspapers and should include the short description of the Project, its implementation framework, territory and desirable Private Property to be expropriated.

All owners of the property also should be informed about the filing to the Court and the date of sitting of the court.

The Expropriator must bring an action to the district or city Court. The application should include the following:

- The Title of the district or city Court;
- The Title and official address of the applicant;
- The Title and/or Name and address of the representative, if the application is submitting by the representative;
- The request of applicant;
- The circumstances, applicant bases the request;
- The proofs of these circumstances;
- The list of documents annexed to the Application;
- Besides, the following documents should be annexed to the application:
 - The detailed description of the Project;
 - The corresponding Decree of the President of Georgia;
 - The detailed description of the Private Property to be expropriated;
 - The proofs of publication of the information (*see above*).

The Expropriator should do his best to receive the Property from the Owner by the bargain. The Expropriator should negotiate with the Owner the conditions of compensation. Prior the negotiations, the Expropriator will hire Independent Expert(s) in order to state the value of the Property according the market prices. The Owner has the right to hire another Independent Expert(s) at his own expense.

Before the negotiations, the Expropriator offers to the Owner the conditions and calculation of compensation in written form. The market price of other property offered as compensation should not be less than the sum stated as the value of Expropriating Property. The surrender of other property as compensation is acceptable only by the assent of the Owner of Expropriating Property.

It is prohibited for the Expropriator to put pressure upon Owner during the negotiations.

The Offer should include any Property (in spite of its insignificance) which is related to or is useless without the main Property.

While stating the value (price) of the Agriculture Lands, the price of the crops should be added. The price of the crops is calculating taking into account the income, the Owner could take from them, during the current year. In case, sowing was made after the stating the value (price) of the Agriculture Lands, the price of the crops will not be taken into account.

The Independent Expert(s) hired by Expropriator have the right to observe the Property, conduct the research and/or take the samples by approbation of the Owner.

Before the Expropriation, the Expropriator gives the Owner the written document, which should include:

- Argumentation of the Absolute Public Necessity of Expropriation of the Property, with corresponding Decree of the President and the Court Decision;
- The argumentation (proofs) of using this Property for Absolute Public Necessity;
- Detailed description of disposition and value of Expropriating Property; the value of Compensation Sum or detailed description and market price of Other Property which is offered as Compensation.

In case, the Expropriator and the Owner could not agree about the market price of the Property and value of Compensation, both parties have the right to apply to the Court.

The Application of Expropriator should include:

- The detailed description of the Private Property to be expropriated;
- The documents proofing the Absolute Public Necessity of Expropriation of the Property;
- The documents related to the Project;
- The Court Decision regarding the Expropriation.

The Court has the right to appoint the Independent Expert(s) in order to state the value of the Property. The Expropriator must pay any expenses related to the Court Case, including expenses for stating the value of the Property.

PREVIOUS SOCIAL EXPERIENCE IN THE REGION (1989-1992)

Enguri

The construction of the Enguri Dam in the 1960s, with the power plant being put into exploitation in 1978, involved the flooding of a small village and the resettlement upstream of a few families.

People report difficulties in accessing agricultural land and distress caused by the flooding and loss of their burial sites.

Khudoni

The construction of the Khudoni Dam, initiated at the end of the '80s, led to the resettlement of 275 families, corresponding to an entire settlement located where the initial construction of the dam was undertaken. The relocation happened in 1992, just before the works were stopped. Relocated people were mostly Government employees, as it was common during the Soviet period.

The resettlement was done 45 km south of Tbilisi in the Kvemo Kartly Region, Tetrtskaro District, in a place called "Khaishi" (for easier reference we will call it "New Khaishi").

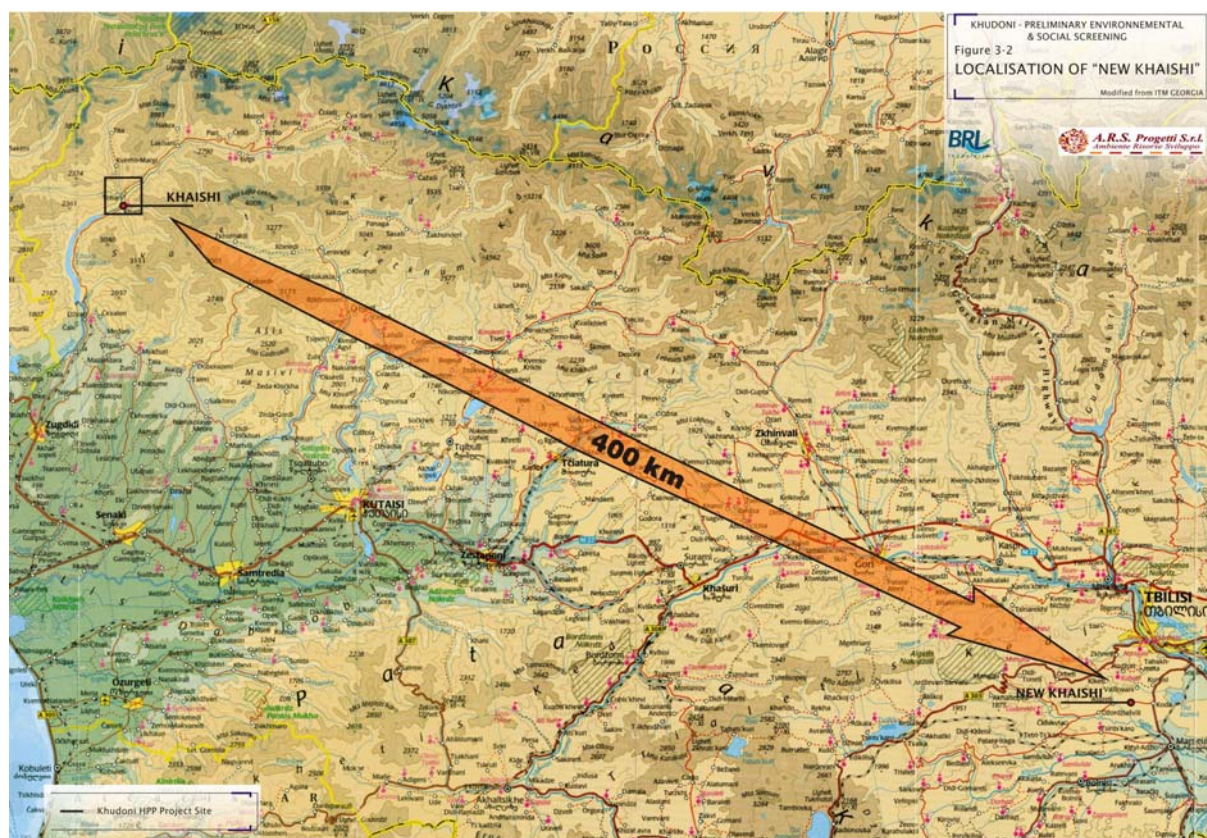
A house and a parcel of good quality agricultural land was made available, but in the middle of an almost desert zone and without irrigation facilities.

Financial compensation was also provided but according to information collected on site, and the funds kept in banks were lost after the collapse of the Soviet regime.

Most families decided to leave, leaving some relatives in Svanetia; many persons returned to their original domicile later or kept their properties to utilize them as summer houses. The *gamgebeli* in New Khaishi informs that currently 130 households (around 600 people) live here, 30 of which regularly move to their original village in Svanetia during the summer to return to Tetrtskaro District in winter.

Adaptation to very different environmental conditions was fatal for some of the elders, being among the most vulnerable people.

Figure 3—1: Localisation of 'New Khaishi'



Recent National Practices Examination

The country's practice with expropriation and resettlement is limited and practically absent in Georgia after the Soviet period. For the present study, the most relevant experience is the British Petroleum (BP) Project for the Baku-Tbilisi-Cheyan (BTC) pipeline which began in 2003. The general expectation was that the benefits, especially in terms of employment, would offset potential negative impacts. To this end, BP proceeded to: a) the purchase of a 44-metre corridor of land from villagers whose land plots stretched out along the pipeline's path, b) the full payment of compensation to affected households and to villages crossed by the pipeline (affecting common land, mainly pasture), c) the establishment and funding of a community development project, the implementation of which was given to CARE International for community mobilization and infrastructure rehabilitation in nearby *sakrebulo*s. Although in the case of Khudoni, the responsibility to pay compensation is kept by the Government (and will not be assumed by the constructing company neither by the potential donors), the BP project provides an interesting lesson as, despite good intentions, a series of setbacks emerged. Those of major interest for our study can be synthesized as follows:

- **Employment:** all parties were characterized by unrealistic expectations in terms of potential employment creation: the President of the Georgian International Oil Company (GIOC) pledged 70,000 new jobs¹. It is reported instead that "while the construction of the pipeline did provide employment to around 6,000 residents (mainly unskilled manual workers) living in the vicinity of the pipeline and provided rather generous compensation to those directly affected, this was not sufficient to revitalize a stagnant local economy"²;
- **Migration waves:** the unrealistic employment expectations created a potentially destabilizing demographic effect in certain areas, encouraging an already on-going migration process from regions where landslides and avalanches forced out-migration. This included people from Zemo Svaneti who could eventually join friends and relatives already settled there as ecological migrants; as most jobs were short-term and many people left their regions to find employment here, the net effect is higher unemployment and a worsened social situation;
- **Private land compensation:** this was paid according to a law which has recently changed and which led to conflicts over which who was entitled to compensation for land crossed by the pipeline: reparation was only paid to those officially owning land, excluding newly-arrived migrants who had no legal claim;
- **Communal land compensation:** this also led to clashes as the Georgian law just stated that communal pasture land belonged to the "village" (*sopheli*) but the definition of the village borders was not legally clearly defined. BP hired the Land Owners Right's Protection Association in order to establish community-based organizations (CBOs) at village level and a democratic mechanism of representation. However clashes emerged in mixed ethnic villages³ over who were members of the village community and was therefore entitled to compensation for common land. The state and local authorities kept a low profile in these disputes, being apparently unable to play a regulatory role. The NGO Green Alternative reports that this is a major problem for people who can't economically afford to go to court;
- **Winners and losers:** the project produced winners and losers as the few families whose land was directly traversed by the pipeline received quite high levels of compensation of between 2 and 5 GEL (1-3 US\$) per square meter depending on the quality of the land, while others – the majority with land the pipeline did not cross – received little or nothing.

¹ Georgian Times, 12 February 2001

² Quotation from "Defusing conflicts in Tsalka District of Georgia: Migration, International Intervention and the Role of the State". J.Wheatley, European Centre for Minority Issues (ECMI), December 2006. This report focuses on the problems experienced in the Tsalka region (located in the west of the province of Kvemo Kartli), characterized by the presence of mixed ethnic groups having been the epicenter of successive waves of in (eco-migrants from Svanetia and Adjara especially) and out (a large exodus of Greeks which started with the collapse of the Soviet regime) migrations. The construction of the BTC project, attracting people from outside, contributed to worsening social disruption.

³ In the region of Tsalka, many Georgians occupied houses belonging to people of Greek origin who were able to return to Greece; however owners never sold their properties which legally still belong to them and the new occupiers have no legal document to claim the property.

3.2 WORLD BANK POLICIES AND GUIDELINES ON ENVIRONMENT AND RESETTLEMENT

Among the World Bank's 10 safeguard policies, 6 concerning environmental issues need particularly to be taken into account in the Safeguard Studies for the Khudoni HPP Project:

ENVIRONMENTAL ASSESSMENT (OP/BP/GP 4.01)

This policy is the main policy directly applicable to the Khudoni Project EIA, EMP, RAP when the Khudoni HPP Project is classified in the Category A.

Target	This policy covers impacts on the natural environment (air, water, land); human health and safety; physical cultural resources; cross-border and global environmental concerns
Requirements	The objective is to ensure that the project [that is likely to have potential adverse environmental risks and impacts in its area of influence] is environmentally sound and sustainable, and decision-making is improved through appropriate analysis of actions and likely environmental impacts.
Consultation and Disclosure	<p>The borrower consults project-affected groups and local NGOs as early as possible about the project's environmental aspects and takes their views into account.</p> <p>For the Category A projects: the borrower consults these groups at least twice: (a) shortly after the environmental screening, and (b) once a draft Environmental Assessment (EA) report is prepared. (c) In addition, the borrower consults with such groups throughout project implementation as deemed necessary in order to address EA-related issues that affect them.</p>

NATURAL HABITATS (OP/BP 4.04)

This policy is applicable to the Khudoni HPP Project regarding the loss of natural habitat areas caused by flooding and potentially by other infrastructure construction including roads (works and erosion).

Target	<p>This policy is triggered by any project with the potential to cause significant conversion or degradation of natural habitats, whether directly or indirectly.</p> <p>The policy distinguishes between critical habitats [those which are either legally protected, officially proposed for protection or unprotected but known for their high conservation value] and other natural habitats. The EA process should identify any critical natural habitats within the proposed project's area of influence.</p>
Requirements	Bank-supported projects must avoid significant conversion or degradation of any critical natural habitats and the policy requires acceptable mitigation measures to minimize damage to other natural habitats to the extent possible.
Consultation and Disclosure	The consultation and disclosure requirements are those required under the EA policy (OP 4.01), and the policy requires consulting with local people in planning, designing and monitoring projects.

FORESTS (OP/BP 4.36)

This policy is applicable to the Khudoni HPP Project regarding the foreseen forests areas that should be flooded and the potential impacts on landslide and erosion of the banks formally covered by forests.

Target	The objectives of this policy related to the project are essentially to protect the vital local and global environmental services and values of forests.
Requirements	Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality.
Consultation and disclosure	The consultation and disclosure requirements are those required under the EA policy (OP 4.01), and in addition the policy requires consulting with the private sector and interested groups in the forest area, if any.

CULTURAL PROPERTY (OPN 11.03, BEING REVISED AS OP 4.11)

This policy is applicable to the Khudoni HPP Project regarding the recognised cultural heritage region of the Upper Svaneti at the international level (UNESCO classification) particularly related to Medieval villages and tower-houses of the Enguri valley

Target	This policy covers impacts on objects, sites, and structures, groups of structures, natural features and landscape that have archaeological, speleological, historical, architectural, religious, aesthetic or other cultural significance, and may be above ground, underground or underwater. Their cultural interest may be at the local, provincial or national level or within the international community.
Requirements	The policy requires investigation and inventory of cultural resources potentially affected and actions which would mitigate potential adverse impacts, including mitigations measures, provisions for treatment of physical cultural resources discovered during the project implementation any necessary measures for strengthening institutional capacity to implement the management plan and monitoring system to track the progress of activities.
Consultation and Disclosure	The consultation and disclosure requirements are those required under the EA policy (OP 4.01), and in addition the policy requires consulting with appropriate agencies, NGOs, and university departments.

INVOLUNTARY RESETTLEMENT (OP/BP/4.12)

This policy is applicable to the Khudoni HPP Project regarding the predicted flooding of Khaishi and some other hamlets.

Target	This policy covers impacts of project [that is likely to have potential adverse socio-economic risks and impacts in its area of influence] on population and assets. The policy covers not only physical relocation but also any loss of land.
Requirements	<p>Avoids or minimizes involuntary resettlement where feasible, exploring all viable alternative project designs;</p> <p>Assists displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them;</p> <p>Encourages community participation in planning and implementing of the resettlement;</p> <p>Provides assistance to affected people regardless of the legality of land tenure.</p> <p>When the policy is triggered, preparation of a Resettlement Action Plan is required.</p>
Consultation and Disclosure	The consultation and disclosure requirements are those required under the EA policy (OP 4.01)

INDIGENOUS PEOPLES (OP/ 4.20 BEING REVISED AS OP 4.10)

This policy is applicable to the Khudoni HPP Project regarding the preserved and original way of life of the Svans with their own language and traditions, ancient customs still being a part of their everyday life, and the predicted flooding of Khaishi and some other hamlets

Target	This policy covers impacts on population considered as 'indigenous people'.
Requirements	<p>The objectives of this policy are to ensure that the project [that is likely to cause potentially physical relocation of households or impose restriction of access to natural resources in its area of influence]:</p> <p>Ensures that the development process fully respects dignity, human rights, economies and cultures of indigenous peoples;</p> <p>Ensures that adverse effects during the development process are avoided or, if this is not feasible, ensures that they are minimized, mitigated or compensated;</p> <p>Ensures that indigenous peoples receive culturally appropriate, gender and intergenerational inclusive social and economic benefits.</p>
Consultation and Disclosure	The consultation and disclosure requirements are those required under the EA policy (OP 4.01), and in addition the borrower will make the EA available to the affected communities in an appropriate form, manner and language

Board 1 : Mestia and upper Enguri valley

1a. Mestia valley.



1b. Tower houses at Mestia.



1c. Mestia.



1d. Higher Enguri valley with Caucasian mountains



1e. High Enguri valley.



1f. Village near Mestia.



1g. Works on the road.



1h. Mountainside road.

Board 2 : Upper Enguri valley upstream the future reservoir area



2a. Process to fight against erosion below the road on mountainside.



2b. Erosion on mountainside



2c. Sawmill.



2d. Enguri deep valley.



2e. Enguri deep valley.



2f. Enguri deep valley.

Board 3 : Future reservoir area (1 - upstream Tobari bridge)



3a. Bridge on Enguri river.



3b. Enguri River.



3c. Enguri river (view to upstream).



3d. Mountainside road .



3e. Sawmill and cultures in flood plain.



3f. Pebble deposit area in the Enguri river bed.



3g. Rock bloc in the river bed.



3h. Rock bloc in the river bed.

Board 4 : Future reservoir area (2 - Nenskra river & downstream Tobari bridge)



4a. Nenskra river.



4b. Nenskra river.



4c. Nenskra river .



4d. Nenskra river before confluence with Enguri.



4e. .



4f. Enguri river bed.



4g. Enguri river upstream Khaishi.



4h. Enguri river upstream Khaishi.

Board 5 : Khaishi and surroundings



5a. Board of the Khaishi village.



5b. Meeting in Khaishi between inhabitants and experts.



5c. Village of Khaishi – Enguri river on the right and a tributary on the left.



5e. Houses on river bank.



5f. A Khaishi place.



5g. One of the church and cemetery.



5h. A store in Khaishi.

Board 6 : Khudoni HPP historical project site



6a. Inlet of the by-pass river.



6b. Inlet of the by-pass river.



6c. Khudoni dam implantation project site.



6d. Deforested an eroded righth-bank montainside.



6e. Deforested an eroded right-bank montainside.



6f. Tunnel towards future engine room.



6g. Existing fondation of khudoni dam on the left-bank.



6h. Outlet of the by-pass river.

Board 7 : Enguri downstream Khudoni project site

7a. Enguri river downstream the outlet.



7b. Enguri river downstream Khudoni project site.



7c. Enguri river just upstream project site



7d. Enguri river



7e. Enguri river



7f. Outlet of the future engine room.



7g. More or less illegal occupation of old settlements



7h. Sawmill and spreading of sewage on the river bank

Board 8 : Enguri dam reservoir



8a. Bowl upstream extremity – trees deposit on the bank.



8b. Bowl upstream extremity – trees deposit on the bank.



8c. Sediment bank in the upstream bowl.



8d. Sediment bank in the upstream bowl.



8e. The reservoir upstream the Enguri dam.



8f. The reservoir upstream the Enguri dam (www.erkonet.de).



8g. The Enguri dam and its reservoir.



8h. The Enguri dam and its reservoir (www.apsny.ru).

Board 9 : Enguri high dam

9a. Enguri dam.



9b. Enguri dam.



9c. Enguri dam and its reservoir.



9d. Plateform on the left bank.



9e. Inlets to Enguri HPP are visibles on this picture.



9f. Outlets.



9g. Outlet facilities.



9h. Enguri river downstream the high dam.

Board 10 : Lower Enguri river



10a. Enguri river upstream Djvari's bridge.



10b. Enguri river downstream Djvari's bridge.



10c. Orsantia bridge.



10d. Hazelnut plantation in the coastal plain.



10e. Anaklia – View of coastal marshland.



10f. Anaklia – View of coastal marshland.



10g. Anaklia – the mouth of Enguri river.



10h. Anaklia - The Black Sea.

4. Methodology for Diagnostic and Preliminary Impact Assessment

4.1 GEOGRAPHIC INFORMATION SYSTEM (GIS)

A GIS dedicated to environmental assessment of the Khudoni Project is initialized in this preliminary phase and will be very useful for the following phases of the safeguard studies.

Integration of both information collected (existing information/raw and spatialized data collected) and field survey results into GIS database will allow for producing thematic maps reporting main features of the bio-physical, sociological and cultural environment.

At this stage, available spatialized data on natural environment and resources in the study area were identified at different places: (i) MEPNR - Spatial Information Centre and Forestry Department/Survey Unit; (ii) Seismic Monitoring Centre of Georgia; (iii) GIS Lab (private agency).

Different maps have been used for this report:

Topographic maps of the whole expanded study area, built up from the topographic maps (1/50,000) provided by the Ministry of Energy (incomplete thus completed by other sources) have been geo-referenced.

Topographic maps of the core study area (1/25,000 based on old data from the '60s) have been provided by the Ministry of Energy.

Since data at a compatible scale for exploitation in the context of the study area were not easy to obtain during this preliminary phase, this first part of the safeguard studies is mainly presenting information supported by an atlas of maps.

For the following phases, topographic maps (1/1,000) and aerial photos of the core study area that will be provided with a suitable definition by Colenco-Stucky JV, will be used for strengthening of the GIS and will be very useful especially for the study of vegetation cover and social issues at the parcel scale.

4.2 BIO-PHYSICAL ENVIRONMENT

For the natural environment issues the method is based on: (i) an in-depth identification of the existing data completed by (ii) a preliminary survey of the study area and field observations on selected stations; (iii) a global description of the study area and preliminary mapping of main biophysical features; (iv) analysis of the key issues and first assessment of environmental impacts and mitigation measures/monitoring process to be implemented.

4.2.1 In-Depth Identification of the Existing Information

The existing environmental data, studies and specialised documents on the Project environment were identified and collected and are to be further analyzed during the EIA, particularly:

- Physical data (meteorology, geology and soils, morphology, hydrology, sedimentology and fluvial dynamics, floating materials, water quality, seismic risk...);
- Biological and biodiversity data, by compiling the list of globally threatened 'trigger' species – with both national and international status – for the study area and by incorporating sites already identified as Key Biodiversity Areas – KBAs (see box 4.1).

Box n° 4.1: Establishment of Key Biodiversity Areas - KBAs

In order to define the importance of the core study area for the conservation of biodiversity (for terrestrial biomes only), we have established site-based conservation priorities in the context of establishing Key Biodiversity Areas (KBAs) throughout the Caucasus Ecoregion. This method is comprised of two stages:

- Defining whether the core study area falls within the national KBA criteria;
- Assigning the priority level based on KBA-based GAP analysis⁴.

For the Khudoni Project, the procedure is applied on a national scale using the national IUCN criteria.

Criteria used to assign species-based vulnerability scores to species-site combinations are the following:

Species-Based Vulnerability Score	Global Threat Status
Extreme	Critically Endangered (CR)
High	Endangered (EN)
Medium	Vulnerable (VU)
Low	Near Threatened (NT), Least Concern (LC)

The KBA identification process uses two criteria, which align with the two principal measures of systematic conservation planning: vulnerability and irreplaceability.

Under these criteria, KBAs are selected based on the presence of species that require site-scale conservation. The KBA delineation process is described in the Appendix 4.1.

4.2.2 Indepth Interviews

Different stakeholders in charge of environmental issues or holding environmental data were interviewed during the first team mission. The list of people interviewed are presented in the Annex 4.2:

During this preliminary phase, and particularly during the inception mission, the environmental experts interviewed major stakeholders in order to understand the main environmental issues of the project, and to collect environmental data on the study area (mainly regulations and hydro-meteorological data).

The table presented in the Annex 4.2 provides a list of stakeholders interviewed during the inception mission with key environmental issues which were discussed.

⁴ The procedure of the identification of KBAs and KBA-based GAP analysis is the one described in the IUCN KBA Guidelines (Langhammer et al. in press).

4.2.3 Preliminary Survey of the Study Area

A preliminary survey of the study area (March-April 2007) was completed by further field observations on selected stations and focused on:

- morphology and landscape of the alluvial valley and river bed: shape and soil occupation of the valley section, nature of banks and river bed, nature of sediments, presence and nature of alluvial wetlands, flowing features and approximate flow;
- activities on banks and river bed: human occupation, pasture, fisheries, sawmills;
- investments (water intake and water discharge, bridges and fords, sills, watering spots...);
- nature of the vegetation cover (main habitats and vegetation communities, extent, state of degradation if any);
- first observation of macro-fauna occurring in the area.

Observations are documented with numerous numeric pictures (see picture boards hereafter).

4.3 SOCIO-ECONOMIC ENVIRONMENT

As proposed in the tender documentation, the applied method for the Preliminary Social Screening is the Participatory Rapid Appraisal (PRA) technique⁵.

The main objective is to identify households, people, and properties affected by the Project, to undertake the first assessment of a possible resettlement and prepare for the comprehensive census which will be conducted during the Expanded Social Screening. This requires identification and interviewing of additional stakeholders and pre-testing of the survey tools (questionnaires) to be used during the following census of population and their properties.

This preliminary investigations allow for making proposals for the communication strategy.

4.3.1 Participatory Rapid Appraisal

Additional stakeholders are identified using the *Snowball* method: i) a focal actor or set of actors are identified; ii) each actor is asked to name some or all of his ties to other actors; iii) all the actors named (who were not part of the original list) are tracked down and asked for some or all of their ties. The process continues until no new actors are identified.

Information from identified stakeholders are collected using two methodologies: (i) In-Depth Interviews and (ii) Focus Group Discussions. The list of people interviewed during this appraisal is presented in the Annex 4.3.

4.3.1.1 In-Depth Interviews

In-depth Interviews are conducted with individual stakeholders, based on previously developed guidelines. In-depth interviews allow for determining of individuals' perceptions, opinions, facts and forecasts, and reactions to initial findings and potential solutions. They are conducted in Tbilisi, Zugdidi, Mestia and the Target Area. Interviews are recorded and, upon completion, detailed transcripts are prepared. Data obtained are analyzed and a draft report prepared.

⁵ PRA provides a "basket of techniques" from which those that are most appropriate for the project context can be selected. The techniques include interviews and discussions, mapping, ranking, and trend analysis. The main tools used in PRA include semi-structured interviewing, focus group discussions, preference ranking, mapping and modelling, and seasonal and historical diagramming.

4.3.1.2 Focus Group Discussions

Focus Group Discussions are used to interview pre-identified Target Groups (6-7 persons each). This is a qualitative research method where a group discussion focuses on a series of topics introduced by a discussion leader (moderator). The group members are encouraged to express their own views on each topic and to elaborate or react to the views of others. To lead the discussions, Focus Group Guidelines are developed by the Social Team, in accordance with the Study objectives and adapted to each discussion group.

Each Focus Group session is lead by a moderator, in accordance with the developed Focus Groups Guidelines, and will last approximately 1.5-2 hours. Discussions will be recorded and a detailed transcripts of the sessions prepared. Data obtained will be analyzed and a draft report prepared.

Qualitative material obtained through focus group sessions provide results that can serve both as independent data as well as complementary information for the analysis of quantitative survey results.

4.3.1.3 Pre-Testing of the Survey Tools for Census

A complete census will be done during the Expanded Social Screening and it will then be the basis for the Resettlement Action Plan. A comprehensive questionnaire will be prepared; in order to assess its effectiveness and structure, the tool will be pre-tested using the Pilot Interviews method, involving at least 15 households (10 randomly selected in Khaishi and 5 randomly selected in small settlements around Khaishi). The tools previously designed are: i) the Draft Survey Questionnaire (combined ESIA & RAP), and ii) the Draft Inventory Questionnaire (RAP).

A photographic documentation will complement the survey.

The most experienced interviewers have participated in the pre-test survey, each one conducting no more than 2 interviews⁶. Particular attention has been given to the following issues:

- Questions that were difficult to comprehend for the respondents;
- Questions that were left without answer;
- Questions that had answers other than those foreseen by the questionnaire;
- Questions that were ambiguously understood by the respondents;
- Other difficulties revealed during the pre-testing.

After the interviews, the entire Team (Project Manager, Analyst, Field Coordinator, Data Manager and Interviewers) meet and share experiences and then adapt the questionnaire to the findings, and prepare the final version. This will allow for immediate operationality at the beginning of the Expanded Social Screening Phase.

4.3.2 Identification of the Most Effective Methodology for Public Consultation and Communication Channels

The process used for this preliminary environmental screening phase is the first step in the process of public consultation. In addition, and envisaging the Expanded Social Screening Phase, a system is set up aiming to keep people informed of the findings and to enable them to express their views (in addition to moments identified above). The strategy will be adapted to the peculiarities of the Svan population, identifying the most effective and accepted mechanism. Findings of the preliminary phase will be proposed for revision to all interested groups.

⁶ To assure quality of the pre-test, the number of interviews is as important as the number of interviewers.

4.4 CULTURAL HERITAGE

Information on historical and archaeological sites in the region are collected and analyzed, by review of existing literature, documentation of cultural tourism, reports of surveys and other conservation projects and interviews of specialists of the cultural heritage of this valley.

Existing excavation reports are considered.

UNESCO has been contacted (UNESCO offices in Tbilisi and Paris) in order to define the range of the site classified as the world heritage (upper Svaneti).

4.5 PRELIMINARY INVENTORY OF IMPACTS AND MITIGATION MEASURES

This preliminary assessment will give an overview of the range and depth of issues to be subsequently studied in detail under EIA to be undertaken further.

The major impacts of the project dam site and reservoir (basic project) as well as all relevant infrastructure (access roads, transmission lines, borrow areas and spoil deposits...) on sensitive components of the environment (bio-physical as well as socio-economic and cultural) determined above are identified.

The impacts are evaluated as regards the environmental value and the sensitivity level (or presumed conflict level) of every component concerned by the effects of the Project.

This evaluation integrates the presumed (i) **Extent**: localised or widespread effects; (ii) **duration**: short-, medium- or long-term effects, (ii) **reversibility**: temporary or irreversible effects; combined with environmental value of the environmental components.

As a result, four levels of impact will be used: **negligible** (not significant), **low**, **moderate** and **high**.

The alternatives (dam location, dam height, extent of the reservoir, location of borrow areas...) are discussed and compared with the basic Project in terms of environmental impacts.

A first set of **mitigation measures** (attenuating/compensating) is proposed.

The major impacts on different components of the environment are synthesised in a **table of impacts and measures** for each stage of the Project (during construction, during filling-up of the reservoir, and during operational stage).

5. Definition of the Study Area

5.1 STUDY AREA

The area to be studied for the Preliminary Environmental and Social Screening of the Khudoni HPP Project includes all areas that might be potentially affected by the Project, or which study is necessary to understand the impacts of the Project.

The study area includes:

- *the whole watershed upstream the future reservoir*, insomuch as it determines the water supply, water quality, sediments and floating material supply to the future reservoir;
- *the area of the future reservoir and its surroundings*: Enguri valley and tributary valleys, Khaishi village;
- *the HPP Project site and immediate surroundings*, i.e. the implantation site of the dam and ancillary infrastructure: construction site, workers' settlements, access roads...;
- *the river systems downstream the Khudoni Project site*, i.e.: (i) the Enguri River between the Khudoni Dam site and the Enguri Reservoir; (ii) the Enguri Reservoir; (iii) the lower Enguri River from the Enguri Dam to the Black Sea; (iv) the Abkhazian River system downstream the Enguri HPP (= Eristakli watershed). The three last elements will be taken into account as the Khudoni HPP implementation might change the hydraulic management of the Enguri Dam.

Environmental and social baseline analysis of the study area will be made on the two following scales:

- *An expanded study area*, (i.e. the whole study area) some parts of which might be affected by indirect impacts of the HPP Project,
- *A core study area*, where direct and major impacts of the Project might occur, i.e. implantation of the reservoir and flooding of the Khaishi village, slope erosion due to the construction of roads and other facilities, other impacts related to the Project during development, construction and operation stages.

Figure 5-1 : Map of the Study Areas



Figure 5—2: General 3D view, from upstream of the Upper watershed: the Enguri valley and the Mestia valley (from Google Earth, 2007)

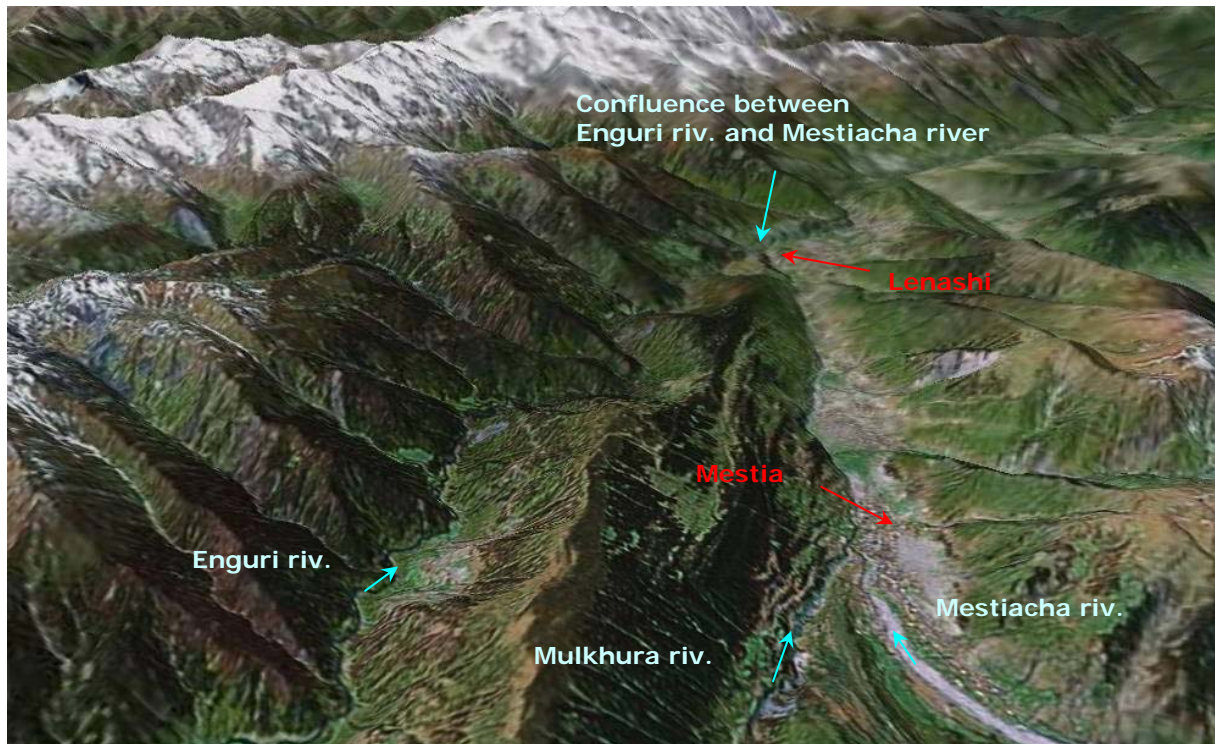


Figure 5—3: General 3D view from upstream of the Upper watershed: the Enguri valley between Svipi and Pari (from Google Earth, 2007)

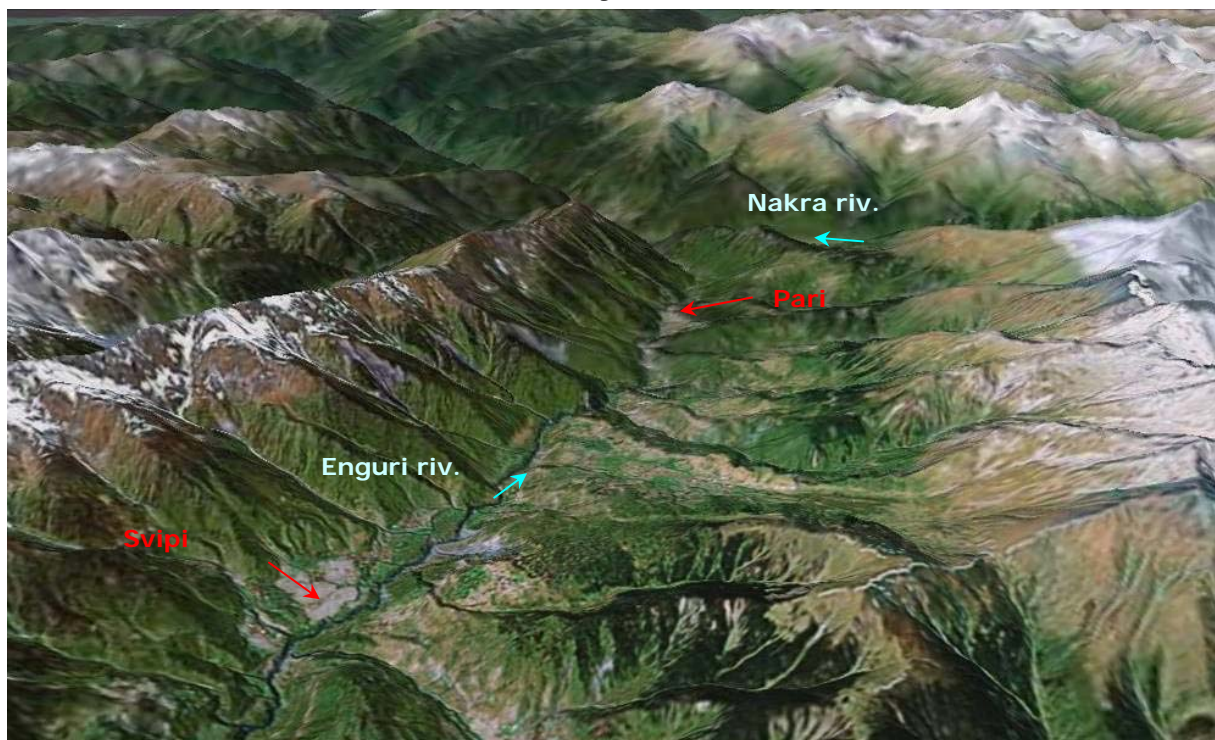


Figure 5—4: General 3D view, from upstream of the Central part of the Enguri watershed - the Khudoni dam project and the Enguri reservoir (from Google Earth, 2007)

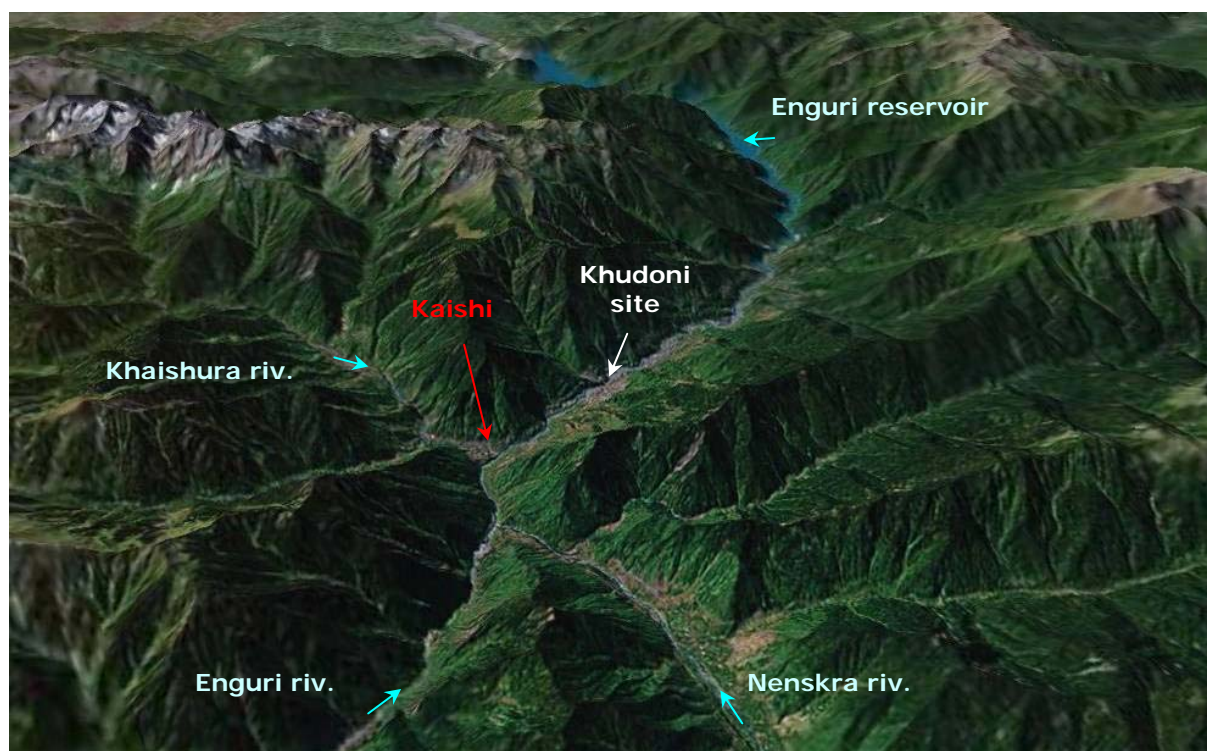
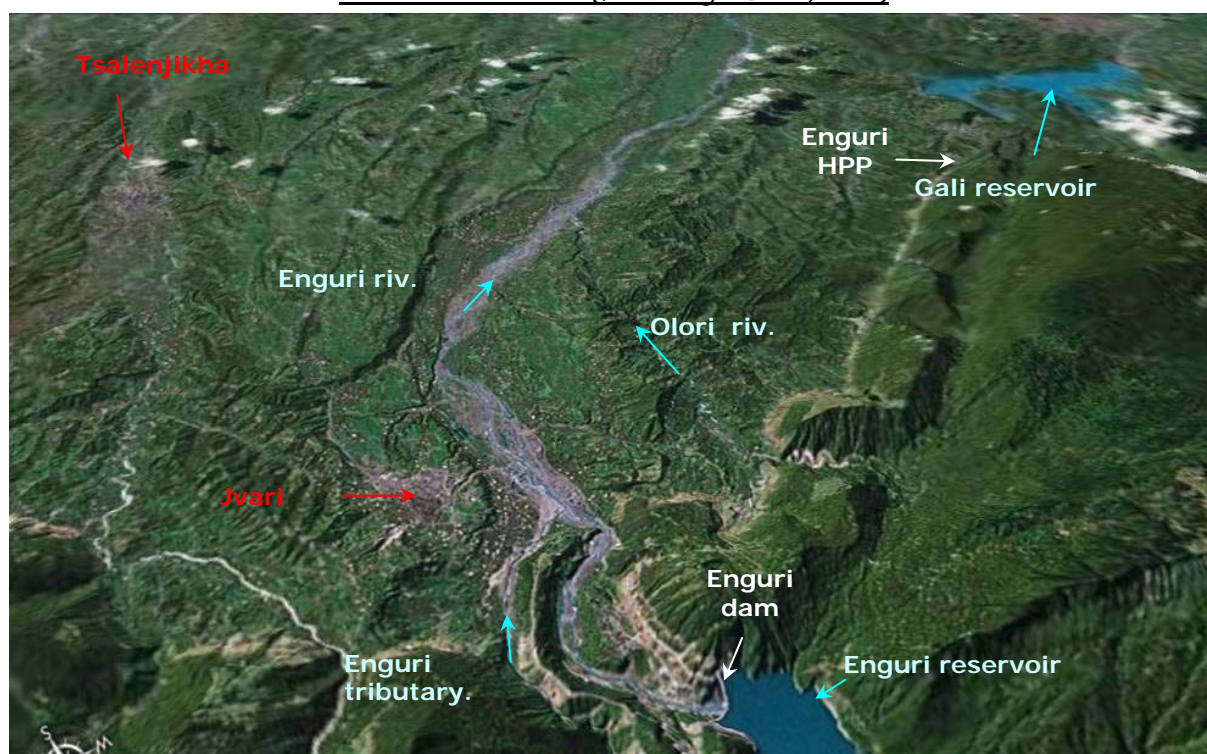


Figure 5—5: General 3D view, from upstream of the lower part of the Enguri watershed - the Enguri dam and the Gali reservoir (from Google Earth, 2007)



6. Natural Environment Diagnostics

This chapter describes, at a screening stage, the key issues of the natural environment within the study area: (i) physical environment (i.e. climate, relief, geology, soils, hydrography, hydrology, water quality, solid flow); (ii) biological environment (vegetation, terrestrial and aquatic fauna, biodiversity status, protected areas); (iii) landscape; (iv) natural resources (hydropower, forest resources, mining, fishing and hunting); and (v) natural risks and pollution.

6.1 PHYSICAL ENVIRONMENT

6.1.1 Climate

6.1.1.1 Local Climate

General features. Western Georgian lowlands around the Black Sea (= Kolkhida lowlands) are characterized by a humid subtropical climate. The Greater Caucasus forms a barrier for cold air masses from the North, and forces moist air masses from the Black Sea to move upward, causing intense precipitations. In contrast, Eastern Georgia is far more dry.

The climate varies significantly with elevation, forming a gradient of climatic belts from the sea to the summits within a distance of one hundred kilometres only. The upper Enguri watershed experiences cool and wet summers, and long winters with high snow fall. Permafrost conditions occurs in the highest mountains.

Temperature. Kolkhida lowlands is one of the warmest part of Georgia, with mean annual temperature ranging from 12 to 15°C. Mean temperature is maximum in July (22-24°C) and minimum in January (5-7°C). The absolute minimum is about -16°C.

Mean annual temperature (figure 6.1) falls with elevation and ranges 6-10°C in the mountainous part of the valley, and 2-4°C in the high mountain zone, with absolute minimum down -30°C and -35°C, respectively. The southern slope of the upper Svaneti valley is the coldest spot of the study area, with mean annual temperature below 2°C.

Rainfall. On the coast, near Anaklia, and in the central part of the Enguri Valley, up to Lakhani, annual precipitations range from 1,400 to 1,800 mm (figure 6.2).

In Zugdidi, precipitation is about 1,788 mm/year (1929-1988 period) and tends to be uniformly distributed throughout the year, with particularly heavy rains during summer and autumn months (figure 6.3). Mean precipitation is maximum in June (182 mm) and decreases gradually to become minimum in May (111 mm). Occasionally sub-tropical anti-cyclones induce drought conditions.

Rainfall raises with elevation, reaching 2,800 mm on the summits of Mount Kodzal and Mount Lajla-Lekheli – on both sides of the future reservoir area -, and more than 3,200 mm in the highest range of the Greater Caucasus.

In contrast, the upper Enguri valley appears to be the driest part of the study area with precipitations down to 1,000-1,200 mm.

Figure 6—1: Distribution of mean annual air temperatures in the study area (from UNDP/GEF, 1999)

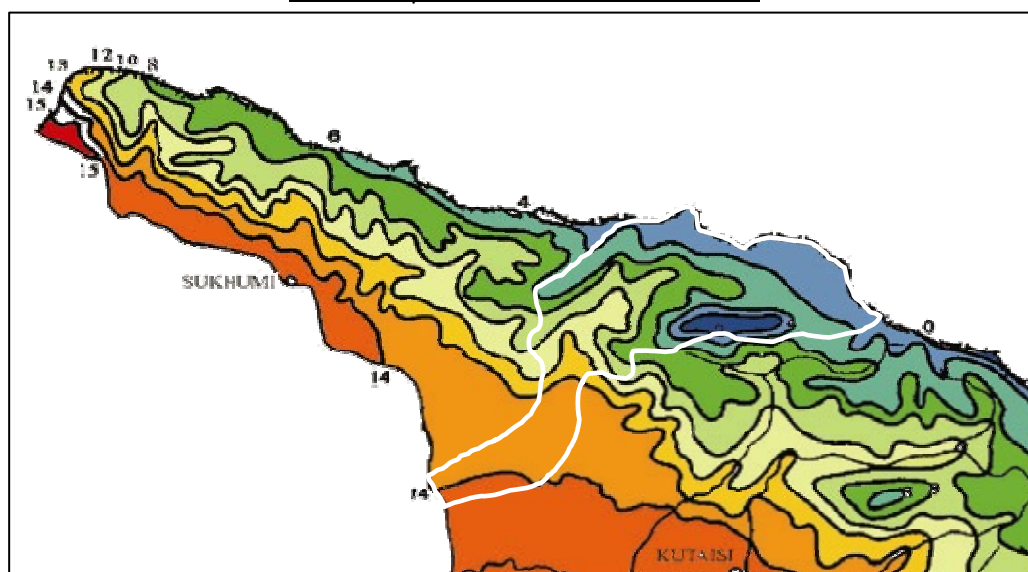


Figure 6—2: Distribution of mean annual sums of atmospheric precipitations in the study area (from UNDP/GEF, 1999)

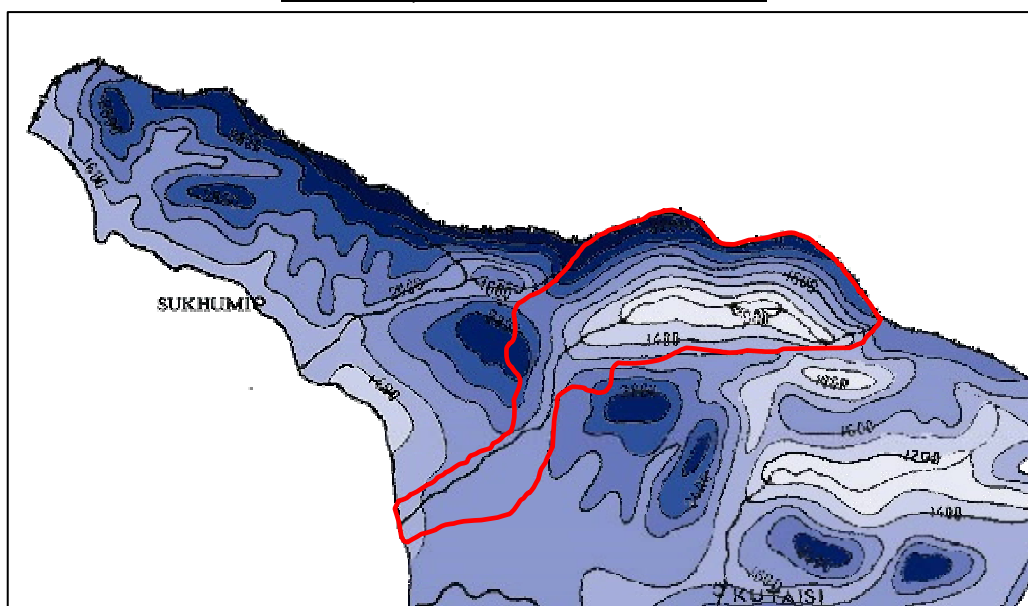
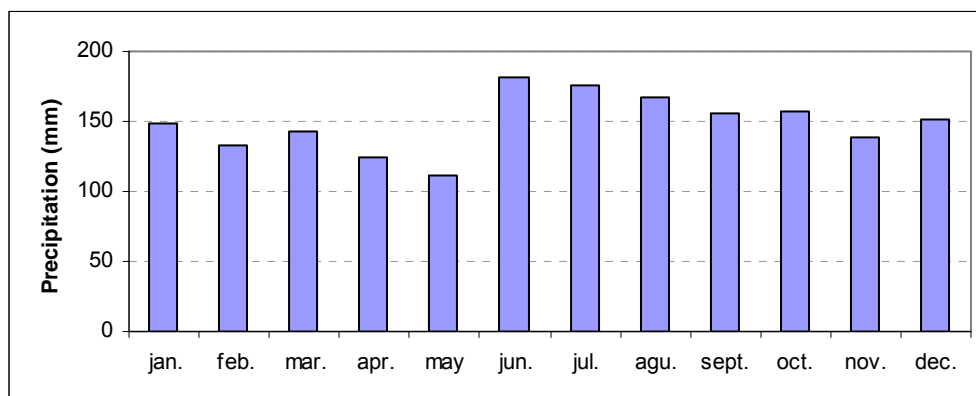


Figure 6—3: Monthly mean precipitation at Zugdidi between 1929 and 1988 (from GHCN)



Snow cover. Duration of a stable snow cover increases from 10-20 days on plains to 100-150 days in mountainous regions. Stable snow cover forms from the altitude of 500-600 m. Alpine conditions begin at about 2,100 meters. Above 3,000 meters, mountains are covered by snow and ice year-round (USAID, 2006). At some mountain stations, the height of snow cover reaches 4 to 6 m.

Wind. Wind regime in Western Georgia is under the influence of orography. Breeze circulation, from Black Sea to valleys is considerably revealed. Average wind speed does not exceed 2 to 3 m/s in the valleys covered by forests. The most frequent and high winds are characteristic for the mountain and high mountain passes with mean annual wind speed reaching 5.5 to 9.0 m/s (UNDP/GEF, 1999)

Solar radiation. In the most part of Georgian territory, mean annual duration of solar radiation varies within the range of 1900-2200 hours. In the high mountain zones, where cloudiness is frequent at some places, this value decreases down to 1,500-1,300 hours (UNDP/GEF, 1999).

6.1.1.2 Climate Change

Climate evolution in the study area is analysed in relation with: (i) global changes over the XXth century, and (ii) the implementation of the Enguri reservoir in the '80s.

Climate changes over the XXth century. Analysis of climatic data from 1905 to the early '90s shows small changes for temperatures and precipitations in the study area (UNDP/GEF, 1999 ; N. Begalishvili, pers.com.):

- A decrease of the mean temperature in the upper Enguri watershed (- 0.3°C) and surrounding ranges but fairly stable in central and lower valley;
- A general reduction of annual precipitation in the whole country, except in a few places like high Caucasian mounts near Mestia (up to 5%) and the coastal plain between Zugdidi and Anaklia (up to 10%).

Climate change due to Enguri dam reservoir. In the late '90s, the Institute of Hydrometeorology (IHM, a department of the Georgian Academy of Sciences) has developed a research program on the influence of Enguri reservoir implementation on local climate. The research was based on data from the former meteorological stations at Mestia/Betho, Khaishi, Djvari and Zugdidi and measurement investigations in the lake area.

The results show (Begalishvili, pers. com.):

- no significant statistical difference on time series of climatic parameters (temperature, humidity, rain fall ...) before and after the dam implementation. If any influence of the dam on humidity, it is insignificant compared to the influence of the Black Sea.
- a good correlation between the 4 stations (Djvari and Zugdidi downstream the dam; Mestia/Betho and Khaishi upstream). There is no reservoir effect at a large scale either in summer or in winter. However, in summer, the climatic difference between Djvari and Khaishi has decreased since the reservoir implementation, which induces homogeneous conditions on this section of the valley.
- a significant elevation of average temperature above the reservoir (measured 2 m above water level) and in immediate surroundings, but no significant difference in the valley, either upstream or downstream the lake.

According to these scientific results, significant changes in local climate due to the Enguri reservoir implantation only appeared above the reservoir and up to a distance of 1-2 km from the shore. No climatic change was observed upper in the valley.

6.1.2 Relief

6.1.2.1 Expanded Study Area

The Enguri watershed, oriented NE-SW, spreads over a distance of about 200 km and a surface of 4,062 sq km, from the Greater Caucasus range to the Black Sea coast.

The watershed belongs to the Samegrelo – Zemo Svaneti Region, with the exception of a small area in the lower valley being situated in Abkasia. The area is at the same latitude as Northern Greece and Northern Spain.

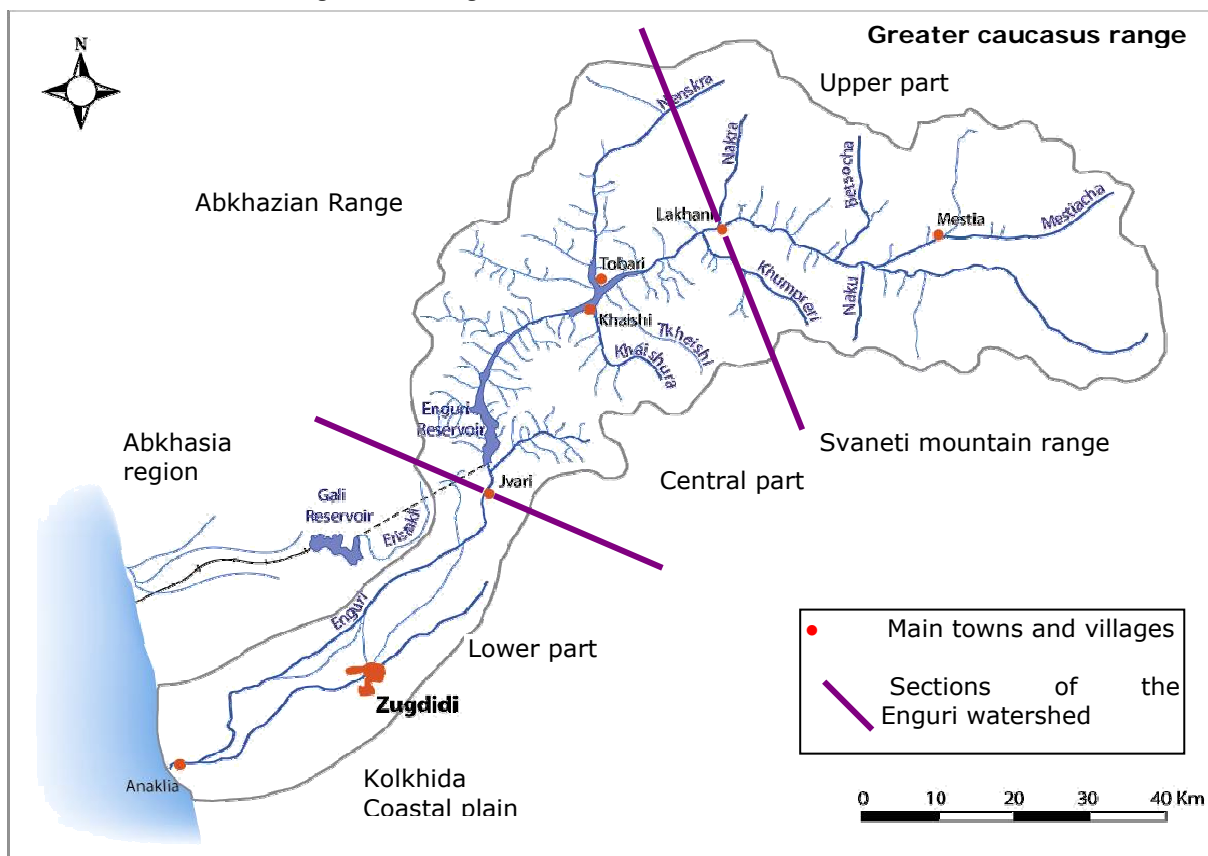
According to morphological features, the Enguri watershed can be divided into three sections of approximately 70 km each: upper valley, central valley and lower valley.

Upper Valley: Upstream the village of Lakhani, the valley is oriented to the west and bordered with two crest mounts higher than 3,500 m: the Greater Caucasus range in the north, culminating at 5,068 m (Mount Shkhara) and the Svaneti mountain range in the south, culminating at 4,008 m (Mount Lajla Lekheli).

Most of the area is within a range of altitude from 1,000 to 3,500 m. Slopes are steep with important erosion figures. The bottom of the main valley is fairly wide, and densely occupied with Svan settlements and agricultural lands.

Tributary valleys, generally oriented north-south, are much smaller and narrower, with the exception of the Mestiacha valley, where Mestia is located.

Figure 6—4: Enguri Watershed divided in three sections



Central Valley: downstream Lakhani, the orientation of the valley changes to the south-west. The central valley (approximately 70 km, between Lhakani and Djvari) is much narrower than the upper valley, with very steep slopes.

Surrounding mountains are the Abkhazian range on the west and the Svaneti mounts on the east, both lower than the Greater Caucasus range and reaching an elevation of 2,000 to 3,000 m.

Tributary valleys are present on both sides, the most important being Nenskra valley on the right bank upstream Khaishi. The village of Kvermo Margi communicates by a secondary valley and a pass with the village of Sakeni, in Upper Abkhazia and a road is currently being built.

Upstream Kaishi (between Lhakani and Tobari), the valley presents a narrow gorge section on a distance of about 15 km.

A few enlarged and flattened places along the river allow for a human occupation with settlements, arable land and sawmills, the most important enlargement, being occupied by the village of Khaishi.

Dowstream Khaishi, the valley is filled by the 20 km long Enguri HPP Reservoir.

The core study area (i.e. future flooded area and surroundings) is entirely located in the medium part of the central valley.

Lower Valley: downstream Djvari, the Enguri River runs out of the montaneous area, flows across a hilly landscape, 200 to 500 m a.s.l, leaves the regional capital of Zugdidi on the right bank, and flows across the Kolkhida coastal plain, up to Anaklia on the coast. Downstream Zugdidi, the river forms the borderline between Georgia and the autonomous Republic of Abkhazia.

The Abkhasian part of the study, Eristakli watershed, is almost entirely situated in the Abksaian coastal plain.

6.1.2.2 Core study area

The slopes surrounding the future reservoir extend on both sides within a range of 1 to 3 km. Their total surface is about 30.5 km². Slopes are fairly regular and reach secondary summits culminating at 1,800 m on the right bank and more than 2,000 m on the left bank (see map on figure 5.1).

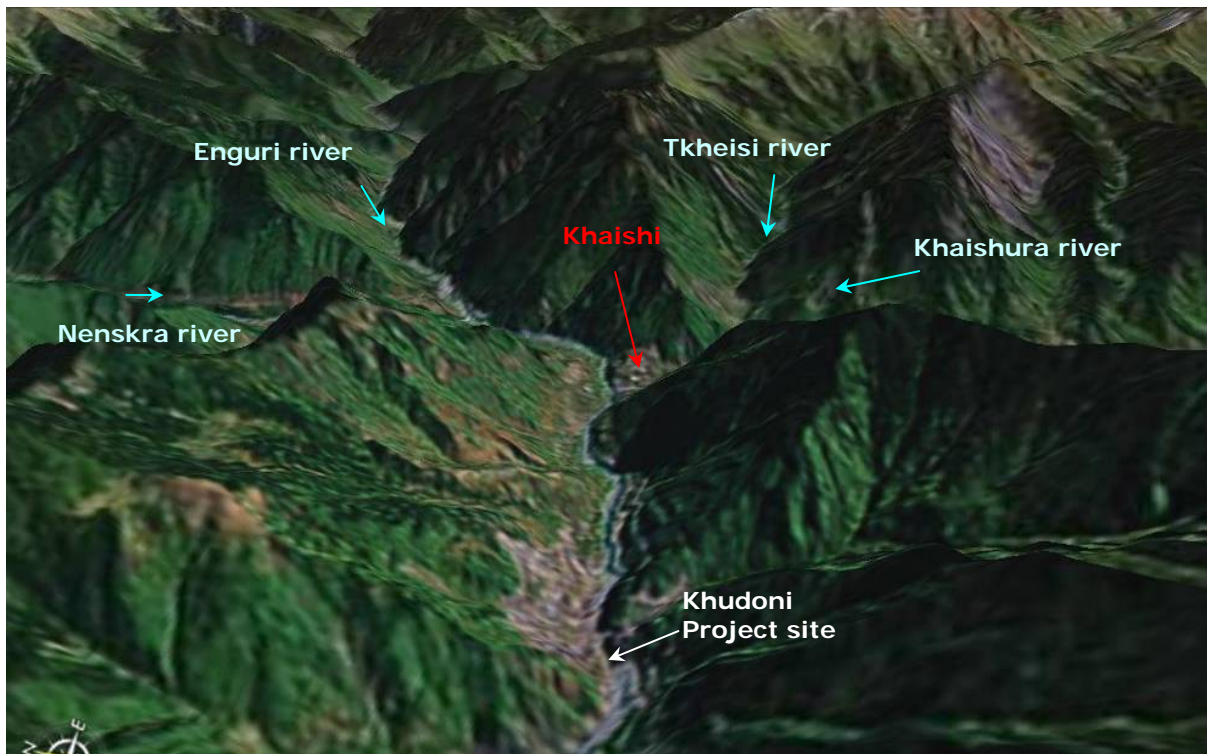
The future reservoir will flood two straight sections of the Enguri Valley, the village of Khaishi being at their junction (see following 3D view).

- The upper section, 4 km long, is oriented to the south-west. Slopes are very steep on both sides especially in the long gorge section between Lakhani and Tobari. Near the village of Tobari, the Nenskra valley embranches on the right bank. The future reservoir will flood the lower part of this tributary valley.
- The lower section, 3 km long, oriented to the west, is a bit larger but still very steep. The first stage of Khudoni dam construction was started on a rocky constriction of the valley. Slopes on the dam site have been deforested and present important erosion figures (photos 6.E and 6.F)

The village of Khaishi (photo 5.C) with surrounding arable lands, occupy an enlargement of the Enguri valley at the bend between this two sections, and the lower part of a valley formed by two tributaries from Svaneti mountains (Khaishura and Tkheishi rivers).

In some areas around Khaishi, the slopes form shelves of limited extension occupied with a few houses and arable land.

Figure 6—5: General 3D view from downstream of the core study area (from Google Earth, 2007)



6.1.3 Geology

REGIONAL GEOLOGY

The study area belongs to the Caucasian collision zone between the Eurasian plate and the Arabian plate, moving northward. The active tectonic features are: (i) wrench faults oriented to the NW, the major one (s'étendant) from the Abkhasian coast (Sokhumi and Ochiri) to the Great Caucasus crest line and (ii) overthrust lines parallel to the Great Caucasian axis (NE-SW). The earth crust in the whole area is divided in many tectonic blocks.

STRATIGRAPHY IN THE STUDY AREA

The expanded study area belongs to the fold system of the central Greater Caucasus. It presents a complex sequence of sedimentary, metamorphic and igneous rocks from different ages that have been folded and faulted:

- paleozoic rocks – The oldest layers - Devonian, Carboniferous and Permian - up to 2000 m thick, are exposed in the upper valley. They are mainly represented by black shales, cherts, sandstones, lenses of marble, and calc-alkaline andesite-dacitic volcanoclastics. Upper paleozoic rocks are also present. In the Main Range zone, crystalline intrusions are overlain by metamorphic rocks.
- mesozoic and cenozoic rocks, made of deposits before the Alpine folding, forms the main part of the Enguri upper and central watershed. Lower jurassic rocks (Aalenian), up to 5,000 m thick, are represented by black shales, sandstone and volcanic lavas and pyroclasts. Middle jurassic rocks (Bajocian) are represented by graywacke-siltstone flysch, shales and marls. Upper Jurassic, Cretaceous and Cenozoic deposits (up to 300 m thick) consists mainly of clastic limestone flysch and greywacke siltstone.
- quaternary sediments, mainly alluvium, are present in the coastal plain and in the bottom of the Enguri valley.

GEOLOGY AROUND THE DAM SITE

The rocks exposed in the core study area (clay shales, sandstones, volcanic and tuffaceous rocks) are mostly from middle Jurassic (Bajocian) and to a lesser extent, from lower Jurassic (Aalenian). Older layers, like Lias schists, are visible at the foundation of the dam.

Bars of hard rocks, diabase and porphyry are present across Enguri river, upstream Tobari and across Tkheisi river, upstream Khaishi.

The Enguri and Neskra valley and the confluence area are filled with alluviums. (boulders, gravels and sand) of quaternary age

In the left abutment a major 10-20 m wide fault zone is developed and crosses the dam foundations. This fault builds the tectonic boundary between porphyric volcanic rocks (higher part) and tuffaceous rocks (lower part). A river paleochannel is visible in the upper part of the left abutment.

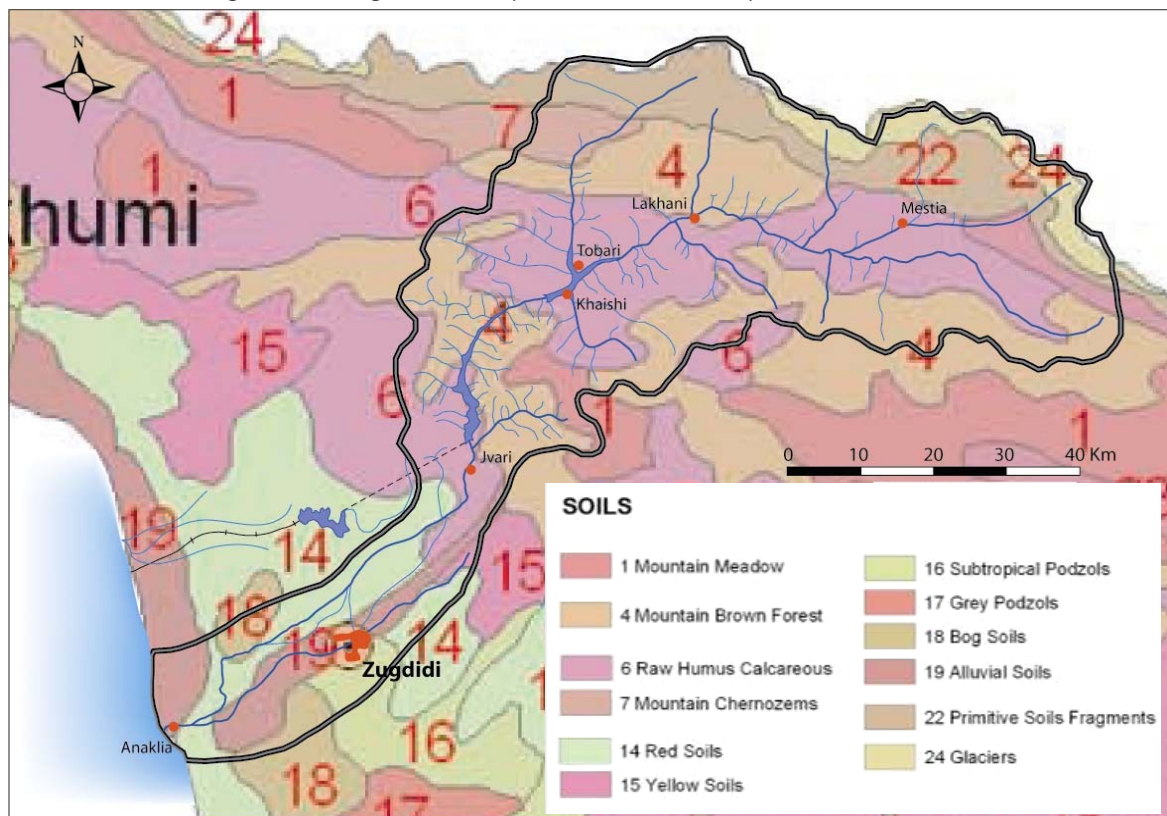
6.1.4 Soils

Soils in the expanded study area (see figure 6.6 hereafter) consists of:

- (i) primitive soil fragments in the Great Caucasus crest (glaciers), (ii) mountain brown forest soils on most parts of the upper and central valley ; (iii) raw humus calcareous in some places, related to calcareous geological background ; (iv) alluvial soils along the river bed, with enlargement deposits in the coastal plain ; (v) red soils and in the Kolkheti plain, with some places of bog soils.

Soils in the core study area, i.e. on the slopes of the future flooded area and surroundings, are mainly brown forest soils, willow, skeletal and clayey, here and there weakly developed and strongly eroded, developed on weathering products of splashed out and sedimentary rocks. Alluvial soils are present along the river.

Figure 6—6: Figure 6.6: Map of soils of the study area (from CENN)



6.1.5 Hydrography

ENGURI RIVER SYSTEM

The Enguri River, approximately 220 km long, originates near Mount Shkhara (alt. 5,068 m) in the Greater Caucasus chain and flows into the Black Sea at Anaklia.

The Enguri River system, the second largest in West Georgia, after Rioni, is fairly dense due to heavy rain and geological features. The hydrological features are given for the three previously described sections (see figure 6.4):

- **Upper valley** (upstream Lakhani): the Enguri River flows to the west in a fairly large valley (photo 1.E) and receives two main tributaries on the left side, draining the Svaneti mountain range (Naku and Khumpreri rivers) and three on the right side, draining the Greater Caucasus range (Mulkhuza-Mestiacha, Betsocha and Nakra rivers).
- **Central valley** (from Lakhani to Djvari): the Enguri River flows to the south west, in a narrow and deep canyon, with rapids. About 2,5 km downstream Khaishi, the river flows into the Enguri Reservoir (length: 20 km, surface: 13.5 km²).
 The Nenskra River, inflowing on the right bank near Tobari Bridge is the main tributary of the whole Enguri river. The Nenskra, 42 km long, originates at 2,650 m a.s.l. and inflows into Enguri at 565.7 m a.s.l. The lower part (2,5 km) is to be flooded by the future Khudoni reservoir. The river presents a steeper slope than the Enguri branch with rapids and rocky gorge sections (photos 4.A to 4.D).
 The other tributaries in the central valley are, from upstream to downstream: (1) Khaishura river (photo 5.C) and its tributary, Tkheishi river, inflowing at Khaishi on the right bank ; the lower course of Khaishura is to be flooded by the future reservoir ; (2) a tributary on the right bank draining Mount Khotzal area and inflowing into the Enguri reservoir, with important sediment deposits (photo 8.D) ; (4) another tributary on the left bank, inflowing downstream Djvari bridge and providing large amounts of alluvium to the river bed (photo 10.B).
- **Lower valley** (downstream Djvari). The Enguri River flows across the Kolkheti plain within a braided river bed, full of alluvial material. At Datcheli, the Enguri receives an important tributary which drains the eastern part of the lower watershed (area of Zugdidi). Enguri River discharges into the Black Sea at Anaklia (photo 10.E to 10.H), in an area of wetlands and bogs.

ERISTAKLI RIVER SYSTEM

The Eristakli river, 30 km long, originates in the foothill of the Greater Caucasus, flows across the coastal plain and discharges into the Black Sea near Meore-Gudava. The upper river has been impounded with a dam forming the Gali Reservoir and a cascade of 4 HPPs ("Vardnilesi Cascade", see § 6.4.1).

6.1.6 Hydrology

WATER FLOW OF THE ENGURI RIVER

Hydrological data on the Enguri River system were measured during the Soviet period since the early '40s until the early '90s, with nine hydrological stations (Ipri, Dizi, Khaishi, Khubezi and Darcheli on the Enguri, Mestia on the Mestiacha, Mulkhuza, Naku on the Nakra and Lakhani on the Nenskra). Data are kept in the archives of the Hydrometeorological Department, Centre for Monitoring and Prognostication (Hydromet). Currently, there is no daily monitoring of the flow by Hydromet. Engurhesi Ltd measures once a month: (i) the flow near Djvari bridge, downstream the inflow of the tributary on the left bank, and (ii) the inflow into the reservoir. All these data could not be made available for the study.

The main characteristics of Enguri water flow are given from existing reports.

Water flow averages 130,8 m³/s at Khudoni dam site (Ministry of Energy, 2005).and 155 m³/s upstream Enguri reservoir (interview with Enghuresi ltd). Average long-term estimated run-off at Khudoni is estimated to 5.35 km³/year.

Seasonal variations are important, with a maximum flow peak in late spring and early summer (600 to 900 m³/s) due to snow smelt and heavy precipitations and a minimum flow in winter (about 20 m³/s).

Water flow downstream Enguri dam is weak most of the year, as the outflow from Enguri HPP is discharged into the Eriskali River system. The regulatory minimal value is 10 m³/s, measured near the Djvari Bridge, downstream the confluence with the tributary, on the left bank (interview with the Engurhesi ltd.)

Maximum flow measured at the Khudoni site was about 2,500 m³/s.

CHARACTERISTICS AND WATER LEVEL IN THE ENGURI RESERVOIR

Enguri reservoir, at full supply level, has a storage volume of 1,110 million m³ and a surface of 13.5 km², a length of about 25 km and a maximal depth of 268.5 m.

The main characteristics of the reservoir are resumed in the following table.

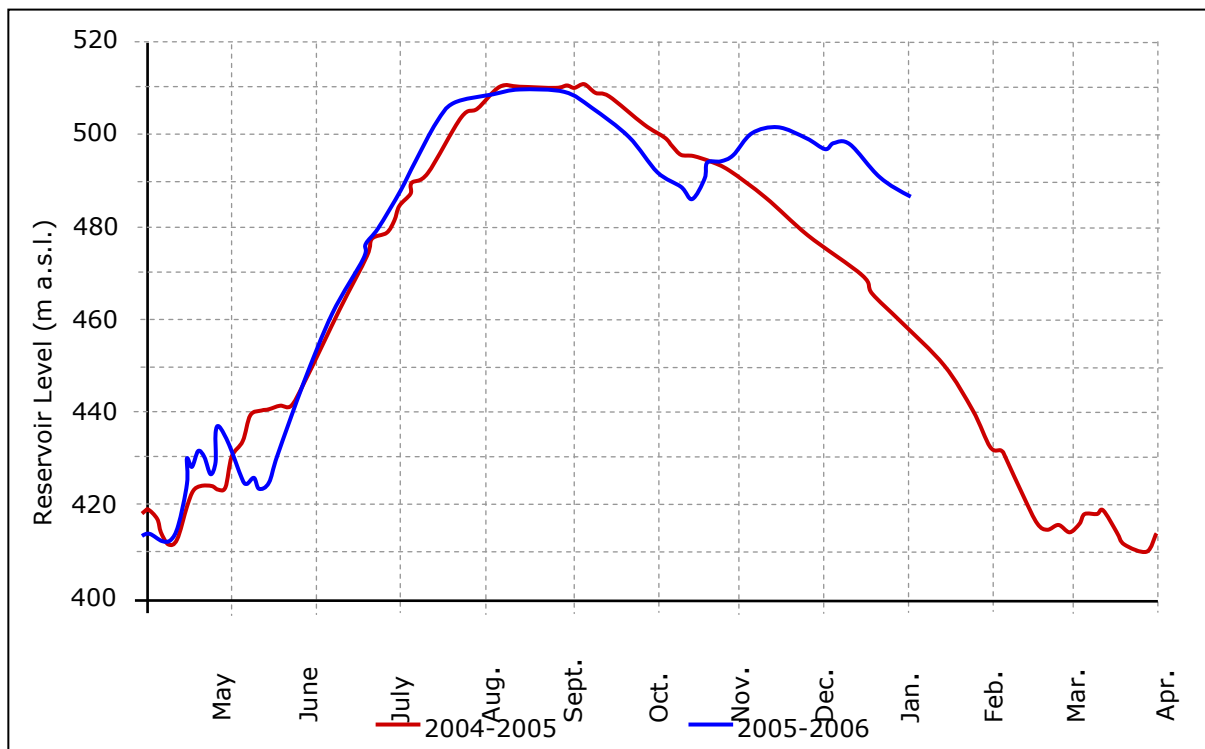
Table 6—1: Main Characteristics of the Enguri Dam Reservoir

Mean inflow	155 m ³ /s
Full supply level	510.0 m a.s.l.
Max flood level	511.5 m a.s.l.
Min. Operating level	430.0 m a.s.l.
Storage volume	1,110 million m ³
Live storage	676 million m ³
Area at full supply level	13.5 km ²
Maximal depth at f.s.l.	About 250 m
Length at f.s.l.	29 km

The water level is monitored automatically. The monitoring system (gauge) was modernized in 1996. The usual pattern of the reservoir level over the year (see following figure) is as follows (interview with the EngurhesiLtd):

- from early August to early October (late summer - early autumn), the reservoir is at full supply level (510 m a.s.l.);
- from October, the level decreases during late autumn and early winter;
- minimum level is reached in February. The reservoir usually drops to 440 m a.s.l. (minimum operating level: 430 m a.s.l.) and more exceptionally to 400 m a.s.l, (under the level of water intakes to HPP) when water is to be released to the river downstream;
- the level remains low at the beginning of spring, usually until May;
- the reservoir fills rapidly in late spring and early summer, with snow melt and heavy precipitations

Figure 6—7: Enguri Reservoir Level Evolution during the Year - Data between April 2004 and January 2006
(USAID, 2005)



The **water level range** is very important, about 100 m. The lowering of the reservoir discovers steep bare banks in the lower part and the whole valley in the upper part, the river flowing in its former bed among sediment accumulations.

The central part of low level outlets is situated 339 m a.s.l., i.e. 101 m below usual minimum level. The natural bottom is about 256 m. a.s.l. Emptying the whole reservoir would mean to pump down between 339 m and 256 m a.s.l.

6.1.7 Water Quality

WATER QUALITY IN ENGURI RIVER

There is currently no monitoring of water quality on the Enguri River⁷. Therefore, the rehabilitation of a minimum water quality monitoring will be proposed in the monitoring Plan of Khudoni EIA.

The following description of water quality is mainly based on the seven water-quality samples collected in April 2007, during the field mission (see following table).

Samples n°1 to 4 allow for a characterisation of the quality of inflow waters to the future reservoir.

Low pollution level. All together, the water at the Khudoni site presents a good quality with high dissolved oxygen level (*Interview T. Mergiani, Mestia Museum*). The concentrations of nitrogenous and phosphorous elements are low (nitrates at 1.2 mg/l; ammonium, nitrites and phosphates under the detection limit) indicating a poor biological productivity. Organic matters are moderate (1.3 to 8.9 mg/l O₂). This situation is characteristic of a mountain watershed with few sources of degradation (few human settlements, non-intensive agriculture, no industry).

Fairly high mineralization. Conductivity and alcalinity (HC03) measured near Khaishi are fairly important (respectively 198 µS/cm and 109.8 mg/l), characterising geological background with calcareous rocks. Upstream of Tobari, an important difference in mineralization between the two rivers can be observed, probably reflecting a different geological background: water conductivity in Enguri river is three times more important than in Neskra river.

Suspended solids, approached on the two rivers through turbidity, appear much higher in the Enguri River (41 FTU) than in the Nenskra River (9.4 FTU). This difference might be related to vegetation cover and land use: Nenskra comes directly from the Greater Caucasus range with few villages and agriculture, whereas Enguri flows across a valley with fairly high density of population, livestock and ploughed fields.

A comparison of samples n°3 and 4 shows no significative difference in water quality upstream and downstream Khaishi, especially for pollution indicators (NH₄, COD).

In the coastal plain (sample n°7), nitrates concentration is maximum, but still very moderate (2.6 mg/l).

7 From 1981 to 1991, 5 water quality stations were monitored on the Enguri River: (1) Khaishi; (2) Enguri Reservoir (800 m upstream the Dam); (3) 5.6 km upper Abastumani (near Zugdidi); (4) Abastumani; (5) Darchali (between Zugdidi and Anaklia).

Measures were done presumably every month for the following parameters: total suspended solids, dissolved oxygen, COD and BOD, ammonium nitrogen, nitrite nitrogen, nitrate nitrogen, iron, copper, zinc, phenols, oil products, and superficially active substances.

A request to get these data was made at the Department of Monitoring of Environmental Pollution, the Centre for Monitoring and Pronostication. But data were not made available for the study.

Water quality of Enguri river system was controlled twice a year at the foot of the Enguri Dam. Data are available at Hydroproject.

WATER QUALITY IN THE ENGURI RESERVOIR

There is no data on water quality and stratification in the water column of the reservoir. According to the *Engurhesi Ltd*, sulphured smelling at the foot of the dam has not been observed. But the lower part of the reservoir is certainly deoxygenized.

During the field mission, the surface water of the reservoir (sample n°5) presented a higher turbidity - possibly due to the presence of plankton - and a lower mineralization than in the river. As for the other parameters, the results from samples n° 4, 5 and 6 do not show any great changes in water quality between the inflow, the surface layer of the reservoir and the outflow.

Table 6—2: Water Quality - Enguri River System - from samples collected during inception mission (April, 2007) and analysed by Gamma Ltd., Tbilissi

	1	2	3	4	5	6	7
River	Enguri riv.	Nenskra riv.	Enguri Riv.	Enguri riv.	Enguri reservoir	Enguri riv.	Enguri riv.
Localisation of the sampled stations	Upstr. future Khudoni reservoir	at the bridge	upstr. Khaishi	downstr. Khaishi	Reservoir	Djvari bridge	Orsantia bridge

pH		6,7	6,5	7,8	6,7	6,6	6,7	7,9
Cond.	μS/cm	250	88	179	198	146	198	202
Tot.Hard. (Ca-Mg)	mg-Eq	3,2	1,0	2,0	2,5	1,8	2,5	2,5

Major ions

Cl	mg/L	5,7	5,7	5,7	5,7	5,7	5,7	5,7
HCO ₃	mg/L	135,5	53,7	104,9	109,8	87,8	129,3	135,4
CO ₃	mg/L	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5
SO ₄	mg/L	35,2	9,5	24,4	31,6	20	13,2	8
Ca	mg/L	37	12,6	25,8	30	31	39	36
Mg	mg/L	15,6	4,1	9	12	3	6,6	8,4
Na	mg/L	10,5	5,7	7,8	7,8	6,6	9,9	5,7
K	mg/L	0,9	0,9	0,8	0,8	1,3	0,9	1,3
Al	mg/L	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02

Nitrogenous and phosphorus parameters

NO ₃	mg/L	1,3	1,1	1,1	1,3	1,1	1,8	2,6
NO ₂	mg/L	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
NH ₄	mg/L	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
PO ₄	mg/L	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02

Organic matter

COD	mg/L O ₂	24,3	14,1	8,9	1,3	1,3	5,1	5,1
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Suspended matter

Turbidity	FTU	41,0	9,4	19,6	21,8	32,5	20,9	28,4
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6.1.8 Solid Flow

Solid and suspended matters data. There is no data on solid flow in the study area, with the exception of suspended matter monitoring during the Soviet period (see note on the previous page). These data were not made available for the Study.

Solid flow should be important considering the important erosion on the slopes and the amount of sediments in the Enguri reservoir.

Silting of reservoirs. Quantity of sediments accumulated since the '80s is considered to be very important (*interview with the Engurhesi Ltd*). A recent study, using subaquatic and ultrasonic pictures, has estimated the silt layer 50 m upstream the Dam.

The channel to the Enguri HPP is very silted too (average layer: 0.5 m). A tender is on the way for cleaning of this channel by removing the silt from upstream. Cleaning the channel by expelling the silt downstream does not seem to be the best solution, because of the ecological risk on the Abkhasian hydrosystem (*Interview with the Engurhesi Ltd*).

Floating Material: The river brings an important flow of floating material (logs and branches, sawmill scraps).

Part of this material accumulates in huge quantity behind the Enguri Dam, with a risk of damaging the spillway. About 1,000 m³ of wood is removed every year with cranes. The private company in charge of this operation works for free, and the material is sold as firewood (*interview with the Engurhesi Ltd*).

Accumulation of wood can also be observed on the banks of the water level range area, especially in the upper reservoir (photos 8A and 8B).

The construction of the Khudoni Dam should decrease both solid and floating material inflow to the Khudoni Dam.

6.2 BIOLOGICAL ENVIRONMENT

Bibliographic information completed by preliminary field observations, enable us to: (i) present the global significance of the Georgian biodiversity, (ii) describe the vegetation cover in the study area, (iii) establish a first listing of fauna species potentially existing in the study area and (iv) identify the position of the Project regarding (existing and projected) protected areas.

6.2.1 Global Significance of the Georgian Biodiversity

(The following description is based on: Elanidze et al. 1970, Elanidze 1983, Beruchashvili 2000, Bukhnikashvili 2004, GCCW database).

The Caucasus region encompasses fully Georgia, Armenia and Azerbaijan and intersects some parts of the Russian Federation, Turkey and Iran.

Apart from being a historic and bio-geographic unit, the Caucasus region is one of WWF's Global 200 Ecoregions identified as globally outstanding for biodiversity. One of the most biologically rich Ecoregions on earth, the Caucasus is ranked among the planet's 25 most diverse and endangered **hotspots**⁸ as well.

In comparison to other temperate countries, Georgia is notably **rich in various species** with a **high level of endemism and relict species**, for both flora and fauna. Georgia supports:

- 6,000 vascular plant species (of which 600 species are native to the Caucasus and 300 species are native to Georgia);
- 659 vertebrates with a high number of endemic species for fishes, amphibians (among 12 species), reptiles (among 54 species), mammal species (among 100 species) and birds (350 species). Over half of the bird species breed in the country, while the rest use it for wintering, roosting, or stop-over sites. If most of Georgia's bird species are also found in the Mediterranean region of Europe, many species common in Georgia are extremely rare elsewhere;
- 13,514 invertebrates.

According to Biodiversity Index (BDI) calculated for all countries, Georgia comes in 36th on the global scale with a BDI value of 1.01, and **1st on the European scale** (Beruchashvili, 2000).

Besides wild flora and fauna diversity, Georgia is very rich in **agro-diversity**. It is one of the centres of plant and animal domestication. The country's agro-diversity includes original breeds as well as many varieties of grapes, fruits and cereals.

6.2.2 Vegetation

The first description of the vegetation of the study area is established based on available literature. We present hereafter: (i) great features of the vegetation cover of the expanded study area, (ii) a preliminary spatial distribution of vegetation types in the core area and (iii) a list of endemic genus/ and species and threatened species potentially occurring in the core study area.

Further investigations to be done in the EIA phase, both on field and through consultation of experts, will define a more accurate spatial distribution of vegetation types and localisation of threatened and endemic genus or species in the core study area.

⁸ Biodiversity hotspots: Countries or Regions that altogether comprise only 1.4% of the land surface of the Earth but contain, as endemics, 44% of the Earth's plant species and 35% of its vertebrate species while facing a high risk of degradation at the hands of humans (Myers et al., 2000)

6.2.2.1 Vegetation Cover

The following description is based on: Gagnidze 2000; Gigauro 2000; Shetekauri & Gagnidze 2000; Gagnidze et al. 2006, Nakhutsrishvili, 2000.

EXPANDED STUDY AREA

In western Georgia there is no semiarid or arid landscapes, and the lower limits of forest zone run at sea level.

Upper valley. In the upper valley of Enguri, and especially upstream Djvari, the general vegetation zones are the following, highly depending on the elevation:

- Forest zone from 400 to 2,500 m a.s.l. comprising broad-leaved forests (oak and other broad-leaved species) and dark coniferous forests;
- Subalpine zone, from 1,800 to 2,600 m a.s.l., mainly occupied by birch forests;
- Alpine zone, from 2,350 to 3,150 m a.s.l., where meadows are the dominant type of vegetation;
- Subnival zone from 2,900 to 3,300 m a.s.l.
- Nival zone above 3 150 m a.s.l.

The upper and lower limits of the vegetation zones vary depending on the slope exposition. On the east-facing slopes (right bank of the Enguri river) the limits are 100-200 m higher than the west-facing slopes (left bank of the Enguri river).

The upper limits of the closed plant cover reaches subnival zone at 3,250 on the main watershed of the Greater Caucasus.

Figure 6—8: Vertical Distribution of Vegetation of Western Georgia

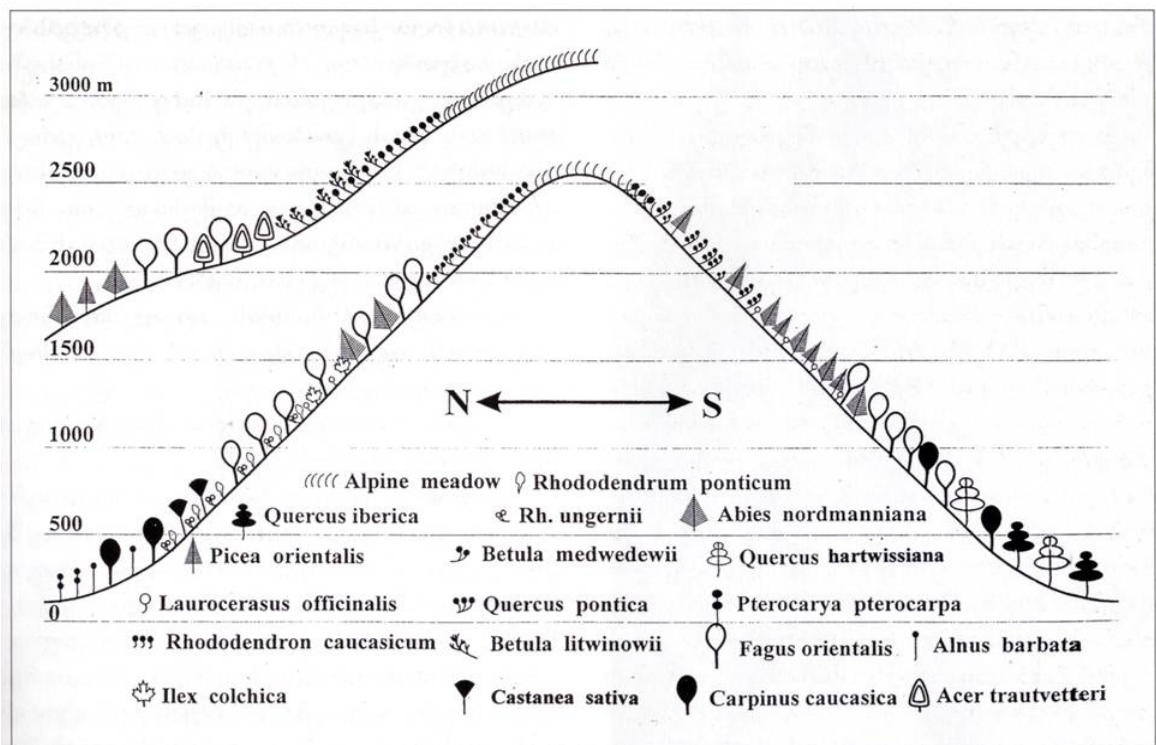
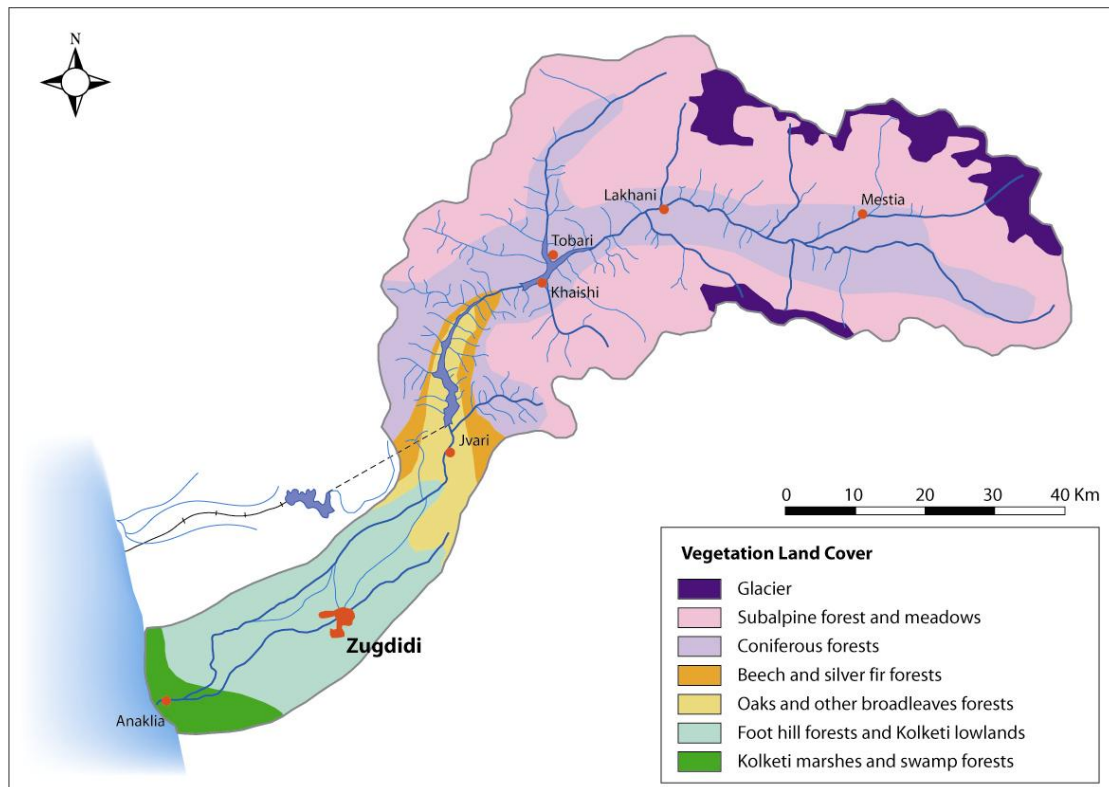


Figure 6—9: Vegetation Cover of the Study Area



Lower valley. In the lower part of the valley of Enguri, and especially downstream Djvari, the vegetation is mainly composed of broad-leaved forests (beech and sylver fir forests on the slopes and oak and other broad-leaved forests in the valley).

Coastal plain. In the kolkhida coastal plain the cover is mainly represented by foothill forests. Wetlands (swampy forests and marshes) are localised at the mouth of the Enguri River and along the cost (Kolkheti National Park).

CORE STUDY AREA

The core study area is globally comprised in the Forest zone. Inside this zone there is a declination of different forest types (see box X) depending on factors like local humidity or dry conditions, nature of the geological substratum and soils, degree of slope and orientation, with undergrowth vegetation associated.

The vegetation cover of the core area and particularly the area that could be flooded by the Project, is mainly represented by broad-leaved forests with patches of coniferous forests of various extent.

The riparian forest is narrow due to steep slopes and narrow valley. This type of forest is more developed around the Neskra River.

At the the Khudoni site, traces of previous activities are still visible and have resulted with numerous deserted spots due to lack of activities on restaruration of the site to its original state. On the slopes, for instance, forest clearing and extraction tracks done without precautions have left a serious degradation or a total inexistence of the vegetation cover, leaving the place for erosion marks to appear.

This state of degradation of the vegetation cover is clearly visible on the satellite image (Figure 6-5).

Upstream the village and at the confluence with the River Nenskra, slopes are more preserved and the forest more dense containing trees of a larger diameter. There are several localised landslides.

These preliminary observations need to be reinforced by a more detailed study based on aerial photographs and soil examination.

Box 6.1: Description of the different types of vegetation in the Forest zone

■ Broad-leaved forests.

At elevation of 600-1,600 m broad-leaved forests are dominant.

Relatively dry slopes are occupied by oak forests (*Quercus iberica*), mixed with hornbeam (*Carpinus caucasicus*) or oriental hornbeam (*Carpinus orientalis*) on acidic soils.

On aciditic soils and north slopes, there are fewer chestnut forests (*Castanea sativa*) mixed with hornbeam (*Carpinus caucasicus*) and beech (*Fagus orientalis*) with hazel tree (*Coryllus avellana*) very frequent understorey.

Moist areas are dominated by beech forests (*Fagus orientalis*) mixed with chestnut (*Castanea sativa*) on aciditic soils and boxtree (*Boxus colchicus*) on calcareous soils with undergrowth dominated by rhododendron (*Rhododendron ponticum*, *R. caucasicum*), and bilberry (*Vaccinum myrtillus*, *V. arctostaphylos*).

■ Dark coniferous forests.

Above 1,600 m, beech forests (*Fagus orientalis*) give way to dark coniferous forests (*Picea orientalis*, *Abies nordmanniana*) with some areas of beech and pine forests (*Pinus sosnowskyi*).

Abies forests (*Abies nordmanniana*) are mainly in the areas of high rainfall like in Nenskra gorges, associated with *Laurocerasus officinalis*, *Vaccinum arctostaphylos*, and in some places associated with *Rhododendron luteum* and *Viburnum lantana*.

Pine forests (*Pinus sosnowskyi*) mostly grow on dry south-facing slopes with thin soil cover.

Primary pine forests are associated with Junipers and gramineous species like *Poa* and *Brachypodium*, when secondary pine forests are usually associated with hazel (*Coryllus avellana*), bilberry (*Vaccinum myrtillus*) and *Azalea pontica*, and grow in less dry areas.

Distribution of spruce (*Picea orientalis*) is irregular: spruce mixed with abies or pine occur in the areas with relatively low rainfall. In moistly areas they are associated with *Rhododendron ponticum*, *Vaccinum arctostaphylos* and tall herbaceous vegetation and on moderately dry south-facing slopes they are associated with *Rhododendron luteum* and *Calamagrostis*.

High mountain oak (*Quercus macranthera*) is also found at these elevations on south and southeast-facing slopes. Svaneti is the western edge of *Q. macranthera* distribution on the Greater Caucasus.

High mountain maple forests (*Acer trautvetteri*) occur on alluvial cones at 1,700-2,300 m asl and near treeline at 2,100-2,200 m asl.

- **Shrubs.** Various species of shrubs grow in Enguri Watershed related to the moisture, elevation and level of forest degradation. Relatively moist areas attract *Sambucus nigra*, *Ligustrum vulgare*, *Rubus caucasicum*, *Lonicera caucasica*, *Ribes biebersteinii*, *Viburnum opulus* and *Viburnum lantana*, *Sorbus subfusca*..., when dry areas are colonized by Junipers (*Juniperus depressa* and *Juniperus oblonga*), *Rhododendron luteum*, *Cotinus coggygria*, *Crataeus pentagyna*, *Spiraea hypericifolia*, *Leptopus colchica*...

- **Herbaceous vegetation.** Communities of herbaceous vegetation are associated with mountain swamps, rocks and scree. High mountain meadows (from 1,800 m asl) include 440 species of vascular plants of which 160 are native to the Caucasus. Tall herbaceous vegetation occurs in or near open forests. In deforested areas, tall herbaceous communities include *Senecio pojarkovae* native to the Greater Caucasus;

- **Riparian forest.** There is no real wetlands in the core study area but only narrow riparian forest because of the steep banks of the river.

Riparian forests are composed with alder (*Alnus spp.*), aspen (*Populus tremula*), willow (*Salix spp.*) and other hygrophilous species associated with tall herbaceous vegetation like *Senecio rhombifolius*, *Petasites albus*, *Pachyphragma macrophyllum*, *Matteuchia struthiopteris*...

6.2.2.2 Biological Value (Flora)

Forests are the most important biome for biodiversity conservation in the Caucasus. Mountain forests make up the majority of the forest biome in the ecoregion and besides, play a critical role in preventing soil erosion and regulating water flow.

Forests harbour many endemic and relic species of woody plants and herbs and are important habitat to rare and endangered species of birds and other animals (WWF Caucasus, 2006). Additionally, most of the focal species of animals are, to various extents, associated with forest ecosystems or are associated with riparian forest ecosystems.

- In Svaneti, 50-55 % of the ligneous vegetation species are native.
- Vascular plants of Svaneti number approximately 1100 species of which 264 are endemic. 212 of the endemic species are native to the Caucasus and the rest (i.e. 52 species) are native to Georgia and among them 10 could be endemic to Svaneti.
- 7 endemic genera occur in Svaneti: *Sedynskia* (*S. grandis*), *Charesia* (*Ch. akinfievii*), *Pseudovesicaria* (*P. digitata*), *Agasyllis* (*A. latifolia*), *Paederotella* (*P. pontica*), *Gadellia* (*G. lactiflora*), *Kemulariella* (*K. colchica*, *K. caucasica*).

The first listing of the endemic and threatened plant species that are potentially occurring in the Core study area has been established and concerns about 20 species.

Tables 6—3: Preliminary listing of threatened plant species potentially occurring in the core study area (VU: Vulnerable; EN: Endangered) and Preliminary listing of endemic genus and species potentially occurring in the core study area

Table 6.3a : Preliminary listing of threatened plant species potentially occurring in the core study area (VU: Vulnerable; EN: Endangered)

Species	Family	UICN Threatened status
Tree species		
<i>Buxus colchicus</i>	Buxaceae	(VU)
<i>Castanea sativa</i>	Fagaceae	(VU)
<i>Staphylea colchica</i>	Staphylaceae	(VU)
Grass species		
<i>Senecio rhombifolius</i>	Asteraceae	(VU or EN ⁹)
<i>Campanula svanetica</i>	Campanulaceae	(VU or EN),
<i>Silene pygmaea</i>	Caryophyllaceae	(VU or EN)

⁹ Threatened status of IUCN : EN or VU for some species is still under discussion

Table 6.3 b : Preliminary listing of endemic genus and species potentially occurring in the core study area

Species	Family	Endemic status
Endemic plant genus potentially occurring within the core study area		
<i>Pseudovesicaria digitata</i>	Brassicaceae	Genus endemic to the Caucasus
<i>Paederotella pontica</i>	Scrophulariaceae	Genus endemic to the Caucasus
<i>Charesia akinfielvi</i>	Caryophyllaceae	Genus endemic to the Central Caucasus
<i>Kemulariella colchica</i>	Asteraceae	Genus endemic to the Georgia
Endemic plant species potentially occurring within the core study area		
<i>Jurinella subacaulis</i>	Asteraceae	Endemic species
<i>Senecio pojarkovae</i>	Asteraceae	Endemic species to the Caucasus
<i>Lamyropsis charadzeae</i>	Asteraceae	Endemic species to the Caucasus
<i>Senecio rhombifolius</i>	Asteraceae	Endemic species to Caucasus
<i>Omphalodes lojkae</i>	Boraginaceae	Endemic species to the Caucasus
<i>Arabis brachycarpa</i> (A. drummondii)	Brassicaceae	Endemic species
<i>Barbarea ketzkhoveli</i>	Brassicaceae	Endemic species to Georgia
<i>Coluteocarpus vesicaria</i>	Brassicaceae	Endemic species to the Caucasus (rare ?)
<i>Campanula engurensis</i>	Campanulaceae	Endemic species to Georgia
<i>Campanula svanetica</i>	Campanulaceae	Endemic species to Georgia (Svaneti)
<i>Silene pygmaea</i>	Caryophyllaceae	Endemic species to Caucasus
<i>Genista suanica</i>	Fabaceae	Endemic species to the Georgia or West Caucasus
<i>Paederotella pontica</i>	Scrophullariaceae	Endemic species to the Caucasus
<i>Heracleum osseticum</i>	Umbelliferae	Endemic species to Georgia
<i>Valeriana jelenevsky</i>	Valerianaceae	Endemic species to Caucasus

■ Paleoendemic¹⁰ species

The gorges of Nenskra river (expanded study area) support such paleoendemic species as *Leptopus cholchica*.

Besides, studies of *Leptopus* genus play an important role in understanding the history of local flora as this genus has a subtropical/tropical origin from South and East Asia.

¹⁰ Paleoendemic species are relict species and isolated geographically and phylogenetically.

6.2.3 Fauna

6.2.3.1 Terrestrial Fauna in the Study Area

First investigations (surveys carried out in the period 01-10 May 2007) and interviews of experts and people met in the area allowed to define the first list of species that potentially occur within the expanded study area (see the Annex 6-1) with mention of its endemic and threatened status (data from Elanidze et al. 1970; Elanidze 1983; Bukhnikashvili 2004; Database of WWF-Caucasus Program Office; Database of GCCW; Red Data List of Georgia).

In first view, the potential terrestrial macro-fauna of the expanded study area is relatively well diversified with: 2 species of amphibians (or more), 7 species of reptiles, 249 species of birds and 55 species of mammals. This species are mainly associated with forest habitats at varying degrees.

Forest habitats. The forests ecosystems, and specially the mountain forests, are the specific habitat for number of species of animals among them most of the focal species of Caucasus. Moreover species that live in the sub-alpine belt (black grouse for example) use mountain forests as alternate feeding and wintering habitat.

The majority of bat species, brown bear (*Ursus arctos*), carnivores like wolf (*Canis lupus*), jackal (*Canis aureus*), fox (*Vulpes vulpes*), and ungulates depend on the presence and quality of forests. Notably, Caucasian population of european wild cat (*Felis sylvestris*) and pine marten (*Martes martes*) are relatively abundant in the forests and maintaining these populations is important for conservation of the species worldwide.

Several endemic rodents and insectivores, such as Robert's snow vole (*Chionomys roberti*), or moles (*Talpa caucasia* and *Talpa levantis*) are also frequent in forest habitats.

Bird fauna in Caucasian forests are also reasonably rich, although the number of endemic or globally threatened species is relatively low

Several endemic species of salamanders and some reptile species are also associated with forest landscapes. Among reptiles, the endemic Caucasian adder (*Vipera kaznakovi*), included in the IUCN red list, and the notable group of endemic rock lizards (*Darevskia spp.*) are occurring in the forests of the Enguri valley.

Many endemic invertebrates, are also exclusively dependant on forest ecosystems.

Riparian forest habitats. Several species, like common otter (*Lutra lutra*) or mink (*Mustela nivalis*) are closely associated with riparian forest ecosystems.

Lakes. Dam-lakes like Enguri reservoir are less important habitats for waterfowl regarding nesting, wintering and stop-over areas during migration than natural wetlands or lakes because of their bad nutritive quality.

6.2.3.2 Aquatic Fauna

■ Source of Information

Knowledge on fish communities and aquatic invertebrates is based on: (i) reference publications describing the situation before the implementation of the Enguri Dam (Elanidze et al., 1970 and 1983 ; Terofal, 1984), (ii) available databases (WWF, GCCW; Red Data List of Georgia), and (iii) interviews with local stakeholders. There is no recent experimental fishing data.

■ Fish Communities

A total of 35 fish species has been identified in the Enguri River System (see Annex 6-2). They can be divided into four groups according to their eco-biology and distribution along the Enguri River System.

1/ Amphibiotic migratory species. The four species of sturgeon (*Acipenser sturio*, *A. stellatus*, *A. gueldenstaedti colchicus* and *Huso Huso*) are anadromous species with a life cycle between the Black Sea and the lower Enguri River. The European eel (*Anguilla anguilla*) is catadrome with a life cycle between the river systems and the Sargasse Sea. **The Enguri Dam is a barrier for migrations:** upstream the Dam it is impossible to find any sturgeon, and the only eels that could be observed would be very old specimens issued from migrations in the late 70's.

2/ Euryhaline species: they can live in marine or brackish water, as well as in fresh-water. They can be found in the lower part of the Enguri River, up to the mouth. The group comprises of Mulletts (*Mugil cephalus*, and *M. auratus*), Pipefish (*Syngnatus nigrolineatus*); Round Gobies (*Neogobius cephalarges* and *Neogobius melanostomus*) and Three-spined Stickleback (*Gasterosteus aculeatus*). **These species are specific to the estuary and the very low part of the river. They are not present upstream the Enguri Dam.**

3/ Lower river freshwater fishes: these species form the community of the lower part of rivers with large bed and low current. They are present in the lower Enguri. Some of them could be present in the Enguri Reservoir too. Most of them are cyprinids: Carp Bream, White Bream and Russian Bream (*Abramis brama*, *Blicca bjoerkna* and *Vimba vimba*), Common Carp (*Cyprinus carpio*), Rudd (*Scardinius eurythrophthalmus*) and Chub (*Leuciscus boristhenicus*), Common Bleak and Danube bleak (*Alburnus alburnus* and *Chalcalburnus chalcoides*), Bitterling (*Rhodeus sericeus amarus*) and Asp (*Aspius aspius*). Associated carnivorous fish are pike (*Esox lucius*) which could hardly reproduce in the Reservoir, European perch (*Perca fluviatilis*), Pike-perch (*Lucioperca lucioperca*) and Wels catfish (*Silurus glanis*). Other potential species are Loaches (*Cobitis taenia satunini* & *Noemacheilus angorae*) and a subspecies of Round goby (*Neogobius cephalarges constrictor*).

4/ Upper river fishes: these species are living in mountain rivers with high currents, gravels and oligotrophic conditions. The dominant species is the common truite, *Salmo trutta* with a form living in reservoirs (*Salmo trutta morpho labrax*). Among them are cyprinids like Crimea Barbel (*Barbus tauricus escherichi*), Colchic nase (*Chondrostoma colchicum*, endemic to colchic rivers), Chub (*Leuciscus cephalus*), Minnow (*Phoxinus phoxinus colchicus*) and Gudgeon (*Gobio gobi*). Other species are the Fresh water round goby *Neogobius cephalarges constrictor*, which is a very ubiquiste fish, and the Fresh water lamprey (*Lamperta = Eudontomyson mariae*).

The dominant species is the common trout (*Salmo trutta*) with a form living in reservoirs (*Salmo trutta morpho labrax*).

■ Longitudinal Zonation

Longitudinal zonation for fish community in European watercourses by Huet (1949), bases on the width and slope of the river, defines four zones each of them being characterized by a particular community: the bream zone, the barbel zone, the grayling zone and the trout zone.

According to this zonation, Enguri River in the future Khudoni Reservoir area presents an ecosystem of trout zone, the river slope being about 10 ‰.

6.2.3.3 Biological Value (Fauna)

The table below (see Table 6-4) presents the number of species that potentially occur in the expanded study area, the number of species occurring in the core study area and concerned by a global or national threatened status (IUCN categories) and the number of species occurring in the core study area that are endemic to the Caucasus region.

■ Amphibians

No threatened amphibian species occur within the core study area.

Two endemic amphibians, *Pelodytes caucasicus* and *Bufo verrucosissimus* are highly likely to occur there, though not recorded yet.

■ Reptiles

The only threatened reptile mentioned is the endemic Caucasian adder: *Vipera kaznakovi* that IUCN red list classifies as globally and nationally 'Endangered'. This species is associated with forest landscapes.

Endemic reptiles potentially occurring in the core study area include one notable group of endemic rock lizards (*Darevskia* genus = *Lacerta* genus): *Darevskia brauneri* and *Darevskia derjugini*.

Some sources suggest the occurrence of other endemic reptiles such as *Darevskia saxicola* and *Natrix megalcephala*, although their status as full species is still controversial from a taxonomic point of view.

■ Birds

The only threatened bird potentially found in the core study area is such a forest-adapted species as the tengmalm's owl: *Aegolius funereus* (nationally VU).

There occur no endemic bird species in the core study area. The two endemic birds the Caucasian snowcock (*Tetraogallus caucasicus*) and the Caucasian black grouse (*Tetrao mlokosiewiczii*) found in the Enguri Watershed occur rather far from the core study area.

■ Mammals

In the core study area some threatened and endemic mammals occur.

These species include the brown bear *Ursus arctos* (nationally EN) and the Lynx *Lynx lynx* (nationally CR). The brown bear and the lynx do not breed in the core study area. The occurrence of brown bear in the core study area is rare because of proximity to roads and human disturbance and is linked to seasonal movements (e.g. vertical shifts). Lynx is extremely rare in the entire Enguri Watershed including the core study area.

Among others endemic species potentially occurring in the core study area, there several rodents like squirrels (*Sciurus anomalus* - globally NT and nationally VU), mice (*Sicista kluchorica* - endemic and nationally VU), shrews (*Sorex satunini* - endemic, *Sorex volnuchini* - endemic and *Neomys teres schelkovnikovi* - endemic) and voles (*Prometheomys schaposchnikovi* - endemic and nationally VU, *Chionomys gud* - endemic and *Chionomys roberti* - endemic).

The otter (*Lutra lutra* - nationally VU) is potentially found in the core study area though its breeding status is not known.

The results of this survey suggest that the west Caucasian tur (*Capra caucasica*) classified in the threatened EN category occurs outside the core study area in the upper reaches of the Enguri Watershed.

KBA Analysis. To assess irreplaceability of the core study area that is to be flooded and degraded if the project is implemented, we used the relative approach developed in KBA analyses.

To assign a KBA Status and a Priority Conservation Level to the core study area, we used such KBA trigger species as threatened and native fauna species.

Based on these species, the core study area failed to meet KBA requirements on global scale, but it did qualify for a national KBA.

Through the KBA-based GAP analysis, the core study area as a KBA was assigned level 5, which is the lowest conservation priority on national level.

In addition, source populations of the KBA trigger species used in our analysis occurred outside the core study area, which did not form a major corridor for these populations either.

■ Aquatic fauna

In the Caucasus ecoregion, river systems flowing to the Black Sea and to the Caspian Sea are, like terrestrial ecosystems, characterized with high endemism with 18 endemic fish and crayfish species (*source: WWF Caucasus*).

Three fish species are endemic to Colchic rivers: the Colchic Nase *Chondrostoma colchicum*, the Round Gobby *Neogobius cephalargus constrictor* and the Colchic Minnow, *Phoxinus phoxinus colchicus* a subspecies of common Minnow. All these species are supposed to be found upstream Enguri Reservoir.

Other species are subendemic to rivers of the Black and Caspian Seas, e.g. *Syngnathus nigrolineatus* and *Neogobius cephalargus* in the estuary and lower course, *Lampetra mariae* in the upper course.

Among invertebrates: The **colchic crayfish** (*Astacus colchicus*) is an endemic species that could be present in the study area.

Table 6—4: Threatened and endemic Fauna species potentially occurring in the the core study area (RSA)

MACRO FAUNA	Nb of species in the Expanded study area	Status of species occurring in the Restricted area	
		Endemic status	Threatened national status
Aquatic invertebrates	?		
<i>Astacus colchicus</i> (Colchic Crayfish)		Relic and local endemic species	
Fishes	35		
<i>Salmo fario</i> (Fario trout)			VU
<i>Chondrostoma colchicum</i> (Colchic Nase)		endemic species to upper Colchic rivers	
<i>Neogobius constrictor</i> (Round Gobi)		endemic species to upper Colchic rivers	
Amphibians	?		
<i>Pelodytes caucasicus</i> (Toad)		endemic species to the Caucasus	
<i>Bufo verrucosissimus</i> (Toad)		endemic species to the Caucasus	
Reptiles	?		
<i>Vipera kaznakovi</i> (Viper)		Endemic ?	EN
<i>Darevskia</i> (= <i>Lacerta</i>) <i>brauneri</i> <i>Darevskia derjugini</i> <i>Darevskia saxicola</i> (Caucasian vipers)		endemic species to the Caucasus	
<i>Natrix megalcephala</i> (water snake)		endemic species	
Birds	249		
<i>Aegolius funereus</i> (Tengmalm's owl)			VU
Mammals	55 ?		
<i>Ursus arctos</i> (Brown bear)			EN
<i>Lynx lynx</i> (Lynx)			CR
<i>Lutra lutra</i> (Otter)			VU
<i>Sciurus anomalus</i> (Caucasian Squirrel)			VU
<i>Sorex satunini</i> (Shrew)		endemic species	

<i>Sorex volnuchini</i> (Shrew)		endemic species	
<i>Neomys teres schelkovnikovi</i> (Shrew)		endemic species	
<i>Chionomys gud</i> (Vole)		endemic species	
<i>Chionomys roberti</i> (Vole)		endemic species	
<i>Prometheomys schaposchnikovi</i> (Vole)		endemic species	VU
<i>Sicista kluchorica</i> (Mouse)		endemic species	VU

6.2.4 Protected Areas

■ General Background

To date, protected areas in Georgia represents 6.6 % of the national territory. They are classified in five categories: (i) strict nature reserve, (ii) national park, (iii) natural monument, (iv) managed nature reserve and (v) protected landscape.

■ Protected Areas in the Study Area

Within Enguri watershed upstream Enguri dam, there are currently no protected areas. However the situation might change sooner or later with the project of setting a large protected area on high mountain ranges around Svaneti Valleys.

■ Protected Areas in the vicinity of the Study Area

The more neighbouring core study area is Kolkheti National Park (including the Ramsar site of wetlands of central kolkheti), bordering the expanded study area at the mouth of the Enguri river 90 km downstream from the Khudoni project site;

► Kolkheti National Park

The Kolkheti National Park is also among **Ramsar sites** of international importance. This area is distinguished by its diverse ecosystems (coastal sand dunes, mires, swampy forest and waterway) and by a high degree of biodiversity. Likewise, the Park has a rich cultural heritage. Consequently, the Park is an attractive tourist destination.

At the southern border of the Enguri watershed, along the Black Sea, is located the Kolkheti National Park. The borders of the National Park and of the Enguri watershed are just 3 kilometres apart. As this area is characterised by swampy forest and peat land, there might be interactions between the Enguri River and the water within the National Park, especially during floods.

► Pryel'brusiye national park is situated in Russia on the northern slope of the Greater Caucasus range. It is contiguous with the "Svaneti priority conservation area" project.

■ Protected Areas Projects in the region

There is two projects aiming to classify new protected areas in Georgia that could directly concern the Enguri watershed, and specifically the core study area.

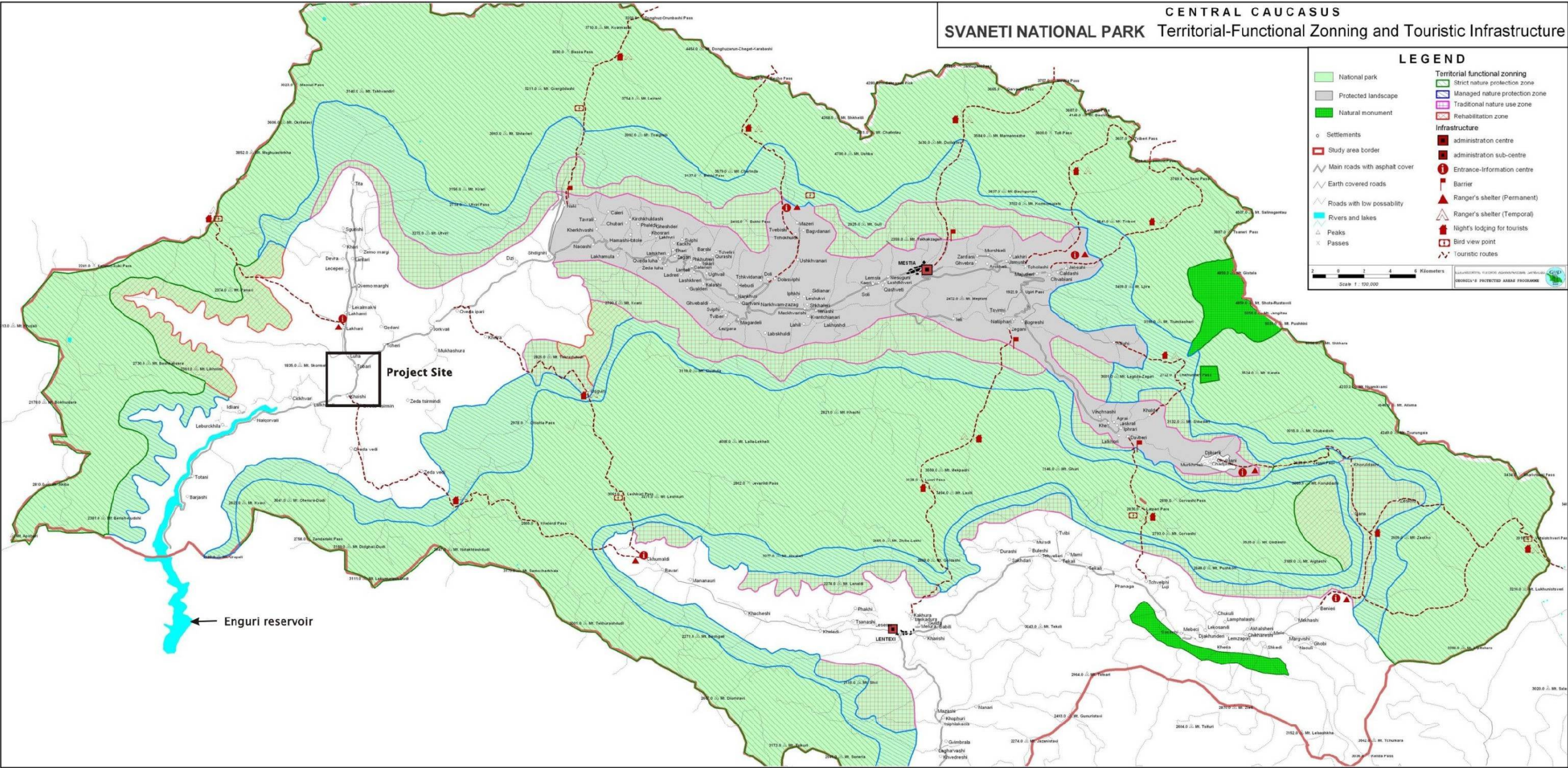
Protected Areas Development Project. This project has began in 2001 and is conducted by the Ministry of Environment Protection and Natural Resources and the World Bank.

At this time a first draft of Management Plan for 'Svaneti Protected Area' (Georgian's Protected Area Programme – GPAP) is available. According to the map of this report (see Figure 6.10), a new National Park and a landscape Protection Area are planned but the limits are still provisional.

The limits of this areas are yet provisional. According to different unofficial maps, it might include the whole upper and lower Svaneti except the valleys' bottom, or only the highest part of Greater Caucasus and Svaneti ranges.

The core study area is strictly kept out of this project of National Park. The upper valley of Enguri (around Mestia), concerned by Unesco classification, is planned to become a zone of Protected Landscape and Traditional Nature Use Zone.

Figure 6—10: Project for 'Svaneti Protected Area' (MEPNR - WB)



KHUDONI - PRELIMINARY ENVIRONMENTAL & SOCIAL SCREENING
Figure 6-10
SVANETI NATIONAL PARK PROJECT
Modified from ITM GEORGIA



Svaneti priority conservation area. WWF-Caucasus Program Office and CEPF (Critical Ecosystems Partnership Fund) have identified a network of "Priority conservation areas" for the entire Caucasus Ecoregion. This is an initial step to develop some of these sites into protected areas.

One of these areas, "Svaneti priority conservation area - PCA" (n°13) covers 2 320 km² the whole upper Enguri watershed upstream of the village of Khaishi. The limits are approximatively the valleys of Nenskra and Khaishura tributaries (see figure xxx). And the upper part of the projected Khudoni reservoir is comprised within this PCA.

Remarquable species associated to this priority conservation area are: *Capra caucasica*, *Capra cylindricornis*, *Rupicapra ruiocapra*, *Ursus arctos*, *Lynx Lynx*, *Tetrao mlokosiewiczzi*, *Tetraogallus caucasicus*, *P. lorenzii*, *Vipera dinniki*.

Figure 6—11: Project for Svaneti priority conservation area (WWF-Caucasus)



6.2.5 Key Issues Affecting Biodiversity and Conservation in the Study Area

Key issues affecting biodiversity and conservation in the study area in order of severity are as follows:

- Illegal logging, fuel wood harvesting, construction material and the timber trade are the major threats to biodiversity in the core study area and lead to habitat degradation (deforestation).
- Poaching and illegal wildlife trade over hunting/trapping of legal game species and poaching of rare species is widespread in mountain regions (large herbivores, brown bear and lynx for hunting, fox and otter for their fur) – see § 6.4.4 hunting.
- Degradation of the vegetation cover in some places is caused by overgrazing and uncontrolled livestock grazing, changing the spontaneous pattern of vegetation
- Additionally to geological events (earthquakes, avalanches, landslides), active erosion, often triggered by careless works on banks, cause serious degradations of the vegetation cover and soils.
- At this time, pollution isn't a major problem in the valley and household and urban waste water, garbage and solid waste, agricultural and forestry effluents (particularly sawmills dust directly push in the river and practices), are causing still localized pollution.

6.3 LANDSCAPE

Heading downstream, the road follows the borderline of Enguri lake, amazingly blue in its green setting and with the high mountains in the background. The scenery changes with the season, it shows a face in winter due to the low water level that gives a clear view of the bare hills now out of the water.

If you look upstream you will see a typical mountainous valley landscape with its very narrow gorges with steep slopes covered by forest that surround an impetuous river. As you go further, you will be able to better see the problems related to the **landslides**. Numerous **power lines**, often looking very old, are present throughout the valley.

Reaching the Khudoni site you will discover many **buildings, more or less abandoned** (former settlements and office buildings, more or less legal investments in the form of bead and breakfast loggings and sawmills) and the signs of a more serious **erosion**. The original infrastructure was **left as it is** and the site now looks really présente un aspect devastated (abandoned tracks, loads of scattered materials, eroded slopes, unfinished buildings, entrance to a by-tunnel...).

The village of Khaishi is suffering from a lack of maintenance of housing and household waste management facilities which has a harmful effect to its appearance.

Above the confluence, the valley becomes narrow again and the slopes **start to look greener**, with more dense forest and beautiful spots before becoming wider again further upstream.

The Nenskra River valley, narrow at first, **gently becomes wider** allowing for human activity setting such as using little hills as pastures or parcels of arable land.

6.4 NATURAL RESOURCES

Natural resource exploited in the study area that might be impacted by the Khudoni project are: hydropower, mineral resources, forest resources, game and fish.

6.4.1 Hydropower

HYDROPOWER IN THE ENGURI RIVER SYSTEM

Hydropower is considered the most important energy resource in Georgia. The Enguri River system, which benefits from heavy rains and high fall, represents an important potential for hydroelectricity, estimated about 21 billion kWh.

The following table (Table 6.X) provides the characteristics of existing and projected HPP facilities in the Enguri watershed.

Existing facilities, situated downstream Khaishi, consist of the Enguri HPP –the major unit- and the Vardnili HPPs cascade in Abkhazia. They produce in total 5.5 billion kWh.

Apart Khudoni, three other facilities have been projected, upstream the village of Tobari.

ENGURI DAM AND HPP

The Enguri dam (Picture board n°9) is located at the foothills of the Great Caucasus range, in the north of Djvari. The facilities are owned and operated by Engurhesi Ltd. The HPP was in service since 1978, whereas the dam was completed in 1984. Currently, the Enguri HPP provides 40 % of the total power requirements in Georgia.

The dam, 271.5 m high above foundation, was, at the time of its construction, the highest arch dam in the world. The crest has an elevation of 513 m a.s.l.

The water intakes, 10 x 35 m section each, open in the rock, on the right bank, with a lower level about 430 m a.s.l., have a flow capacity of 450 m³/s each. They are protected by a grid (photo 9e) and supply a 15 Km long pressure tunnel (diameter 9.5 m).

The powerhouse, underground and situated in Abkhazia, is equipped with 5 Francis turbines. The total installed capacity is 1,300 MW. The annual energy output is 4,430 GWh (POYRY, 200?).

The water outflow discharges into the Gali reservoir by a 3,200 m long tailrace, supplying the Vardnili HPP cascade (see below).

Water discharges from the reservoir by: (i) four low level outlets, gate diameter 4.5 m, with a capacity flow of 750 m³/s each ; (ii) a spillway composed of 12 slides-gates (3.5 m x 9.5 m) with a design capacity of 2,500 m³/s. Except in exceptional conditions, the reservoir is discharged by low level outlets as the spillway is damaged by floating woods.

VARDNILI HPP CASCADE

The Eristskali river situated near Gali (Abkhazia) has been impounded with a dam (Gali reservoir) supplying a channel to the black sea (Eristskali channel) and a cascade of 4 HPP units (Vardnili HPP 1, 2, 3 and 4). All these facilities were put in exploitation in 1971-1972. Since 1978, the Eristskali reservoir receives the outflow from Enghuri HPP.

The Vardnili HPPs cascade needs to be rehabilitated. The installed capacity of Vardnili I is 220 MW, but the operational capacity is 110 MW. Vardnili 2, 3 and 4 HPPs, 120 MW each, are fully flooded and not functioning.

