



Climate change and using water resources management in Arid and Semiarid zones of Central Asia

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The beginning of irrigated farming in Central Asia belongs to sixth – seventh century b. c. Since that time and up to now its role constantly grew, the area of irrigated lands increased and the methods improved. To the beginning of 20th century about 3,5 mln. ha was irrigated in region. Particularly the intensive development of irrigation in region began in period of USSR existence (mainly from, 60-s up to 90-s). Occurring in this time interference on nature and its achievement could be named as unique in world practice in such experiments. In the result to 90-s the total area of irrigated lands in region increased to 8,8 mln. ha.

The same abrupt drawing in soviet time was also observed in hydropower. As a matter of fact beginning from the 30-s of XX century in the region the perfectly new base branch – hydropower was founded. The total fixed capacity of all power stations in region reached to the middle of 90-s – 37,8 mln. kWt.

Unfortunately all these impressive results also led to negative consequences. Intensity of ecological balance breach processes in region sharply increased, particularly hard it showed itself in zone of Aral Sea, the salting of lands and their becoming deserted increased, the quality of water became worse practically in all sources. With it already to 70-s the water resources of Syrdarya river basin proved quite fully to be exhausted. Practically all these turn into the global ecological problem of region and according to Aral Sea – to ecological catastrophe. The rapid growth of population negatively influenced upon it.

In integrated view anthropogenesis influence of people in nature shows itself on change of climate. The conception of “Climate” includes aggregate of physical and

geographical processes happening in atmosphere at their interaction with surrounds. Climate is the main factor from the condition of which depends to existence of all olives on the Earth. The Earth itself and its components form under the operation of climate change.

Generalized parameters of climate change from the hydropower point of view are the temperature and amount of precipitation.

In the article the results of researches on vulnerability of hydropower of Tajikistan from climate changes the possible consequences of it and necessary measures on decreasing such influences as on hydropower itself so on surrounds as a whole are presented.

Vulnerability on its definition is the opportunity to get negative consequences at influence of some factors. There are two sides at consideration of vulnerability problem – objects, which are under influence and influenced factors themselves.

First we consider objects of influence. In our case it is hydropower. But the common conception itself does not tell anything concrete, so as energetic can be very different. There are important its type, technical state, location, conditions of exploitation etc.

Peculiarity of modern energetic of Tajikistan is its quite full orientation on hydropower resources. If the share of power stations on common structure of capacity and working out energy makes up about 9% in average in the world, so in Tajikistan it equal to 92% now on capacity and more 95% on production.

The analysis made above convince shows that in fact the base of energy in Tajikistan both now and in visible perspective will be hydropower. More that it is quite probable that on Tajik hydro – resources the neighboring countries will orientate in future. And apparently this export potential will be already in next future claimed in region. Already now the volume of hydropower export – import of Tajikistan makes up 3,5 – 5,0 bln. kWt. h./year.

Even with account of coal, the total found out stocks of mineral fuel in region, on which based the energetic of all other republics beside Tajikistan are rather restricted – in general about 8,45 bln. t. specific fuel (s. f.) including in Tajikistan – 0,5 bln. t. s. f. Therefore at the level of power resources consumption, proper in 1990 to 2,6 t. s. f./year pro person and restrained growing of population number providing of region with mineral fuel equals to 60 years. Taking into account expected economical growth and also that all given estimation were done 15-20 year ago; in fact this term can reduce to 30 and less years.

Thus, even in average all regions are provided with mineral fuel only in term almost

comparable with term of building large hydro unit type of Nurek's. What about Tajikistan so for it even theoretically the stocks of or necessary needs of the state?

Tajikistan owns very insignificant stocks of oil and gas as absolute size so in comparison with another republic of Central Asia. The stocks of coal in republic are quite significant, but they are located mainly in small not necessary areas for building large thermo stations and transportation network is not developed.

Besides, the use of coal requires the large outstripped expenses for exploring and organizing of fields. All these prove very restricted opportunities of industrial use of coal.

Less possibilities of industrial use of non – traditional renewable sources of energy are in Tajikistan.

Wind – power is quite expensive, the small in capacity wind – installations require estrangement of large areas (about 100 m² for capacity of 1 kWt), and the large installations emerge serious ecological problems. Besides, all of them are very complex in exploitation. In result of it even in the countries where it initially got spreading, interest to wind – power decreased gradually.

Tajikistan possesses large, simply unique stocks of hydropower resources. The republic is in the eighth place in the world with its total stock – 527 bln. kWt. h.

Arising now in the world ideas practically synonymously value possible in perspective changes of climate. It is connected with degradation of glaciers, drying up of Aral Sea and forming of salt winds, spreading right up to Pamir's mountains cutting off woods, erosion of river banks etc. In this case the valuation hesitates from moderate – pessimistic up to apocalyptic.

Unfortunately all these are weakly confirmed by actual materials. The systematical observations on glaciers in republic are not carried out since 1986 yet and as it is shown above the point of view about their sharp restriction are not based enough. There is not any data on salt wind. The connection of another analogical factor with climate is not unambiguous.

In these conditions it is necessary use of many – factor mathematical models for obtaining objective and reliable valuation of climate changes. We have for models scenarios of climate change now developed by west specialists: 1. CCC – EQ; 2. UK – TR; 3. GFDL – model of geophysical hydro dynamic laboratory of USA; 4. Had CM2 – model of United Kingdom.

All these are based on accounting of emission influence of green gases and gives valuation of climate change on main parameters – temperature of surrounds and at-

mosphere precipitation to the end of 50 – year’s period. Their very big difference from each other can be noted.