Environmental status and ways of ChAB sustainable development

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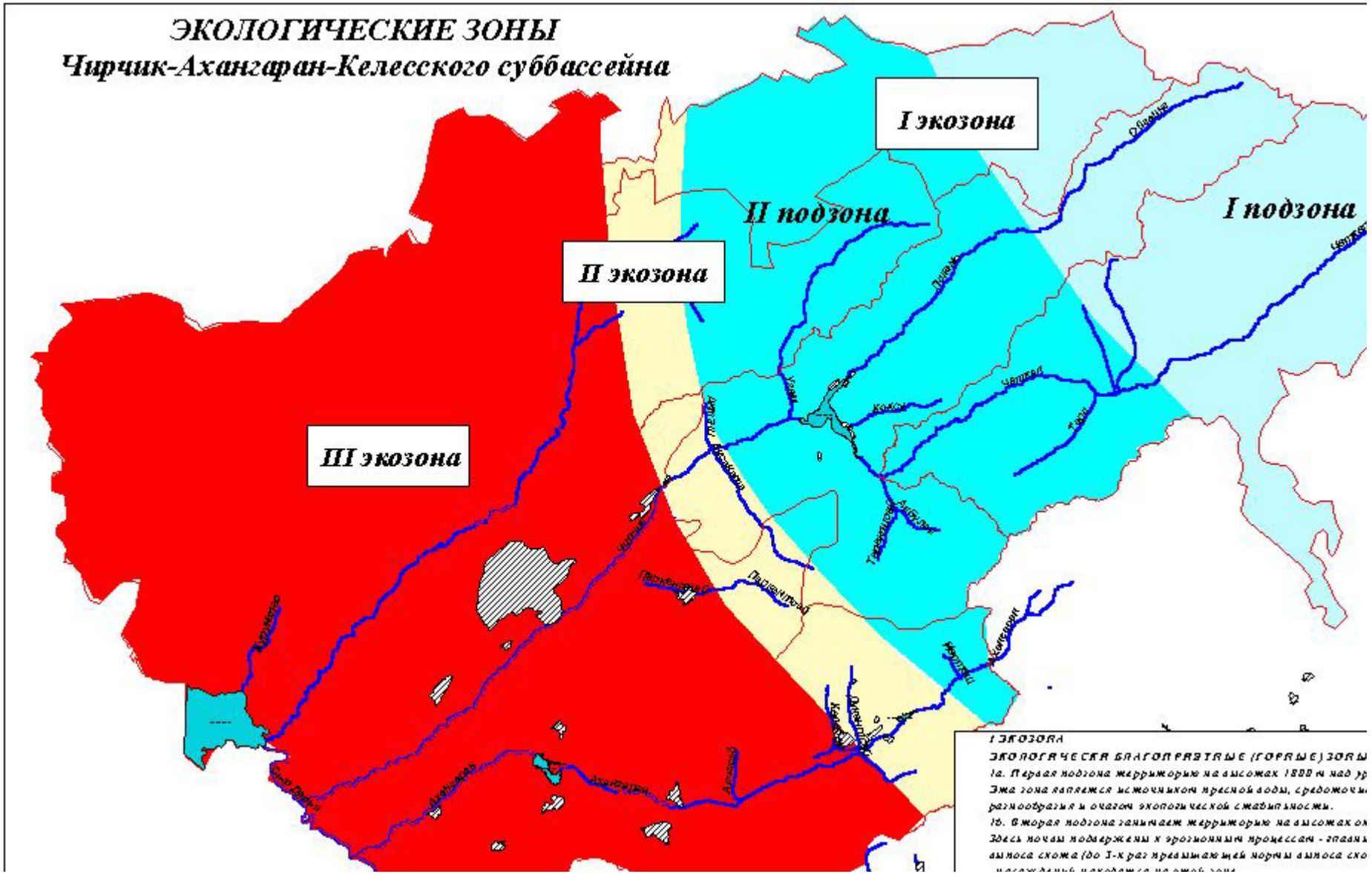
Environmental zoning of Chirchik and Akhangaran river basins

Environmental zoning of Chirchik and Akhangaran river basins was based on environmental conditions. Thus, the basins were zoned, according to anthropogenic load categories and criteria, into environmentally favorable, environmentally satisfactory and environmentally unfavorable zones. Natural-climatic conditions and land types made for the following main economic directions in this region: agriculture, forestry, recreation, fuel and power industry, chemical industry, and food industry.


ЭКОЛОГИЧЕСКИЕ ЗОНЫ
Чирчик-Ахангаран-Келесского суббассейна
I экозона
II подзона
I подзона
II экозона
III экозона
I ЭКОЗОНА
ЭКОЛОГИЧЕСКИ БЛАГОПРИЯТНЫЕ (ГОРНЫЕ) ЗОНЫ

Environmentally favorable (mountain) zone

The zone is divided into 2 sub-zones - flow generation areas under natural impact and practically free from anthropogenic impact; and, flow generation areas with minor anthropogenic impact.

- The first sub-zone covers mountains – Alpine and sub-alpine zones at elevation of 1800 m above sea level and higher. This sub-zone is a freshwater source, concentration of biodiversity and an area of ecological stability.

- The second sub-zone occupies medium- to low-mountain areas at elevation from 900 to 1800 m. In the Akhangaran basin, this zone is located up to Turk city, while in the Chirchik basin – up to Khodjikent settlement.

Environmentally satisfactory (highland and foothills) zone

The zone occupies elevations from 900 to 600 m above sea level: Akhangaran basin - from Turk city to Angren city; Chirchik basin – from Khodjikent settlements to Chirchik city. Environmental risks in this zone are posed by discharge into natural sources of poorly treated or non-treated domestic sewage from urban settlements, as well as by small utility or industrial plants.

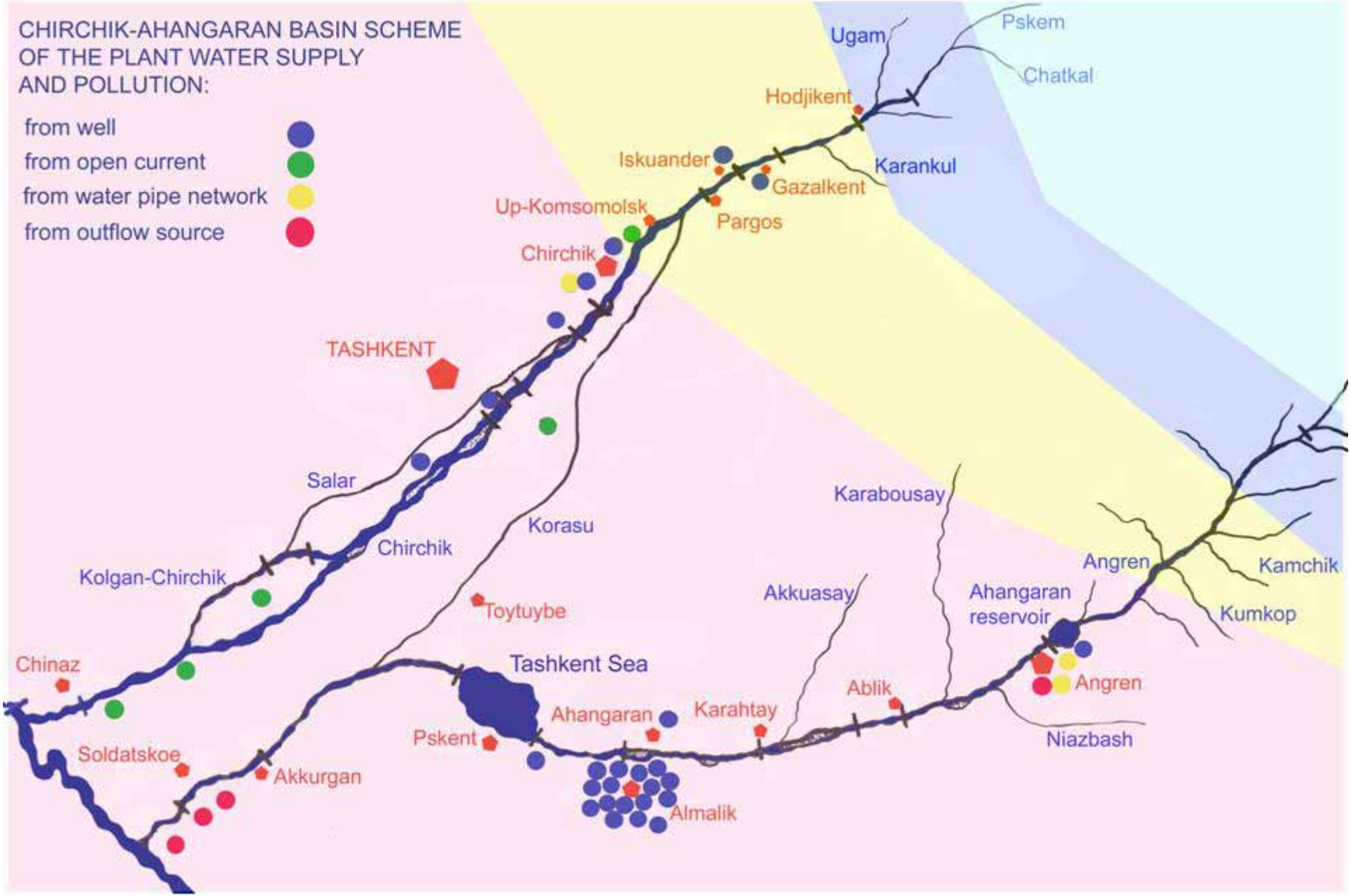
Main anthropogenic load on ecosystem in this zone comes from industrial, livestock, partially agricultural, domestic effluents and residential wastes.

Environmentally unfavorable zone

This zone occupies elevations from 600 to 280 m above sea level: Akhangaran basin – from Angren city to mouth; Chirchik basin – from Chirchik city to mouth, i.e. to the Syrdarya river. The zone covers about 15 thousand square km, where 22% of population from the Republic of Uzbekistan lives (12 cities and 19 urban settlements). Here, 16% of national industrial potential is concentrated. Moreover, metallurgy industry prevails: 98% of ferrous and 94% of non-ferrous metallurgy, 36% - chemical and petrochemical industry, 30% - microbiological industry, 25% - engineering industry, more than 31% of wood industry, and 26% - construction industry. Besides, there are also cotton-cleaning, printing, flour-milling and other municipal industries.

Major pollutants of surface water and groundwater in the basins

- Industrial plants contaminate both air as a result of toxic gas emissions containing nitrogen, phosphorus, carbon, fluorine and heavy metal oxides and water (surface and ground) by wastes of organic matters, biogenic elements and heavy metal salts. Out of total amount of sewage discharge into Chirchik-Akhangaran basin in an amount of more than 5000 Mm3/year, about 90% of load falls at 3rd environmental zone. Most share of agriculture is in this zone as well. Irrigated area is about 400 thousand ha, from which annually more than 2000 Mm3 of return water is drained into surface and ground water sources.
- Environmental risks from CDW discharge into the rivers are related with increased concentrations of salt and agrochemicals in this water. Environmental risks in this zone are also posed by non-metallic mines, Those are concentrated directly along the Chirchik river. These are mines of Chirchik-Kuilyuk, Tashkent, Sergely, and Chinaz deposits.


CHIRCHIK-AHANGARAN BASIN SCHEME
OF THE PLANT WATER SUPPLY
AND POLLUTION:
from well
from open current
from water pipe network
from outflow source
Ugam
Pskem
Chatkal
Hodjikent
Karankul
Iskuander
Gazalkent
Pargos
Up-Komsomolsk
Chirchik
TASHKENT
Salar
Chirchik
Kolgan-Chirchik
Korasu
Karabousay
Angren
Kamchik
Kumkop
Akkuasay
Ahangaran
reservoir
Toytuybe
Chinaz
Tashkent Sea
Ablik
Angren
Ahangaran
Karahtay
Pskent
Niazbash
Soldatskoe
Akkurgan
Almalik

Groundwater pollution

Niyazbash diversion is one of the main sources of household and drinking water supply in Tashkent province. It is located in rice farm. Chemical analyses indicate to high concentrations of extra toxic pesticides - bazagran and propanid (0,3-0,7 mg/l at MPC - 0,1 mg/l) in its groundwater.

At present, many operational wells of Kibray diversion show that groundwater pollution by nitrogen compounds achieved more than 3 MPC (major polluters of Kibray aquifer are Chirchik city, UzKTJM, Kaprolaktam, etc.)

Local pollution of groundwater by infiltrating effluent from tailing pit of copper and leaden processing plant, as well as from phosphogypsum dumps of chemical plant is observed in Pskent district, Tashkent province. This has led to outage of drinking water intakes. As far as 5 km from the tailing pit dam, concentrations of selenium, cadmium, phosphate and value of hardness were 2-8 times higher than permissible norms in groundwater.

Surface water pollution

Water quality parameters in the Chirchik river increase from upstream section to the mouth. Thus, in the first section water salinity for 2000 – 2003 changed from 132 to 272 mg/l and the mean annual values varied from 181 to 195 mg/l, while in the 10-th section it increased from 273 to 1526 mg/l and the mean annual values – from 449 to 763 mg/l. Correspondingly, increase in ions, particularly sulphates, chlorides and sodium ions was observed. Among nitrogen compounds, nitrates show maximum concentrations and amount to 5–6 mg/l in middle reaches. Copper, zinc, chrome, nickel, mercury, leaden, cadmium are detected among heavy metals with toxicological indicators. Phenols account for maximum share of pollutants and are found along the river, from thousandth to hundredth mg/l. Oil products, synthetic surfactants, pesticides: alpha and gamma GHCG are also found in water.

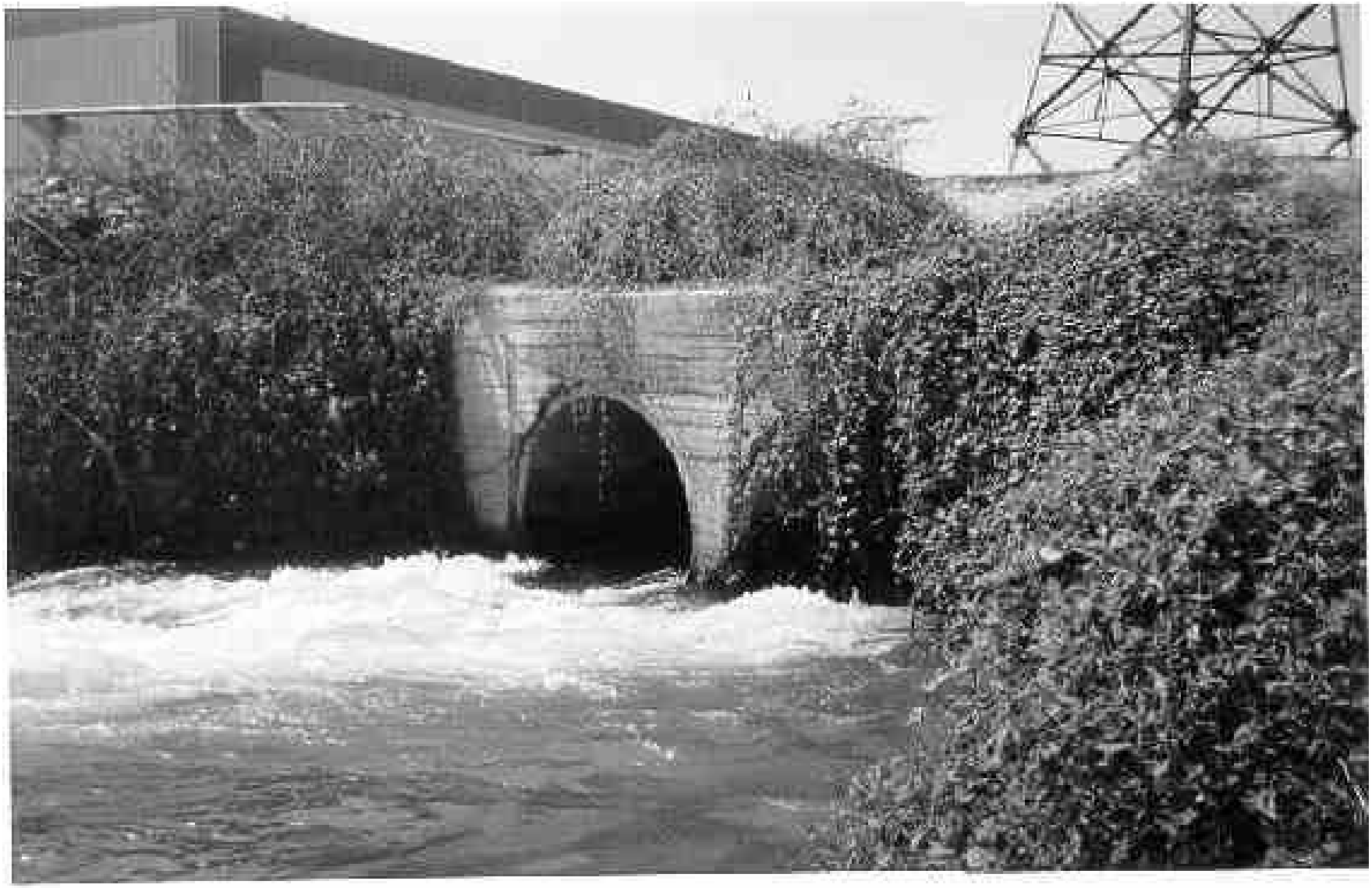
Akhangaran river

In the third EZ, which is subjected to considerable anthropogenic loads, the Akhangaran river receives sewage from industrial plants and utilities that contain different pollutants (ammonium ions, nitrites, BOD, COD, nitrates, suspended matters, fluorides, salts of iron, copper, zinc, chrome, cadmium, oil products, phenols).

- Natural water pollution sources are effluents from Angren treatment plants, coal cut, Angren TPS, petroleum storage depots and utility plants. According to data from Akhangaran SIAK, most plants does not meet the established maximum permissible discharges of sewage and practice emergency discharges of sewages that flow to ground and surface water sources.
- In river upstream, water is not highly saline. Its mean annual values (2000-2003) ranged from 111 to 253 mg/l, while maximum value was less than 413 mg/l. Water salinity increases in downstream area. Thus, it reached 788 mg/l in downstream pool of Tuyabuguz reservoir, 1482 mg/l in Soldatskiy section, and 1488 mg/l in the river mouth.

Kaprolaktam

Electrohimprom



Treatment plants

Open-cast mines

Soil salinization and erosion

- Lately, soil formation process step back erosion processes due to anthropogenic impact. Excessive pasturing cause thinning of vegetation. This leads to loss of fertile layer in flank of hills. 15-30 t and more of fertile soil per hectare/year is lost through water erosion. In irrigated areas, most losses are caused by washout of fields because of inadequate irrigation. Most lands become unusable due to salinization and improper application of fertilizers and insecticides. The total saline area is 15390 ha in the province, of which 6570 ha fall at Chirhik and Akhangaran basins. In some places the soil is contaminated by industrial, agricultural and domestic wastes.