HPP PROJECTS UPSTREAM KHUDONI HPP SITE

Beside Khudoni HPP project presented in chapter 2, three other HPP projects have been studied in the river system upstream Khaishi:

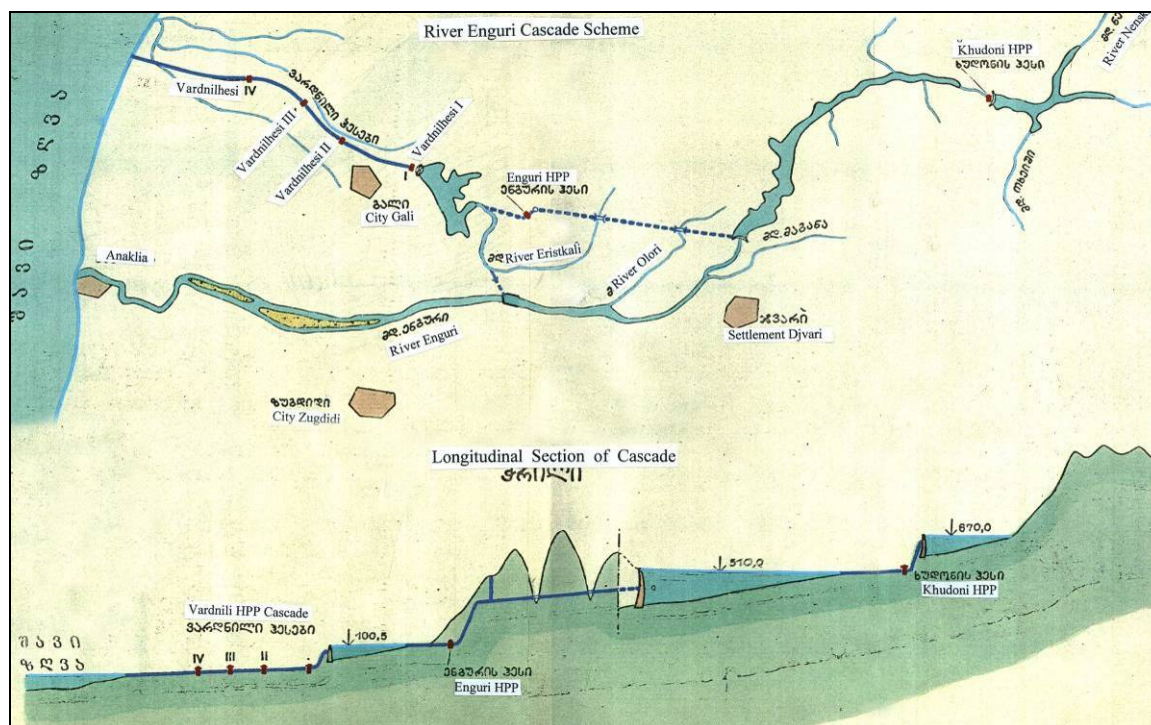
- (i) Tobari HPP project, designed as a third dam on Enguri river to be implemented upstream the future Khudoni reservoir, with a potential installed capacity of 600 MW (same as Khudoni). The dam would be constructed at an elevation of 1060 m.
- (ii) Neskra HPPs Cascade project: this project consists of 5 derivation type HPPs on the Neskra river, main tributary of the upper Enguri. Head structures and power plants are planned to be constructed on left bank, resulting in a by-pass of the river on a long section. The total potential installed capacity of this project is 87 MW.
- (iii) Shdigiri HPP project on the Nakra river, a right-side tributary of Enguri river, upstream the village of Lakhani. The project consist of a derivation type HPP, constructed on the left bank. The potential installed capacity would be 29.2 MW.

The environmental and social impact assessment of Khudoni HPP project should take into account the scenario of implementation of these different HPP projects in the upper valleys and the potential cumulative effects that will result from these projects.

Table 6—5: Main characteristics of existing and projected HPP units in the study area
(from Ministry of Energy)

HPP unit		River	Head structure and power plant altitudes (m a.s.l.)	Water discharge (m ³ /s)	Potential installed capacity (MW)
Projected	Neskra Cascade	Neskra			87.3
	Neskra 1		1,650 / 1,300	9	22.4
	Neskra 2		1,300 / 1,160	13	14.0
	Neskra 3		1,150 / 1,050	15	10.8
	Neskra 4		1,040 / 830	17	25.4
	Neskra 5		810 / 715	22	14.7
	Shdigiri	Nakra	1,100 / 900	19	29.2
	Tobari	Enguri	1,060 / ??-	-	600.0
Existing	Khudoni	Enguri	670 / -	3 x 130	638.0
	Enguri	Enguri	510 / -	5 x 90	1,300.0
	Vardnili Cascade	Eristskati			340.0
	Vardnili 1		-	-	220.0
	Vardnili 2		-	-	40.0
	Vardnili 3		-	-	40.0
	Vardnili 4		-	-	40.0

Figure 6—12: Scheme of HPP facilities on Enguri and Eristkali river systems, existing (Enguri and Vardnili) and projected (Khudoni)



6.4.2 Forest Resources

Forest resources in Georgia: Forest covers about 40% of the Georgian territory and 46% of the district of Mestia. It has expanded naturally during the last four decades (about 5,500 ha per year, UNECE, 2003.

Table 6—6: Distribution of forest cover in Georgia

Area forest found (1999)	
Actual area forest cover	2,770,000 km ²
Percentage of forest cover	41%
Distribution by range of elevation	
< 1000 m	26.8%
1000-2000 m	66.2%
> 2000 m	7.0%
Distribution by range of slope	
< 10 °	5.5%
11 to 20 °	16.5%
21 to 30 °	34.8%
31 to 35	19.6%
Above 36 °	23.6%
Distribution by type of tree	
beech	52.9%
other deciduous species	22.5%
conifers	15.7%
other species	8.9%

The most abundant resource is beech, *Fagus orientalis*. Beech forests cover 52.9 % of forest land.

Other deciduous species (mainly oaks *Quercus spp*, hazel *Corylus caucasica*, elm *Ulmus barbata* and chestnut *Castanea sativa*), conifers (mainly fir *Abies nordmanniana*, spruce *Picea orientalis* and Pine *Pinus sp*) and other species represent respectively 22.5%, 15.7% and 8.9% of forest land. The more commercially valuable species (beech, chestnuts, oaks) are rare above 1,500 m.

At present, almost all forest land is still owned by the State. Although the Forest Code allows multiple forms of ownership, forest land privatisation is not yet in the process (84% are controlled by the State Dept of Forestry, 2% by the mountain forest institute and 8% by the former collective and state farms). The Forest Code does not foresee their privatisation.

Georgia's forests are classified as follows: (i) valuable forest massifs, (ii) green zone forest, (iii) resort forest, (iv) soil-protecting and water-regulating forest and (v) protective-exploitative valley forest.

Forest ecosystems is still globally well preserved with 98% natural or near natural forest (among them 800,000 ha of virgin forest, usually natural reserves or areas with restricted exploitation status) mainly because many areas remain inaccessible due to topography and limited forest road network, since the forest industry in Soviet times was dependant on cheap wood imports from Russia. At present, 100 km of forest roads are built annually and about 800 km are repaired (UNECE, 2003)

However, in many places, forests are under serious threat because of illegal logging, both by private individuals for home eating and by enterprises. The complete reduction of the timber imports (cheap wood) from Russia has increased illegal logging to a threatening rate with clear cut close to roads.

The main threat is harvesting of fuel wood, which has been boosted with declining of GDP and disruption of fossil fuels. At present, nearly 60% of the annual forest harvest is unrecorded fuelwood (UNEC, 2003). Illegally harvested timbers is highly visible, with trucks hauling unrecorded high-quality beech logs across the border, mainly with Turkey, but this account for only 6% of the total estimated harvest.

Forest industry. Total standing wood is estimated at 434 million m³, but the average economic value of the timber harvest turnover in Georgia is not very high, since the average density per ha is 158 m³ to 163 m³/ha (Direction of Forests, 2002, statistics for the year 1999), well below European peak value.

In Zemo-Svaneti, the amount of timber cut each year is about 60,000 m³ (Department of forestry) to 120,000 m³ (GTZ) for about 20 registered sawmills.

Most of the forest cover of Georgia is on steep slopes, which makes exploitation very difficult and dangerous from the erosion point of view.

Industry consisting of primary processing of wood (paper and construction wood) is declining owing to the decrease in traditional markets and to the obsolete technology

Non wood Products. In addition to wood and environmental functions, Georgian forests produce a great variety of non wood products with more than 150 species of fruits, berries, nuts, barks (chestnut, hazelnut, walnut, cornelian cherry, dog rose, figs, pomegranate ...), about 100 species of edible mushrooms of which a dozen is regularly used, and a great number of indigenous medicinal plants for treating people and animals (among them more than 110 woody species). Georgian forests are also rich in honey and decorative plants. All these products are used by local populations and do not support any industry.

6.4.3 Minerals

The study area is rich in natural resources of various metallic and non metallic Minerals including:

- Gold (Au) is present in the alluviums. A small scale mining in the river bed occurred before world war II ;
- Barium (Ba) was exploited during the soviet time with a Barite mine being in activity near Khaishi ;
- Quick silver (Hg) and lead (Pb) are present at many places of the Enguri valley
- Marble: an important supply of marble facing (204,000 t), non exploited, exists near Khaishi
- Limestone and travertine (sawing stone) are available in large quantities, as well as hard intrusive magmatic rocks, but still non exploited

6.4.4 Fishing

The Enguri reservoir and the river system upstream and downstream have no commercial fishing even at a small scale. Fishing is either a leisure activity or a subsistence activity for local people. No permit is requested. Fishing gears are angling, seine nets (mainly used in the mouth of tributaries inflowing to the reservoir) and gill nets. Electric fishing, although illegal, has been observed.

Before the dam implementation, trouts were abundant in the river. No study was conducted on fish population and fishing activities in Enguri reservoir. Nowadays, the total fish biomass in the reservoir is probably poor. Catches mainly consist of lake trouts (*Salmo trutta*), with some big specimens. (*Interview with the Engurhesi Ltd*). In the past, attempts to restock with commercial carp species failed, probably due to cold temperatures and poor nutritive environment. No information was found about restocking with coldwater species like trout, vendace (*Coregonus albula*) and other salmonids or coregonids

6.4.5 Hunting

In Georgia hunting is regulated by the Ministry of Environment protection and natural resources. According to the law, hunting is allowed seasonally with certain bag limits only in game preserves except for migratory game birds that can be hunted outside the game preserves.

There are no game reserves in Zemo Svaneti including the core study area. However hunting (poaching) is regularly practiced there, all the year long.

Big game species hunted regularly are as follows: bear (*Ursus arctos*), wild boar (*Sus scrofa*), roe deer (*Capreolus capreolus*), chamois (*Rupicapra rupicapra*) and Caucasian turs (*Capra caucasica*, *C. cylindricornis*). Water birds are hunted on passage.

Moreover, bear and chamois are designated as endangered in Georgia's Red Data Book while West Caucasian tur and East Caucasian tur are globally endangered and vulnerable, respectively. Unmanaged and illegal hunting has almost pushed the turs to extinction in entire Svaneti.

Local hunters have lost old traditions of respecting game and treating it as wild livestock. However, there have recently been some cases of some villages imposing informal bag limits on West Caucasian tur in order to save this species in their surroundings.

Major reason of hunting is entertainment, not commerce even though hunters sometimes sell bear gall bladder and fat (for medicinal purposes), skins, fur and tur horns. Fortunately, the pretty limited amount of this kind of trade does not give locals an incentive to hunt.

Trapping fur animals is rare and mainly for entertainment.

In some parts of Svaneti, people kill various birds for use in pagan rituals.

There are hardly any conflicts between carnivorous (wolf & big cats) and humans for the density of such species is very low in Svaneti.

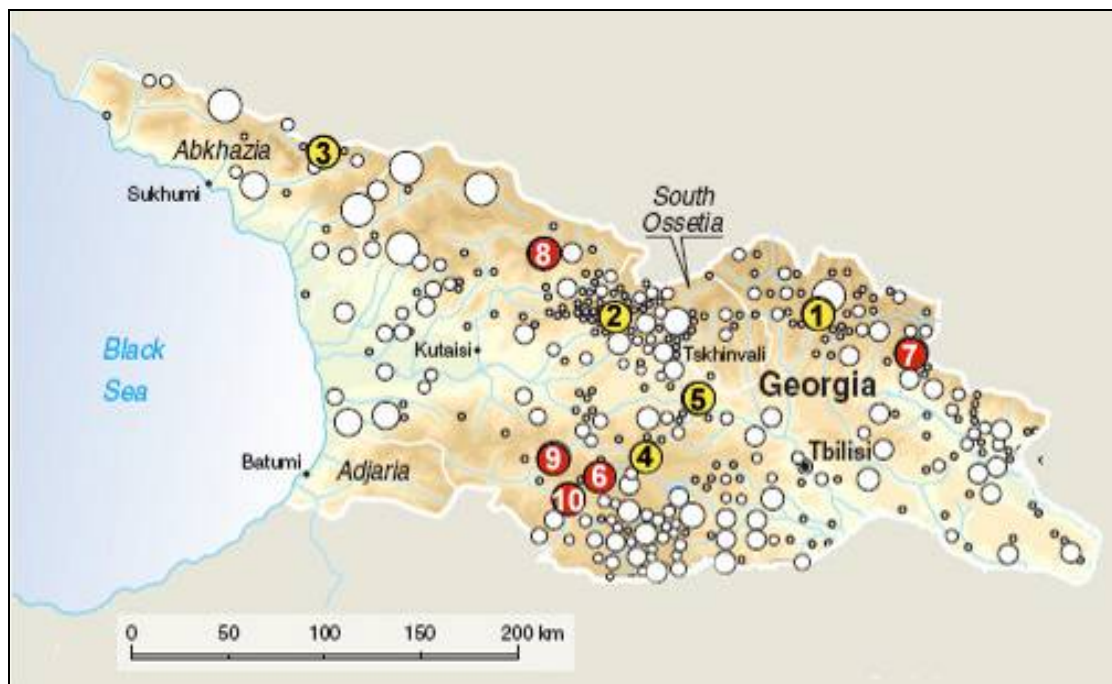
6.5 NATURAL RISKS AND POLLUTIONS

6.5.1 Seismic Risk

Being a part of the Alpine-Himalayan seismic belt, at the junction between the African Arabian plate in the South, and Eurasian plate in the North, the region is distinguished by a high level of seismic activity which, along with the other evidences of recent geodynamic activity (folding, faulting, mountain building), make the region highly susceptible and vulnerable to various natural hazards inflicting potential considerable damages to infrastructures and environment.

As show in the following figure, earthquakes are recorded along the Greater Caucasus, connected to active fault (principally in South Ossetia) and in the Lesser Caucasus (principally in Javakheti plateau).

Figure 6—13: Epicenter localization for earthquakes recorded in Georgia



The circles are proportional to earthquake magnitude, from 3.5 to 7.5 on the Richter scale. The largest circles represent earthquakes above 6.0 magnitude. Among them, mains recorded and historical earthquakes are designed respectively in yellow and red, with year and magnitude in the following table (from UNEP, UNDP, OSCE, 2004, and Georgian Geophysical Society, 2005).

Table 6—7: Recorded and historical earthquakes in Georgia (from Georgian Geophysical Society, 2005).

Recorded			Historical		
Point	Year	Magnitude	Point	Year	Magnitude
1	1992	6.3	6	1899	6.5
2	1991	6.9	7	1742	6.7
3	1963	6.4	8	1350	7.0
4	1940	6.0	9	1283	7.0
5	1920	6.2	10	1088	6.5

Concerning the study area, several strong earthquakes (with magnitude more than 6.0) were recorded in the past in the Enguri catchment;

One of the strongest earthquakes in Georgian history with an estimated 7 magnitude (n°8 on the map) occurred in 1350 in Lechkumi-Svaneti, not far from the study area.

The Enguri dam has been constructed for a 8 magnitude earthquake.

Khudoni dam should be designed with anti-seismic characteristics for a 9 magnitude earthquake.

The Georgian seismic network comprises two stations in study area: one at Enguri dam and one in the upper valley.

6.5.2 Flood, Landslide and Avalanche

The study area, like other mountainous regions in Georgia, is vulnerable to several dangerous geological and hydro-meteorological hazards, e.g. floods, landslides and avalanches, related to the different components of the physical environment (climate, hydrology, geology and soils, topography, vegetation cover) and also to the activities on the watershed (forestry, agriculture).

The constant threat of these hazards, specially of floods and landslides or mudslides, has forced in recent years many families from several villages (Mestia, Mulakhi, Tsvirmi,...) to move to safer areas (ICRC, 2005). In 1987, the village of Becho was classified by the Government as highly at risk and families were advised to relocate (eco-migrants) immediately because of the threat of another landslide.

Recent studies suggest that the climate change might alter the frequency, duration and intensity of these hydro-meteorological events, increasing hazard risk (UNEP, UNDP, OSCE, 2004).

Figure 6—14: Damages of flood in Ipari villages and view of a landslide in Svanetia (ICRC,2005)



Floods: Dramatic floods occurred recently, in 2004 and 2005, due to many days of torrential rains and snowmelt. In Upper Svaneti, floods were associated with mud and debris slides. Damages were important on houses and public facilities like roads and water supply system. Farm land was destroyed, availability of potato seed was affected, and some livestock was killed. Communities received international help (ICRC, 2005 ; ACH, 2005).

Floods situations also affect the lower valley downstream Djvari. Since the construction of the Enguri dam, flow reduction has led to the accumulation of sediments in the river bed, brought by tributaries, causing a change in erosion pattern and river course, and bed raising. As a result, during exceptional flood, houses, facilities and farm lands have been destroyed.

Landslides and mudslides: Landslides and mudslides occur on steep slopes, due to torrential floods or important precipitations. According to the map of landslide hazard by the Georgian Geological Society, the risk in the Upper Enguri catchment is weak in high mountain ranges and moderate in the valleys between Mestia and Khaishi. Several villages were affected by these phenomena during floods in 2004: Mestia, Mulakhi, Tsvirmi, Ipari, Becho... (ICRC, 2005). Heavy landslides also blocked roads and covered some agriculture parcels.

Downstream Khaishi, the risk is weak, except in south of Tsalenjikha, where it is considered as high.

Avalanches: In the study area, the risk of avalanche is considered as high on slopes of high mountains of Greater Caucasus and Svaneti Range, moderate in the Upper valley, and low in the Central valley.

6.5.3 Pollution Status in the area

Pollution status of the river is moderate like most Georgian important rivers, with the exception of the Koura river, highly polluted downstream Tbilisi.

Pollution due to household wastes, however, might be a problem in the study area. Within Mestia district, the waste water systems covers only fifty percent of the town of Mestia and are absent in many villages. The poor sanitation (toilets facilities) could lead to water contamination. After flood, high level of E. Coli have been detected in Mestia water. Degradation of microbiological quality is also a problem in Zugdidi, where the waste water system needs a complete rehabilitation (UNECE, 2003).

Though, the physicochemical quality of the water remains fairly good, according to the moderate level of nitrogene, phosphorous and organic matter measured during the field mission (see Table 6.2).

Industrial waste is rare in the upper watershed (Mestia district), the main source of industrial pollution comes from sawmills situated along the river. On some places, sawdust and sawmill scraps are directly discharged in the river, increasing the amount of organic matter in the water. In the lower valley, a few industries discharge their waste waters into the environment without any treatment

Enguri hydroelectric facilities (dam and HPP) are likely to contribute to water pollution - and soil pollution as well - as noticed in the feasibility study for rehabilitation of Enguri dam (JV Electrowatt-Stucky, 1998), in relation with the following sources: (i) oil spills, resulting from leaks of used tanks ; (ii) technical and household waste water from the power station, dam facilities and housing settlements (more than 500 persons) ; (iii) household wastes and debris of construction material in the facilities and settlement in the absence of waste disposal service. After rehabilitation, some of this pollution sources might have been reduced.

6.5.4 Radioactive Waste in the Study Area

Radioactive pollution is a serious problem in upper Svaneti, since the discovery of radioactive cylinders containing strontium-90. These material were used in Soviet era as fuel for portable thermo-electric generators for communication stations in remote areas. Eight of these generators were brought to Georgia in 1984. They were abandoned on the field instead of being recycled. Some people who found these material and kept them home were badly irradiated (UNECE, 2003).

In the study area, six sources of Strontium Sr-90 have been identified, four in Khaishi in May 1999 and two within Tsalenjikha region in December 2001 (MEPNR, 2002). The remaining two are still to be discovered.

7. Socio-Economic and Cultural Context Diagnostics

This preliminary diagnostics are based on literature review and individual interviews (in-depth interviews) and focus group discussions conducted in June and July 2007.

Interviews and focus group discussions were implemented with local representatives from Khaishi and other 5 villages (Idliani, Lakhani, Tsvirmindi, Tobari, Vedi), including moral authorities (the patriarch, the doctor, the director of the Khaishi school, a member of Mestia District Sakrebulo, also a teacher in the Khaishi school, other school teachers...), farmers, women (the list of stakeholders is provided in the Annex 4.3).

7.1 LOCATION OF THE AREA

The study area is situated in the Samegrelo-Zemo Svaneti region, in the west of Georgia, comprising 8 districts (Mestia, Tsalenjikha, Zugdidi, Chkhorotsku, Martvili Khobi, Senaki and Abasha).

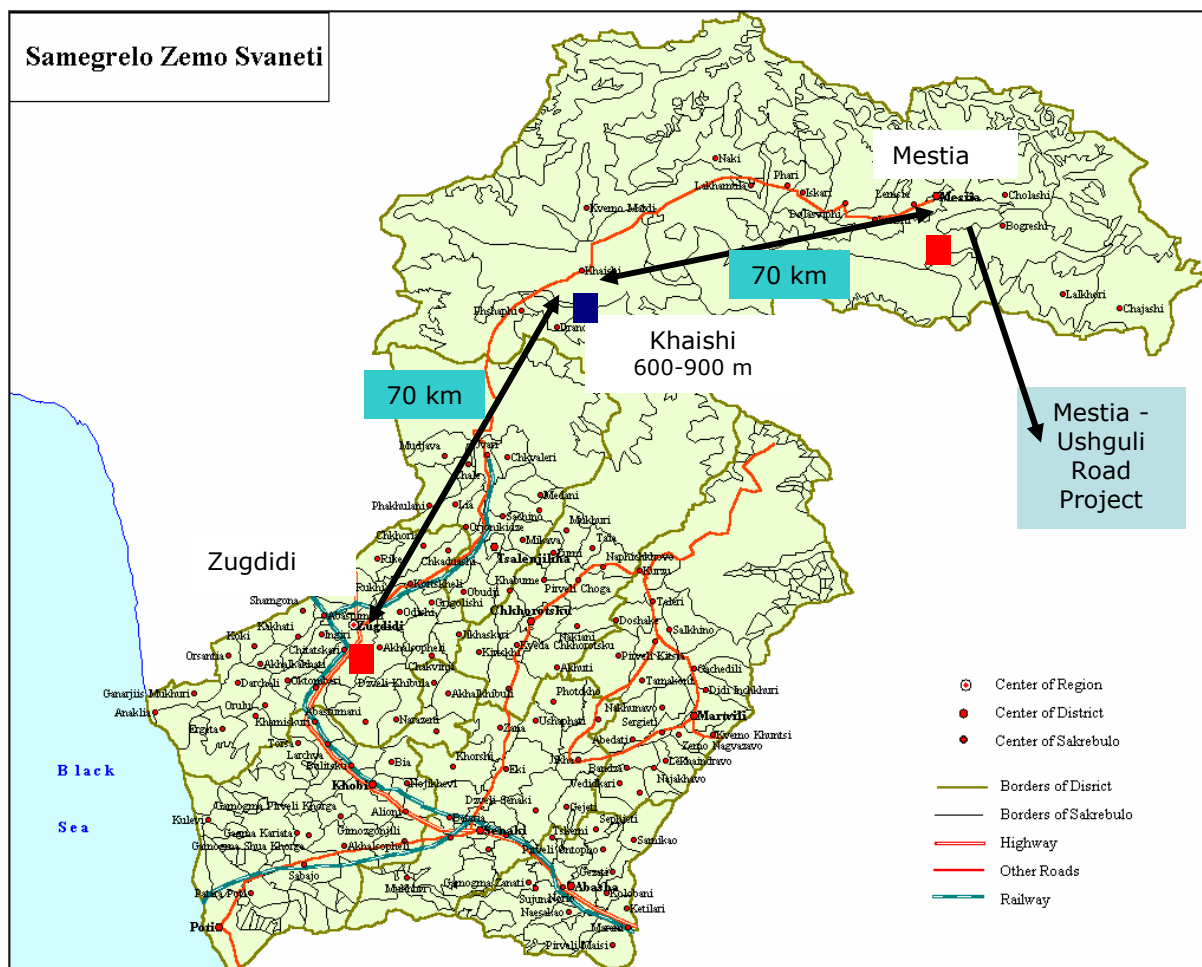
The main demographic, economic, social and cultural characteristics of the Khaishi community and its surroundings are profiled here. Reference to the entire district of Mestia, to which it belongs, is necessary considering that all Zemo Svaneti communities are highly dependent upon family clans and kinship relations and the fact that the population informally requested to consider the possible construction of the dam as an issue concerning the entire region and not only the Khudoni area.

The district of Mestia is situated north of the River Enguri at an altitude of between 700 and 3,000 meters above sea level (ASL); it is considered the roof of Georgia¹¹. 140 km. separate Mestia from Zugdidi – the administrative centre of the region and the seat of the regional government; 540 km. separate it from the capital city Tbilisi and 118 km. from the nearest railway station in Djvari. The district is separated from the Black Sea by the neighboring autonomous republic of Abkhazia, with which the conflict is still unresolved.

Khaishi lies at an altitude of 600-900 meters a;s.l; it has a similar distance (around 70 km.) from the regional centre Zugdidi than from the district centre Mestia.

¹¹ One-third of the territory is located at an altitude of 1,000-2,000 meters ASL, almost half of the area is situated at an altitude of 2,000-3,000 m. and the rest of the territory above 3,000 m.

Figure 7–1: Samegrelo-Zemo Svaneti Region



7.2 THE SVAN POPULATION: SOCIETY, FAMILY STRUCTURE AND GENDER ROLES

Zemo Svaneti is inhabited by an ethnic group of the Georgian (Kartvelian) ethnic family called "Svan". The Svans speak both Georgian and their own unwritten language which together with the Georgian, Migrelian, and Laz languages constitute the Kartvelian, or South Caucasian language family. They are Georgian Orthodox Christians. Christianized in the 4th-6th centuries, they have however maintained some remnants of old paganism.

The Svans inhabit an area of 3,044.5 km²; they are grouped in 16 communities (15 village sakrebulo and one small town (Mestia), articulated in 134 settlements¹². They are described as a proud ethnic group, characterized by strong traditions and an important cultural heritage (see relevant chapters), whose distinctive defense structures are the tower houses; the Svans were never fully subdued by external rulers.

¹² Data from the 2002 Census. Most data are taken from the 2002 Census; in some cases reference will be made to a database set up in the Regional Department in Zugdidi, with the financial support of the international NGO AFC. Data taken from secondary literature (mostly GTZ, UN, WB documents) are eventually different: when divergences are important it will be noted, otherwise the 2002 Census will be taken as the main official reference.

The society is traditional and articulated around the nucleus family; together with kinship and neighborhood, these are elements which guarantee social coherence and have greater influence than formal administration structures. As socio-cultural elements strongly influence local economic processes and choices, any development option must take them into account: mistrust and skepticism immediately appear when cooperation is requested outside the family or the kinship boundaries and moral authorities and mediators are reference figures. Family elders are respected authorities; the head of the family is male, even when he is not the oldest person of the family. Gender-specific roles are evident in the distribution of the workload: most household and educational work are a woman responsibility as well as dairy cows milking, milk processing, gardening and agricultural work in the fields. Scything, ploughing, and felling of trees are men's tasks. Potatoes harvesting and hay collecting are done together by men and women. Although women are legally and socially free to apply for representative positions, men dominate the scene. When interviewed, women are outspoken.

The Svan have long lived isolated; the neighboring conflict with Abkazia, the collapse of the Soviet regime and the degradation of the infrastructure, especially roads and transport links have all added to their sense of isolation. The wealth rank of the population goes from poor to very poor as a result of low quality land and limited cultivated area, poor infrastructure, limited market access and the fact that the area is prone to natural hazards, affecting both people and goods.

7.2.1 The Community of Khaishi and the Surrounding Settlements

The rural village of Khaishi is one of the 16 communities of the district. It is articulated in a centre and 19 settlements (2002 Census), scattered around the mountain in a range of 10-15 km. The total land area is 30,938 ha distributed as following:

Table 7—1: Land tenure of Khaishi community

Land tenure	area (ha)
Areas under buildings	27
Roads	68
Agricultural land	10,247
Forest	13,679
Bushes	393
Eroded areas	1,501
Rivers and lakes	4,296
Glaciers	98
Rocks and sands	330
Graveyards	12
Ravine surfaces	287
Total area	30,938 ha

The population lives on subsistence agriculture. The characteristics of isolation, severe climate conditions and difficult access roads of Zemo Svaneti are less prominent in Khaishi as it lies at a lower altitude and is nearer to Zugdidi than other communities; however the social and economic infrastructure of the community is seriously destroyed and people survive on a few resources; the few semi-industrial development opportunities of the Soviet period have gone and at present most incomes derive from the forestry sector for those who can still be employed by the wood cutting facilities.

Although the distance from the regional centre is similar to the distance from the district centre, Zugdidi is a generally preferred destination for most businesses and needs and also when in search of employment opportunities as the only available road to Mestia is often in bad conditions due to snow, avalanches and landslides. Bureaucratic issues require however access to the local government in Mestia.

7.3 DEMOGRAPHY

The 2002 Census reports that the district of Mestia has a population of 14,248 persons (6,899 males and 7,349 females); 80% of the population lives in rural areas (11,673 persons: 5,668 males and 6,005 females). Approximately 3,000 internally displaced people (IDPs) from the neighboring Abkhazia live in the district. There are 3,950 households. The average size of a household is higher than in the rest of Georgia with 6 instead of 3 members. The density of population is 4.68 persons per 1 square km. Until the 1930s Migrelians and Svans had their own census grouping, but were classified under the broader category of Georgian thereafter.

Information collected on site confirmed the presence in Khaishi of about 400 permanent inhabited households, for a total population of 1,376 persons (2002 Census)¹³ of which 653 are men and 723 are women. 50 additional households are not permanently inhabited but are used as summer houses¹⁴. The following box attempts to divide the population of the centre and of the villages according to the way they would be affected by the construction of the dam. Variations will depend on the alternatives suggested by the technical studies.

Table 7—2: Population of the core study area

Villages	N. inhabitants	Villages	N. inhabitants
Villages & hamlets that would be flooded by the dam			
Khaishi	554		
Upstream hamlets that would be isolated as a result of the dam			
Barjashi	6	Nalkorvali	18
Cheri	87	Skordzeti	59
Idliani	321	Tobari	28
Jorkvali	34	Totani	0
Kedani	0	Tsitskhvari	0
Lalkhorali	0	Kveda Tsvirsmindai	38
Lakhani	10	Kveda Vedi	82
Leburtskhila	71	Zeda Tsvirsmindi	0
Lukhi	41	Zeda Vedi	27
Mukhashura	0		
Downstream villages and hamlets that would be affected by the dam			

¹³ Data differ according to sources: the database refers to 1,570 persons and to 462 households. The Census 2002 do not refer to households but only to inhabitants. People refer to about 400 permanently inhabited households, plus 50 used as summer houses.

¹⁴ No data have been found on birth and death rates.

7.3.1 Migrations Trends

Out-migration is an increasing phenomenon in the district and in every village a remarkable amount of households migrate to other regions (apparently some 75-80 households leave Zemo Svaneti each year). This is the result of both the post Soviet era difficult economic and social conditions (lack of employment opportunities) and the frequent natural disasters. Since 1995 the population has been constantly declining, posing a serious threat to development and sustainability.

In Khaishi seasonal demographic variations are significant due to eco-migrants (people who left their homes as affected by landslides or avalanches), economic migrants (people who went outside of the region or followed their relatives in search of work), and part of the people resettled in the 90s in the New Khaishi village, returning during the summer.

7.3.2 Vulnerable Groups

Vulnerable people may include the very poor, the old, widows or women with heavy workloads and all those people who are likely to bear a disproportionate share of the social and environmental costs of a dam project without gaining an appropriate share of the economic benefits.

The database indicates as vulnerable people one single mother, 63 pensioners and one disable person. Internally Displaced People (IDPs) range from 20 to 30 persons, that is 8-10 households¹⁵. IDPs are hosted in the former Khaishi hospital building; they include eco-migrants (mainly from the village of Vedi where following a natural disaster, they partially lost their house and access to pasture land) and one family resettled from Abkhazia. They are generally unemployed; some of them receive the State pension; they cultivate small plots of garden near the hospital and contributed to partially renovate the space they occupy in the former hospital, at their own expenses.

The presence of IDPs can raise jealousies in the population when, for example, they get help not available to the very poor. In any case IDPs are always in difficult conditions and food insecure, having no access to land and so to subsistence agriculture, for which they are to be considered among the vulnerables.

As far as disable people are concerned, it is difficult to know their exact number as most of them are not registered; only when registered they can access health services and expensive drugs.

¹⁵ Data are: 21 persons for the database, 26 from information collected on site and 29 registered in 2004 by the NGO AFC).

7.4 SOCIAL SERVICES AND ECONOMIC INFRASTRUCTURE

Social and economic infrastructure are in very poor conditions in Zemo Svaneti and are seriously constrained by the lack of a strategy for development. Although the district of Mestia has some experience in working with international organizations, until 2004 security concerns restrained donor support to humanitarian interventions which followed natural disasters.

7.4.1 Health

The primary health care structure currently in place in the region is that inherited from the Soviet era; the Regional Government's Departments of Labor, Health Care and Social Welfare coordinate health care and social welfare activities at different levels.

The main hospital of the district is in Mestia but conditions are poor and medicines and equipment generally lacking. The presence of doctors is seriously limited by the possibility to reach the place due to the conditions of the road. Most medicines are expensive and can be purchased only in Zugdidi, Kutaisi and Tbilisi.

The community of Khaishi disposed of a 35-bed hospital during the Soviet period. Today the building hosts IDPs and the medical post which occupies two rooms and has only one doctor. A car ambulance has recently been promised by the Government. Conditions are poor and only first aid is provided. For major problems the proximity and quality of the facilities of the regional centre make it much easier for people to travel down to Zugdidi than to Mestia.

The main nutritional diseases are iron and iodide deficiencies and a general lack of vitamins and micronutrients. High blood pressure and heart diseases are prevalent. Both in Khaishi and in other parts of the region, people claim an increase of health problems (basically arthritis) due to the presence of the Enguri dam which would have altered the micro-climate. Contradictory evidence, supported by scientific studies, have been found by the Team.

7.4.2 Education

The district provides schools for basic, primary and secondary levels. The nearest place for university studies is in Zugdidi. Schools are located in all communities but the buildings are in a general state of disrepair and often located far from the settlements requiring long walks to reach them.

The community of Khaishi has four primary schools (according to our information there is only one school-check) and one secondary school.

Khaishi itself provides schools for both primary and secondary levels for a total of 12 classes and 170 pupils. On the other hand most villages have only primary school with a small number of pupils, obliged to walk long distances to reach the school (5-10 km) as many villages are accessible only by horse; in addition these schools could shortly be closed as a result of the upcoming National Conversion of the Education System.

7.4.3 Housing and Infrastructure

Many houses and subsidiary buildings in different communities require urgent repair. Most houses have no appropriate sewage and sanitary systems to ensure proper sanitation and waste management. Water is supplied by springs but the provision is not constant in all places and there is no pipe system. Drinking water is inadequate, and the waste water system presently covers only 50% of the town of Mestia. Heating is done with wood and occasionally electric heaters. Electricity is generally available and free, only private businesses pay for it; private citizens feel they have a right to have it for free due to the fact that they had and have to support the negative consequences of having the Enguri dam in place and because of the work they or their relatives provided in its construction.

The typical Svan houses and towers which concurred to have Zemo Svaneti declared a Cultural Heritage Site by Unesco are not present in Khaishi.

Housing rehabilitation is not frequent, probably an indication that people has long been expecting relocation. On the other hand, the possibility of the construction of the dam which has recently recovered pace, may be the reason for the latest construction of small buildings... from which it is hoped to obtain compensation.

In the centre of Khaishi there are one pharmacy, one gas station and 15-20 small shops, mainly selling food and drinks items (alcoholics, beverages, bread, cigarettes, mayonnaise, sugar, salt, coffee, tea, cereals, candies, cookies..); most goods are purchased in Zugdidi through the "after sale payment" condition formula¹⁶. Small shops may sell goods for about 5 GEL per day.

Public buildings concern the *gamgeoba* office, the Police Office and the old hospital. There are various old municipal buildings, mainly unused after the Soviet collapse, which are currently listed for privatization: the former Consumer Services (build in 1973); two multi-apartment houses (build in 1980 - 1985); the laundry (build in 1975); the Roads Department offices (build in 1976); the Woods Department office; the grocery store; the manufactured goods store; the agricultural goods store; the club (burned-out). Recreational infrastructure is very limited in the district.

7.4.4 The Road Network

The main road connecting Georgia with Russia passes through the Samegrelo region; however it is currently closed as a result of conflict in Abkhazia. The Zugdidi-Mestia road connects Samegrelo with Upper Svaneti and has regional importance. Mestia is connected to Tbilisi through: i) the Mestia-Djvari-Zugdidi-Kutaisi-Tbilisi road, ii) an alternative road which goes through Mestia-Lentekhi-Tsageri-Kutaisi-Zugdidi. The Mestia district's road network measures 333.7 km., with 193.7 km. of road being of local importance, connecting different settlements.

The road network requires significant investment and repair; the budget allocated for the purpose is insufficient and the situation is worsened by continuous natural calamities, thus requiring periodic repair of roads and bridges. Many communities are cut off during the winter season. Since the former state transportation enterprise was abolished, no public sector organization has responsibility for the transportation service in the district; the private sector provides transport for both passengers and goods, through small sized buses traveling daily between Mestia and Tbilisi, and Mestia and Zugdidi. The district is categorized as a high-risk area in terms of natural hazards and the movement of passengers and goods is particularly problematic in the northern part of the region, with roads often being impassable as a result of landslides, snow and poor road conditions. Due to its location, a small district airport was established in 1936 in Mestia; it has recently been renovated and provides 4 flights service per week.

Khaishi is located along the road Zugdidi-Mestia. From Zugdidi the quality of the road is acceptable while the road to Mestia may often be blocked due to adverse climatic conditions. Minor roads connecting settlements are in a state of dilapidation and some upland villages are often totally isolated during the winter season. Pasture roads are often inaccessible and even access to agricultural plots is difficult, sometimes requiring a full day walk; the delivery of harvest is made by horses.

7.4.5 Communications

The communication infrastructure is in very poor conditions. TV and radio are not everywhere available and translations are of very poor quality. There are only two TV channels (Rustavi 2 and Imedi) available. The Georgian FM radio channels are not available at all. The MAGTI and GEOCELL communication systems are available but with many areas without reach; the traditional (wire) telephone system is not available in the region. There is no distribution system for newspapers; 1-2 weeks-old newspapers are occasionally sold by resellers.

The poor conditions of the communication infrastructure may be among the reasons for which the first Government messages for informing the population about the Khudoni dam were not widely received. A different system of communication is required to ensure all citizens of the region are adequately, equitably and timely informed (see chapter on strategy of communication).

¹⁶ Payments to be done only after incomes from selling goods is obtained.

7.5 GOVERNANCE AND REPRESENTATION OF THE POPULATION AT THE LOCAL/REGIONAL LEVELS

The Rose Revolution changed the country's leadership, with clear repercussions at regional levels. Between 1993 and 1995 Georgia was divided into nine regions, each one covering a number of districts. In 2001 the administration of the country has been organized on four levels: national, regional, district and community levels. This last level was abolished by the 2005 "Organic Law on Local Self-Government". At present there is no representative body at the regional level (Samegrelo-Zemo Svaneti) and the administration of a region is the responsibility of an appointed regional Governor, chosen by the President of Georgia. This regional Governor determines the appropriate administrative structure for the region. Consequently although the country's mandate is for participatory, inclusive, transparent, consensus oriented, accountable and efficient policies, at local level the quality of the governance and the links between the communities and the local administration are weak. The decentralization process is on-going but with an unclear situation with regard to roles and responsibilities and to the provision of local budgets, making planning rather difficult.

A "Regional Economic and Social Development Plan" (RESDP) for Samegrelo-Zemo Svaneti Region for the period 2006-2009 has been prepared and funded by the WB for implementation of the Civil Society Development Centre Counterpart and the Association of Disabled Women and Mothers of Young Children. As part of this Plan, a new regional governance structure has been put in place and the Regional Governor appointed a Deputy Regional Governor to act as coordinator of the RESDP strategic planning process. A stakeholder advisory group has been established with 62 persons including representatives of the President's Office, the Regional and district governments, NGOs, the communities, the private sector and the media; it acts as a forum for issues related to strategy making and development. It appears that district-level stakeholder groups have or will be established to provide feedback and input on strategy development¹⁷.

At district level (Zemo Svaneti), the Head of the Administration is located in Mestia. The District is governed by sixteen boards covering the district's one town and the villages. There is an appointed district Governor and sixteen personnel consisting of two deputy governors, one counsellor of governor, one assistant and twelve technical specialists.

NGOs and CBOs are present in Zemo Svaneti, some of which emerged during the implementation of the USAID Community Mobilization Program but they are financially and managerially very weak.

At present there is no local representative in Khaishi; however it is reported that the Samegrelo-Zemo Svaneti authorities should nominate a person to act as a trustee, with no decision making power but with representation functions; in addition two deputies (representatives) of the village should be able to sit in the *sakrebulo* (Regional Council)¹⁸.

There is only one NGO, the Farmers Association, which is the counterpart of the project managed by the international NGO ACF - Movement Against Hunger - Accion contra la faim (see below).

¹⁷ However, during the interviews in Mestia, nobody appeared to be aware of this process.

¹⁸ This would answer also to the need of ensured transparency in the control and selling of permits of the wood cutting industry as well as to the possibility that the construction of the Khudoni dam recovers interest.

7.6 LAND TENURE AND HOUSE PROPERTIES (LAND CADASTRE)

In 1991 Georgia started to implement land reforms. In 1992, a resolution was approved allowing the privatization of land and establishing that the maximum amount of land each household could receive was 1.25 ha. However it was only in March 1996 that the Parliament of Georgia adopted the Law on the Ownership of Agricultural Land and that the right of private ownership could be defined.

At present all agricultural and arable land (1.209 ha.) are under private ownership in Zemo Svaneti; some communal pastures are owned by the *sakrebulo* while it is a common Svan practice that families *unofficially own* small wood areas. During the privatization process, each household received small plots of land: generally 2.5 ha. per household to farmers and 1.5 ha to clerks. However it appears that the strong family traditions of Svanetia– the Svans traditionally inherit land and property from father to sons - made it impractical to fully implement the law: a small amount of land could not be returned to the previous owners due to unclear property rights and so at present this land is not being used. Most households reverted to subsistence farming as the basis of their livelihoods. Each household owns a minimal of 50-100 sq.m. of vegetable garden; plots are usually of 1 ha. each, the maximum being 2-3 ha.

The process resulted in fragmented and difficult to manage ownership and tenure; land availability is scarce both for geographical conditions and because when inherited land is passed to sons in equal parts, the result is even smaller production units; consequently agricultural production is minimal due to plots being very small. In addition most local households have no documents to validate their title to land and houses are not accurately registered¹⁹.

At central level, the National Agency of Public Registry has no information regarding the Khaishi *sakrebulo* while the Samegrelo/Zemo Svaneti Regional Branch of the Agency informed that the State Programme of Public Registry is still under way in the country and the registration in Svaneti has not yet started. Authorities at local level expect that the possibility of the construction of the Khudoni dam will speed up the registration process in Khaishi. In the meantime the Agency Regional Branch works based on the 1996 Agricultural Land Privatization Law, according to which: a) plough-lands; grasslands; plots of land attached to houses and so called "reserved lands" (lands previously owned by *kolkhozes*) are to be privatized free of charge; b) farmers have the right to privatize up to 5 ha per person (0.74 ha must be plough-land; and the rest grasslands and/or pastures); c) in high mountain areas (such as Khaishi), pastures can not be privatized but are instead communal property.

In 2005, the Ministry of Energy requested information about lands identified for possible flooding should the Khudoni Hydropower Station be constructed and called for a speed-up of the land registration process. The Regional Branch of the Agency's official reply makes reference on the Institute of Agriculture "Inventory of the Land Surveying" plan for Georgia up to 2010, a document including a description of lands to be expropriated and the identification of the number of possible new jobs created during the construction of the Khudoni dam.

At present the only land registered in Khaishi concerns 20 plots near Khaishi (100-200 sq.m. each), mainly used by sawmills. The National Agency of Public Registry confirms that the process of official land registration in the Region and in Khaishi in particular is being speeded up and that land and house measuring and collection of documents should be completed shortly.

The Khaishi *sakrebulo* has other possible sources for getting further information about private properties: a) the taxpayers lists; b) the households record cards; c) the *sakrebulo* Archives, responsible for collection of the information about plots of land attached to houses (the *sakrebulo* is instead responsible for the buildings). However these documents are probably updated only up to 1996 (at present the region is tax free). The subject will be further researched in the next phase of this study.

State land around Khaishi is under the management of the Forest Fund (Forestry Department, Ministry of Environment and Natural Resources).

Agriculture lands and plots of land attached to houses are private.

¹⁹ The Cadastre problem regards all the country.

Churches Land is owned by the Patriarchate.

The following preliminary information was collected concerning official land prices (non market): a) in Mestia 1.06 GEL per sq.m., b) in villages 0.53 GEL per sq.m. (half prices than in Mestia; c) outside villages 0.275 GEL per sq.m. (25% the price in Mestia). Market prices usually ranges from 0.50 to 1.00 GEL per sq.m. of land, up to 2.00 GEL in Mestia. A house in Mestia may cost between 5.000 and 8.000 USD.

7.7 LIVELIHOOD: HOUSEHOLD PRODUCTIVE ACTIVITIES AND INCOMES

The political and economic situation of the last 15 years in Georgia dramatically affected economic activities in the region. In addition, for several years, Zemo Svaneti has remained isolated from the rest of the country being considered Georgia's most unsafe area. Household incomes depended and still depend on agriculture and forestry and to a lesser extent on tourism. Most people is employed in agriculture. The Household Food Economy Study, undertaken by WFP in Samegrelo-Upper Svaneti, classifies Upper Svanetia as one of the food economic zones defined as Mountainous Highlands Areas based on animal husbandry (cattle) and potatoes cultivation. For centuries, cattle breeding and cheese production have been the basis of livelihoods and the region has always been famous for the quality of potatoes. Food processing activities on a commercial scale are non existent. The district is characterized by a largely non-cash economy and a shortage of usable land both for arable and pasture purposes.

The village of Khaishi is no exception, with incomes largely dependent on forestry. During the Soviet period, most workers were employed by the State or engaged in agriculture and animal farming. There were 16 small and medium businesses, including a barite mine for the exploitation of barium. They all closed after the Soviet collapse, except the wood cutting facilities where most people currently find employment; otherwise people are self-employed in subsistence agriculture (cattle meat mainly but also pigs, poultry and goats, production of fruits and vegetables, maize, dairy products, potatoes, spices) with only small amounts of produce sold or bartered (basically cattle meat, potatoes and cheese but also fields and meadows are leased and share cropping is common). Bear hunting is practiced while fishing is not exploited on a commercial basis although the Enguri river does has good quality fish.

Other sources of income are represented by the transfer of money of eco and economic migrants, living in other areas and basically returning during the summer. As in other parts of the region, out-migration is a major issue with many young people emigrating to big cities or to Russia in search of work; usually people maintain strong family relations and their transfers constitute an important source. Tourism, which has represented a good source of income in other parts of the region and is recovering pace, is practically inexistent in Khaishi.

The income of the Khaishi population is calculated in 505.325 GEL/year, that is 1.743 p/household or 404 p/capita. This amounts to 33-34 GEL per month thus classifying the population as very poor. The maximum official income goes to doctors, teachers, the *gamgebeli* and arrives up to 250 GEL while the minimum income is the pension amounting to 38 GEL per month. Most people are unemployed or work in the forestry sectors for salaries of 5-10 GEL per day; the privatization process in the sector, underway but not yet completed, will probably bring a reduction in the number of employment offered.

The district is rich in natural mineral resources. There are important supplies of marble, mineral and medical waters, limestone, gold and gravel. However there are no major industries to exploit them or are occasionally unsustainably exploited. Facing marble and barite are found in Khaishi. Gold is present in the river bed and is reported also between Tobari and Khaishi. Nevertheless there is currently no mining project in the area. The Russian presence in Abkazia has certainly contributed to the Georgian Government being reluctant to engage in mining activities.

Timber is also a plentiful resource, offering the potential for local timber production and processing. There is one big company for wood exploitation in the district and 15 small ones.

7.7.1 Agriculture and Livestock

The economy of the district is primarily based on agriculture and almost the entire population is employed in the sector (according to the 2004 Agricultural Census of Georgia²⁰ 12,560 persons are engaged in agriculture in the district). There are approximately 101,100 ha. of agricultural land in the district, 96-98% being pastureland and only a small area is arable land (1,209 ha.) and cornfields (meadows) (2,064 ha.).

Cattle farming (for both meat and cheese) and potato cultivation are the main activities. The agricultural season goes from May to October. There are no perennials in the district. Potatoes are the main agricultural product, and the only one to have importance for the cash economy. Maize, beans, hay, vegetable, fruit are also produced, essentially for household consumption. Bee farming is also popular. Food processing is done at family level mainly to preserve fruits and vegetables for wintertime and milk is processed for production of cheese (*sulguni*) and matzoni. Although cattle breeding represents one of the main source of livelihood is characterized by a low level of productivity, which is reflected in a milk and meat yield far below viable possibilities; cheese is sold at about 7 GEL per kg. Nevertheless carrying capacity in terms of the number of animals for available fodder is said to be already out of control, limiting the possibility for improvement unless adequate measures are taken. In 2004, 13,204 head of livestock were registered in the district, including 8,924 cows, 5,441 pigs and 1,588 sheep and goats. 1,050 kg. of milk is produced annually. Animal production also fulfils a social function: wealth is measured in animal possession and for all Svan festivities, slaughtering of animals is essential. Cattle also serve as a financial reserve, being sold or slaughtered when there is an urgent need for money. Furthermore, oxen play a significant role as draught animals. Pastures are owned by the communities and collectively used. They are not fenced. On the other hand meadows are mainly privately owned and generally fenced in to protect the land from undesired grazing.

The majority of the district's agricultural products are produced by small holders. More than 99% of the district's population are small farmers. Land reforms implemented in Georgia in 1992 provided local district farmers with arable lands and 16,714 ha. of pasture in the district, creating 3,828 new small holdings. Each community was given an average of 0.33 ha. of privatized arable land.

The sector is labor-intensive: agriculture is barely mechanized; technical equipment used is old and antiquated and is mainly based on manual tools: the oxen is owned, rented or borrowed by the neighbors. Small plots are difficult to manage. Credit, loans, seeds, veterinary and extensions services, species of livestock adjusted to high mountainous conditions, chemicals, fertilizers are all difficult, if not impossible, to obtain. The situation is quite extraordinary thinking that all activities of the region are agricultural activities. The absence of assembly, collecting and processing hampers value-added production and most of the produce cannot reach the market. This situation, combined with the limited purchasing ability of the local market and the difficulties in transporting goods to other regions due to long distances and poor roads conditions, makes it very difficult to increase the levels of productivity, uneconomical for smallholders to take their agricultural products to the markets and thus to emerge from subsistence agriculture. Besides important quantities of produce, especially potatoes, are lost.

The main markets are in Zugdidi, Kutaisi and Tbilisi; most products are brought to the market in shared transportation by the producers themselves and there sold in bulk to resellers; these are occasions also convenient to purchase goods not available in Zemo Svaneti.

The community of Khaishi lives in an area of 30.937 ha. of land out of which 10.247 ha. of agricultural land articulated in: 10.065 ha. pastures, 139 ha. meadows and only 43 ha. are arable land.

²⁰ Ministry of Economic Development Department for Statistics.

In Khaishi small quantities of agricultural production which can be marketed or bartered include good quality potatoes, cattle meat and dairy products; fruit and vegetables are produced for household consumption. On average, every household has a set of animals. Good quality honey is available but the production in the district is decreasing due to higher costs with relation to other honey available on the market and the cost of transportation which makes production not interesting. In addition, during a CARE intervention, potato seeds infested with the Colorado beetle were distributed in some villages; to control the disease pesticides were used in excess with negative effects on bees. Fish is present, with the trout being the dominant species but it is seldom eaten. Khaishi

Table 7—3: Agricultural production of Khaishi

Agriculture in ha	Meadows	Pastures	Fields total	Fields potato	Fields Maize	Fields beans
	48,5	780	109,2	105,0	2,0	2,0
Animals	Cattle	Cows	Pigs	Sheep and goats		
	1096	767	1650	355		

7.7.2 Forest products

Zemo Svaneti possesses an important endowment of mountain forest, a large part of which has been conserved in a pristine state providing ecological protective functions as well as shelter for rare, native plants and animals. The two major forest uses are: a) firewood (for heating and cooking), which has increased since the energy situation has worsened and b) commercial timber production. Winter in Svaneti is quite cold and prohibitions/penalties to wood cutting will not have major effects unless alternatives are provided: during the last years strong confrontations between the population and the environmental and forestry control authorities are reported. These forests, which have international significance, are in a serious state of danger: deforestation occurs as a result of illegal logging activities on mountain slopes and shortages of staff and insufficient control are at present an impediment to prevent it. The conditions of erosion, landslides and floods are catastrophic in some areas and ecological refugees are increasing; overgrazing is also becoming a problem.

Government statistics vary widely on the amount of timber cut each year in Zemo Svaneti. According to information collected by GTZ, the communities declare that some 120.000 m³ are cut annually while the Department of Forestry indicates only the half of that amount. Officially there are 22 registered sawmills but the number of enterprises exploiting the wood is probably more than the double but many more are unofficial and illegal logging plays a major role in this community. In addition the strong social heritage tradition of the Svans may contribute to the illegal use of forest as clans feel they control "their forests". Most of the small sawmills do not have licenses; reforestation and regeneration measures are rarely envisaged and forest protection and management activities are not planned and claimed. However, the local population is aware of the importance of sustainable forest use. The marketing of traditional Non Timber Forest Products (NTFP) and handicrafts could create new income. Wood carving produces chairs, kitchen utensils, crosses and eventually some souvenirs. In Khaishi NTFP are collected mainly for family use and includes berries, mushrooms, herbs, chestnuts; marmalades and compotes are produced. Honey is of very good quality but expensive to produce for commercial use.

7.8 DONOR SUPPORT AND DEVELOPMENT OPPORTUNITIES

Since the 1990s various elements concurred to limit the possibilities for development: the system inherited by the Soviet era collapsed, the conditions of the road and of the communication systems worsened, the unsafeness of the area constrained the opportunities for tourism, for domestic and foreign investment and generally for economic development. The conflict with Abkhazia, incoming refugees and the conditions of isolation favored the presence of criminals and Zemo Svaneti became generally described as Georgia's most unsafe area.

The situation has prevented donors from a real engagement in the region at least until 2004. Recent activities count: i) the Social Investment Development Fund, implemented with WB financing; ii) the USAID Community Mobilization Program, implemented by CARE International; iii) food distribution by WFP and ICRC; iv) the UN rehabilitation of river banks and bridges in Mestia district; v) the German cooperation (GTZ but also the Friederich Ebert Stiftung which cooperates with the Georgian Union of Mountain Activists - GUMA) activities in supporting small businesses and in developing tourism: facilitating investment opportunities, fostering quality wine production, sustaining the tourism industry (guesthouses, cultural and trekking routes, preparation of guides, web posting information...); vi) IFAD seems also ready to implement rural development actions.

Activities specifically including the village of Khaishi are undertaken in the framework of the WFP-ECHO agreement: the international NGO ACF has carried out an assessment of the socio-economic context and of the food security situation in order to identify community and basic households needs to provide support for agricultural production; Khaishi, originally not included, qualified for the program by responding to a request to elaborate a small project in order to receive assistance. ACF is currently the only organization providing some kind of support to this community; the counterpart - the Khaishi Farmers' Association - received fodder and inform of an increase in milk yield.

In terms of development opportunities, the very poor conditions of the infrastructure, especially roads, affect all economic sectors. Maintenance is insufficient and natural disasters further contribute to damages. From an institutional point of view, the lack of the extension service is striking in an area where agriculture is the main source of livelihood. The absence of the bank and the possibility for people to receive credit is another drawback. Nevertheless the district has quite some potential for sustainable development and although robberies and brigandage are still registered, the situation has gradually improved since the Police Reforms undertaken after the Rose Revolution and the implementation of large-scale anti-criminals operations (parts of Khaishi are considered an unsafe and uncontrolled area, notwithstanding the presence of a 12 people police department).

7.8.1 Regional Development/Business

The above mentioned RESDP sets out the scene for greater economic and socially sustainable development, for facilitating rural progress, encouraging business growth and improving the livelihoods of the population of Samegrelo-Zemo Svaneti. A SWOT analysis and a Regional Business Enabling Environment survey were conducted in the eight constituent districts of the Region, including the district of Mestia. Barriers to business were identified and a number of issues recognized as important for improving the regional and local business enabling environment to foster business development.

Among the issues selected, the most important ones for the purpose of the present study are linked to the needs to increase the energy/electricity supply and to improve the road network between and within districts both in terms of opening new roads and in terms of maintenance and upkeep. Both elements are generally recognized as key for development and for contributing to the regional vision which is emerging from the RESDP. With this respect, the construction of the Khudoni dam could contribute to the achievement of some of the identified strategic goals of the Plan, if all safeguard measures are taken.

7.8.2 Sustainable Livestock Production

The local economy is based on agricultural and livestock activities. According to the international NGO ACF, which provides support to the community, the breeding of animals has an unexploited potential in Khaishi but skills in pasture and animal fodder production maintenance and management are lacking, agricultural machinery is inexistent or outdated and thus at present the production is scarce.

Although carrying capacity is already becoming a limiting factor in the district, cattle breeding should be sustained while preparing the pace for the activity which has more potential for development, that is tourism.

7.8.3 Tourism

The Region holds many natural and cultural assets and tourism is identified as having great potential for economic development. Traditionally, Mestia has had a pivotal role in Georgian history and culture. The Svan unique historical and cultural heritage with medieval-type villages and tower-houses and the beauty of the mountain scenery resulted in UNESCO declaring Upper Svaneti a United Nations World Heritage site in 1996.

Tourism used to be one of the leading development activity in the district, providing employment and supporting livelihoods with many households involved in the sector, serving almost 20,000 tourists a year. After the Soviet collapse and during the period of transition, the activity declined and presently the region is characterized by a dilapidated tourism infrastructure and is in need of rehabilitation and repair. The German Technical Cooperation (GTZ), the Georgian Mountain Federation (GMF) and the Friedrich-Ebert-Stiftung (FES) supported in 2005 a study tailored to the development of tourism and business opportunities in Zemo Svaneti²¹. In the last years, with improved conditions of securities in the area, the number of tourists is increasing (48% from 2004 to 2005). The main limiting factors are poor access and underdeveloped infrastructure and the lack of a tourism development strategy. Natural disasters destroy the economic infrastructure and hamper development opportunities.

However the relative remoteness and isolation of the area has resulted in less human impact and higher resource sustainability than in other mountainous areas and the opportunities for developing eco and cultural tourism are kept intact: visits to the Svans architectural attractions, sites of historical importance, the Kolkheti National Park in Samegrelo, clean air, protected flora and fauna can be combined with different activities of hunting, fishing, horse riding, sailing and rafting in the Enguri reservoir and in the middle and upper segments of the River Enguri. Handicrafts include the typical Svanetian hats, wooden handmade souvenirs, wool products, local paintings. The development of the tourist sector can contribute to improving social conditions in the district and reduce the pace of out-migration, if and when investments are made available, communities are involved and measures proposed are sustainable and respectful of the nature and of the social characteristics of the Svans. From Khaishi 3 routes are identified and local people confirm the intention to have them part of a tourist trekking system.

²¹ FES hosted a workshop "Development of Priorities for the Svaneti" in March 2005 and then in October 2005 a stakeholders meeting took place to discuss on "Support and services of hiking and mountaineering tourism development in Svaneti."

7.9 COMMUNICATION STRATEGY

A communication strategy is needed to allow meaningful **stakeholder consultation** and **participation**.

This responds to both reasons of equity and fairness as well as of reducing risk and increasing the chances for reward and sustainability of the decision making process. The communication strategy for the proposed Khudoni investment must at least ensure that information is i) warrant to all parties concerned, ii) appropriately diffused at the different levels of the various stakeholders, iii) coherently diffused without contradictory or hidden messages.

This required a first assessment of: i) the political, social and cultural environment, ii) the history of the project which has been retraced back to Soviet times to find out people's experience, perceptions and concerns, iii) the institutional context, especially of project responsible entities, iv) the NGOs context, v) the media environment and its capacity to communicate.

Points i), ii), and iv) above were more or less covered; point iii) requires some further analysis due to changes in Government, especially in the ministries at the forefront of the project. The Communication Strategy to be designed during the next phase will include a deeper insight of the context to prove the political willingness and commitment to communicate and identify the institutions/departments which will take overall responsibility for this process. NGOs should be included as Government potential partners in implementing communication activities. A first assessment of the media environment present in the area has been conducted but should be further evaluated in the next phase to really identify the capacity, ethic and professional quality of each outlet to reach the different groups of stakeholders in order to design the most appropriate Communication Strategy.

7.9.1 Public Consultation

These safeguard studies are based on:

- Government of Georgia's laws and practices (see § 3.1.5).
- WB requirements for category A projects²² the elaboration of a Public Consultation and Disclosure Plan (PCDP) and an Environmental Action Plan (EAP); in this case a Resettlement Action Plan (RAP) is also needed. People and institutions are required to be consulted at least twice: first when the TORs for the Environmental Impact Assessment (EIA) are under preparation but before they are finalised and second when the draft EIA is ready.

Additionally, WCD principles guided the team, in particular with relation to:

- the need for a stakeholder analysis, based on recognition of rights and assessment of risks and thus on the identification of a stakeholder group which may be consulted accordingly;
- the need to assess who shares the costs and benefits of the investment project;
- the need to enable all groups to participate in an informed manner, including those more vulnerable or traditionally in a disadvantaged position;
- the need to develop agreed mitigation and resettlement measures to promote development opportunities and benefits for displaced and adversely affected people;
- the need to avoid, through modified design any severe and irreversible ecosystem impacts (in conjunction with the technical studies);
- the need to mitigate or compensate any unavoidable ecosystem impacts;
- the need to design and implement recourse and compliance mechanisms.

²² Large dams fall into this category.

Public consultation is an integral part of the Environmental Assessment process. The main purposes are to ensure that: i) there is an inclusive and meaningful participation of all affected and interested parties and ii) this process of inclusion is started early enough in project identification and planning to be able to build the trust that all voices will be heard and compensation and mitigation measures identified to minimize impacts.

As safeguard studies are developed before a concrete investment decision is taken for the Khudoni dam, this first phase of the studies concentrated in the analysis of the context, in the identification of key stakeholders and in conducting in-depth interviews, focus group discussions and a pilot application to 15 families of the questionnaire for the future census of the potentially affected population.

This first round of consultation was multi-purpose: i) identification of key informants and stakeholders ii) identification of key environmental and social issues iii) collection of stakeholders' views on the potential impacts that the construction of the Khudoni dam could cause and finally iv) initiation of a discussion on the possible alternatives for an eventual resettlement of concerned people, taking into consideration limitations and opportunities. Consultations took place at both national and local levels (see Annex X: Organizations and people interviewed for in-depth interviews and focus group discussions). Results are presented below.

If after this stage, a decision is taken to continue with the investment project and thus to deepen technical and safeguard studies, other stages of consultation will be undertaken and, according to Georgian Law on Environmental Licenses and Permits, public meetings will be organised both during the further elaboration of safeguard studies, their disclosure and discussion.

Following the identification of concerned stakeholders and the first interviews, the completion of the first round of consultations requires the elaboration of a summary of project objectives and a description of possible envisaged impacts.

The second round of consultations will happen after approval of this first phase and authorization to proceed with an in-depth environmental and social assessment of the investment project. At that point a non technical summary of the EIA conclusions will be developed and information made available to all concerned parties in a form and language which is adequate for the different groups. Public meetings will be organised.

If the decision to construct is taken, public consultations need to be continued during project construction and operation and annual reports prepared accordingly.

7.9.2 Stakeholders' Opinion with Relation to the Khudoni Dam

Interviews and focus groups discussions were conducted with all relevant stakeholders and a number of issues emerged.

Conversations were held with the population in general and specifically with representatives from the district *sakrebulo* including the village of Khaishi and of Etseri, Tskhumari, Tchuberi, Latali, Becho, Mestia. Village representatives are elected by the local population; their opinion is trusted and are considered the main link to inform and be informed before the local government.

7.9.2.1 The Population

The construction of the Khudoni dam is no news for the people of the region; there is a widespread expectation that this would happen one day or the other. Nevertheless a large part of the population would not like to be resettled and in fact hope that the feasibility studies will result in a negative conclusion for the construction. It is their opinion that during the Soviet period the feasibility testing were not appropriately conducted and the flanks of the mountain would not sustain the dam. In any case their main concern is to be part of the decision-making process: they require appropriate information and that their views are taken into consideration. As already stated in other parts of this report, a specific request is made to treat the construction of the Khudoni dam as a problem with relevance and impact for all Zemo Svaneti region. Clearly people expectations varies whether the person belongs to the community of Khaishi or lives elsewhere in the region.

EXPECTED POSITIVE IMPACT:

- increasing employment opportunities linked with the construction of the dam and the provision of services to the workers (people from Khaishi and from all the villages);
- rehabilitating the network roads. As the Zugdidi-Mestia road could be interrupted or could become a longer way once the dam is built, as a compensation measures, the request is to open a new way Zugdidi-Mestia-Ushguli. This would greatly contribute to the development of the region by supporting local communication, markets and tourism which, in their opinion, could become of the most important factors of economic development (mostly people from upper villages);
- rehabilitating pasture roads: farmers indicate 900 sq. km. of good land in the Alpine Zone over Khaishi, used during the Soviet period and currently inaccessible; provided the ecological sustainability of putting this land to pasture is proven, farmers think plots could be used for growing potato, vegetables and cereals; at present wealthier families own 4-5 cows but farmers think that if pasture roads are rehabilitated (water is available) it would be possible to raise the number of cattle, allow trucks to enter for fodder delivery and thus increase incomes;
- new provision of energy, currently provided free of charge but used only for electricity while in the future could also be used for heating thus counterbalancing wood cutting forestry damages;
- monetary compensation linked with the resettlement which could improve the economic conditions of the population;
- a raise of public interest for Zemo Svaneti and so more investments and donors' interest.

EXPECTED NEGATIVE IMPACT:

- some villages will be flooded and some downstream and upstream villages could be isolated if access roads will not be constructed;
- a possible worsening of the transport situation created by the eventual interruption of the road at certain points and consequently a longer route from Djvari to Mestia unless the Mestia-Ushguli road is not opened (people from district upper villages);
- worsening climate conditions: people think that the Enguri dam is already negatively impacting on agriculture (more rains damaging harvest) and on people's health (more humidity increasing problems of rheumatism, asthma..): the construction of the Khudoni dam would aggravate these conditions.

ALTERNATIVES REGARDING THE RESETTLEMENT AND SPECIFIC REQUESTS:

- Svan kinship ties and traditions suggest that relocation would better take place within than outside of the region;
- nevertheless different voices report that there is not enough land for resettling the entire village together;
- it is reported that there are some abandoned houses in some villages but it is unlikely that owners would cede them;
- according to some opinions, conflicts among opposed clans discourage the resettlement of a few families in different areas;
- the entire village of Khaishi to be kept as a community and resettled together in an area somewhere between Kutaisi and Tbilisi;
- according to information collected on site, New Khaishi resulted unacceptable to most people because despite good land availability, there is a major water problem (both drinking and irrigation water) and the place is regarded as a sort of "desert" where it is unacceptable to be relocated;
- compensation to be provided to nearby villages which will not be flooded but will eventually lose the connection with infrastructure in Khaishi village (school, medical point, shops..);

- money compensation to be provided to IDPs to allow them to purchase apartments in some big cities;
- provide monetary compensation and then let the population decide where and how to resettle (opinion expressed by Svans other than those living in Khaishi)
- develop micro hydropower stations on local rivers to supply farms with electricity.

At the level of the Khaishi community, from the 2005 GTZ study we learn that the population identified as priority needs, among others: i) the rehabilitation of inter-village roads, ii) the rehabilitation of the roads to pastures and meadows, iii) business skills improvement (for timber industry), iv) developing wood waste management systems, v) reforestation.

It is to be expected that resettlement would probably be strongly opposed from groups making money through illegal logging activities.

7.9.2.2 Authorities

The Government, through the Ministry of Energy, visualizes the construction of the Khudoni dam as a development opportunity for the region and for the country especially in terms of contributing to the nation becoming independent in energy production. This position is sustained by the fact that: a) Georgia has a high hydropower capacity still unexploited, b) since Soviet times, Khudoni appeared as one of the most realistic hydropower station.

The Ministry is open to find the best alternative options, acceptable for both people and the Government and based on a positive cost/benefit comparison.

Other official authorities expressed the idea that the dam should be constructed in a way so to avoid flooding of the village and thus avoid resettlement as there is not enough land for this purpose in the district.

Many suggested to avoid resettlement in the Tsalka region, south of Tbilisi which during the years has received both eco-migrants (even from Upper Svanetia) and IDPs providing them houses, property of people of Greek origin (which allowed them to obtain a Greek passport and emigrate): the result is a messy and conflicting area, with people of different nationalities, often unable to communicate in a common language, competing for scarce resources and with a totally unclear situation with relation to the properties of land and houses (officially still belonging to the Greek people who emigrated). Filling this area with more people will only increase the tensions;

It is also suggested to avoid money compensation and prefer goods compensation.

7.9.2.3 NGOs

The most relevant NGOs for the purpose of this project appear to be: the Green Movement, Green Alternative, "Djvari" and some NGOs network such as CENN. Most of them require to be informed and be part of any process leading to a positive decision for the construction of the dam.

Credit should be given to the NGO Green Alternative, the loudly negative voice against the project. Interviews were conducted with them and opinions taken from their report released in June 2007 from the Georgian member groups of the CEE Bankwatch Network. The report highlights what the authors consider to be the likely severe negative impacts of the Khudoni dam construction.

NGOs express the opinion that Khudoni would little improve people's quality of life, based on the assumption that most energy will be used for export and in fact it could worsen their lives as prices of energy are likely to increase as a result. This is already happening in the village of Djvari, near the Enguri dam, where people has to pay electricity (0.13-0.14 GEL per KW/h) while in Upper Svanetia electricity is provided free of charge. When even a single household is unable to pay, the electricity company cuts the line to the entire neighborhood (there are no individual meters in households and so electricity consumption is measured by neighborhood instead than by household²³) and conflicts among users raise.

NGOs also point to the ecological fragility of the area and to the need to protect and preserve archeological and burial sites.

Most NGOs seems to share the population perception that the Enguri Dam has changes the micro-climate, especially in the area near Djvari.

7.9.2.4 Preliminary Conclusions of Public Consultations

Some preliminary elements can be drawn from the public consultations activities undertaken and can be summarized as follows:

- potentially affected people have been waiting the investment project to happen sooner or later as it was already initiated during the Soviet period and a group of households already resettled
- although people do not seem to strongly oppose the investment project, many potentially affected persons do not favor it and are concerned about their future
- there is a general lack of confidence on the possibility to be really and effectively included in the decision-making process
- information to date has been scarce and has not reached people in the right way causing misinformation and confusion
- different interests are at stake and increase confusion by diffusing misinformation
- there is the risk that high expectations in terms of employment opportunities cause a similar situation of the BP project
- there is a weak media environment
- NGOs are generally against the investment project
- the unique characteristics of the area and its inhabitants suggest that a communication strategy takes into consideration various elements described below.

7.9.3 Elements for Designing a Communication Strategy

Key elements of a communication strategy for this project are:

- the provision of correct information about the decision-making process of the Khudoni dam investment
- the creation of mechanisms which allow people to express their views and grievances about the process, collect concerns and suggestions
- the creation of mechanisms which create confidence and effectively answer people's concern: participation as a cost for people who need to travel long distances so they must feel their participation is meaningful.

²³ This situation is common for the majority of Georgian rural areas.

As stated above the communication infrastructure is in very poor conditions. TV and radio do not appropriately cover Zemo Svaneti. This requires to consider a mix of different elements to diffuse and collect information. Various elements were discussed with people and authorities and should be considered:

- Media outlets should be included but complemented by other means
- moral authorities and *sakrebulo* elected people are the entry point
- provide journalists with appropriate information and stimulate them to talk about the project
- regularly issue press releases
- monitor media and NGOs' information outputs
- establish telephone and e-mail contacts with the district administration in Mestia
- production of written information such as leaflets, newsletters, billboards ...
- posting of information in the Information Board of the Sakrebulo Office in Mestia
- organization of public meetings with village representatives and the population of the district
- in Khaishi internal roads are in very poor conditions, some villages could be accessed only by horse: some people could be reached by mobile phone but there are few places where mobile phones work properly
- written information (newsletters, booklets..) can be sent to families and feedback collected through pupils daily going to school in Khaishi;
- information can be sent to and collected from Khaishi through the minibus driver²⁴;
- public meetings can be fixed and organized with support from the school Director and the Gamgebeli (people trust both persons) who can write messages inviting representatives to attend meetings, informing about progress
- information can be posted in the Information Board of the Gamgeoba office.
- The project of Communication strategy is presented in the Annex 7-1.

²⁴ The Postal services in Georgia work very poorly and mini bus drivers are commonly utilized to deliver packages from one place to another.

7.10 BASELINE INFORMATION ON CULTURAL HERITAGE

7.10.1 UNESCO in Georgia and the Upper Svaneti Issue

Georgia became a Member State of UNESCO on 7/10/1992. In the same year was set up a secretariat of the National Commission of Georgia for UNESCO and the Commission itself in which the representatives from the fields of education, science, culture and communication were involved. In 1994, the Permanent Delegation of Georgia to UNESCO was set up in Paris. In 1999, Georgia became the first state in the region of South Caucasus to be elected as a Member of the Executive Board.

In 1994, four Georgian monuments of cultural heritage were inscribed into the World Heritage List of UNESCO:

- Historical Monuments of Mtskheta: the old capital of Eastern Georgian Kingdom of Kartli (according to Georgian Chronicles), or Iberia (according to Greek records);
- Bagrati Cathedral: monument of the X-XI centuries in Kutaisi (Imereti, Western Georgia);
- Gelati Monastery (Georgian religious, cultural and educational centre established in 1106 by the King of United Georgia - David (IV) Aghmashenebeli (the Builder);
- **Upper Svaneti:** Currently only the village of Chazhashi in Ushguli commune, with its unique landscape and medieval architecture, is inscribed into the World Heritage List of UNESCO, under the criteria (iv) and (v). However, the State Party proposed to add also criteria (ii), (iii), (iv) and (vii); – for the criteria definitions see Annex 1. Although the State Party retains the option of extending the inscribed monument at some time in the future, it is unlikely that the territory of the Khudoni site, which is located far enough (at about 100 km) from Ushguli-Chazhashi, will be embraced in this property. – for details see website:

<http://whc.unesco.org/archive/periodicreporting/EUR/cycle01/section2/709-summary.pdf>.

At this time the boundaries of the inscribed monument is still not precised and proposal will be done by Georgian party.

7.10.2 History

Some scholars suggest that the ancestors of the Svans reached the eastern coast of the Black Sea as early as the third millennium B.C. and moved upland into what is now Svaneti. Some place names found in Western Georgia believed to be of Svanetian origin testify to this movement.

The reason for settling in the region apparently was caused by its rich natural resources such as poly-metallic ores, deposits of iron and notably of gold, which together with abundance of wooden resources was creating a fertile landscape for the development of ancient metallurgy in the region. Archaeological investigations showed that the population of Svaneti was engaged in metal production through the Bronze and Iron ages. There were dozens of ancient mines discovered in the region with ancient tools for mining and metal production (see Pl. 1).

The Svans are usually identified with the Soanes mentioned by the Greek geographer Strabo, who placed them more or less in the area still occupied by the modern-day Svans. Strabo describes the Svans as a fierce, warlike mountain people, ruled by a king and a council of 300 elders and capable of fielding an army of 200,000, though unorganized.

Svaneti had been a dependency of Colchis, and of its successor kingdom of Lazica (Georgian name - Egrisi, what is now western Georgia) until the Lazic War, fought between the Byzantine and the Sassanid (Persian) empires for controlling the region Lazica. This war lasted twenty years, from 542 to 562, with varying success. In 552 the Svans took advantage of the Lazic War and switched sides with the Persians. The Byzantines were interested in the region, because if they secured its passes, they could prevent Persian raids on the border areas of Lazica. With the end of the war, bringing victory to Byzantines in 562, Svaneti again became part of Lazica. Later, the province joined Abkhazia to form a unified monarchy which was incorporated into the Kingdom of Georgia in the early 11th century. Svaneti became a *saeristavo* (duchy) within the United Kingdom of Georgia and since then governed by an *eristavi* (duke). The province's Orthodox culture flourished particularly during the Georgian "golden age" under Queen Tamar (1184-1213), who was respected almost as goddess by the Svans.

Most of the land belonged to the Svan nobility (*wærg, pusd*) or to the local Georgian Orthodox churches and monasteries. The peasants (*glekh*) worked the land and provided crops and other services for the landowners. Several Svan noblemen rose to powerful positions in the medieval Georgian government and were rewarded with important titles and large holdings of land in lowland Georgia.

Beginning from the mid-thirteenth century, wave upon wave of Mongol, Persian and Turkish armies devastated the lowland parts of Georgia. Because of its remote location, much of Svaneti was never invaded. For this reason, many of the finest works of Georgian artistry—icons, illuminated manuscripts, and gold and silver items—were preserved in Svanetian churches during this period. The Svan villagers protected these treasures zealously (the theft of an icon was punishable by death, usually by stoning, even in not distant past). A sizable number of objets d'art of foreign origin (Persian, Syrian, Italian, German) have also found their way into Svaneti, a testament to the wide-ranging cultural and trade contacts of medieval Georgia. After the dissolution of the Georgian empire, the land was segmented into several smaller kingdoms and principalities. Svaneti came under the nominal authority of the kingdom of Imeretia. From the sixteenth century to the beginning of the nineteenth, a handful of powerful Svan families came to exert dominance over all of the province except for the upland (eastern) half of the Upper Svaneti, which came to be known as "Free Svaneti" (*Tævisupæl Shwæn*). There were also several peasant uprisings during this period, resulting in the decline of the feudal system in some localities.

The Treaty of Georgievsk, signed in 1783, placed the kingdoms of eastern Georgia under the protection of the Russian Empire. Most of western Georgia, including the lower Svaneti, was incorporated into the empire in 1803-1804. The people of the Upper Svaneti, however, resisted the imposition of Russian rule for some time. The princely house of western Upper Svaneti finally capitulated in 1833, and the rest of the province in 1853-1857. During the period of Russian rule the peasantry was freed from serfdom and given small land lots. After the October Revolution of 1917 of 1917 Georgia declared its independence from Russia. In 1921 the Red Army invaded Georgia and incorporated it into the Soviet Union. In recent years notable infrastructural improvements have been made in Svaneti: schools and health centers have been opened, roads upgraded, and electricity introduced.

For many centuries the Svans have been in contact with the northern Caucasian tribes on the other side of the mountains and with the Ossetians to the east. These relations have often been hostile, with raiding parties from one or the other group attempting to seize the other's property. On the other hand, the Svans have engaged in trade with these tribes, and in earlier times many Svans worked for them as migrant laborers.

7.10.3 Cultural Heritage/Property

7.10.3.1 Archaeology

There are more than **300 archaeological sites known in Svaneti** ranging from the Chalcolithic through the Late Medieval Period. Archaeological investigations showed that the region was constantly settled since the third millennium BC. This period is notable by introducing bronze (the alloy of copper with tin and other metals) and establishment of long-distance trade relations in the Old World. Favourable natural conditions of Svaneti for the development of bronze metallurgy as well as gold work, on which was constantly increasing demand in the ancient Near East, became apparently the main impetus for the ancestors of the Svans to occupy the region since the third millennium BC. The third and second millennia types of bronze weapons discovered on the sites of Svaneti are identical to the ones found elsewhere in the Caucasus and the Near East, which testify involvement of Svaneti in relations with outward world. Richness in gold deposits of Svaneti was known since the ancient times. As Strabo writes - *"It is said that in their country gold is carried down by the mountain torrents, and that the barbarians obtain it by means of perforated troughs and fleecy skins, and that this is the origin of the myth of the golden fleece..."*

Svaneti with its rich metal resources remained as attractive region also for iron metallurgy during the first millennium BC and through the Classical Period.

7.10.3.2 Medieval Architecture and Wall Painting

The most notable feature of the Upper Svaneti settlements is the abundance of towers, especially in Mestia and the frontier villages, such as Ushguli and Latali. These towers usually have from three to five storeys and the thickness of the walls decreases giving the towers a slender, tapering profile. Their upper floors are exclusively defensive in function, serving as platforms for observation and for storing and throwing projectiles; they have machicolated parapets crowned with arches. The houses themselves are usually two-storied and between 80 and 130 m² in ground area. The ground floor is a single hall with an open hearth and accommodation for both people and domestic animals, the latter being separated by a wooden partition, which is often lavishly decorated. A corridor annex helped the thermal insulation of the building. The upper floor was used by the human occupants in the summer, and also served as a store for fodder and tools. A door at this level provided access to the tower, which was also connected with the corridor that protected the entrance.

Continuing research on the origins of the Svaneti tower house now suggests that these go back to the prehistory. Its features correspond with the economic imperatives of the communities to which they belong: intensive mountain agriculture and stock-rearing. They also throw valuable light on social organization (family size, distribution of functions, etc.). Many of the tower-houses have disappeared or are collapsing into ruins. The village of Chazhashi in Ushguli Commune has, however, been preserved as a Museum-Reserve. Here more than two hundred towers and four hundred houses have survived. The village is situated at the confluence of the Black and Inguri rivers, an easily defensible location. It is protected by two castles above and below the village; the lower castle has a Small hall Church known as Lashkdash; another church known as Matskhvar in which medieval wall paintings are preserved stands on a nearby hill.

The severe outlines of the Svaneti house consisting of strong vertical and horizontal elements are softened by the addition of a purely decorative 'cap' to the tower. The houses are built of irregularly sized stone blocks and sometimes local slate set in lime mortar.

The churches of Upper Svaneti are generally very small, rarely exceeding 20 m² and sometimes as small as 5-6 m², and not ornamented with carved external decoration. Internally, however, they are noteworthy for their wealth of **wall paintings, carved doors, processional and altar crosses, and illuminated manuscripts**. They range in date of construction from the early 9th to the 17th centuries, with a creative peak in the 10th-12th centuries. The Wall Paintings in particular are of high historical and artistic importance. A Special feature of the Svaneti Churches is the painted decoration on their facades, which depict Biblical and hagiological subjects. The village of Zhibiani is one of the highest in Svaneti, some 2100 m above sea level. To the north of and dominating the village lays the Lamaria religious complex. The wall paintings on the church here are an outstanding example of Renaissance painting in Georgia.

7.10.4 Cultural Sites in the Study Areas

The list of the cultural sites known and localised in the core study area has been set up in a first approach (see figure 7.1):

- 10th-11th centuries cemetery in the village of Khaishi (Excavated partially in 1979 by the Svaneti Archaeological Expedition of the Centre for Archaeological Studies, Georgian Academy of Sciences);
- 12th century church on the top of the abovementioned cemetery excavated by the Svaneti Archaeological Expedition and rebuilt²⁵ by the local community of the village. The church is currently active;
- Remains of the Iron Age metallurgical workshop (?) on the same territory;
- Cave with the remains of Medieval pottery in Khaishi that has been covered with soil while building the new road;
- Metallurgical workshop on the right bank of the River Enguri in Gaghma-Khaishi;
- Medieval Settlement, cemetery, church and tower in Tsirindi, up in the gorge of Khaishura;
- Medieval cemetery, church and tower in the lower part of the village Idliani on the right bank of the River Enguri;
- 12th century tower built on the Classical Period layer 3 km westwards from the village of Khaishi, in front of the Arch Dam of Khudoni.

7.10.4.1 Cultural Sites in the Core study area

Table 7—4: Cultural sites in the core study area

Site description	Measure recognized on case of flooding
<p>KHAISHI HOARD</p> <p>Khaishi hoard artifacts (or grave goods) were discovered by accident in 1948, during the village road construction works. Exact location of this discovery is unknown.</p> <p>The hoard dates to the 1st century AD. It contained equal in shape three two-handled silver vessels on high stands, gold necklace with impressions of two mythical animals and gold pendent with impressions of a roofed tower and two human figures with musical instruments. One of the silver vessels is ornamented with high-relief foliated motif and is considered as one of the best specimens of the Classical silverwork. It was apparently manufactured in one of the workshops of the Hellenistic East. As for the gold objects, they are of local production, continuing gold work traditions of Early Classical Period of Georgia.</p>	<p>In case these artifacts come not from a hoard, but from a grave, one might expect existence of other Classical Period graves as well at the same place. The probability of the latter assumption is strengthened by the existence of the remains of Classical Period settlement in Khaishi (see below), which imply the existence of a cemetery of the same period comparatively nearby this site. The only chance of discovering this cemetery is to conduct archaeological survey along the Khaishi village road with trial excavations in the selected places.</p>

²⁵ This church was totally rebuilt by local community with modern materials and without architectural reference to the original church

Site description	Measure recognized on case of flooding
<p>KHAISHI ST. GEORGE CHURCH</p> <p>Khaishi St. George Church is located in the village of Khaishi on the right bank of the river Khaishura, on a high terrace, within the territory of the modern graveyard and the medieval cemetery. GPS coordinates: Elv. – 881 m., N - 42°54.517, EO - 42°11.263 (coordinates have been taken next to the eastern entrance of the church).</p> <p>Late Medieval Period St. George Church in Khaishi was built on top of the 12th-13th century cemetery. It was reconstructed in 1903-05. However, in 1991-94 a new, architecturally similar church was built at the site, although larger than the medieval one. The architecture of both medieval and modern churches of Khaishi with semicircular niche from the northern side and covered with a semi-dome (conch) is common for the church architecture of Upper Svaneti.</p>	<p>Although the church of Khaishi with its current appearance was built recently and has no unique architectural value, still it is understandable that the people of the village do not want their religious site to disappear under the water. As for the possibility of demolishing the church and transferring its each stone and other architectural details to a new place, where the population of Khaishi might be resettled, and rebuilding it there, the opinion of the villagers seems rather mild. However, the religious figures of Upper Svaneti are against the suggested transfer. The main stakeholders who can make the final decision on the problem are the Patriarchate of the Georgian Orthodox Church and the Ministry of Culture.</p>
<p>KHAISHI MEDIEVAL CEMETERY</p> <p>Khaishi Medieval Cemetery is located in the village of Khaishi on the right bank of the river Khaishura, on the territory of the modern graveyard and the Khaishi Church.</p> <p>A part of the medieval cemetery was excavated in 1979 by the Svaneti Archaeological Expedition of the Centre for Archaeological Studies (director of the expedition Shota Chartolani). Most of the graves date to the 12th-13th centuries. The grave goods are mainly represented with iron weapons and pottery (see Pl. 4₂). As the excavator suggests, the graves belonged to warriors. These graves have destroyed earlier cemetery, whereas the church was built on top of some of these graves. There are still left some medieval graves unexcavated and the stone structures of some of them are clearly visible (Pl. 7₁). Besides the graves, there are structures of some buildings apparently also belonging to the Medieval Period (Pl. 7₂).</p>	<p>In case of execution of the Khudoni Project proposing the flooding of the territory of the medieval sites located within the modern graveyard, archaeological excavations must be carried out in two stages. The first stage implies trial archaeological excavations on selected places, in order to define the scope of spreading and the character of archaeological remains and to estimate the scale of works required for the second stage of stationary archaeological excavations.</p> <p>According to the Law of Georgia on Cultural Heritage, issued on 06.06.2007, all archaeological works should be licensed by the Ministry of Culture, Monument Preservation and Sport.</p>
<p>KHAISHI EARLY CLASSICAL PERIOD SETTLEMENT</p> <p>The remains of Khaishi Early Classical Period settlement are located in about 200 m. north-west of the Church, close to the village school.</p> <p>The excavations at this site were carried out in 1983 and 1988 by the Svaneti Archaeological Expedition of the Centre for Archaeological Studies (director Shota Chartolani). The archaeological material discovered at the site is represented with 6th-7th century BC pottery shards which were scattered around the excavated area. There were some stone structures as well, although the architecture of the buildings could not be identified.</p>	<p>The settlement has not been excavated completely and future archaeological excavations which are required in case of implementation of the Khudony Project, apparently will shed more light on the architecture and nature of this site.</p>
<p>KHAISHI CLASSICAL PERIOD SITE</p> <p>Some Classical Period pottery shards have been discovered at the top of the rocky hill in Khaishi, on the left side of the river Enguri, close to the main road, behind the petrol station. There is an iron cross mounted on the top of this hill. Elevation 706 m.</p>	<p>In case of implementing the Khudoni Project, a small scale archaeological works has to be performed on this site.</p>

7.10.4.2 Cultural sites outside the core study area

Table 7—5: Cultural sites outside the core study area

Cultural Site Description

BARJASHI CAVE

The cave with the remains of medieval pottery is located in about 15 km westwards from the village of Khaishi, near the village of Barjashi, on the left side of the river Enguri, next to the Samegrelo-Upper Svaneti road. GPS coordinates: Elv – 579.5 m, N - 42°52.229, EO - 42°01.910 (coordinates are taken in about 10 m north from the site).

