Annex III

The Black Sea coastal zone (Anaklia)

Proposal I

Anaklia touristic segment of the Black Sea coastal zone have been chosen as pilot area for demonstration of new technology such as artificial reef-ball promoting the diving tourism in many countries poplar with the sea tourism. However, this technology is not enough for full protection of the coastal zone and it should be considered in combination with other additional measures recommended below for three different sections of this segment.

As the first priority for the section I of this segment it would be advisable to accomplish artificial piling of inert material and to create a shingly beach, as well as to construct an artificial peninsula north to the mouth of R. Tikori for consolidating the newly formed shingly beach. At the same time it would be expedient to create underwater reefs along the beach, which will serve as wave-breakers to dissipate the storm energy and as shelter for fish and shellfish. On the shore these measures have to be accompanied by the artificial heightening and widening of the row of shore line duns.

The same measures should be undertaken at the second section of the shore line, while at the third section main attention of duns, and focused on the heightening and widening of duns, and on the heaping of inert material along the shore line.

The piling of inert material could be performed in different ways, mainly ashore along the coastline in the form of washable piles, or in a broken way in the form of interrupted bermas in the sea, at the depth down to 2m. The sections of the berma could be 30m wide and 150m long with the interval between them of 80m. The total length of this part of shore line south to the mouth of R. Enguri, to be filled by shingly inert material is about 4 km.

To the north of mouths of rivers Tikori and Churia the heaping should be carried out perpendicular to the shore line, in the form of broken stone boons, with the length of more than 120m. Eventually this measure will result in the origination of a small artificial peninsula, which will serve as a barrier, detaining the sub-water sediments moving from the north and thus providing the coastline with a new beach forming material.

After undertaking the above mentioned measures to guarantee the protection of the coast it would be necessary to create a through underwater wave-breaker along the shore line. It will consist of 3 rows of concrete figures (reef-balls), mounted at the depth of 3-5m in the form of broken reefs. The length of reefs must be 150m, and the interval between them – 70-80m. The height of the reefball itself is 1,52m and the width – 1,83m.

In case of accelerating sea-level rise, reaching 5-7mm/yr, before the coastal duns had time to move into the depth of the coast, it would become necessary to increase artificially the parameters of shoreline rows of dunes, and in the exceptional case – to construct the artificial dam. For the high rates of sea-level rise the height of the dunes must be increased up to 4m, their width – up to 300m, and the regular heaping of coarse-fraction inert material is to be undertaken to stabilize the coastline.

Two of these recommended technologies, beach nourishment and creation of artificial capes have been practiced in Georgia since 1960-ties, while the reef-balls and artificial growing of coastal knolls in width and in height are relevantly new and not tested yet.

Advantages and disadvantages of each of these four technologies and tentative costs are provided in the TFS located in the www.tnageorgia.wikispaces.com

Main activities which should be conducted for implementation of this proposal are:

- Comprehensive feasibility study should be conducted for the project implementation;
- Based on the results of feasibility study final decision should be done by the local government on the set of technologies to be implemented;
- Local engineers should be well trained, because even in case of well known technologies (beach nourishment and creation of artificial reefs) modernized technologies should be implemented;
- Relevant financial sources should be identified for covering the additional costs borne by the sea level raise and choosing of more safe, preventive measures;
- Awareness of local government, population and private sector acting in tourism development is crucial in this process because some negative visual effects accompany some of these protective measures;

- Plan for efficient maintenance of implemented technologies and measures should be developed;
- Recommended measures should be implemented in step-wise approach giving higher priority to the most vulnerable segments

Agriculture

Proposal II

Measures to combat soil water erosion in Adjara

Overview of the region

The Adjara region, with the territory of 2,900 km2, is situated in extreme South-Western part of Georgia at the slopes of Meskheti and Shavsheti Ranges. To the West it borders the Black Sea, and to the South-Turkey. 80% of the territory is occupied by mountains, 15%-by foothills and 5%-by lowland. There are 16 rivers and 5 small lakes in Adjara. The largest rivers are Chorokhi, pouring from Turkey and Adjaris-tskali, crossin the region in longitudinal direction.

Despite the relatively small area, the climate and landscapes of Adjara are very diverse. Lowland with humid subtropical climate is covered by thick wet forests with evergreen underbrush, foothills and mountain slopes - by deciduous and coniferous forests, at higher elevation transforming into alpine meadows. Mean annual air temperature varies between 10 and 15 0C, and the annual sums of precipitation-between 1000 and 2800 mm. At the top of Mt. Mtirala in 15 km from Batumi the annual precipitation reaches 4000 mm.

According to 2009 census, the population of Adjara is 380.2 thousand, and for the last decade this number has slightly increased by 2.5%. Adjara is most densely populated regions of Georgia. The average density of population makes 129 persons/km2. The territory of Adjara is devided into 5 administrative districts (municipalities) with centers in Keda, Kobuleti, Shuakhevi, khelvachauri and Khulo. The largest city is the capital of Adjara-Batumi with 32% of total population. A 48.4% of total population is rural population. The level of unemployment is 22.1%, and the poverty level-35.1%.

Adjara's economy is closely tied with its natural resources that are represented by the sea-shore recreation potential, subtropical climate favorable to citrus growing, forest and virginal landscapes, and vast water resources conditioned by the abundant precipitation. Correspondingly, main sectors of region's economy are agriculture and fishery, tourism and recreation industry, processing industry and construction. Agriculture and tourism are leading industries. A 16% of population is self-employed in agriculture sector which is third after processing industry and construction.

Forests occupy 162.2 thousand ha (56% of Adjara's total territory), that facilitated the creation of Kintrishi Nature Reserve in the central part of the region and Mtirala Nature Reserve in the western mountainous part. There are 42 registered mineral springs with the total daily output of about 1300 m3. Five hydropower plants operate in the region with total capacity of 23.5 MW.

Problem description

In spite of the diversity of natural resources and huge potential for their use, there are many still unresolved problems, hampering the successful development of Adjara's economy. According to the document "Regional Development Strategy of Adjara" prepared in cooperation with the UNDP main problems identified by the project are: