Probable changes in natural conditions and environmental situation in the Chirchik and Akhangaran river basins in the future

I. RUZIEV

In order to assess environmental situation in Chirchik-Akhangaran basin at present and for the future, we will consider the following development scenarios:

- Option 1. Business as usual (zero option);
- Option 2. Recreation capacity building, tourism development, expected development of industry, agriculture, and other economic sectors, infrastructure development (optimistic option).

Option 1. Business as usual (zero option)

- (**1st environmental zone**) 1st sub-zone – a source of freshwater, focus of biological diversity and center of environmental stability. The flow formation sub-zone is practically free from anthropogenic impact. Analysis shows that environmental damage from pollution of water sources served for drinking, household and fishing needs is not observed in this sub-zone, however there is change in forests.

Option 1

2nd sub-zone of flow formation with minor anthropogenic impact. Analysis shows that here, due to anthropogenic impact, concentrations of some components in water for drinking and household needs and for fishing exceed the maximum permissible concentration (MPC).

Computations showed that the total annual damage to environment from pollution of water sources (for household and drinking water supply (HDS) and for fishing needs (FN)) amounts to about **347 million soums or 277600 US$**.

Option 1

- **2 nd environmental zone**, which is subjected to moderate anthropogenic load from discharge of municipal wastes and effluents of small enterprises in Charvak and Gazalkent cities and Iskander and Tavaksai villages into the Chirchik river. Computations showed that the total annual damage of water source pollution in this zone is **411 million soums (328800 US$)**.
- **3 rd environmental zone** subjected to huge anthropogenic impact. Large cities and industrial enterprises such as PA Electrokhimprom, UzKTJM, Uzbekhimmash, meat-packing plants, bakery plants, food production plants, construction industry and construction material plants are located in this zone. Under-treated effluents from these plants contain biogenic elements, organic matters, heavy metals and have negative effect on ecological conditions in the Chirchik river.

  For this zone, the total damage is **1546,6 million soums (1 237280 US$)**.

  Thus, according to business as usual scenario (option 1), the total annual damage in the Chirchik river basin is **2304,6 million soums (1 843682 US$)**.

Option 2. Optimistic

According to Government's Decrees (№ 23 of 16.01.02 and №471 of 29.10. 03), Tashkent Provincial Committee for Nature Conservation developed a range of measures to prevent environmental deterioration in the region. (Measures for implementation of action plan under the National Environmental Conservation Program for Tashkent province for 2006-2010 are under consideration). At present, implementation of these measures was started, with total cost of **70 million US$,** including **10 million US$** of foreign investments. Out of these investments, **11,2 million US$** are to be allocated for water quality improvement in the basin's water bodies.

Option 2

- Mountain areas relating to the **first environmental sub-zone,** which is practically free from anthropogenic impact, are particularly sensitive to all atmospheric and climate changes. In order to prevent natural destabilization, the following measures are needed in the flow formation area:
- - preservation and improvement of environmental state in this sub-zone;
- - organization of environmental monitoring service.

- This option includes the following measures for the **second environmental sub-zone** – flow formation area with minor anthropogenic impact :
- - reduce livestock population density to 2-3 heads per 1 ha of pasture, current figures are 3 times higher than the norm;
- - expand forest area to 100 thousand ha and increase percentage of forest land to 15 % (at present, 8,1 %);
- Besides, within the area of Chimgan aquifer, it is planned to connect all entities (27) to Bogochul collector so that to prevent contamination of the aquifer.

Option 2

- **For the second and third environmental zones** by 2007 it is planned to put out of operation 21 structures that have potential impact on water quality and located in water-protection zones and coastal belts of the Chirchik-Akhangaran basin. Next, speeding up of putting new treatment plants into operation is planned (mid 2007). Green plantations are planned along the banks (in an area of about 12000 ha) with their transformation into forest shelter belt for nearest 2 years.
- For 2006, the developed measures include construction of special systems of vertical drainage to isolate sources of groundwater contamination in the right-bank area of Chirchik aquifer (Kibray intake). In the near future, the same systems are planned to use for some sites, settling reservoirs, slime tanks and similar structures.
- Reconstruction of 22 treatment plants to improve treatment and bring sewage quality to required standards so that to prevent pollution of both surface and ground water bodies.
- These measures are planned to implement during 5 years since 2006 to 2010, with total capital investments of **11,2 million US$** or **2,24 million US$** per year. The last year of implementation is the first year of economic effect (damage prevention). Later on, during three years, the effect will increase and reach the design level.

Basin's fisheries and its prospects

Capacity of fish industry is the main indicator of fish-breeding in the basin. In 1970-1980, fish capacity of water bodies in ChAB averaged 35 centner/ha.

- In 1995-96, fish capacity dropped to 9-16 centner/ha, i.e half compared to eighties. Computations showed that annual damage from fish capacity losses amounted to more than **200 million soums (200 thousand US$**).
- In the first option – business as usual (zero option), damage in ChAB fisheries will increase due to losses of fish capacity in ponds.

Option 2. Optimistic

In this option, after 2003 Decision of the Cabinet of Ministers of Uzbekistan № 350 “About measures for demonopolization and intensification of privatization in fish industry in Uzbekistan”, situation has begun to improve. Accordingly, measures to overcome critical situation in ChAB’s fishery were developed. Computations showed that due to those measures, fish capacity would increase by **500 t** annually, i.e. by 2008 damage in ChAB fisheries would be covered completely. In 2010, fish capacity would reach the level of eighties in the last century.

Conclusions

Thus, the following conclusions can be made from the above computations:

- efficiency of measures for environmental improvement and former fish capacity rehabilitation in ChAB is very sensitive to beginning time of their implementation.
- maximum effect is achieved in case of soonest beginning and maximum reduction of implementation period.

In general, the results indicate to effectiveness of measures for environmental improvement and fish capacity increase in the basin.