Barjashi cave has been covered with soil during the road construction works and currently only its upper part is visible. It was used during the Medieval Period apparently as a shelter for wayfarers traveling to, or from Upper Svaneti. Although the cave is located outside of the core study area it might be influenced by the Khudoni Project in case of widening the road next to the cave, or any other road construction works in this place. In this context, one might consider small scale archaeological works to be carried out in order to get more information about this site.

KHAISHI FORTRESS

Khaishi Fortress is located in about 10 km west from the village Khaishi, next to the rock-cut-pass Leburtskhila. GPS coordinates: Elv – 602 m, N - 42°54.797, EO - 42°04.310 (coordinates have been taken in approximately 30 m south from the site, near the old road).

Khaishi Fortress measures 11,5m by 7m. The corners of the fortress are strengthened with rounded poles (see fig.). The masonry of the walls is lime mortar and wooden armature reinforcement has been used. This construction technique is typical for the Svaneti Medieval architecture and was used until it was replaced by the reinforced concrete framing of modern times. Archaeological works carried out by the Svaneti Archaeological Expedition of the Centre for Archaeological Studies (director Shota Chartolani) showed that the fortress was apparently built in the 10th century and functioned until the 17th century. However, the remains of some artifacts found during the archaeological excavations suggest that the place was used as a military outpost as far back as the Classical Period. There was a wooden tower in this place in the Early Medieval Period, before the stone fortress was built in the 10th century.

Although Khaishi Fortress is located outside the flooding area, since it is nearby the existing Enguri HPP reservoir and next to the projected Khudoni HPP reservoir which is certain to further increase the level of humidity in the area, the foreseen impact on the fortress masonry might necessitate conservation/restoration works. Conservation/restoration works of this site were in the agenda of the Ministry of Culture, however it has not been implemented yet.

Khaishi Fortress is the most important fortification in the observation-fortification system of the river Enguri midstream and is one of the first historical sites visible from the road going from Samegrelo to Upper Svaneti. It is easily accessible and since it can be viewed as an introduction to the cultural heritage of Svaneti, might be used as a tourist attraction site.

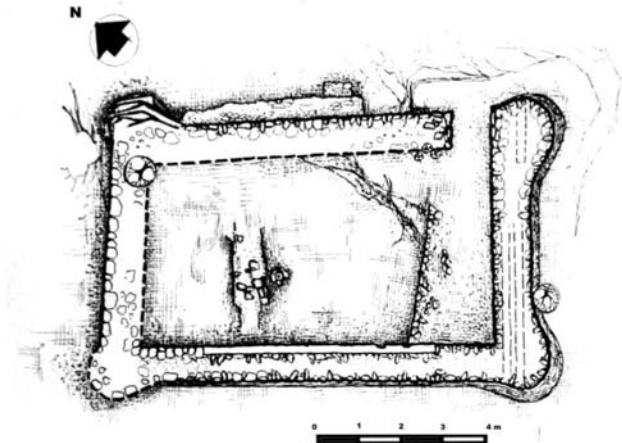
7.10.4.3 Cultural heritage sites on the right bank of the river Enguri

Although cultural heritage sites located on the right bank of the river Enguri are not within the core study area, still they can be affected by the project indirectly, because the only road connecting Upper Svaneti with the rest of the country runs along the left bank of the river. The 9th century Archangel Church in Laghrali and the remains of the fortress and 12th century church and cemetery in Idliani might be isolated from the rest of the country because of the reservoir (see the map). Hence, the construction of bridges over the river Enguri and roads leading to these sites should be envisaged.

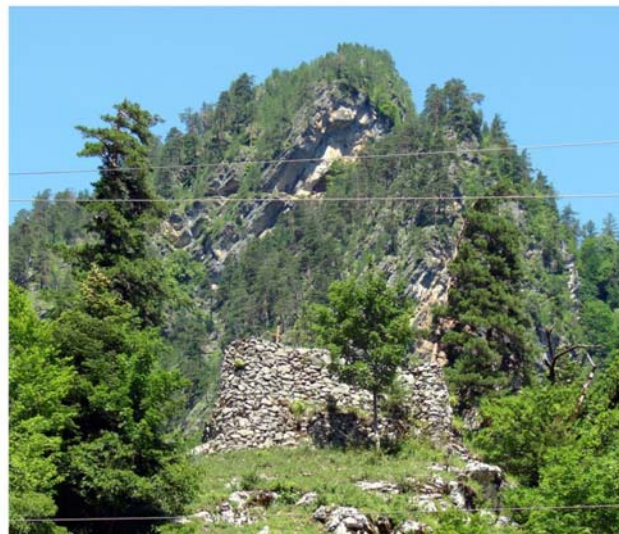
Figure 7—2: Cultural Heritage sites



1



2



Pl. 5 Khaishi Church, built in 1991-94 on the place of the smaller church built in 1903-1905

Pl. 3 Khaishi Fortress, 10th-17th centuries

Figure 7—3: Cultural heritage sites

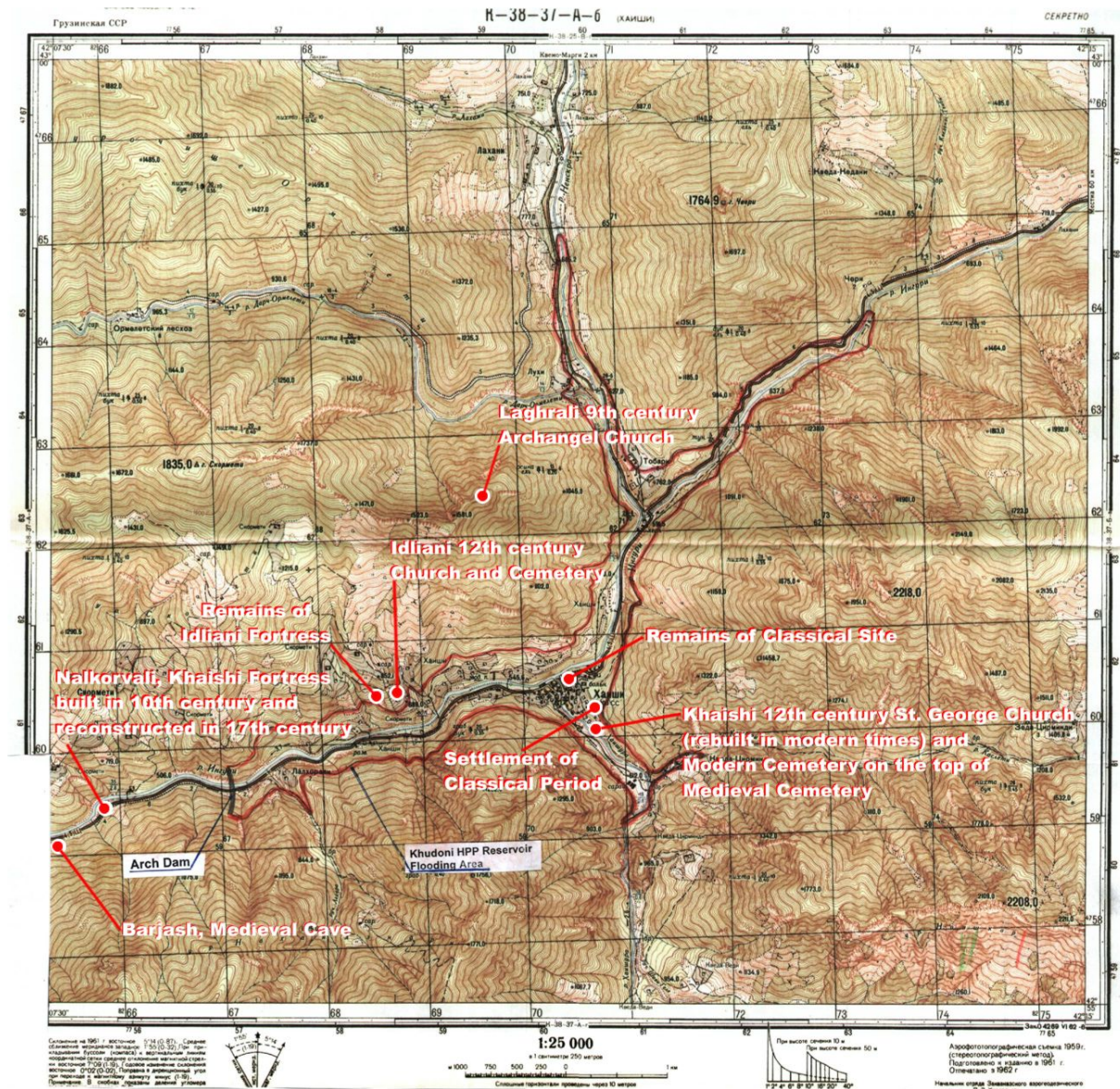


Tableau 8-1: Impacts and measures on physical components

CONSTRUCTION STAGE				
CP	Physical components	Potential impact	Impact level	First Proposal of Measures
CP1	Air quality	Local degradation of air quality due to: (i) <u>dust</u> from construction of dam, roads and other facilities, stone mining and crashing, increase traffic ; (ii) <u>exhaust gas</u> from the engines ; (iii) <u>smoke</u> from the concrete factory	— Moderate	Use and maintenance of engines in conformity with environmental standards - Limitation of vehicle speed - Watering of open surfaces against dust - Environmental obligations for companies in charge of works - Implementation of an environmental management system (ISO 14001 or equivalent) during the construction.
CP2	Soils	<u>Increased instability of slopes</u> : erosion due to removal of the vegetation cover for construction of dam, roads, power line & other facilities, stone mining ; <u>possibly increase of landslide risk</u> with heavy rain, and <u>avalanche</u> in winter.	— High	Control of erosion - Environmental obligations for companies in charge of works - Reshaping and revegetation of surfaces after work completion.
CP3	Soils	<u>Loss of agricultural soils</u> in the areas affected by construction activities (pastures, arable lands, market gardens ...)	— Moderate	Compensations for land owners
CP4	Water flow downstream	<u>No modification of the Enguri river flow pattern</u> (flow will continue to pass through the by-pass system)	— Moderate	Assessment of water requirement in order to estimate the impacts. Monitoring of the water intake during the construction stage.
CP5	Water flow downstream	Impact of <u>water intake</u> during construction, for workers settlement, concrete factory and other facilities (washing & cooling processing)	— Low	
CP6	Quality of surface & ground waters	Increase of <u>suspended matter</u> in the river downstream Khudoni area due to water run-off and erosion on uncovered surfaces	— High	Implementation of drainage and sedimentation systems for running waters Monitoring of the concentration of suspended matter in the river
CP7	Quality of surface & ground waters	Degradation of <u>physico-chemical</u> and <u>bacteriological quality</u> of surface and ground waters due to sewage and wastes from workers' life-site.	— Moderate	Implementation of a provisional sewage purification system Management of domestic wastes
CP8	Quality of surface & ground waters	Impacts of <u>leaks and accidental spilling of hazardous liquids</u> (fuel, oils, toxic substances ...) on surface water (Enguri river and Enguri lake) and ground waters, due to engines, storage areas for engine / material, dumping sites.	— Moderate	Control of spreading of engine leaks Water quality monitoring of the river downstream Khudoni Environmental obligations for companies in charge of works Implementation of an environmental management system (ISO 14001 or equivalent) during the construction.
CP9	Sediments	<u>Increased silting</u> in Enguri reservoir due to erosion of uncovered surfaces during the construction of dam, roads and other facilities.	— Low	Implementation of drainage and sedimentation systems for running waters Reshaping and revegetation of surfaces after work completion
CP10	Sediments	<u>Degradation of the river bed</u> and hydro-sedimentary impacts due to material extraction in the Enguri river, near Djvari	— Moderate	Choice of an adequate site and process for material extraction Monitoring of the concentration of suspended matter in the river

FILLING UP STAGE				
FP	Physical Components	Potential impact	Impact level	First Proposal of Measures
FP1	Local climat	<u>Microclimate change</u> due to storage of heat and cold, with possibly (i) increased temperature & humidity above the reservoir and in the close vicinity ; (ii) formation of early morning and winter fog around the reservoir. No significant change on the Upper Svaneti valley is expected.	— Low to moderate	No mitigation measure
FP2	Water flow downstream	<u>Temporary disruption of water flow</u> in the river Enguri downstream Khudoni during filling up of the reservoir (approx. 130 days in winter and less than 20 days in high water-flow season)	— Low	Maintenance of a sanitary and ecological minimal flow. Monitoring of waterflow downstream Khudoni
FP3	Water level in Enguri reservoir	<u>Impact on Enguri reservoir management</u> during the filling up stage of Khudoni reservoir	— Moderate	Forward-looking management of Enguri reservoir during the filling-up stage of Khudoni Monitoring of water level in both reservoir
FP4	Ground water	<u>Increase of water table level</u> in the vicinity of the reservoir	— Moderate	No mitigation measure
FP5	Soils	<u>Destabilisation of soils</u> during the filling up of the reservoir, with associated risks of landslides	— High to moderate	Progressive filling of the reservoir Monitoring of slopes exposed to the risk of landslides
FP6	Soils	<u>Loss of agricultural & forestry soils</u> in the flooded area (pastures, arable lands, market gardens ...)	— Moderate	Compensations for land owners
FP7	Seismic risk	<u>Possible increase of seismic risk</u> during filling of the reservoir	— Moderate ?	Progressive filling of Khudoni reservoir Monitoring of seismicity during and after the filling of the reservoir
FP8	Water quality in the future reservoir	<u>Degradation of water quality in the future reservoir</u> due to decomposition of flooded organic matter (soils, vegetation) with increase in nutrient concentration and possible oxygen depletion	— Low	Cutting and removal of trees within the flooded area before filling-up, partially or totally Commercialisation of valuable trees and valorisation of cuttings (charcoal or fire food) Monitoring of water quality in the future reservoir
FP9	Water quality in the future reservoir	<u>Degradation of water quality in the future reservoir</u> due the flooding of Khaishi facilities (houses, shops, garages ...)	— Moderate	Demolition of all facilities before flooding of the village – depollution of sites
FP10	Water quality downstream	<u>Stopping of domestic sewage</u> from the population of Kaishi	+ Low	No measure
FP11	Sedimentary carry-over and silting	<u>Decrease of sedimentary carry-over and progressive silting</u> in Khudoni reservoir. <u>Decrease of silting rate in Enguri reservoir.</u>	+/- Moderate	Anti-erosive actions on the watershed (control of landuse and forest exploitation, reforestation and forest protection ...) Monitoring of silting in both reservoirs
FP12	Floating material	<u>Stopping of floating material</u> (trees & branches, sawmills wastes) in Khudoni reservoir with important accumulation on the banks and upstream the dam. <u>Decrease of floating material accumulation upstream Enguri dam.</u>	+/- Moderate	Cutting and removal of trees within the future flooded area Forward-looking management of floating material in Khudoni reservoir- Implementation of floating wood management facilities at Khudoni (crane, processing and storage area) Improvement of sawmills waste management

OPERATION STAGE				
OP	Physical components	Potential impact	Impact level	First Proposal of Measures
OP1	Global Climat	Potential emission of green house gases (GHG) from the reservoir, particularly methane (CH ₄), hydrogen sulphur (H ₂ S) and CO ₂ (carbon dioxide)	— Low ?	No mitigation measure Monitoring of GHG production
OP2	Local climat	<u>Settlement of a microclimate at the very vicinity of the reservoir</u> (increased temperature & moisture, formation of early morning and winter fog). But no significant effect is expected on the whole upper valley.	— Low	No mitigation measure
OP3	Soils	<u>Post-construction erosion and possible landslides</u> around future reservoir, roads and other facilities, due to poor stabilized slopes during the construction phase and to the water table level range in the surroundings of the reservoir	— High	Revegetation of deforested areas and of the whole watershed with implementation of forest protection status Stabilisation works & revegetation of erosion along the roads. Drainage system. Monitoring of slope erosion
OP4	Water resource	<u>Water loss due to evaporation</u> in the future reservoir	— Low	No mitigation measure
OP5	Water flow (in the by passed river section)	<u>Drastic decrease of water flow</u> in the by-passed section of river Enguri between the future Khudoni dam and the outlet of the powerstation during periods of no discharge by spillways	— Low	Maintenance of a minimum sanitary & ecological water flow in the by-passed section of the river.
OP6	Water flow (downstream powerplant outlet)	<u>Artificialisation of the water flow pattern</u> depending upon Khudoni hydraulic management) with (i) seasonal regulation ; (ii) daily variations of discharge flow and river level downstream ; (iii) Interruption of discharge flow when turbinng stops (e.g. for HPP maintenance)	— Moderate	Maintenance of a minimum sanitary & ecological water flow in the river downstream
OP7	Water flow (downstream Enguri dam)	<u>Probably no significant change in waterflow pattern downstream Enguri dam</u> , either on Enguri river and Eriskali river	O ?	Design and implementation of a coordinate hydraulic management of the HPPs including Eriskali cascade
OP8	Water level of the future reservoir	<u>Implementation of the new reservoir</u> : volume: 230 Mm ³ , surpericy 4 km ² , max. depth, 170 m, important seasonal range level (minimum level in winter and maximum in early summer)	+/- High	Design and implementation of a coordinate hydraulic management of Enguri and . Khudoni HPPs. Monitoring of water level in the reservoir
OP9	Water level of Enguri reservoir	<u>Possible decrease of the water level range at Enguri reservoir</u> (the inflow will be regulated by Khudoni)	+/- ? Moderate	Design and implementation of a coordinate hydraulic management of Enguri and . Khudoni HPPs. Monitoring of water level in the reservoir
OP10	Water quality in the future	Thermal & chemical water stratification of the reservoir in summer with <u>cold, anoxic and poor quality hypolimnion</u>	— Moderate	Monitoring of thermal & chemical water stratification

	reservoir	Possible (but probably insignificant) <u>water quality degradation</u> in the lake due to decomposition of organic matter (flooded vegetation & soils, natural and anthropic organic matter carried down from the watershed, chronic effluents from Khudoni facilities) <u>Risk of degradation of surface water</u> in case of accidental spilling of hazardous liquids (fuels, oils, toxic chemicals,)		No mitigation measure against water stratification Removal of vegetation before flooding ; improvement/implementation of wastewater treatment systems ; removal of floating material
OP11	Water quality downstream the future dam	<u>Changes in thermal and quality pattern</u> of the river downstream and the upstream part of Enguri reservoir, due to cold, anoxic and poor water in-flow quality from Khudoni hypolimnion (depending of outlet elevation and stratification pattern) <u>Possible accidental spilling & leaks from Khudoni facilities</u> (fuels, chemicals, domestic & industrial wastewaters)	— Moderate	Monitoring of the quality of discharge waters from Khudoni dam Management of outflow with outlets at different elevation to avoid discharge of anoxic waters Prevention of accidental spillings and treatment systems for waste waters and sewages from the future HPP.
OP12	Sedimentation in the future reservoir	<u>Progressive silting of the reservoir</u> with large sized sediments in reservoir extremity and fine and suspended matters in the whole reservoir	— Moderate	Anti-erosive actions on the watershed Monitoring of the level and quality of sediments in the future lake
OP13	Sedimentation in the future reservoir	<u>Possible accumulation of strontium</u> and other radioactive wastes	— ?	Anti-erosive actions on the watershed Monitoring of strontium concentration sediments
OP14	Sedimentary carry- over downstream the future dam	<u>Stopping of bottom load and drastic decrease of suspended matter</u> in the river downstream <u>Change in hydro-sedimentary equilibrium</u> in the river downstream, with possible erosion of banks	— Moderate	No mitigation measure (a bottom sluice for flushing sediments is not conceivable, for one of the objective of the future dam is to trap sediments) Monitoring of bank erosion and reinforcement of banks (if necessary)
OP15	Sedimentary carry- over downstream the future dam	<u>Drastic decrease of silting rate</u> in Enguri reservoir	+ High	No measure
OP16	Floating material	<u>Accumulation of floating material</u> (loggs, branches, sawmills scraps ...) upstream the future dam	— Moderate	Routine removal of floating wood and valorisation as firewood Improvement of sawmills waste management

8. Preliminary Inventory of Project Environmental Impacts and Alternatives

Impacts are presented by category of components (physical, biological, socio-economical and cultural) and targets and are associated with mitigation measures.

Matrix of impacts/measures is presented in table 8-1 to 8-3.

8.1 IMPACT ON PHYSICAL COMPONENTS

8.1.1 Impacts on Climate and Air Quality

TEMPORARY DEGRADATION OF AIR QUALITY (CP1)

During the construction stage, the quality of air will be locally affected due to: (i) dust from construction of the dam, roads and other facilities, stone mining and crashing activities, increased traffic ; (ii) exhaust gases from engines (CO₂ and other types of gas) ; (iii) smoke from the concrete factory.

SETTLEMENT OF A MICROCLIMATE IN THE VICINITY OF THE RESERVOIR (FP1 & OP2)

The presence of a large reservoir, by permitting a storage of heat and cold, is likely to change local climate by: (i) increasing humidity at the vicinity of the reservoir due to increased evaporation ; (ii) forming fogs over the reservoir and along the shore when the temperature approaches the freezing point (particularly in early morning and in winter); (iii) and, in some cases, modifying rainfall pattern (source: Berkamp et al., 2000)

The local climatic change induced by Enguri Dam has been a subject of discussion for years, as mentioned in § 6.1.1. For many people in the area, the Enguri Dam is perceived as being responsible for increased humidity in Upper Svaneti with indirect effects on human and animal health, and crops.

However, a research programme conducted in the late '90s by the Institute of Hydrometeorology (IHM), the Georgian Academy of Sciences, based on climatic data from the former meteorological stations in the Upper Svaneti, has clearly concluded that the only significant changes are observed above the reservoir and up to a distance of 1-2 km from the shore. The climate in the upper valley did not change in relation with the implementation of the reservoir. The small increase in annual rainfall observed at Mestia during the XXth century (+5%) has to be related with regional or global changes. According to Mr Begalishvili, Head of IHM, the influence of the regional climate, and especially the flow of moist air coming from the Black Sea, is far more significant than the possible influence of the Enguri Reservoir.

Concerning the future Khudoni Dam, the impacts on local climate should be the same as observed for Enguri, with a significant increase of air temperature above the reservoir and surroundings, and possible winter fogs. But no significant change on rainfall and climate in the upper valley is to be expected.

CONTRIBUTION TO GLOBAL GREENHOUSE EFFECT (OP1)

Once implemented, the reservoir will produce two types of greenhouse gas (GHG): methane (CH₄) due to anaerobic decomposition of organic matter, and CO₂ (carbon dioxide).

Hydrogen sulphur (H₂S) is also likely to be produced due to anaerobic decomposition, with a possible toxic effect on aquatic life.

These emissions are still to be quantified, from data on reservoirs in similar geographic context, in Georgia or elsewhere, and from available downstream (L.P. Rosa & M.A. dos Santos, 2000).

The volume of gas emission might be quite significant, especially in summer when subtropical temperatures are likely to occur. But the greenhouse effect of a deep and cold reservoir like Khudoni, with moderate amount of flooded organic downstream, will be in any case less important than those of an equivalent thermic powerplant.

GHG emission from the Khudoni Reservoir (CO₂ and CH₄) will have no direct impact on local climate, but it will still contribute to global climate change.

8.1.2 Impacts on Soil, Slope Stability and Local Seismicity

INCREASE IN EROSION AND LANDSLIDE RISK (CP2, FP5 & OP3)

Before construction of the dam, roads, powerline and other facilities, the vegetation will be removed from the implementation sites and their surroundings.

Concerning the dam itself, the removal of trees was carried out in the '80s, especially on the right bank, showing a bare slope with intense erosion (see photo 6.E). In other places, strong erosion figures due to the previous work are visible on the slopes (photos 7.E to 7.G) and give an idea of long-term impacts if nothing is done to control erosion.

Roads' construction should be the most important source of erosion, with a risk of destabilisation of the slope below the road, even if the excavations are done properly. The main road (Djvari to Mestia) should be rebuilt on the same slope and about 200 m higher than the existing one. Access road to different levels of the dam will probably be implemented on steep slopes, similarly to Enguri. Other roads will be built for the purpose of construction and access to off-site facilities, or reconnection with isolated small villages.

Other ancillary facilities (powerline, cement factory, workers' settlements, stocking areas, garages...) will be mostly situated in the bottom of the valley, with limited impacts on slope erosion. As for the implementation of powerplant, located in a cave already excavated, no major erosion is expected during or after completion of the works.

Furthermore, the deforestation during the construction phase may increase the risk of landslides in case of heavy rain and the risk of avalanche in winter due to the removal of obstacles on the slopes.

Poor stabilization of slopes during and after construction is likely to worsen erosion and landslide risk.

Besides construction works, the important variations of water level in the reservoir during the filling-up and on a seasonal cycle when in the operational stage, are also likely to destabilize slopes around the reservoir and to increase the risk of landslide.

LOSS OF AGRICULTURAL & FORESTRY SOILS (CP3 & FP6)

During the construction and filling-up stages, agricultural soils (i.e. soils used as pastures, arable lands and market gardens) and forestry soils will be lost in the future flooded area, at the implementation sites of different facilities and in their vicinity.

At the scale of the watershed, the surface of lost soils will be moderate. But the surface remains to be estimated. The lost soils will be located mostly in the surroundings of Khaishi for agricultural soils, and in the lower part of slopes for forestry soils.

IMPACTS ON LOCAL SEISMICITY (FP7)

Filling-up of big reservoirs may cause local risks of seismicity due to the weight of water and destabilisation of geological formations beneath. In the case of Khudoni, an assessment by specialized experts would be necessary in order to assess the level of risk.

8.1.3 Hydraulic Impacts on the River Downstream

As for impacts on water flow downstream, the dam will concern a very short section of the river (about 2 km long) between the future dam and the upstream extremity of the Enguri lake, with the focus on by-passed section (between the future dam and the outlet of the future HPP). No significant impact is expected on the low Enguri River or the Ersikali River.

NO SIGNIFICANT IMPACT ON WATER FLOW DURING CONSTRUCTION (CP4 & CP5)

During the construction stage:

- the water flow will continue to pass through the existing by-pass system implemented in the '80s (see photos 6A to 6D). No modification of the water flow pattern is expected.
- the water intake for workers' settlement, concrete processing (sand washing and cooling) and other uses during the construction stage will probably be low. Except for water used for concrete processing, all intake will return to the river. Therefore, no significant decrease of the waterflow is expected, even in winter when the flow is minimal (about 20 m³/s).

TEMPORARY WATER FLOW DISRUPTION DURING THE FILLING-UP (FP2)

The filling-up stage will be very short (about 130 days considering a minimum winter flow of about 20 m³/s; about 20 days, considering an average flow of 130 m³/s and less than 20 days in late spring or early summer).

During the filling-up stage, a disruption or a drastic decrease of the discharge in the river downstream and in the Enguri lake is expected.

The hydraulic impact on the river can be considered as low due to its temporary character and the length of the river section affected (about 2 km).

The indirect impact on the Enguri lake management is assessed hereunder.

WATER FLOW DISRUPTION IN THE BY-PASSED SECTION (OP5)

During the operational stage, the water flow in the by-passed section, about 200 m long (= section of the river between the future dam and the outlet of the future powerplant) will be disrupted or drastically decreased, except during the high waterflow season (late spring - early summer) when spillways will discharge.

WATER FLOW ARTIFICIALISATION DOWNSTREAM THE FUTURE HPP (OP6)

Once the Khudoni HPP will be operational, the hydraulicity of the river between the future HPP outlet and the Enguri lake (less than 2 km) will be controlled by the Khudoni hydraulic management: (i) regulation of seasonal hydrological regime, compared to natural condition, with increased water flow in low water periods (winter) and decreased water flow in high water period (summer); (ii) possible attenuation of floods in late spring and early summer during the seasonal filling-up of the reservoir; (iii) daily variations of discharge flow and river level in relation with turbinning; (iv) discharge disruption when turbinning stops (e.g. for HPP maintenance).

IMPACT ON WATER FLOW DOWNSTREAM THE ENGURI DAM (OP7)

Downstream the Enguri Dam, neither in the Enguri River nor the Eritskali River, water flow should not be affected by hydrological modifications due the future dam, as the hydrological management of the Enguri Dam should stay unchanged. The sanitary flow will continue to be released in the lower Enguri River.

8.1.4 Impacts on Hydraulic Management of Reservoirs

IMPACT ON ENGURI RESERVOIR DURING THE FILLING-UP STAGE (FP3)

The first filling-up of the future reservoir will take from a few days to a few weeks, depending on the season (about 130 days with a minimum 20 m³/s winter flow; about 20 days, considering an average flow of 130 m³/s; less than 20 days in late spring and early summer). The inflow to the Enguri lake might be disrupted with possible consequences on the level and hydraulic management of the Enguri reservoir.

IMPLEMENTATION OF THE NEW RESERVOIR (OP8)

During filling-up, the Enguri river system will gradually change from lotic to lentic, with implementation of a deep reservoir occupying the bottom of the valleys (maximum depth: about 170 m), a volume of 230 Mm³ and a smaller surface than the Enguri lake (4 km² versus 13.5 km²). The reservoir will flood a section of about 8 km in the Enguri valley, 3.5 km in the Nenskra valley and about 1 km in the Khaishira valley.

The future reservoir will present an important seasonal level range (same pattern as the current situation on the Enguri lake). It will be at full supply level from late summer to early autumn. The level will decrease during the late autumn and early winter to reach the minimum level in mid winter.

IMPACTS ON ENGURI RESERVOIR DURING THE OPERATIONAL STAGE (OP9)

The artificialisation of seasonal hydrological pattern downstream the future dam (see OP6) might have significant consequences on the seasonal level range and management of the Enguri reservoir. During high water periods (late spring –early summer), the filling-up time of Enguri lake will be longer, due to the filling up of the Khudoni reservoir. At the opposite, in low water periods (winter), Enguri reservoir will be less lowered, because of turbined flow from Khudoni lake, superior to the natural flow. The level range in Enguri lake will probably decrease compared to the present situation.

8.1.5 Impacts on Water Quality

WATER QUALITY DEGRADATION DOWSTREAM DURING THE CONSTRUCTION (CP6, CP7 & CP8)

During the construction stage, the water quality in the 2 km river section downstream the future dam and the Enguri reservoir will probably be affected by several factors:

- An increase of suspended matter is expected in the river downstream the Khudoni area due to water run-off and erosion of uncovered surfaces;
- A degradation of physical, chemical and bacteriological quality of surface and ground waters due to sewage and wastes from workers' settlements is likely to happen if no water purification system is implemented;
- Leaks and accidental spilling of hazardous liquids (fuel, oils, toxic substances...) on surface and ground waters are also likely to happen due to the presence of engines, storage areas for engines and materials, dumping sites...

The water quality in the Enguri lake might also be affected, but to a lesser extent because of the dilution and sedimentation in the reservoir.

WATER QUALITY IN THE FUTURE RESERVOIR (OP11)

During and after the filling-up stage, a certain degradation of water quality in the future reservoir is likely to happen, due to: (i) decomposition of flooded organic matter (soils and vegetation) increasing nutrient concentration and causing a possible oxygen depletion; (ii) flooding of possible pollution sources in Khaishi (houses, shops, garages...). However, household pollution by the population of Khaishi will stop.

During the operational stage, the future dam will receive a certain flow of natural and anthropic organic matter from the watershed. Concentrations in mineral and organic compounds should remain low. Chronic effluents from Khudoni facilities are also likely to happen.

The water quality should however recover progressively within a few years, with pollutants and nutrients resulting from the flooding being flushed away due to a rapid renewal of the water in the reservoir. The Khudoni reservoir will probably present oligotrophic characteristics.

The future reservoir will present a seasonal thermal and chemical water stratification caused by its depth, with variations depending on seasonal hydrologic and climatic variations. In summer, the deep layer (hypolimnion) will present cold, anoxic and poor quality water, whereas the superficial layer will present warm and oxygenated water. The stratification might disappear in late autumn and spring with a blend of the whole water.

WATER QUALITY DEGRADATION DOWSTREAM DURING THE OPERATIONAL STAGE (FP8, FP9 & FP10)

The 2 km long river section between the future dam and the Enguri lake will be affected by the temperature and quality of discharged water. The impact will depend on the stratification pattern and on the elevation of inlets supplying the powerstation and releasing the sanitary water flow. In summer, discharged water will probably be cold, low oxygenated or anoxic, and of poor quality.

The risk of accidental spilling of hazardous liquids from Khudoni facilities (fuels, oils, household and industrial wastewaters.....) will also be taken into account.

8.1.6 Impacts on Carry-Over and Accumulation of Solid Material

SILTING OF THE FUTURE RESERVOIR (OP 12 & 13)

The future dam will make a barrier to sedimentary carry over. Large-sized and heavy sediments (cobbles, pebbles, granules...) will mainly deposit on reservoir extremities (Enguri, Nenskra and Khaishira valleys), whereas sands and silt will gradually deposit in the whole reservoir. Long-term, the reservoir will present sedimentary features similar to those that can be observed in the Enguri reservoir.

At a later stage, depending of the amount of sediment supply, a silt layer will cover the whole bed of the reservoir.

The risk of strontium accumulation in the sediments is mentioned here as strontium pollution is present in some parts of Svaneti. Further information and baseline data sediment analysis are needed for a better assessment of this impact.

ACCUMULATION OF FLOATING MATERIAL IN THE FUTURE RESERVOIR (FP12 & OP16)

During the filling-up and operational stage, the carry over of floating material (logs and branches from the watershed and from the flooded forests, sawmill wastes...) will accumulate in the future reservoir on the banks and upstream the dam, as it is currently the case with the Enguri lake (about 1000 m³ of wood per year is removed from the Enguri reservoir).

Meanwhile, there will be a decrease in floating material accumulation in the Enguri reservoir.

SEDIMENTARY IMPACT IN THE RIVER DOWSTREAM THE FUTURE DAM (OP14)

In the 2 km long river section downstream the future dam, the trapping of sediments will cause stopping of the bottom load downstream the dam and a drastic decrease of suspended matter. Changes in hydro-sedimentary equilibrium in this river section are likely to happen, with possible erosion of banks and incision of the river bed.

No impact is expected in the Enguri and Eritskali Rivers, downstream the Enguri Dam and HPP. The Khudoni project implementation should not have any impacts on sedimentary hydrodynamic downstream Enguri, although the management of Enguri HPP might change. The lower Enguri River is already under the influence of the Enguri Dam. The lack of water flow (no flushing) creates an important sedimentation in the river bed brought by tributaries, causing important changes in the erosion pattern and river course, and bed rising.

DECREASE OF SILTING RATE IN THE ENGURI RESERVOIR (OP15)

The sedimentary carry-over to the Enguri reservoir should temporary increase during and shortly after construction (especially during the construction of new roads) due to increased erosion process.

But once the future dam will have been filled-up, a drastic decrease of the silting rate is expected in the Enguri dam. The "sediment trap" effect is one of the objectives of the Khudoni project: it aims at extending the useful life of the Enguri HPP.

Tableau 8-2: Impacts and measures on biological components

CONSTRUCTION STAGE				
CB	Biological components	Potential impact	Impact level	First Proposal of Measures
CB1	Vegetation	<u>Destruction of the vegetal cover</u> on construction sites of dam, new roads, powerline and other facilities, and on slopes affected by erosion. Destruction of habitats, endemic and possibly protected plant species.	— Moderate	Environmental obligations for companies in charge of works. Post-construction revegetation and reforestation of slopes around the reservoir and dam site (as a compensation and/or as a protection measure of the slopes around the site) Localisation & preservation of possible stations of protected species. Preservation ex-situ if necessary
CB2	Forest resources	<u>Destruction of wood resources</u> (broad-leave and coniferous), <u>non wood resources & pastures</u> on construction sites of dam, new roads, powerline and other facilities, and on slopes affected by erosion	— Moderate	Cutting and commercialisation of valuable trees on construction sites. Establishment of a workers' code including prevention of illegal wood cutting Compensation for land owners Control of erosion. Post-construction revegetation.
CB3	Aquatic life downstream Khudoni	<u>Loss of biological value</u> of the river downstream Khudoni site - and to a lesser extent, of Enguri lake - due to chronic or accidental pollution and to increased siltation. Possible fish mortalities	— Moderate	Implementation of drainage and sedimentation systems for running waters. Provisional sewage purification system. Prevention of leaks and accidental discharge of hazardous liquids. Implementation of an EMS
CB4	Aquatic life downstream Djvari	<u>Loss of biological value</u> of the lower river downstream Djvari due to increased suspended matter and other impacts of material extraction in the river bed	— Moderate	Choice of adequate site and process for material extraction Monitoring of the concentration of suspended matters in the river
CB5	Wildlife	<u>Impacts on wildlife</u> present in the area (including games, endemic and possibly protected species): - destruction of habitats (mainly forest); - run-away of animals due to noise, human presence and traffic ; - accidental mortality due to increased traffic. - poaching by workers	— Moderate	Post-construction compensatory measures for restoration of forest habitat and other habitats possibly affected (if necessary) Environmental obligations for companies: limitation of vehicle speed, timing of violent noises (explosions) taking into account the impacts on fauna (e.g. avoid the reproduction season) Establishment of a workers' code including prevention of poaching Monitoring and surveillance of wildlife and hunting
CB6	Protected areas	No impact of construction stage on protected areas	O	

FILLING UP STAGE				
FB	Biological Components	Potential impact	Impact level	First Proposal of Measures
FB1	Vegetation	<u>Flooding of the vegetation</u> in the future reservoir area, with destruction of habitats and destruction of endemic & possible protected plant species	— Moderate	Possible compensatory measures: (i) protection and reforestation of the watershed ; (ii) involvement of the Electricity company in implementation of forest areas with a protection status and natural protected area : (iii) protection ex situ of protected plant species (if necessary)
FB2	Forest resources	<u>Flooding of wood resources</u> (broad-leave and coniferous), <u>non wood resources & pastures</u> in the flooded area	— Moderate	Cutting and commercialisation of valuable trees before filling up – removal or burning on-site of non commercial wood. Compensation for forest owners Possible compensatory measures: improvement of forest management regulations in the surrounding areas ; monitoring and control of timber and fuel-wood extraction
FB3	Wildlife	<u>Loss of habitats</u> for terrestrial species including games, endemic and protected species. <u>Run-away of animals</u> out of the flooded area with possible temporary and indirect effects on faunic equilibrium in the surroundings areas. Barrier effect due to the filling up of the reservoir	— Moderate	Possible compensatory measures: (i) protection and reforestation of the watershed ; (ii) involvement of the Electricity company in implementation of forest areas with a protection status and natural protected area
FB4	Aquatic life	<u>Modification of aquatic habitats</u> within the flooded area and <u>disappearing of running water fish species</u> , with possible endemic species among them (fish and crayfish)	— Moderate	No mitigation measure
FB5	Aquatic life	<u>Barrier effect</u> for aquatic communities, and especially for reproductive migrations of trouts from Enguri reservoir to upstream rivers	— Low to moderate	No mitigation measure (a fish pass is not conceivable due to the height of the dam)
FB6	Aquatic life	<u>Fish biomass increase and development of a lake community</u> in the future reservoir based on microphagous and carnivorous pelagic species. Common trouts will adopt a lake ecology. <u>Increased resource for fishing</u>	+ Moderate	Fish stocking of the future lake with introduction of commercial value species adapted to the new environment (like coregonids and salmonids)

OPERATION STAGE				
OB	Biological components	Potential impact	Impact level	First Proposal of Measures
OB1	Vegetation	<u>Change in vegetation communities in the vicinity of the reservoir and the downstream river due to changes in local climate and groundwater level.</u>	— Moderate	Revegetation and reforestation of slopes around the reservoir with adapted species
OB2	Forest resources	<u>Changes in the pressure on forest resource in the area : decrease pressure due to the disappearing of Khaishi village, but increase pressure due to new access roads</u>	+ / - Moderate	Revegetation of deforested areas and implementation of forest protection status in the surroundings of the reservoir – Surveillance of illegal cuttings
OB3	Aquatic life in the future reservoir	<u>Progressive settlement of a stable lake community</u> (mainly downstream on, zooplankton microphagous and carnivorous pelagic fish) <u>Absence of spawning beds</u> due to seasonal level range <u>Creation of a new fishing resource</u>	— / + Moderate	Fish & fisheries management plan in the reservoir. Fish stocking of the future lake with introduction of adapted species of commercial value (coregonids and salmonids) Possible implementation of floating artificial spawning grounds Maintenance of a good connection between reservoir and upstream tributaries (Enguri, Nenskra, Khaishura) for the reproduction of lake trout Monitoring of fish community in the reservoir with gill net experimental fishing
OB4	Aquatic life in the river downstream	<u>Degradation of aquatic biocoenosis</u> downstream due to: (i) flow interruption in the by-passed section, (ii) daily and seasonal water level changes related to discharge waters of the HPP, (iii) bad quality and cold outflow (disappearing of sensible species, loss of trout spawning beds ...) . <u>The dam will be a barrier for reproductive migrations of common trout</u> from the Enguri dam to upstream rivers.	— Moderate	Maintenance of a minimum sanitary & ecological water flow in the by-passed section of the river. A fish pass is not conceivable due to the height of the dam Monitoring of fish community in the river with electric experimental fishing
OB5	Wildlife	<u>Habitat disruption and barrier effect of the reservoir</u> Accommodation of wildlife fauna (amphibians, , water birds, mammals ...) to their new environment.	— Moderate	Possible compensatory measures: implementation of forest areas with a protection status in the surroundings of the reservoir
OB6	Wildlife	<u>Creation of biodiversity due to the reservoir</u> (implementation of a new habitat, rest area for migrating waterbirds , habitat for aquatic species...)	+ Low	no measure
OB7	Protected areas	<u>No impact on protected areas</u>	O	

8.2 IMPACT ON BIOLOGICAL COMPONENTS

8.2.1 Impact on Terrestrial Ecosystems and Biodiversity

DESTRUCTION AND FLOODING OF THE VEGETATION COVER (CB1 & FB1)

During the construction stage, the vegetation cover will be destroyed or affected on the implementation sites of the different facilities (dam, new roads, powerlines...) and their surroundings, with direct effects (removal of vegetation before construction) and indirect effects (slope destabilisation and erosion, especially during the road construction). The surface of destroyed vegetation cannot be assessed at this stage of the environmental study.

During the filling-up stage, an area of 4 km² of the river, riparian vegetation and slope forests will be flooded.

Destruction of the vegetation cover goes along with destruction of habitats and biodiversity associated to this area, with possible endemic and/or protected plant species, and with impacts on wildlife and forest resources (see below).

*These impacts can be qualified as: negative, permanent, local and partially mitigable. The level of impact can be considered as **moderate**.*

CHANGE IN THE VEGETATION COVER IN THE VICINITY OF THE RESERVOIR (OB1)

Vegetation in the close vicinity of the reservoir will be probably modified due to changes in the local climate and groundwater level, with progressive apparition of mesophile tree species.