Chirchik river, Kuilyuk market

Conclusion

The analysis shows that the main source of impact on the environment in the Chirchik river basin is anthropogenic factor.

As to water quality in Akhangaran and Chirchik rivers, it is impacted by industrial and agricultural activities in area of their interstream. Salinity change is particularly visible. Water salinity increases almost 10 times at the section from the upstream to downstream stations in the Akhangaran river and three-fold in the Chirchik river. Nitrate and suspended matter concentrations is greatly exceeded in downstream stations. Nitrate pollution had effect on basin's groundwater.

Over-pasturing and excessive deforestation have caused changes in soil erosion and river regimes.

Besides, there is intensive recreational load on Charvak reservoir.

Fisheries in ChAB basin

- 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.
- It should be noted that capacity of 10-20 centner/ha (this is high figure for fish industry) can be achieved under good management practices through natural forage reserve, development of which is promoted by fertilizer application. In 1995-96, fish capacity dropped to 9-16 centner/ha, i.e half compared to eighties.

Conclusion on basin fisheries

Based on results of conducted study, according to plan of measures from the Decision of the Cabinet of Ministers of Uzbekistan № 350, the following conclusions can be made:

1. Chirchik-Akhangaran basin is one of prospective basins in view of both fish production and quite high value of recreational fishing among other basins in the Republic of Uzbekistan.
2. It is necessary to solve personnel problems in national fishery, i.e. to establish ichthyology departments in National University or in some of provincial Universities.
3. Establish Fishermen Association on the basis of JSC “Balykchi” since given farm has a possibility to provide young fishes and underyearlings for other fish cooperatives in the basin.
4. Organize farms on the basis of non-privatized fish cooperatives and transfer them to private ownership.
5. For future fishery development in the basin, it is necessary that the government provide Fishermen Associations with lax credits.
6. Number of fish cooperatives increased from 4 (Balykchi, Damashi, Tashkentryba and “Trout” firm in 2002 to 10 by present. This indicates that population demand for fish raises and, at the same time, fish production expands.