Analysis of natural hydrological phenomena in Belarus and Kazakhstan

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The emergencies caused by anthropogenic catastrophes and extreme natural phenomena pose threat to sustainable economic development of any country, its national security and decrease living standards through deterioration of environmental conditions.

According to the Center for Research on the Epidemiology of Disasters (Brussels), from 1965 to 2009 natural disasters caused more than $500 billion damage to the world community. Meanwhile, as economic development and population growth continues, preconditions are created for a more sensitive environment, which undergoes constant increase in man-made accidents and natural disasters accompanied by ever increasing economic damages. As a result, the number of injured alone in the world is annually increasing by 6%; the number of major natural disasters with the damages exceeding 1% of GDP of the affected area is increasing in the same way. In these years, economic losses from natural disasters (by very rough estimates) have amounted to $63.2 billion. Over the past 20 years, the number of such accidents has increased more than five-fold taking thousands of human lives, destroying cities, roads and all that is created through the efforts of many generations. Meanwhile, 62% of people affected by natural disasters worldwide for the period 2005-2009 falls on floods, 36% on droughts, 2% on mudflows, avalanches and other natural disasters.

Belarus experienced catastrophic and extraordinary floods on the rivers Pripyat (1845), Western Dvina, Dnieper, Berezina, Sozh (1931), Neman and Schara (1958). The outstanding overflows and floods were observed on the rivers Western Dvina (1878, 1929, 1941, 1951, 1956), Neman (1886, 1931), Mukhavets (1974, 1979), Dnepr, Berezina (1908, 1956, 1958), Sozh (1956, 1958, 1962, 1970), Pripyat (1888, 1895, 1900, 1932, 1958, 1974, 1979, 1999). In recent years, floods causing huge material damage are occurring once every 4 - 5 years. In southern Belarus flood situation is exacerbating due to the lack of peak flow passing schedule and use of existing reservoirs with neighboring Ukraine.

In Kazakhstan, major damage is caused by flooding on large transboundary rivers Ural (Zhayyl) Tobyl, Ishim, Nura, Zhem, Torgai, Sarysu, Buktarma and their numerous tributaries. Over the past 15 years, more than 300 cases of flood of different origin have been recorded in the country, of which spring floods account for 70%, rain for 20% and other causes for 10%. A total of 850 flood prone sites, place for 732 settlements and home to more than 900 thousand people, have been identified on the country’s territory. Moreover, 268 (including 28 large ones) out of 653 hydraulic facilities are in need of emergency repairs.

The report proposes common to both countries measures for prediction, prevention and mitigation of floods. Other countries can use this methodical approach proposed by the authors.