Due to the important seasonal level range of the future lake, no development of aquatic plants (hydrophytes or helophytes) is expected around the reservoir. An annual herbaceous riparian vegetation will hardly grow on the emerged banks, as low levels will occur in winter.

The riparian vegetation downstream river could also be modified due to changes in river flows and groundwater level.

*These impacts can be qualified as: negative, permanent, local (reservoir and 10 km long river section). The level of impact can be considered as **low**.*

DESTRUCTION AND FLOODING OF FOREST RESOURCES (CB1 & FB2)

Construction and filling-up stages will cause destruction of wood resources (broad-leaved trees and coniferous), non-wood resources and pastures due to implementation of the dam, new roads, power lines and other facilities, flooding and destabilisation of slopes.

Besides direct impacts, increased human activity in the area due to the presence of workers, may cause additional pressure on firewood and other forest resources.

The loss of natural forest resources cannot be assessed at this stage of the environmental study.

*These impacts can be qualified as: negative, permanent, local (reservoir, site implementation facilities and surroundings). The level of impact can be considered as **moderate**.*

IMPACTS ON THE WILDLIFE (CB5 & FB3)

During the construction stage, the fauna present in the area (including games and possibly endemic and/or protected species) will be affected by: (i) destruction of habitats (mainly forest); (ii) noise, traffic and an increased human activity in the area, causing disturbance and run away of animals; (iii) accidental mortality due to increased traffic; (iv) possible poaching by workers.

During the filling-up stage, the flooding of a 4 km² area will add to the loss of habitats. Furthermore, it will create a disruption of natural habitats and a barrier effect (the reservoir will be much more difficult to cross than the river).

Before the project completion, the fauna will be destroyed or will migrate to surrounding areas, but with no assurance of finding new territories.

The implementation of the reservoir will create a new equilibrium with accommodation of wildlife fauna (amphibians, water birds, mammals...) to this new environment. To a certain extent, the reservoir represents a new habitat (e.g. rest area for migrating water birds) and may increase biodiversity in certain fauna groups.

The level of impact of the Khudoni Project on the biodiversity and irreplaceability of terrestrial fauna in the future flooded or degraded area (= core study area) has been assessed using a relative approach developed in KBA analyses. Assignment of a KBA status and a priority conservation level to the core study area, KBA trigger species as threatened and indigenous terrestrial fauna species are used.

Based on these species, the core study area failed to meet KBA requirements on global scale, but it did qualify for a national KBA.

Through the KBA-based GAP analysis, the core study area, as a KBA, was assigned level 5, which is the lowest conservation priority at the national level. This means that it is relatively unimportant compared to other national KBAs, and there is no urgency to protect it at present although it could be important in the long run after other high priority KBAs are established and managed. In addition to that, source populations of the KBA trigger species used in our analysis occurred outside the core study area, which did not form a major corridor for these populations either.

*These impacts can be qualified as: negative, mostly temporary (until the project is completed), local (core study area). The level of impact can be considered as **moderate**.*

IMPACTS ON PROTECTED AREAS(CB6 & OB7)

The project will have no impact on protected areas, as there is currently no protected area within the study area.

The creation of a protected area in the upper valley is in project and can be seen as a compensation of the artificialisation of the medium valley due to hydroelectric development.

These impacts can be qualified as: null.

8.2.2 Impacts on Aquatic Ecosystems and Biodiversity

IMPACTS ON AQUATIC LIFE IN THE FUTURE RESERVOIR (FB6 & OB')

The flooding of the reservoir will transform about 8 km of the river system into a lake system. The aquatic biocenosis will be modified. Riparian forest, aquatic plants and helophytes currently present on the banks will be flooded.

Due to steep slopes and important seasonal level range, the vegetation will hardly develop on the banks of the reservoir. The only area where wetlands are likely to develop are the upstream extremities of the reservoir in the main valley and its tributaries. Spawning grounds for fish might be scarce.

Aquatic communities (fishes, crayfish and benthic invertebrates) will be modified with the disappearing of running water fish species, with possible endemic species among them (fish and crayfish) and progressive settlement of a stable lake community (mainly ☐ownstream☐on, zooplankton microphagous and carnivorous pelagic fish). Among them, the population of common trout, probably one of the most important species in terms of biomass and fishing potential, will adopt a lake comportment.

The creation of the reservoir will certainly increase the fish biomass in comparison with the initial river section. However, the biomass will remain at a low level due to oligotrophic conditions and the scarcity of spawning grounds for cyprinids.

The lake will hardly permit development of a small-scale commercial fishery if no fish stocking is carried out. But leisure fishing will be possible.

IMPACTS ON AQUATIC LIFE DOWSTREAM THE FUTURE DAM (CB3, CB4, FB5 & OB5)

In the 10 km long river section downstream the future dam a loss of biological value will probably occur during the construction stage and after, due to: (i) high concentration of suspended matter during construction; (ii) flow interruption in the by-passed section; (iii) discharge of cold and bad quality water from the reservoir, especially in late summer when the hypolimnion is anoxic; (iii) daily and seasonal water level changes related to discharge waters from the HPP; (iv) chronic or accidental pollution. Possible fish mortalities are likely to occur in extreme situations like anoxic discharge or accidental pollution. Therefore, sensitive species (fish, crayfish and other aquatic invertebrates) may ☐ownstrea from this river section.

In the Enguri lake, the fish community should not be so affected. But, the common trout population present in the lake will not be able to migrate in the rivers upstream the future lake for reproduction ("barrier effect" of the dam). Indeed, for spawning, the specie needs rivers with low depth, moderate flow and granulated bed. Trouts will only be able to join spawning grounds in tributaries between the two dams. This may affect the potential population in the lake.

In the river ☐ownstream the Enguri dam, no significant change on aquatic life is expected due to the presence of the Khudoni reservoir. But sand and gravel extraction in the river bed near Djvari – supplying the concrete plant – will probably generate increased suspended matter flow and other sedimentary impacts to the river bed, with indirect effect on the aquatic life.

Tableau 8-3: Impacts and measures on socio-economical components

CONSTRUCTION STAGE				
CS	Socio-Economic Components	Potential Impact	Impact Level	First Proposal of Measures
CS1	Land and Fixed Assets (Khaishi Community)	Loss of <u>land and fixed assets</u> for the Khudoni Community (for at least 550 people) Loss of <u>community assets</u>	- High	Resettlement in places agreed with the population (Svan Community) (provision of houses and land, equal to the original situation as a minimum) Financial compensation Reconstruction of community assets
CS2	Livelihoods and Natural Resources	Loss of <u>income and livelihood</u> from agriculture, forest harvesting, NTFT, pasture activities	- High	Identification of agricultural, forestry and pasture alternatives of comparable productivity
		Increased <u>pressure on natural resources</u> (Firewood, wild fauna, non-timber forest products)	- Moderate	Development of alternatives to forest harvesting Information on rules and regulations (wood cutting, hunting...) Involvement of the Ministry of Environment (MEPNR) services in the supervision of the Project
		Disturbance of <u>fishing activities</u>	- Low	
CS3	Employment Opportunities	Increased <u>employment opportunities</u> (construction of the dam and related services)	+ High	Design of a local employment and sourcing policy
CS4	Local/Regional Economy	Enlarged <u>local market</u> (increased sales) due to workers' presence and more people in the area Increase of consumption after financial compensation	+ Moderate	
		<u>Inflation</u> of local prices	- Moderate	Mechanisms for identification of and support to vulnerable people
CS5	Transportation Lines and Connections (hamlets, pasture/agricultural land roads)	Loss or more difficult <u>access</u> to pasture roads and agricultural land More difficult access to Zugdidi markets and culture Worsened <u>transport situation</u> in the valley	- High	Rehabilitation of the road network (comprising permanent access to hamlets and pasture) Permanent access opened between Mestia and Jvari Opening of the Mestia - Ushguli road
CS6	Social Infrastructure	Increasing <u>pressure on social and sanitary infrastructure</u> due to workers' settlements in the region	- Moderate	Improved social infrastructures Adjusting the effective population in the area Construction of facilities in the workers' settlements

CS7	Way of Life and Social Organisation	Disruption of <u>social network</u> and cultural interaction caused by inflow of non-Svan workers	- Moderate	Family clans and kinship relations taken into account Improved local governance and cooperation between administration and civil society Establishing a workers' code to prevent conflicts between local people and immigrant workers Elaboration of a Project for the development of the Svaneti Region involving the commitment of different donors Control of immigration in the region
CS8	Gender Issues	<u>Prostitution</u> Cultural and gender differences between local people and immigration workers	- High	Establishing a workers' code to prevent prostitution Providing information to the population by using suitable communication channels and means
CS9	Health	Introduction/changes of contagious <u>diseases</u> (acute respiratory infections, HIV/AIDS and other sexual diseases...) Loss of incomes from farming activities	- High	Providing information to the population and workers (prevention campaigns)
CS10	Harmful Effects	Noise pollution due to excavation, mining crashing activities, concrete processing, dam construction, traffic...	- Moderate	Obligation for firms in charge of works. Timing of violent noise (explosion) taking into account the impacts on population and fauna.
CS11	Public Security in the area	Increase in traffic accidents <u>risks</u> and <u>pollution</u> Possible associated risk/impact with relation to the conflict with Abkhazia	- Moderate	Rehabilitation of the road network Increased security measures in the area
CS12	Cultural Property	Loss of <u>culturally significant sites</u> or damages to historical sites	- Moderate	Complementary archaeological excavations Recovering and resettlement of cultural monuments (Kaishi church and cemetery) if needed in accordance with the wishes of the population (felt rites) Prevention during works (roads etc...) by signalisation of archaeological sites
CS13	Landscape	Increased human activities in the region Modification of landscape features (dam and other infrastructure construction, works with dust and noise...)	+ High	Organization of engine movements and parking Choice of dump sites Choice of road alignment taking into account landscape integration Water flow control Control of dust and mud deposits

FILLING-UP AND OPERATIONAL STAGE				
OS	Socio-Economic Components	Potential Impact	Impact Level	First Proposal of Measures
OS1	Land and Fixed Assets (Khaishi Community)	Loss of <u>land and fixed assets</u> for the Khudoni Community (for at least 550 people) Loss of <u>community assets</u>	- High	Resettlement of population – negotiation for resettlement (agreement on the place chosen and dispositions for resettlement) Family clans and kinship relations taken into account Financial compensation for the loss of houses and properties Compensation for loss of crops and pasture products
OS2	Livelihoods and Natural Resources	Loss of <u>income and livelihoods</u> from agricultural and pastures activities Loss of income from forest harvesting Loss of livelihood from collection of NTFP Possible increase in the <u>pressure on natural resources</u> (illegal forest cutting, hunting...) by opening of new access roads	- Moderate	Identification of agricultural and pasture alternatives of similar productivity Compensation for loss of crops and pasture products Design of Sustainable Development Project for the entire Svaneti Region (such as the UNDP Area-Based Approach) Identification and promotion of alternatives to forest harvesting (new supply of energy instead of firewood) Inclusion of the slopes (from crests) in the surroundings of the reservoir in a protected area concerning forest and fauna (prohibition of wood cutting and hunting)
		Increased <u>pressure on natural resources</u> at the resettlement site	- Moderate	Development and promotion of alternatives to forest harvesting (new supply of energy instead of firewood) Carrying out of capacity measures in pasture land
		Changes in <u>fishing activities</u>	- Low	Restocking with fishes adapted to the new ecological conditions Development of fishing activities in the reservoir
OS3	Employment Opportunities	Increase in the <u>employment opportunities</u> by development of the region and permanent workers' settlements Development of <u>recreational activities</u> on the reservoir	+ Low	Design of a local employment and sourcing policy Development of an area-based, integrated development Project for the Svaneti Region

FILLING-UP AND OPERATIONAL STAGE				
OS	Socio-Economic Components	Potential Impact	Impact Level	First Proposal of Measures
OS4	Regional Economy	Depletion on <u>local economy</u> following termination of construction and leaving of construction workers	- High	Ensuring donor investments for the Zemo Svaneti Region
		Increase in <u>electricity tariffs</u>	- Moderate	Negotiation of special conditions for the supply of electricity for the Zemo Svaneti Region
		Contribution to the <u>development of the region</u> resulting from the rehabilitation of the road network and the support to local communications, markets and tourism	+ Moderate	Design of a Sustainable Development Project for the Svaneti Region (such as UNDP Area-Based, Integrated Approach)
		Increased <u>public interest</u> and possibly tourism in the Zemo Svaneti Region More <u>investments and donor interest</u> for development of the region	+ Moderate	
OS5	Transportation Lines and Connections (hamlets, pasture/agricultural land roads)	Loss or more difficult <u>access</u> to pasture roads and agricultural land Improvement of the road network	- High	Rehabilitation of road network (comprising access to hamlets and pastures) Opening of the Mestia - Ushguli road
OS6	Social Infrastructure	Loss of <u>community assets</u> and social and economic infrastructure (school, health care facilities, shops...) for both villages directly affected and those losing the connection with social infrastructure (nearby villages or hamlets)	Indirect - High	Compensation to nearby villages (not directly flooded) and improved roads and other communication links Reconstruction of social and economic infrastructure at relocation site Improved communication channels (newspapers, TV, radio, internet...)
OS7	Public Security in the area	Possible <u>associated risk/impact</u> with relation to the conflict with Abkhazia	- Low	Control of immigration in the area
OS8	Way of Life and Social Organisation	Disruption of <u>social network</u> and cultural interaction from the presence of non-Svan permanent workers and their families	- Moderate	Family clans and kinship relations taken into account Prevention of conflicts between local people and immigrant workers (workers' code) and their families (information on Svan way of life and rules). Development of an area-based, integrated development Project for the Svaneti Region

FILLING-UP AND OPERATIONAL STAGE				
OS	Socio-Economic Components	Potential Impact	Impact Level	First Proposal of Measures
OS9	Gender Issues	<u>Gender differences</u> between local people and immigration workers and their families	- Low	Family clans and kinship relations taken into account
OS10	Health	Possible increase/outbreak of <u>diseases</u> due to air humidity in the surroundings of the reservoir (cumulative impact with the Enguri reservoir)	- Low	
OS11	Improved Capacities	More <u>investments and donor interest</u> for development of the region	+ Moderate	Design of a Sustainable Development Project for the Svaneti Region (such as UNDP Area-Based, Integrated Approach)
OS12	Cultural Property	Loss of <u>culturally significant sites</u>	- Low	Complementary archaeological excavations Relocation of cultural monuments (Kaishi church and cemetery) if necessary Consult wishes of the population with relation to felt rites before relocation of burial sites
OS13		<u>Higher interest</u> for the Zemo Svaneti cultural and natural heritage	+ Low	
OS14	Landscape	Modification of atmosphere and landscape features (presence of dam and its lake, buildings and all facilities related to the dam and HPP, electric lines, new roads...)	-/+ High	Landscape restoration (revegetation and landscape integration) for all surfaces worked and surroundings of infrastructure Pulling down and evacuation of all unused infrastructure and equipment

8.3 IMPACTS ON SOCIO-ECONOMIC AND CULTURAL COMPONENTS

IMPACTS ON LAND AND FIXED ASSETS (CS1, OS1)

The construction of the dam and flooding of the area will result with the total loss of land and fixed assets of the resident population, causing:

- loss of houses and land for at least the entire community of Khaishi and other villages and hamlets concerned (core study area), which is at least 550 people which corresponds to the population number of the central Khaishi. However, the identification of the villages/hamlets to be flooded and the exact number of people and households directly affected depend on the project design. Resettlement of population will be required.
- loss of community assets.

IMPACTS ON LIVELIHOODS AND NATURAL RESOURCES (CS2, OS2)

During construction, loss of land and natural resources (both at the construction site and as a result of roads being upgraded or cut off) will cause:

- loss of income from forest harvesting and from collection of non-timber forest products (NTFP);
- loss of income and livelihoods from agricultural and pasture activities.

Operation of the dam and reservoir will have impact on fishing activities in the Enguri River and the loss of parts of livelihood (not significant and fishing appears low) due to changes in reservoir ecology and flow regimes;

EMPLOYMENT AND REGIONAL ECONOMY (CS3, CS4, OS3, OS4)

The construction of the dam will produce a positive increase in the employment opportunities linked with works and provision of services to the workers; besides, the financial compensation linked with resettlement may improve the economic conditions of the population;

During operations some effects could be linked to:

- a positive increase in the supply of energy which could be used for heating thus counterbalancing wood cutting forestry damages;
- a negative increase of electricity tariffs;
- a positive increase in recreational activities on the reservoir;

IMPACTS ON ROADS, PASTURE ROADS AND TRANSPORT LINKS (CS5, OS5)

The construction of the dam (both during the construction and operation) and flooding of the area will have an impact on transport lines and connections;

During the works' implementation it will cause a worsening of the transport situation in the region due to eventual interruption of the road at certain points and consequently a longer route from Djvari to Mestia, but also:

- lack of or difficult access to the main road for some villages which will be cut off;
- lack of or difficult access to pasture roads and agricultural land for some villages.
- difficult access to Zugdidi markets and culture for people upstream (and if resettlement is done upstream), increasing transportation time and length of roads.

During the operation a possible advantage for people could be the rehabilitation of network roads and pasture roads and the eventual opening of the Mestia-Ushguli road;

IMPACTS ON SOCIAL ORGANIZATION CAUSED BY MANPOWER MOVEMENT (CS6, CS7, CS8, OS6, OS7, OS8)

During the construction, interaction of the community with the workforce and immigration of casual workers may cause:

- disruption of social networks and of cultural interaction due to the inflow of non-Svan workers;
- possible conflicts linked with prostitution or cultural and gender differences between local people and immigration workers;
- increased pressure on social and sanitary infrastructure.

During the termination of construction and operations, the related impacts may result with a new disruption of social networks.

IMPACTS ON HEALTH AND SECURITY (CS9, CS10, CS11, OS9, OS10, OS11)

During the operation, presence of the reservoir may cause micro-climate changes, especially if cumulative impacts would result from the presence of the Enguri and Khudoni dams thus:

- possible increase/breakout of diseases;
- increased incidence of humidity in the air;
- increased the incidence of arthritis, rheumatism, asthma and related problems;
- impact on farming and thus possible loss of incomes.

Besides, the presence of workers in the area could induce introduction/changes of contagious diseases (acute respiratory infections, HIV/AIDS and other sexual diseases..);

The works will increase traffic and pollution in the area and also the risk of accidents.

A possible associated risk/impact could appear with relation to the conflict with Abkhazia.

IMPACTS ON LOCAL/REGIONAL ECONOMY AND DEVELOPMENT (CS2, CS4, OS2, OS4)

During the construction impacts may result with:

- inflation of local prices;
- pressure on natural resources.

During the operations and termination of construction, impacts may result with the following:

- pressure on natural resources both at the site and at resettlement site(s);
- a positive impact on forestry by new supply of energy currently obtained by firewood (an issue to be better analyzed under a full fledged SEA);
- depression of local economy following the termination of construction;
- a positive contribution to the development of the region from the rehabilitation of the road network by supporting local communication, markets and tourism;
- an increase of public interest for the Zemo Svaneti and thus more investments and donor interest.

IMPACTS ON HOSTING COMMUNITIES AFTER RESETTLEMENT (OS2)

Resettlement will have impacts on the hosting land and community but this can only be evaluated once alternatives for resettlements are more clearly identified. Land uses (farming, hunting, fishing, harvesting of forest products) may change at new locations and pressure will increase on natural resources thus increasing competition and possibly raising conflicts among people. Although there are strong solidarity links among the Svans, competition for land and natural resources would certainly cause clashes among local communities and resettled people.

IMPACTS ON CULTURAL PROPERTY (CS12, OS12)

Loss of culturally significant sites (there are only few archaeological sites, but sites such as churches and burial sites are also important to people) will cause:

- impacts on the population feeling of place, history, culture and memories...

IMPACT ON LANDSCAPE (CS13, OS13)

During the construction phase, the works, workers' settlements and associated facilities, increased activity (works, traffic...) will considerably change the perception of the area. What was previously known as a calm and poorly visited area will now become a zone of intense activities (traffic, noise, dust...).

Progressive building of the dam will create a visual barrier within the valley.

Additionally, (high voltage) electricity lines will be built on the slopes, maybe crests, and along the road.

A newly marked route of the main road will be built at a higher altitude which will modify the user's perception of the valley, both upstream and downstream.

Upon filling of the reservoir, the valley will look completely different, it will seem larger and its visual aspect will be softened by the presence of the lake (blue colour, still water...). The atmosphere will therefore be completely changed.

9. Preliminary Inventory of Mitigation Measures

This chapter gives a preliminary inventory of proposed environmental and social measures aiming at: reducing or eliminating the negative impacts of the project (= attenuation measures) and/or improving positive impacts (= optimisation measures), compensating negative impacts (= compensation measures), follow-up environmental & social changes (= monitoring measures).

The measures have been identified based on the one-to-one relation between impacts and measures given in tables 8-1 to 8-3. They are presented in different packages according to operational considerations, in order to lay the foundation of the environmental & social action plans according to the World Bank standards.

A more precise and operational definition of the programme of measures will be designed at a later stage together with the EIA report (i) once technical elements about the Project will permit a clearer vision of its implementation, management and impacts; (ii) following a review in cooperation with the stakeholders (administrations, affected population, NGOs...).

9.1 MEASURES RELATED TO THE BIO-PHYSICAL ENVIRONMENT

Environmental measures can be grouped together into four main issues: (i) measures related to planning and construction activities; (ii) measures related to the management and protection of water system in the Project area; (iii) measures related to the management and protection of watershed in the Project area; (iv) measures related to an integrated and sustainable development in Zemo Svaneti.

MEASURES RELATED TO PLANNING AND CONSTRUCTION ACTIVITIES

Objectives and Positioning

The planning stage will have to decide on routes for roads, tracks and electric lines and the choice of implementation sites for ancillary facilities like rock and sand extraction areas, material storage areas, concrete factory, workers' settlements, technical areas...). These choices may happen after completion of the EIA. They will have to take into account the main environmental issues: erosion risk, presence of ecological or cultural stations of particular interest, landscape consideration...

As analysed in the last chapter, the construction stage will generate important specific environmental impacts, the major ones being: (i) site degradation in the Project area associated with destruction of forest environment; (iii) erosion and destabilisation of slopes, especially in relation with the construction of roads (Djvari-Mestia road, access roads, temporary tracks); (iii) hydro-sedimentary and waterquality hydrobiological perturbations of aquatic environments (river and lake) between Tobari and Djvari, and especially between the two dams.

Specific environmental mitigation measures are to be implemented through:

- (i) environmental obligations for contracting companies, being an integral part of the Terms of Reference of different contracts;
- (ii) Environmental Management Systems (EMSs) - if possible certified ISO14001 or equivalent - to be implemented by the contractor companies. EMS approach permits to achieve good environmental performances especially for all issues directly related to construction and industrial processes (fuel storage, concrete factory...);
- (iii) environmental survey by the administrations in order to control conformity of contractants to national regulations or international standards (if national standards are insufficient or lacking) and to keep law and order.

Preliminary Inventory of Proposed Measures

Measures related to constructions and management of work facilities, as pointed out in table 8-1, will comprise (the following list is not limiting):

- Use and maintenance of earth-movers and vehicles in conformity with environmental (e.g. noise and gas emission...) and security standards (limitation of vehicle speed...);
- Avoid rambling and parking of earth-movers and vehicles outside allowed areas for circulation, parking and reversal;
- Watering of open surfaces - tracks and work areas - to prevent dust emission under dry weather conditions;
- Timing of violent noises (explosions) taking into account ecological issues (e.g. reproduction season) or social issues (no explosion on Sunday and fest day);
- Storage and management of hazardous liquids in conformity with national and international standards, in order to prevent leaks and accidental discharges;
- Extraction, storage and management of rocks and sand, and concrete processing in conformity with standards and with minimized impacts on landscape and water pollution;
- Establishment of a workers' code including prevention of illegal wood cutting and poaching;
- Collection and treatment of waste waters and rain waters resulting of run-off on works area and construction activities before discharging into the river (e.g. sedimentation and oil separation pits);
- Collection and treatment of sewage from the workers' settlements before discharging into the river (e.g. temporary treatment plant);
- Monitoring of water quality (suspended matter and hydrocarbure concentrations) at the discharge point of raining and waste waters;
- Collection, storage and management of construction and domestic solid waste (storage, recycling, burying, off-site transportation ...), taking into account sanitary and landscape considerations;
- Maintaining, wherever possible, cleanness around the works and tracks for the engines. The areas for storage of material or products will be organised and situated on the places chosen while taking into account environmental (distance from the water flow) and landscape (low visibility) issues.
- Construction of roads according to rules and regulations in order to prevent erosion and degradation of slopes: evacuation of excavated material by trucks and no discharge on the slope; stabilisation of all banks and terraced areas by planting of vegetation followed by if necessary draining works and anti-erosion measures; implementation of stream water management works with fitting-in of outlets on the slopes; maintaining a longitudinal barricade along the roads...
- Returning the sites into their original state upon completion of works: demolition of infrastructure and equipment of no further use and their transfer to an appropriate location, returning to the previous state and landscaping of deforested work areas and areas surrounding the works sites in order to ensure their integration into the surrounding landscape. In addition to that, all infrastructure and equipment of no further use will be dismantled and transferred to an appropriate location.
- Monitoring of water intake during the construction stage (for concrete processing, workers' settlements...)
- Monitoring of water quality in the river during the construction stage: follow-up of key parameters by the administration (suspended water, germ indicating fecal contamination, hydrocarbures) in two stations upstream and downstream the dam.

MEASURES RELATED TO THE MANAGEMENT AND PROTECTION OF THE RIVER SYSTEM IN THE PROJECT AREA

Objectives and Positioning

The different stages of the Khudoni HPP project (construction, filling-up and routine management) will generate significant impacts on water flow, water quality, sedimentary flow and aquatic life in the Enguri River system (identified in the Table 8-1 and 8-2).

Specific measures to mitigate or monitor these impacts are related to the following issues: (i) water flow management, (ii) sedimentary and hydraulic monitoring, (iii) removal or limitation of organic matters (wood) and pollutants input to the reservoir, likely to decrease water quality, and (iv) fish and fisheries management.

Preliminary Inventory of Proposed Measures

Measures related to water flow management

- Progressive filling-up of the future reservoir in order to minimize slope destabilisation around the reservoir (landslides risk) and local seismic risks;
- Design and implementation of a coordinate hydraulic management of the Enguri HPPs (including the Eriskali cascade) in order to optimize electricity production and to minimize impacts on aquatic environment and related activities;
- Forward-looking management of the Enguri reservoir during the filling-up stage of the future dam, in order to maintain the electricity production of the Enguri HPP;
- Definition and maintaining of a minimum sanitary and ecological water flow downstream the future dam in any circumstances, in the river between the two reservoirs during filling-up and operational stage, both in the by-passed section (200 m long, between the future dam and the discharge point from the future HPP) and in the river downstream the discharge of the future HPP (9 km long). A regulatory minimum water flow value will have to be defined, based on standards in other countries (e.g. in France, 1/10 of the average annual waterflow) and/or on estimated water supply needed to preserve aquatic life. The minimum waterflow will occur even during works and in the situation of non-turbining (i.e. for the HPP maintenance);
- Management of outflow with outlets at different elevations, in order to avoid discharge of anoxic waters.

Hydrological and sedimentary monitoring measures

- Reimplementation of hydrological stations on the Enguri River system between Tobari and Djvari, and limnigraphs on the reservoirs, and follow-up of the river waterflow and reservoirs level by the Electricity company(ies), with transmission of data to the MNERP, and public accessibility. If possible, the monitoring will be carried out at the same stations as those used until the early '90s.
- Reimplementation of a water quality monitoring system in the Enguri River system between Tobari and Djvari, with a follow-up by the administration and/or the Electricity company(ies) and public accessibility (if possible, using the same monitoring stations as those used until the early '90s). The monitoring will focus on key water quality parameters: temperature, conductivity, pH, O₂ level, concentration of suspended matter, organic matter, nutrients and major ions.
- Monitoring of thermal and chemical water stratification in the reservoir at different levels of the reservoirs by the Electricity company(ies), with transmission to the MEPNR and public accessibility (at least during the first 3 years, in order to understand the stratification pattern).
- Regular monitoring of the siltation and quality of sediments in the reservoirs by the Electricity company (once every 2 or 5 years ?) with transmission to the MEPNR and public accessibility. The quality analysis will include *inter alia*: granulometry, organic matter and strontium concentrations.

- Mitigation of erosion on the watershed upstream the future reservoir in order to minimize siltation rate in the future reservoir (see hereafter).

Removal/limitation of organic matters (wood) and pollutants input to the future reservoir and the river downstream

- Partial or total removal of trees within the future flooded area before filling-up, in order to prevent water quality degradation in the future lake and damages on turbines and spillway. If possible, the wood will be valorized as timber or firewood. As a last resort, non-commercial wood will be burned on-site.
- Demolition and, if necessary, depollution of all facilities before flooding the village of Khaishi (garages, workshops...).
- Implementation of an Environmental Management system (EMS) for the future Khudoni facilities – if possible certified ISO14001 or equivalent - in order to mitigate any risk of routine or accidental pollution to the reservoir and river system.
- Routine removal of floating wood upstream the dam and with possible valorisation as firewood or, as a last resort, on-site burning.
- Limitation of sawmills' discharge (scraps and sawdust) into the river upstream the future lake in order to prevent water quality degradation and damages on turbines and spillway. The DoF shall apply regulations against discharge of sawmill waste in the river and seek ways of valorization as fuel sawdust or firewood, or burning on-site, in cooperation with sawmills' owners.

Fish and fishery management measures

- Fish-stocking of the future reservoir with species adapted to cold and oligotrophic lakes and with high commercial value (e.g. salmonids and corregonids);
- Implementation of artificial floating spawning grounds;
- Maintenance of a good connection between reservoir and upstream tributaries (Enguri, Nenskra, Khaishura) in order to permit lake trouts to reach spawning grounds in upstream tributaries;
- Development of fish management and, if possible, leisure fishing activities;
- Regular monitoring of fish population and biomass in the reservoir (gill net experimental fishing) and in the river (electric experimental fishing) by the Department of Fisheries (every 2 to 5 years ?).

MEASURES RELATED TO THE MANAGEMENT AND PROTECTION OF THE WATERSHED IN THE PROJECT AREA

Objectives and Positioning

The impacts of the Project on terrestrial ecosystems are expected to be insignificant in the upper and lower Enguri valley, but quite important in the Project area, i.e. the area of the future dam and reservoir and their surroundings (= core study area). Actually, the Project will affect, directly and indirectly, stability of slopes and integrity of vegetal cover, forest biodiversity, including endemic species, and forest resources.

During the construction and filling-up stage, a removal of the vegetation that will be flooded or damaged will both permit to valorize wood resources, as timber or firewood, and to mitigate impacts on water quality and damages on the spillway.

After completion of the HPP, it might be in the interest of the hydroelectric company to have a sound forest ecosystem around the future reservoir and facilities, in a better state than the current, with an adequate vegetation cover contributing to slopes stabilisation, limited erosion and silting. In an area of important vegetation and animal biodiversity with a high rate of endemism, a better preservation and management of the slope forest can be seen as a compensatory measure to the development of hydroelectric plant on the river. This protection measure is to be made compatible with a sustainable development of forest resources by local population and forestry industry.

The vacuum caused by displacing of the Khaishi population will reinforce the need to implement a sustainable management system for the forest around the project area.

Preliminary Inventory of Proposed Measures

- Clear cutting or partial cutting and valorisation of valuable wood resources on the construction sites and in the flooded area. Timber of a commercial value can be sold with an auction sale organized by the State. Firewood can be either sold or put at the disposal of local population, in coordination with the Department of Forestry and local authorities. The DoF regional office will be in charge of marking the area to be cut.
- Compensations to affected private forest owners.
- Post-construction reforestation of the slopes around the future reservoir and dam site, with adapted tree species. The objectives will be: (i) prevention against erosion, landslide and avalanche, and silting of the reservoir; (ii) protection of biodiversity; (iii) supplying firewood, high quality timber and other forest resources to local populations and to forest industry.
- Implementation of anti-erosive actions on the slopes surrounding the Project area.
- Adoption of a forest protected status for the slopes surrounding the future dam and reservoir, by the Department of Forests and MEPNR (no clear cutting or commercial cutting).
- Design and implementation of a forest management plan for the entire area by the Department of Forests, in cooperation with local authorities, private land owners, forest industry, MEPNR and conservation NGOs. According to the Head of DoF regional office, the Ministry of Environment will create a land use commission, as a tool for forest management policy in relation with the Khudoni Project.
- Assessment and monitoring of slope erosion and destabilisation risks in the most critical areas (geotechnic auscultation, erosion markers...).
- Monitoring of vegetation and wildlife, forest resources and game.
- Reinforcement of administration surveillance on logging and hunting activities, fight against illegal cuttings and poaching.
- Localisation and preservation of possible stations of protected or endangered species (animal or vegetal). Preservation ex-situ if necessary.
- Post-construction restoration and/or creation of protected areas for particular habitats affected by the Project (if necessary).
- Reinforcement and capacity building of local administrations in charge of forest and biodiversity.
- Development of a GIS as a tool for the management of erosion risk, forest and forest resources in the Project area and surroundings.

MEASURES RELATED TO AN INTEGRATED & SUSTAINABLE DEVELOPMENT IN ZEMO SVANETI

Objectives and Positioning

The Khudoni project might offer an opportunity for the district of Zemo Svaneti to design and lay down the foundations of an integrated and sustainable development plan, in cooperation with involved stakeholders (central and local administrations, local communities, conservation NGOs, hydroelectricity company, forest industry, tourism industry, inhabitants, individual users of natural resources...).

Such an approach could aim, among other objectives, at conciliating hydroelectric development in the Enguri river basin, mainly in the middle valley, with nature preservation and local development, mainly in the upper valley.

Success factors for such an approach are: (i) the concurrence of a natural area (middle and upper Enguri watershed) with an administrative area (Zemo Svaneti district) and a human community (Svans), which makes the area a good management unit for such an approach; (ii) the potential of the valley both for hydroelectricity, forestry and traditional rural activities; (iii) the international recognition in terms of cultural heritage and biodiversity (UNESCO site and projected protected area) with possible development of tourism.

The following measures clearly go beyond the framework of the Khudoni HPP project. They aim at giving some tracks for a more global and integrated management of the future facilities within the regional context.

Preliminary Inventory of Proposed Measures

- Capacity building of stakeholders involved in the management of natural resources in the area. The mains stakeholders - administrations, local authorities, NGOs - have to be trained in objectives, regulatory framework (Georgian and World Bank) and tools of environmental impact assessment and integrated river basin management.
- Implementation of a river basin approach on the Enguri River system. Such an approach does not exist yet in Georgia, but the MEPNR has already planed its introduction within a few years. The Enguri River system, due to the current hydropower development programme and valuable natural and cultural heritage, could be a good area for implementing such an approach in the country.
- Definition of "no HPP sections" in the upper Enguri River system. After Khudoni HPP, the hydroelectric development of Enguri valley, as planned during the Soviet time, might continue upstream with the Tobari HPP and the Neskra cascade. The entire middle valley and part of the upper valley would be occupied by HHP facilities. Smaller equipment in tributaries near Mestia is also likely to be restored or built. Such a scenario would mean cumulative impacts on the river and terrestrial ecosystems, landscape, natural and cultural heritage. Definition of "no HPP sections" by law is a way used in other countries to control excessive long-term development of hydroelectricity.
- Rehabilitation of water flow and water quality monitoring systems in the entire Enguri Basin (based on the pre-existing systems functioning until the early '90s) under the coordination of Hydromet and the Ministry of Environment, and with public access to the data.
- Design a coordinated approach to biodiversity preservation at the scale of the watershed, seeking for coherence among actions to be implemented in future protected areas in the mountainous part of the upper valley and compensatory actions in the area surrounding the future reservoir.
- Include the stakes related to the future dam into regional forest and forestry management scheme by the local representation of DoF in Samegrelo Svaneti by the rehabilitation of slope forests with a function of soil protection.
- Develop a regional GIS by the MEPNR as a tool for integrated and sustainable development in Upper Svaneti.

9.2 MEASURES RELATED TO SOCIO-ECONOMIC COMPONENTS

As the World Commission on Dams (WCD) states “dams are only a means to an end”. And the “end than any project achieves must be the sustainable improvement of human welfare. This means a significant advance of human development on a basis that is economically viable, socially equitable and environmentally sustainable. If a large dam is the best way to achieve this goal, it deserves support. Where other options offer better solutions, they should be favored over large dams”.

The team believes that the construction of the Khudoni dam, if a positive decision is taken in this sense, could and should translate in an occasion for joining the Government's and donors' efforts for the sustainable development of the area.

If it is true that the construction of a dam and the consequent resettlement always involve social disruption and difficulties, it is also true that there are a number of elements happening in Svanetia which may concur to sustainable development: security is increasing, donor interest is increasing, tourism is evaluated as a positive and promising possibility, pasture and cattle farming can be sustained and exploited if carrying capacity is maintained.

Therefore, activities in Upper Svanetia can contribute to the achievement of at least the first of the three Millennium Development Goals (MDGs) to which Georgia has committed:

- MDG 1: Eradicate extreme poverty
- MDG 2: Ensure coherence of Georgian Educational Systems with educational systems of developed countries through improved quality and institutional set-up
- MDG 7: Ensure environmental sustainability

Local economic development and incomes can be sustained, provided that:

- the sustainable use of natural resources within an integrated land use planning scheme is concurrently promoted;
- local governance is improved by fostering cooperation between the administration and the civil society, offering capacity building opportunities at all levels;
- disaster prevention and preparedness is addressed in all possible development interventions, leading in the long run to integrated land use planning and the establishment of a disaster risk management system;
- the Svan kinships relations are taken into account and the communities are given responsibility for the selection of their development options and for ensuring their success.

The team suggests to explore the UNDP Area-Based Approach, implemented with success in other countries in transition, for implementation in Upper Svanetia; here multi-sectoral activities concur to foster economic opportunities while protecting the natural base and context.

On the other hand, decision-making about such an important development as the construction of a dam should be built on consensus and on the recognition of people rights and of associated risks, especially for those involuntary risk-bearers who often have little or no say in the overall water and energy policies. This means addressing risks, safeguarding affected people, providing information available to all groups, including the most vulnerable ones, negotiate open and transparent agreements.

More specifically on compensation/mitigation measures, a number of issues emerged during interviews and are herebelow listed for consideration at the time of elaborating a mitigation plan:

Measures for Resettlement

Resettlement (with provision of houses and lands and/or financial compensation) would be planned in the places and under the provisions agreed upon with the population. Notably, the site identified for resettlement should be chosen among different alternatives that could be:

- Resettlement within the region or in an area somewhere between Kutaisi and Tbilisi;
- Resettlement with displacing of the population into different areas or considering that the entire village of Khaishi should be kept as a community and people should be resettled together.

The resettlement in the Tsalka region is discouraged also to avoid an increase of social tensions.

Compensation should be provided to nearby villages which will not be flooded but will lose the connection with social and economic infrastructure in the Khaishi village (school, medical post, shops..).

Mitigating measures related to transport lines:

- opening the Mestia-Ushguli road;
- rehabilitation of the road network;
- rehabilitation of pasture roads.

Mitigating measures related to loss of livelihoods and vulnerable people:

- identification of alternatives to forest harvesting but minimization of removal or disturbance to vegetation;
- identification of alternatives for agricultural and pasture areas of comparable productivity;
- compensation for loss of crops and pasture products;
- possible financial compensation for identified people and IDPs - those who expressed the wish to relocate to cities;
- develop micro hydropower stations on local rivers to supply farms with electricity;
- rehabilitation of inter-village roads;
- rehabilitation of roads to pastures and meadows.

Mitigating measures related to disruption of social organization:

- design a local employment and sourcing policy;
- design workers code of conduct;
- construction of facilities at construction camps.

Mitigating measures related to gender and health:

- Establishment of a workers' code of conduct to prevent prostitution;
- Provision of information to the population by using suitable channels and means.

9.3 MEASURES RELATED TO THE CULTURAL HERITAGE

BEFORE WORKS

Archaeological research is recommended to be implemented in several stages, among which the first - namely the trial excavations - are paramount in order to assess the value and the character of the site and to determine the scope of works to be carried out. The next, more complex stage, would be stationary archaeological excavations and translocation to other places agreed by population and religious authorities.

In this phase it is imperative to consult and respect people's wishes with relation to felt rites before relocation of burial sites....

DURING WORKS

During works it will be useful that a specialist archaeological supervision or monitoring should be applied during any ground works foreseen by the Project. This is necessary in order to avoid possible loss or negligence of any prospective archaeological find or historically valuable site. Thus, the financial estimate entirely depends on the scope and scale of the ground works planned by the technical support team within the Project.

Implementation of works in the valley will be an occasion to reactivate the process of defining the boundaries of the UNESCO site (Upper Svaneti) in order to ensure a better recognition of this classification.

10. Missing data and gaps of information

The missing information are related to:

- **Topographic maps of the core study area.** For the following phase of the safeguard studies, topographic maps (1/1,000) and aerial views of the core study area are needed in order to be used as the basis for construction of the GIS dedicated to the project.
- **Hydrologic data.** Hydrologic data on the Enguri River, especially monthly mean flows (during the longest known period).
- **Biodiversity in the project area:** terrestrial and aquatic biodiversity potentially present in the future flooded area, in the future construction sites and their surroundings is described based on the existing data and preliminary field survey. A more comprehensive analysis with the identification of stations of endemic plants and particular habitat to be preserved would require further field investigation.
- **Current forest management in the project area:** the GIS material available at the Department of Forest with limits of forest management units and other qualitative information on forest management both in state forest and private forest will be required for further definitions of measures to be implemented related to control of erosion, preservation of biodiversity and future forestry management rules.
- **Sedimentology.** Data on the suspended matters in the Enguri River and sedimentation (smiting) in the Enguri Reservoir.
- **Technical information on the Project.** More detailed information on the Project (chosen option), facilities and related infrastructures, like roads and power lines, phasing of the works.
- **Employement.** Evaluation of employment created by the project.
- **Demography and land tenure.** Since land registration is still in the process in the Svaneti Region, it is not possible to obtain a valuable evaluation of the properties that could be concerned by the expropriation procedure.

11. Notification of the study team

The team of consultants is comprising 3 foreign, each of them supported by suitably experienced local experts, and additional support staff to fulfil all personnel requirements:

- Dr France MARION. Team Leader
- **Mariam BEGIASHVILI**, Deputy Team Leader (local expert) - Sociologist
- **Elena Laura FERRETTI**, sociologist (foreign expert)
- **Mikheil ABRAMISHVILI**, archaeologist (local expert and international expert)
- **Dr Loic TREBAOL** environmentalist (foreign expert)
- **Alexander GAVASHELISHVILI**, biologist and ecologist (local expert)

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ANNEXES

Annex 4-1.

Stakeholders interviewed during the inception mission (Natural environment)

Annex 12-1 - Stakeholders interviewed during the inception mission (Natural Environment)

Institution			Collected information
Administration	MEPNR Head Office	Division of water resource protection	Administrative permit required for Khudoni HPP – Watershed based management in Georgia – Available hydro-meteorological data.
		Biodiversity unit	Key issues about fish communities and fisheries in Enguri river and Enguri lake
		Division of permit	Organisation of EIAs procedures in Georgia
	MEPNR – SZS Regional Office	Biodiversity unit	Tasks & organisation of the regional representation – Task and experience in EIA process
	MEPNR Forest Department (DoF)	Head office	Georgian regulation – GIS data on forest in the study area
		Regional office Samelegro Zemo Svaneti	Tasks & organisation of the regional office – Forest management and activities in the study area – Management of forest within the future reservoir and surrounding slope forest.
	MEPNR Centre for the Monitoring and Prognostication	Dept of monitoring of environm. pollution	Tasks and organisation – Available data on water quality Monitoring on Enguri basin
		Hydro-meteorological Department	Available meteorological and hydrological data ont Enguri basin
	Georgian Academy of Sciences	Institute of Hydrometeorology (IHM)	Organisation and tasks of the Institute – Available publications Results on global climatic change and climatic change around Enguri reservoir – Current climate monitoring
Others (private firms & NGOs)	NGO DEEH (Jvari)		Aims of DEEH – Opinion about the impacts of Enguri reservoir – Position about Khudoni dam project – Fishing and hunting activities in the area – Pollution with strontium
	WWF Caucasus Regional Programme		Role of WWF Caucasus in EIAs – Management of sediments in Enguri reservoir – Botanical issues of the study area – Endemic fish species – Law and Policies on water- Re-implantation of hydrological monitoring stations
	Engureshi Ltd		Monitoring and available data on climate, hydrology, water quality, level in the reservoir – Problems of silting & floating material – Sanitary flow released – Fish production and fishing activity in the reservoir.- Environmental impacts of Enguri dam during & after the construction, in the reservoir area and downstream – Abkhazian river-system downstream Enguri HPP.
	Mestia Museum		Geological background & mineral resources – Hydrology and water quality – Fish communities

Annex 4-2.

Stakeholders interviewed during the Participatory Rapid Appraisal (social environment)

Annex 4-2: Organizations and people interviewed during Participatory Rapid Appraisal (In-Depth Interviews and Focus Group Discussions)

- Ministry of Energy – Mr. Archil Nikolaishvili, Deputy Minister of Energy; Mr. Nikoloz Gilauri, Minister of Energy
- Ministry of Labor, Health and Social Affairs – Ms. Nia Bjalava, Head of Regional (Samegrelo and Upper Svaneti) Centre of Disease Control;
- National Agency of Public Registry – Ms. Lia Chanturia, previously worked in the State Agency of Public Register (in Tbilisi) and was in charge of Svaneti Region; Ms. Zaira Vezdeni, the representative of the Samegrelo / Zemo Svanety Regional Branch of the Agency of Public Registry;
- Samegrelo and Upper Svaneti Administrations – Mr. Alexander Alhvlediani, the Deputy Governor of Samegrelo and Upper Svaneti Region; Mr. Gela Svirava, the head of Department of Economy and Statistics;
- Representatives of all villages included in the Khaishi Sakrebulo – Focus Group Discussion;
- Informal Leaders of selected Upper Svaneti villages other than Khaishi (including Mestia) – Focus Group Discussion;
- Representatives of the Local NGO 'Jvari', operating in the project-affected area – Ms. Londa Khasaia, Head of NGJ;
- Scientists and other people informed about the project related issues based in Tbilisi – Dr. Adilar Chartolani, the former Chief Medical Officer of Mestia District, during 30 years;
- Representatives of religious authorities – brother Lasha, the assistant of Bishop of Svaneti;
- Farmers owning farms in the project-affected area / Farmers Association Members – Focus Group Discussion;
- Representatives of vulnerable households members (the elderly, women, the very poor...), living in the project-affected area – Focus Group Discussion;
- Representatives of people resettled in New Khaishi and still owning the property in the project-affected area – Focus Group Discussion;
- Representatives of the Upper Svaneti districts – Focus Group Discussion;
- Representatives of Georgian NGOs working on environmental and social issues – Ms. Manana Kochladze, Green Alternative; Ms. Rusudan Simonidze, Green Movement.

Besides the following people were interviewed:

- Ms. Roena Chkadua, the Representative of Mestia Municipality in village Khaishi (the new title for the Gamgebeli);
- Ms. Domna Chkadua, the Director of Khaishi Secondary School;
- Mr. Zurab Nijaradze, Delegate to Mestia District Sakrebulo (Legislative Assembly) from Khaishi village;
- Mr. Guladi Umriani, Representative of Tetri Tskaro Municipality in village (New) Khaishi (Gamgebeli);
- Ms. Lali Gelovani, head of CBO in (New) Khaishi.

Annex 6-1.

List of terrestrial fauna potentially occurring in the expanded study area

Annex 6 - 1: List of terrestrial fauna potentially occurring in the expanded study area

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Ciconiiformes</i>					
<i>Ardea alba/Casmerodius albus</i>	GREAT EGRET	M			
<i>Ardea cinerea</i>	GREY HERON	M			
<i>Ardea purpurea</i>	PURPLE HERON	M			
<i>Ardeola ralloides</i>	SQUACCO HERON	M			
<i>Botaurus stellaris</i>	GREAT BITTERN	M			
<i>Bubulcus ibis</i>	CATTLE EGRET	M			
<i>Ciconia ciconia</i>	WHITE STORK	M	LC	VU	
<i>Ciconia nigra</i>	BLACK STORK	M	LC	VU	
<i>Egretta garzetta</i>	LITTLE EGRET	M			
<i>Ixobrychus minutus</i>	LITTLE BITTERN	M			
<i>Nycticorax nycticorax</i>	BLACK-CROWNED NIGHT-HERON	M			
<i>Anseriformes</i>					
<i>Anas acuta</i>	NORTHERN PINTAIL	M			
<i>Anas clypeata</i>	NORTHERN SHOVELER	M			
<i>Anas crecca</i>	COMMON TEAL	M			
<i>Anas penelope</i>	EURASIAN WIGEON	M			
<i>Anas platyrhynchos</i>	MALLARD	M			
<i>Anas querquedula</i>	GARGANEY	M			
<i>Anas strepera</i>	GADWALL	M			
<i>Anser albifrons</i>	GREATER WHITE-FRONTED GOOSE	M			
<i>Anser anser</i>	GREYLAG GOOSE	M			
<i>Anser erythropus</i>	LESSER WHITE-FRONTED GOOSE	M	VU	EN	
<i>Anser fabalis</i>	BEAN GOOSE	M			
<i>Aythya ferina</i>	COMMON POCHARD	M			
<i>Aythya fuligula</i>	TUFTED DUCK	M			
<i>Aythya marila</i>	GREATER SCAUP	M			
<i>Aythya nyroca</i>	FERRUGINOUS DUCK	M			
<i>Branta ruficollis</i>	RED-BREASTED GOOSE	M			
<i>Bucephala clangula</i>	COMMON GOLDENEYE	M			
<i>Cygnus cygnus</i>	WHOOPER SWAN	M			
<i>Cygnus olor</i>	MUTE SWAN	M			
<i>Melanitta fusca</i>	VELVET SCOOTER	M	LC	EN	
<i>Mergellus albellus</i>	SMEW	M			
<i>Mergus merganser</i>	COMMON MERGANSER	M			
<i>Mergus serrator</i>	RED-BREASTED MERGANSER	M			
<i>Netta rufina</i>	RED-CRESTED POCHARD	M			
<i>Tadorna ferruginea</i>	RUDDY SHELDUCK	M	LC	VU	
<i>Tadorna tadorna</i>	COMMON SHELDUCK	M			
<i>Falconiformes</i>					

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Accipiter brevipes</i>	LEVANT SPARROWHAWK	M	LC	VU	
<i>Accipiter gentilis</i>	NORTHERN GOSHAWK	YR-R			
<i>Accipiter nisus</i>	EURASIAN SPARROWHAWK	YR-R			
<i>Aegypius monachus</i>	CINEREOUS VULTURE	M	NT	EN	
<i>Aquila chrysaetos</i>	GOLDEN EAGLE	YR-R	LC	VU	
<i>Aquila clanga</i>	GREATER SPOTTED EAGLE	M	VU	VU	
<i>Aquila heliaca</i>	EASTERN IMPERIAL EAGLE	M	VU	VU	
<i>Aquila nipalensis</i>	STEPPE EAGLE	M			
<i>Aquila pomarina</i>	LESSER SPOTTED EAGLE	BB			
<i>Buteo buteo</i>	COMMON BUZZARD	YR-R			
<i>Buteo lagopus</i>	ROUGH-LEGGED HAWK	M			
<i>Buteo rufinus</i>	LONG-LEGGED BUZZARD	M	LC	VU	
<i>Circaetus gallicus</i>	SHORT-TOED SNAKE-EAGLE	M			
<i>Circus aeruginosus</i>	WESTERN MARSH-HARRIER	M			
<i>Circus cyaneus</i>	NORTHERN HARRIER	M			
<i>Circus macrourus</i>	PALLID HARRIER	M			
<i>Circus pygargus</i>	MONTAGU'S HARRIER	M			
<i>Falco columbarius</i>	MERLIN	M			
<i>Falco naumanni</i>	LESSER KESTREL	M	VU	CR	
<i>Falco peregrinus</i>	PEREGRINE FALCON	YR-R			
<i>Falco subbuteo</i>	EURASIAN HOBBY	M			
<i>Falco tinnunculus</i>	COMMON KESTREL	YR-R			
<i>Falco vespertinus</i>	RED-FOOTED FALCON	M		EN	
<i>Gypaetus barbatus</i>	LAMMERGEIER	YR-R	LC	VU	
<i>Gyps fulvus</i>	EURASIAN GRIFFON	SV	LC	VU	
<i>Haliaeetus albicilla</i>	WHITE-TAILED EAGLE	M	NT	EN	
<i>Hieraaetus pennatus</i>	BOOTED EAGLE	BB			
<i>Milvus migrans</i>	BLACK KITE	M			
<i>Neophron percnopterus</i>	EGYPTIAN VULTURE	M	LC	VU	
<i>Pandion haliaetus</i>	OSPREY	M			
<i>Pernis apivorus</i>	EUROPEAN HONEY-BUZZARD	BB			
Galliformes					
<i>Coturnix coturnix</i>	COMMON QUAIL	BB			
<i>Tetrao mlokosiewiczi</i>	CAUCASIAN BLACK GROUSE	YR-R	DD	VU	+
<i>Tetraogallus caucasicus</i>	CAUCASIAN SNOWCOCK	YR-R			+
Gruiformes					
<i>Anthropoides (Grus) virgo</i>	DEMOISELLE CRANE	M			
<i>Crex crex</i>	CORNCRAKE	BB			

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Fulica atra</i>	COMMON COOT	M			
<i>Gallinula chloropus</i>	COMMON MOORHEN	M			
<i>Grus grus</i>	COMMON CRANE	M	LC	EN	
<i>Porzana parva</i>	LITTLE CRAKE	M			
<i>Porzana porzana</i>	SPOTTED CRAKE	M			
<i>Porzana pusilla</i>	BAILLON'S CRAKE	M			
<i>Rallus aquaticus</i>	WATER RAIL	M			
Charadriiformes					
<i>Actitis hypoleucos</i>	COMMON SANDPIPER	M			
<i>Arenaria interpres</i>	RUDDY TURNSTONE	M			
<i>Burhinus oedichnemus</i>	EURASIAN THICK-KNEE	M			
<i>Calidris alba</i>	SANDERLING	M			
<i>Calidris alpina</i>	DUNLIN	M			
<i>Calidris canutus</i>	RED KNOT	M			
<i>Calidris ferruginea</i>	CURLEW SANDPIPER	M			
<i>Calidris minuta</i>	LITTLE STINT	M			
<i>Calidris temminckii</i>	TEMMINCK'S STINT	M			
<i>Charadrius alexandrinus</i>	KENTISH PLOVER	M			
<i>Charadrius asiaticus</i>	CASPIAN PLOVER	Cas			
<i>Charadrius dubius</i>	LITTLE RINGED PLOVER	M			
<i>Charadrius Eudromomias morinellus</i>	EURASIAN DOTTEREL	M			
<i>Charadrius hiaticula</i>	COMMON RINGED PLOVER	M			
<i>Charadrius leschenaultii</i>	GREATER SAND PLOVER	Cas			
<i>Chlidonias hybridus</i>	WHISKERED TERN	M			
<i>Chlidonias leucopterus</i>	WHITE-WINGED TERN	M			
<i>Chlidonias niger</i>	BLACK TERN	M			
<i>Gallinago gallinago</i>	COMMON SNIPE	M			
<i>Gallinago media</i>	GREAT SNIPE	M			
<i>Glareola nordmanni</i>	BLACK-WINGED PRATINCOLE	M			
<i>Glareola pratincola</i>	COLLARED PRATINCOLE	M			
<i>Haematopus ostralegus</i>	EURASIAN OYSTERCATCHER	M			
<i>Himantopus himantopus</i>	BLACK-WINGED STILT	M			
<i>Larus cachinnans</i>	YELLOW-LEGGED GULL	M			
<i>Larus canus</i>	MEW GULL	M			
<i>Larus fuscus</i>	LESSER BLACK-BACKED GULL	M			
<i>Larus genei</i>	SLENDER-BILLED GULL	M			
<i>Larus ichthyaetus</i>	GREAT BLACK-HEADED GULL	M			
<i>Larus marinus</i>	GREAT BLACK-BACKED GULL	Cas			

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Larus melanocephalus</i>	MEDITERRANEAN GULL	M			
<i>Larus minutus</i>	LITTLE GULL	M			
<i>Larus ridibundus</i>	COMMON BLACK-HEADED GULL	M			
<i>Limicola falcinellus</i>	BROAD-BILLED SANDPIPER	M			
<i>Limosa lapponica</i>	BAR-TAILED GODWIT	M			
<i>Limosa limosa</i>	BLACK-TAILED GODWIT	M			
<i>Lymnocyrtus minimus</i>	JACK SNIPER	M			
<i>Numenius arquata</i>	EURASIAN CURLEW	M			
<i>Numenius phaeopus</i>	WHIMBREL	Cas			
<i>Phalaropus lobatus</i>	RED-NECKED PHALAROPE	M			
<i>Philomachus pugnax</i>	RUFF	M			
<i>Pluvialis apricaria</i>	EURASIAN GOLDEN-PLOVER	M			
<i>Pluvialis squatarola</i>	GREY PLOVER	M			
<i>Recurvirostra avosetta</i>	PIED AVOCET	M			
<i>Scolopax rusticola</i>	EURASIAN WOODCOCK	M			
<i>Sterna albifrons</i>	LITTLE TERN	M			
<i>Sterna hirundo</i>	COMMON TERN	M			
<i>Sterna sandvicensis</i>	SANDWICH TERN	M			
<i>Tringa erithropus</i>	SPOTTED REDSHANK	M			
<i>Tringa glareola</i>	WOOD SANDPIPER	M			
<i>Tringa nebularia</i>	COMMON GREENSHANK	M			
<i>Tringa ochropus</i>	GREEN SANDPIPER	M			
<i>Tringa stagnatilis</i>	MARSH SANDPIPER	M			
<i>Tringa totanus</i>	COMMON REDSHANK	M			
<i>Vanellus gregarius, Chetusia gregaria</i>	SOCIABLE LAPWING	M			
<i>Vanellus leucurus, Chetusia leucura</i>	WHITE-TAILED LAPWING	M			
<i>Vanellus vanellus</i>	NORTHERN LAPWING	M			
<i>Xenus cinereus</i>	TEREK SANDPIPER	M			
Columbiformes					
<i>Columba livia</i>	ROCK PIGEON	YR-R			
<i>Columba oenas</i>	STOCK PIGEON	YR-R			
<i>Columba palumbus</i>	COMMON WOOD-PIGEON	YR-R			
<i>Stigmatopelia senegalensis</i> <i>Streptopelia</i>	LAUGHING DOVE	YR-R			
<i>Streptopelia decaocto</i>	EURASIAN COLLARED-DOVE	YR-R			
<i>Streptopelia turtur</i>	EUROPEAN TURTLE-DOVE	BB			
Cuculiformes					
<i>Cuculus canorus</i>	COMMON CUCKOO	BB			

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
Strigiformes					
<i>Aegolius funereus</i>	BOREAL OWL	YR-R	LC	VU	
<i>Asio flammeus</i>	SHORT-EARED OWL	M			
<i>Asio otus</i>	LONG-EARED OWL	YR-R			
<i>Athene noctua</i>	LITTLE OWL	M			
<i>Bubo bubo</i>	EURASIAN EAGLE-OWL	YR-R			
<i>Otus scops</i>	COMMON SCOPS-OWL	BB			
<i>Strix aluco</i>	TAWNY OWL	YR-R			
Caprimulgiformes					
<i>Caprimulgus europaeus</i>	EURASIAN NIGHTJAR	BB			
Apodiformes					
<i>Apus apus</i>	COMMON SWIFT	BB			
<i>Tachymarptis Apus melba</i>	ALPINE SWIFT	BB			
Coraciiformes					
<i>Alcedo atthis</i>	COMMON KINGFISHER	YR-R			
<i>Coracias garrulus</i>	EUROPEAN ROLLER	M			
<i>Merops apiaster</i>	EUROPEAN BEE-EATER	M			
<i>Upupa epops</i>	EURASIAN HOOPOE	BB			
Piciformes					
<i>Dendrocopos leucotos</i>	WHITE-BACKED WOODPECKER	YR-R			
<i>Dendrocopos major</i>	GREAT SPOTTED WOODPECKER	YR-R			
<i>Dendrocopos medius</i>	MIDDLE SPOTTED WOODPECKER	YR-R			
<i>Dendrocopos minor</i>	LESSER SPOTTED WOODPECKER	YR-R			
<i>Dryocopus martius</i>	BLACK WOODPECKER	YR-R			
<i>Jynx torquilla</i>	EURASIAN WRYNECK	BB			
<i>Picus viridis</i>	EURASIAN GREEN WOODPECKER	YR-R			
Passeriformes					
<i>Aegithalos caudatus</i>	LONG-TAILED TIT	YR-R			
<i>Anthus pratensis</i>	MEADOW PIPIT	BB			
<i>Anthus spinoletta</i>	WATER PIPIT	YR-R			
<i>Anthus trivialis</i>	TREE PIPIT	BB			
<i>Bombycilla garrulus</i>	BOHEMIAN WAXWING	M			
<i>Carduelis cannabina</i>	EURASIAN LINNET	YR-R			
<i>Carduelis carduelis</i>	EUROPEAN GOLDFINCH	YR-R			
<i>Carduelis chloris</i>	EUROPEAN GREENFINCH	YR-R			
<i>Carduelis flavirostris</i>	TWITE	YR-R			
<i>Carduelis spinus</i>	EURASIAN SISKIN	YR-R			
<i>Carpodacus erythrinus</i>	COMMON ROSEFINCH	BB			
<i>Certhia brachidactyla</i>	SHORT-TOED TREE-CREEPER	ND			
<i>Certhia familiaris</i>	EURASIAN TREE-CREEPER	YR-R			

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Cinclus cinclus</i>	WHITE-THROATED DIPPER	YR-R			
<i>Coccothraustes Coccothraustes</i>	HAWFINCH	YR-R			
<i>Corvus corax</i>	COMMON RAVEN	YR-R			
<i>Corvus corone cornix</i>	CARRION CROW, HOODED CROW	YR-R			
<i>Corvus frugilegus</i>	ROOK	M			
<i>Corvus monedula</i>	EURASIAN JACKDAW	M			
<i>Delichon urbicum</i>	NORTHERN HOUSE-MARTIN	BB			
<i>Emberiza cia</i>	ROCK BUNTING	YR-R			
<i>Eremophila alpestris</i>	HORNED LARK	YR-R			
<i>Erithacus rubecula</i>	EUROPEAN ROBIN	YR-R			
<i>Ficedula albicollis</i>	COLLARED FLYCATCHER	M			
<i>Ficedula hypoleuca</i>	EUROPEAN PIED FLYCATCHER	M			
<i>Ficedula parva</i>	RED-BREASTED FLYCATCHER	BB			
<i>Ficedula semitorquata</i>	SEMICOLLARED FLYCATCHER	BB			
<i>Fringilla coelebs</i>	CHAFFINCH	YR-R			
<i>Fringilla montifringila</i>	BRAMBLING	M			
<i>Garrulus glandarius</i>	EURASIAN JAY	YR-R			
<i>Hippolais icterina</i>	ICTERINE WARBLER	BB			
<i>Hirundo Ptyonoprogne rupestris</i>	EURASIAN CRAG-MARTIN	BB			
<i>Hirundo rustica</i>	BARN SWALLOW	BB			
<i>Lanius collurio</i>	RED-BACKED SHRIKE	BB			
<i>Lanius excubitor</i>	GREAT GREY SHRIKE	M			
<i>Loxia curvirostra</i>	RED CROSSBILL	YR-R			
<i>Lullula arborea</i>	WOOD LARK	BB			
<i>Luscinia luscinia</i>	THRUSH NIGHTINGALE	BB			
<i>Luscinia megarhynchos</i>	COMMON NIGHTINGALE	BB			
<i>Luscinia svecica</i>	BLUETHROAT	BB			
<i>Monticola saxatilis</i>	RUFIOUS-TAILED ROCK-THRUSH	BB			
<i>Montifringilla nivalis</i>	WHITE-WINGED SNOWFINCH	YR-R			
<i>Motacilla alba</i>	WHITE WAGTAIL	YR-R			
<i>Motacilla cinerea</i>	GREY WAGTAIL	YR-R			
<i>Motacilla flava</i>	YELLOW WAGTAIL	M			
<i>Muscicapa striata</i>	SPOTTED FLYCATCHER	BB			
<i>Oenanthe oenanthe</i>	NORTHERN WHEATEAR	BB			
<i>Oriolus oriolus</i>	EURASIAN GOLDEN-ORIOLE	BB			
<i>Parus ater</i>	COAL TIT	YR-R			
<i>Parus caeruleus</i>	BLUE TIT	YR-R			
<i>Parus cristatus</i>	CRESTED TIT	Cas			

Birds	Common name	LH*	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Parus major</i>	GREAT TIT	YR-R			
<i>Passer domesticus</i>	HOUSE SPARROW	YR-R			
<i>Phoenicurus ochruros</i>	BLACK REDSTART	YR-R			
<i>Phoenicurus phoenicurus</i>	COMMON REDSTART	BB			
<i>Phylloscopus collybita</i>	COMMON CHIFFCHAFF	BB			
<i>Phylloscopus nitidus</i>	GREEN WARBLER	BB			
<i>Phylloscopus sindianus lorenzii</i>	MOUNTAIN CHIFFCHAFF	BB			
<i>Pica pica</i>	BLACK-BILLED MAGPIE	YR-R			
<i>Prunella collaris</i>	ALPINE ACCENTOR	YR-R			
<i>Prunella modularis</i>	HEDGE ACCENTOR	YR-R			
<i>Pyrrhocorax graculus</i>	YELLOW-BILLED CHOUGH	YR-R			
<i>Pyrrhocorax pyrrhocorax</i>	RED-BILLED CHOUGH	YR-R			
<i>Pyrrhula pyrrhula</i>	EURASIAN BULLFINCH	YR-R			
<i>Regulus ignicapilus</i>	FIRECREST	YR-R			
<i>Regulus regulus</i>	GOLDCREST	YR-R			
<i>Saxicola rubetra</i>	WHINCHAT	BB			
<i>Saxicola torquata</i>	COMMON STONECHAT	BB			
<i>Serinus pusillus</i>	RED-FRONTED SERIN	YR-R			
<i>Sitta europaea</i>	WOOD NUTHATCH	YR-R			
<i>Sitta krueperi</i>	KRUEPER'S NUTHATCH	YR-R			
<i>Sylvia atricapilla</i>	BLACKCAP	BB			
<i>Sylvia borin</i>	GARDEN WARBLER	BB			
<i>Sylvia communis</i>	COMMON WHITETHROAT	BB			
<i>Tichodroma muraria</i>	WALLCREEPER	BB			
<i>Troglodytes troglodytes</i>	WINTER WREN	YR-R			
<i>Turdus iliacus</i>	REDWING	M			
<i>Turdus merula</i>	EURASIAN BLACKBIRD	YR-R			
<i>Turdus philomelos</i>	SONG THRUSH	YR-R			
<i>Turdus pilaris</i>	FIELDFARE	M			
<i>Turdus ruficollis</i>	DARK-THROATED THRUSH	M			
<i>Turdus torquatus</i>	RING OUZEL	YR-R			
<i>Turdus viscivorus</i>	MISTLE THRUSH	YR-R			

***Life history:** life history segment(s) in which the species is present in the region of analysis:

YR-R Year-round resident; breeder, present throughout the year.

BB Breeding bird; breeder, absent during non-breeding period.

SV Summer visitor; non-breeder, present in spring and summer.

M Migrant; bird of passage; present primarily in fall and spring.

Cas Casual; recorded irregularly; less expected because normal range is distant from Georgia.

Threat status (IUCN):

(CR) Critically Endangered

(EN) Endangered

(VU) Vulnerable

(NT) Near Threatened

(LC) Least Concern

Mammals:	Common name	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Lutra lutra</i>	EURASIAN OTTER	NT	VU	
<i>Martes foina</i>	BEECH MARTEN			
<i>Martes martes</i>	EUROPEAN PINE MARTEN			
<i>Mustela nivalis</i>	LEAST WEASEL			
<i>Meles meles</i>	EURASIAN BADGER			
<i>Ursus arctos</i>	BROWN BEAR		EN	
<i>Canis lupus</i>	GRAY WOLF			
<i>Canis aureus</i>	ASIATIC JACKAL, GOLDEN JACKAL			
<i>Vulpes vulpes</i>	RED FOX			
<i>Felis silvestris</i>	WILD CAT			
<i>Lynx lynx</i>	EURASIAN LYNX		CR	
<i>Sus scrofa</i>	WILD BOAR			
<i>Capreolus capreolus</i>	ROE DEER			
<i>Rupicapra rupicapra</i>	CHAMOIS		EN	
<i>Capra caucasica</i>	WEST CAUCASIAN TUR	EN	EN	+
<i>Erinaceus concolor</i>	EASTERN EUROPEAN HEDGEHOG			
<i>Talapa caucasica</i>				
<i>Talpa levantis</i>	LEVANTINE MOLE			
<i>Crocidura gueldenstaedtii</i>	GUULDENSTAEDT'S SHREW			
<i>Crocidura leucodon lasia</i>	BICOLOURED WHITE-TOOTHED SHREW			
<i>Neomys schelkovnikovi</i> <i>teres</i>	TRANSCAUCASIAN WATER SHREW			+
<i>Sorex raddei</i>	RADDE'S SHREW			+
<i>Sorex satunini</i>	CAUCASIAN SHREW			+
<i>Sorex volnuchini</i>	CAUCASIAN PYGMY SHREW			+
<i>Miniopterus schreibersii</i>	COMMON BENTWING BAT			
<i>Myotis bechsteinii</i>	BECHSTEIN'S BAT	VU	VU	
<i>Myotis blithii</i>	LESSER MOUSE-EARED BAT			
<i>Myotis mystacinus</i>	WHISKERED BAT			
<i>Nyctalus lasiopterus</i>	GIANT NOCTULE			
<i>Nyctalus noctula</i>	NOCTULE			
<i>Pipistrellus kuhlii</i>	KUHL'S PIPISTRELLE			
<i>Pipistrellus pipistrellus</i>	COMMON PIPISTRELLE			
<i>Plecotus auritus</i>	BROWN BIG-EARED BAT			

Mammals:	Common name	Global status (IUCN categories)	National status (IUCN categories)	Endemic to the Caucasus:
<i>Plecotus austriacus</i>	GRAY BIG-EARED BAT			
<i>Rhinolophus euryale</i>	MEDITERRANEAN HORSESHOE BAT	VU	VU	
<i>Rhinolophus ferrumequinum</i>	GREATER HORSESHOE BAT			
<i>Rhinolophus hipposideros</i>	LESSER HORSESHOE BAT			
<i>Vespertilio murinus</i>	PARTICOLOURED BAT			
<i>Lepus europaeus</i>	BROWN HARE			
<i>Sciurus anomalus</i>	CAUCASIAN SQUIRREL / PERSIAN SQUIRREL	NT	VU	
<i>Sciurus vulgaris</i>	EURASIAN RED SQUIRREL			
<i>Chionomys gud</i>	CAUCASIAN SNOW VOLE			+
<i>Chionomys roberti</i>	ROBERT'S SNOW VOLE			+
<i>Prometheomys schaposchnikowi</i>	LONG-CLAWED MOLE VOLE		VU	+
<i>Terricola Microtus daghestanicus</i>	DAGHESTAN PINE VOLE			+
<i>Terricola Microtus majori</i>	COMMON PINE VOLE			
<i>Apodemus agrarius</i>	STRIPED FIELD MOUSE			
<i>Apodemus Sylvaemus fulvipectus</i>	YELLOW-BREASTED FIELD MOUSE			
<i>Apodemus Sylvaemus uralensis</i>	URAL FIELD MOUSE			
<i>Dryomys nitedula</i>	FOREST DORMOUSE			
<i>Mus musculus</i>	HOUSE MOUSE			
<i>Myoxus glis</i>	FAT DORMOUSE			
<i>Sicista kluchorica</i>	KLUCHOR BIRCH MOUSE	DD	VU	+
<i>Rattus rattus</i>	HOUSE RAT			
<i>Rattus norvegicus</i>	BROWN RAT			

Threat status (IUCN):

(CR) Critically Endangered

(EN) Endangered

(VU) Vulnerable

(NT) Near Threatened

(LC) Least Concern

Annex 6-2.

Aquatic Fauna

Annex 12-2: Fish community in the Enguri river system (source: *Elanidze et al., 1970 and 1983 ; Terofal, 1984*) with IUCN global/*national* status and potential location on the river system from available ecobiological data on the species (Terofal, 1984)

Common name	Scientific name	Family	Threatened Status	Endemic status	Potential location			
					Estuary	Lower Enguri	Enguri lake	Upper Enguri
Brown trout	<i>Salmo fario</i>	Salmonidae	VU			?	+	+
Black Sea trout	<i>Salmo fario morpha labrax</i>	Salmonidae			+	+	+	+
Ukrainian brook lamprey	<i>Lampetra mariae</i>	Petromyzontidae		Cau		+		+
Round goby	<i>Neogobius cephalges constructor</i>	Gobiidae		Cau		+		+
Loache	<i>Noemacheilus angorae angorae</i>	Cobitidae				+?	+?	+
Loache	<i>Cobitis taenia satunini</i>	Cobitidae				+?	+?	+
Oriental chub	<i>Leuciscus cephalus orientalis</i>	Cyprinidae				+	?	+
Dnieper chub	<i>Leuciscus borysthemicus</i>	Cyprinidae				+	?	+
Crimean barbel	<i>Barbus tauricus escherichi</i>	Cyprinidae				+?		+
Colchic nase	<i>Chondrostoma colchicum</i>	Cyprinidae		Col		+ ?	?	+
Minow	<i>Phoxinus phoxinus colchicus</i>	Cyprinidae		Col			?	+
Gudgeon	<i>Gobio gobio lepidolaemus n. caucasicus</i>	Cyprinidae				+	?	+
Asp	<i>Aspius aspius</i>	Cyprinidae				+	?	
Bitterling	<i>Rhodeus sericeus amarus</i>	Cyprinidae				+		
Bleak	<i>Alburnus alburnus</i>	Cyprinidae				+	?	
Danube bleak	<i>Chalcalburnus chalcoides derjugini</i>	Cyprinidae				+	?	
Chub	<i>Alburnoides bipunctatus fasciatus</i>	Cyprinidae				+	?	
Rudd	<i>Scardinius erythrophthalmus</i>	Cyprinidae				+	?	
Common Carp	<i>Cyprinus caprio</i>	Cyprinidae				+	?	
Carp bream	<i>Abramis brama</i>	Cyprinidae				+	?	
White bream	<i>Blicca bjoerkna</i>	Cyprinidae				+	?	

Common name	Scientific name	Family	Threatened Status	Endemic status	Potential location			
					Estuary	Lower Enguri	Enguri lake	Upper Enguri
Russian bream	<i>Vimba vimba tenella</i>	Cyprinidae		Cau		+	?	
European perch	<i>Perca fluviatilis</i>	Percidae			?	+	?	
Pike-perch	<i>Lucioperca lucioperca</i>	Percidae				+	?	
Northern pike	<i>Esox lucius</i>	Esocidae			-	+	?	
Wels catfish	<i>Silurus glanis</i>	Siluridae			?	+	?	
European eel	<i>Anguilla anguilla</i>	Anguillidae			+	+		
Beluga	<i>Huso huso</i>	Acipenseridae	EN		+	+		
Russian sturgeon	<i>Acipenser gueldenstaedti colchicus</i>	Acipenseridae	EN		+	+		
European sturgeon	<i>Acipenser sturio</i>	Acipenseridae	CR		+	+		
Starry sturgeon	<i>Acipenser stellatus</i>	Acipenseridae	EN		+	+		
Round goby	<i>Neogobius cephalus</i>	Gobiidae		Cau	+	+		
Round goby	<i>Neobius melanostomus</i>	Gobiidae			+	+		
Flathead mullet	<i>Mugil cephalus</i>	Mugilidae			+	+		
Golden mullet	<i>Mugil auratus</i>	Mugilidae			+	+		
Three-spined stickleback	<i>Gasterosteus aculeatus</i>	Gasterosteidae			+	+		
Black-striped pipefish	<i>Syngnathus nigrolineatus</i>	Syngnathidae			+	+		

IUCN global/national threatened status : (VU) Vulnerable / (EN) Endangered / (CR) Critically endangered

Endemism: (Col) : to Colchic rivers ; (Cau): to Caucasian rivers (source:Terofal, 1984)

Annex 7-1.

Communication strategy

KHUDONI PROJECT - COMMUNICATION STRATEGY

DRAFT REPORT

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COMMUNICATION STRATEGY

○ INTRODUCTION

Public consultation is an integral part of the Environmental Assessment process. Its main purpose is to ensure that: i) there is an inclusive and meaningful participation of all affected and interested parties, and ii) this process of inclusion is started early enough in the project identification and planning with the aim of building the trust that all voices will be heard and compensation and mitigation measures identified to minimize impacts.

○ ADMINISTRATIVE ORGANISATION IN GEORGIA

Regional level (ZUGDIDI)	Governor chosen by the President of Georgia
	Deputy Regional Governor (Coordinator of RESP strategic planning process) Stakeholder Advisory Group (62 persons) Regional Council (sakrebulo)
District level (MESTIA)	District Governor 2 Deputy Governors 1 Counsellor to the Governor 1 Assistant 12 Technical Specialists
Local level (KAISHI)	1 Gamgebeli 2 Deputy Representatives

○ PUBLIC INFORMATION AND CONSULTATION IN THE EIA PROCESS

Public information and consultation is an integral part of the Environmental Assessment process in Georgia and consultation and disclosure provisions are required by the Word Bank Policy (Environmental Assessment OP/BP/GP 4.01).

According to the Law on Environmental Licenses and Permits of Georgia, the official public consultation starts after the written application for environmental permit prepared by the investor (EIA report and other documents) has been received by the Government. Stages of the process are as follows:

- Information published in the press (within 10 days after application);
- Consultation on EIA report and written remarks from public representatives (Public review) (within 2 months after reception of application);
- Possibility of the public to carry out an independent EIA
- State Ecological Expertise organized by the MEPNR by commissioning a panel of independent experts.

The WB requires for category A projects²⁶ the elaboration of a Public Consultation and Disclosure Plan (PCDP) and an Environmental Action Plan (EAP); in this case a Resettlement Action Plan (RAP) is also needed.

Project-affected groups, local NGOs and institutions, are required to be consulted as early as possible on the Project's environmental aspects and their views taken into account, at least:

- Shortly after the environmental screening;
- Once the draft Environmental Assessment Report is prepared;
- Throughout project implementation.

○ CONSULTATION WITH STAKEHOLDERS AND TARGET GROUPS

Consultation will take place at both national and local levels:

- Government bodies:
 - ▶ Ministry of Energy;
 - ▶ Ministry of Environment protection and natural resources;
 - ▶ Ministry of Labour, Health and Social Affairs;
 - ▶ National Agency of Public Registry.
- Regional authorities:
 - ▶ Samegrelo and Upper Svaneti Administrations;
 - ▶ Representatives of the Upper Svaneti Districts;
- District authorities:
 - ▶ Delegate to Mestia District Sakrebulo (Legislative Assembly) from Khaishi village;
- Local authorities (elected representatives):
 - ▶ Representatives of all villages included in the Khaishi Sakrebulo;
 - ▶ Representative of Mestia Municipality in village Khaishi (the new title for the Gamgebeli);
 - ▶ Representative of Tetri Tskaro Municipality in village (New) Khaishi (Gamgebeli);
- Population affected:
 - ▶ Population of the villages in the affected area (all villages included in the Khaishi Sakrebulo);
 - ▶ Informal leaders of selected Upper Svaneti villages other than Khaishi;
 - ▶ Farmers owning farms in the project-affected area / Farmers' Association Members;
 - ▶ Representatives of vulnerable households members (elderly, women, very poor...), living in the project-affected area;
 - ▶ Representatives of people resettled in New Khaishi and still owning properties in the project-affected area.
- NGOs (international, national and local levels):
 - ▶ Representatives of the Local NGO 'Jvari', operating in the project-affected area;
 - ▶ Representatives of Georgian NGOs working on environmental and social issues (Green alternative – CEE Bank Watch Network, Green Movement, CENN Network..).

²⁶ Large dams fall into this category.

- Other interested members of civil society:
 - ▶ Representatives of religious authorities;
 - ▶ Representatives of education sector (for example the Director of Khaishi Secondary School);
 - ▶ Scientists and other people informed about the project-related issues based in Tbilisi.

○ COMMUNICATION CHANNELS AND TOOLS

Various communication channels and means will be used to ensure that appropriate information and disclosure on the Project will be dissemination to different stakeholders.

Ministry of Energy

A permanent correspondent for public relations (Georgian and English speaking) will be designated within the Ministry of Energy to ensure dissemination of appropriate information to the public (civil society) and responding to requests for documents' consultation.

Website

There will be a web page dedicated to the Project on the website of the Ministry of Energy. All documents (Terms of Reference of studies, technical and safeguard studies, reports on public hearings and workshops...) will be available for consultation and downloading both in English and Georgian.

Additionally, information on the project is currently available on the Word Bank info shop. Nevertheless, this disclosure will be supported by suitable publicity ensured by the Georgian Government.

Information Centers

Information centers will be open at the regional and local levels:

- Village Sakrebulo: Kaishi at the Gamgeoba;
- District Mestia: at Mestia Gamgeoba;
- Region Zugdidi.

A person will be designated at each information center to ensure dissemination of suitable information to the public (civil society) and responding to requests for documents' consultation. Telephone and e-mail contacts will be established in order to provide up-dated information.

During the public consultation period the official registers (for collecting public remarks and questions) will be open in these information centers and under the responsibility of this designated person (commissioner).

National and Regional Diffusion of Information

Information on the Project and means of information, opening of the public disclosure period, holding of workshops or public hearings will be disseminated by way of official publication in three different large newspapers at the national and regional levels.

Moreover, it will be necessary to provide journalists (newspapers, TV, radio) with appropriate information and stimulate their covering of the Project.

Local Dissemination of Information

As mentioned in the E&S Screening, the internal roads are in a very poor condition and while some of the villages from Kaishi Sakrebulo are accessible by car, most of small and isolated hamlets can be accessed only by horse or by foot.

Poor operation of the communication infrastructure (only a partial coverage of the territory by Georgian FM radio or TV channels, postal services working poorly, a mobile phone network working properly in few places only) may be among the reasons for which the first Government messages aimed at informing the population about the Khudoni Dam were not widely received.

In these conditions, moral authorities and Sakrebulo elected representatives are the entry point of information: two key persons will be mediators in the communication between population and "the Project": the Director of School and the Gamgebeli of Kaishi Sakrebulo. The proposed mechanism for dissemination of information is the following:

- Information will go through the Gamgebeli (e-mail access available): Gamgebeli can then distribute the materials in Kaishi, display them on the information board (information point) in Gamgeoba and distribute to the population by a minibus driver.
- For isolated hamlets: the pupils from all villages access school in Kaishi daily and they can be used for sending any written information (leaflets, newsletters, meeting invitations...) to the village and to collect feed-back.

○ INFORMATION AND CONSULTATION MEANS

Leaflets and Newsletters

Leaflets on the Project (related to key issues and schedule of implementation) will be disseminated (in both electronic and paper versions) upon Government's decision to proceed with the Project, and followed by periodically published newsletters.

Workshops

Workshops will be held both at the national (Tbilisi) and local levels (Kaishi) during the technical feasibility and EIA processes, to ensure appropriate information and its disclosure to the population and civil society.

A report of each workshop (in English and Georgian) will be available on the website dedicated to the Project and an electronic copy will be sent to the information centers for further dissemination.

Public Hearings

In order to ensure that public is well informed and has the opportunity to express its opinions, three public hearings will be held during the public review (2 months): in Tbilissi, in Zugdidi and in Kaishi.

In Mestia District, transport from every part of the District will be organized to ensure that everybody has the possibility and means to attend the public hearing.

Each public hearing will be recorded and followed by a public hearing report written and published by independent reporters.

Public Disclosure

Complete EIA accompanied by a non-technical summary of the EIA main issues will be developed and information made available to all concerned parties in the form and language appropriate for different groups.

To collect public opinions, **registers** will be open (with numbered pages) in each information center and maintained by a specific person in charge of public disclosure (investigating commissioner).

At the national level, an independent **investigating commissioner** will supervise regional and local commissioners and synthesise (in a specific report) public opinions written in the official registers, public hearing reports and results of independent investigations (EIA) undertaken by public representatives.

This public review report will be published and made available for public consultation which conclusions will be taken into account while granting environmental permit by the Government through the MEPNR.

○ PUBLIC INFORMATION AND CONSULTATION PROGRAMME

Stage 1: During E&S Screening Process

This first phase of the safeguard studies is focused on identifying key stakeholders and conducting in-depth interviews, focus group discussions and a pilot application of the questionnaire for a future census of potentially affected population (during the EIA and RAP Processes).

This first round of consultation (at both national and local levels) has multiple purpose: i) identification of key informants and stakeholders, ii) identification of key environmental and social issues, iii) collection of stakeholders' views on the potential impacts that the construction of the Khudoni Dam could cause, and finally iv) initiation of a discussion on the possible alternatives for eventual resettlement of concerned people, taking into consideration limitations and opportunities.

Stage 2: Upon Technical Feasibility and Preliminary E&S Screening Studies Approval

If, after this stage and on the basis of information and contents of the reports, the Government decides to continue with the investment project and thus to deepen technical and safeguard studies, the process of consultation and disclosure will continue.

In addition to the Preliminary E&S Screening and technical feasibility study reports, a non-technical summary of the Project's objectives and a description of potential impacts will be made available (by different communication channels defined above) both in Georgian and English version.

Stage 3: During the E&SIA and RAP Processes

This stage comprises three operations: (i) implementation of a complete census during the EIA process and preparing the RAP, (ii) implementation of workshops at the national level, and (iii) implementation of workshops at the local level.

- Complete census and preparation of RAP

The second round of consultation will happen upon approval of the first phase and authorization to proceed with an in-dept environmental and social assessment of the investment Project.

At that point a complete census of the affected population will be undertaken on the basis of the improved pre-test questionnaire.

A RAP is built up on the census result analysis. This RAP prepares the official expropriation process

- Workshop with population at Kaishi
- Workshop with civil society at Tbilisi

Stage 4: During Application for Environmental Permit Examination

At this stage, and as stipulated by the Law on Environmental Licenses and Permits, different actions for information and collection of public opinions will be undertaken using the different communication channels and tools defined above:

- Information on the application [and opening of the public disclosure] in the press and by communication channels within 10 days after application;
- Holding of public hearings at the national and local levels;
- Opening of public inquiry supervised by an independent investigating commissioner;
- Publishing of the independent investigating commissioner report;
- Publishing of the Government's decision.

Stage 5: Continuous Information on the Project during the Dam Construction

If the decision to construct is taken, public information and consultation need to be continued during the construction and especially during the expropriation procedure and resettlement process.

Information will continue to be available to the public by communication channels defined above (website, displaying or availability at information centers, etc.) through quarterly newsletters and annual reports.

In addition to that, the results of EMP will be published quarterly.

Annex 11.

List of People/Organizations met during the preliminary screening

Annex 11. List of People/Organizations met during first mission of Team leader and Foreign experts

Name	Fonction	Organization / Adress	Phone number.	e-mail
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