

Rivers Pollution in Central Asia

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ABSTRACT

It has been studied seven river basins of Central Asia (CA) situated in four countries. We studied health-danger pollutant contents of rivers, river-cost areas food - during latest nine years. It has been registered steadfast pollutants infiltration to rivers - from old uranium tailings, from mercury, stibium, chromium enterprises, from abandoned pesticides warehouses. There are some health disturbance of people in the polluted river-costs areas. The pollutants are: a) obsolete pesticides, examples: Ak-Buura river in East Fergana valley - the sum of HCH $3,1 \times 10^{-2}$ mg/litre; Vakhsh river in Pamir mountain - HCH $1,45 \times 10^{-2}$ mg/litre, Aldrin $9,0 \times 10^{-3}$, DDT-DDE $4,64 \times 10^{-2}$ mg/liter; b) uranium (TienShen-Pamir was Uranium Boiler of USSR), example: Mailuu-Suu river 250-750 mg/litre, and local plants dry residue 2.20×10^{-6} g/g; Min-Kush area drinking water $4,0 \times 10^{-5}$ g/l; c) heavy metals - the worst rivers pollution CA areas: Khaidarken area with mercury pollution; Lower Amy-Darya and whole Aral Sea region (Uzbekistan and Kazakhstan); Lower Syr-Darya (Kyzil-Ordo area, South Kazakhstan, which lead to rice pollution); Ilek river (by chromium 6, North Kazakhstan). An irrigating-agricultures is the life-pivotal for whole Central Asia (CA). Rivers and irrigating canals are main ways of danger pollutions of vegetables, crops, grass and cow body and milk. We studied pollutant contents of rivers, canals and drinking water in CA. The pollutants are: obsolete pesticides - from abandoned warehouses, uranium - from abandoned tailings, chromium and mercury (from enterprises). These threats steadfast rise up due destruction of tailings and warehouses and by ground waters high up due land over-irrigating.

Tremendous former USSR uranium tailing situated in CA river costs: Min-Kush, Mailuu-Suu, and in Pamir - Degmai. Uranium wastage pulp had been kept in the mountain gorges covered by concrete with sands and soil, and lies approximately 6 m from the surface. We determined uranium under surface 50 times higher than geographical area trend. At the moment uranium spreads with upper and ground waters because of local conditions (soil hydrocarbon status and high level of ground water). There is high concentration of drinking water in Min-Kush ($4,0 \times 10^{-5}$ g/l) due infiltration via obsolete dump (40 years old). The concentration of uranium in river Mailuu-Suu is up to 250-750 mg/litre (in spring and autumn). Uranium content in local plants (dry residue) is very high - average 2.20×10^{-6} g/g. The fodder is a source for animal body building (cows and camels), so a source of pollution for meat and milk. Lambs meat contains 1.2 mg/g uranium in Min-Kush. Cow milk and meat in Min-Kush contain 2.27 and 0.107 mg/kg of wet weight. Lambs skin, horn, hoof in Mailuu-Suu contain 0.183 mg/kg uranium. Meat of domestic animals is the single source of protein for Tien-Shen aborigens. Human teeth contain uranium content (Mailuu-Suu town): in children milk-teeth $0,481 \times 10^{-6}$ g/g; in elderly people group $0,687 \times 10^{-6}$ g/g. Degmay uranium area (North Pamir, Tadzhikistan). Its square is 90 hectares, its volume is $19,5 \text{ mln m}^3$, its mass is 36 mln ton, exposition dose 3,00-20,00 mkZivert/h. Two hundred of observe slits (using for control of solution flow) in the dike are broken and abandoned (after USSR collapse). So the dikes of the tailings is open now. There is migration of toxic solution from the tailings in the ways of upload plats waters of Hodji - Bakyrghan - Sai and Syr -



Daria river. There is migration of solution from storehouses in direction where reservoir water Khodji-Bakirgan-Sai lie. The main CA rivers: Syr-Darja and Amu-Darja waters contents of the majority of heavy metals (Hg, Cr, Sb, Co, Fe, Zn) in 5 times is higher in comparison with the Global data, so it lead to pollution of rise – main food of local people.

Tien-Shen mining-enterprises Khaidarken (mercury) and Kadamjai (stibium) situated in shore of rivers. Khaidarken mercury tailings (total volume 2190 thousands square m) and dumps (volume 165 thousands square m). Khaidarken enterprise was the second in the World Hg production (first was Almadena, Spain) in 60th-80th also. Destroying of old tailing and ground water filtration from - lead to accumulate in grass and vegetable accumulation. Kadamjai stibium enterprise (produced 17.000 ton pure ore in USSR time) have dumps (76.000 m³). There are high content of mercury in hair of Khaidarken adult inhabitant 2,9-5,2 mkg/g, and in urine of child 3,8-22,8 mkg/liter. Chromium enterprise in North Kazakhstan (town Actobe) polluting Ilek river by chromium six valent, which polluted land along the river (includes Russia territory). The same high concentration of chromium (100 mg/l) determined in lower Syr-Darja (in Kazakhstan, but water flow from Uzbekistan enterprises).

Obsolete pesticides warehouses of CA situated in river costs (and irrigated canals) mostly. Dichlorodiphenyltrichloroethane (DDT)-containing antifouling paints were an important .It leads to high obsolete POP content in plant - Ak-Buura and Chui rivers basin. By the way there is high level of POP and other chemicals in Ak-Bura river: HCH sum $6,0 \times 10^{-2}$ mg/litre in 1983 (our old study), but it is $3,1 \times 10^{-2}$ mg/l in 2009 (recent study). There are high and there and danger concentration of the chemical compounds in carrot and onion in the kitchen-gardens. In South Pamir (Tadjikistan), in the point intern of Vakhsh river to Amu-Darja - the sum of HCH $1,45 \times 10^{-2}$ mg/l, Aldrin $9,0 \times 10^{-3}$, DDT-DDE group $4,64 \times 10^{-2}$ mg/liter. We determined obsolete POP content in onion, cabbage, potato, meat produced in irrigated land along cost Ak-Buura and Chui rivers. There are HCH $1,0 \times 10^{-2}$ mg/kg, and Aldrine $4,0 \times 10^{-3}$ mg/kg. There was registered high concentration of POP and other toxicants in other CA rivers by several researchers (Burlibaev; Kadirjanov). POP are gradually pass to vegetables, grass – cow milk. There are connect rising curves of pollution and immune-related diseases (tuberculosis, child chronic lung illness, skin and lung cancer, etc). Additionally, we are studying immunity of inhabitants in these hot points. There is close correlation between immunity and genetic damages and level of pollutants (in land and food). A lot of pesticides, dioxins and radioactive elements carrying by rivers Amyr-Darya and Syr-Darya diffuse of Aral Sea. It has been found high toxic concentrations of POP in blood and woman milk in Aral region.

Our map study shown close correlation between heritage and several chronic illness on one hand, and level of pollutants (in food) in – the other hand. It has been done some practical implementation:

a) twice prolongation of water staying in sediment basin (in water-purified stations); b) rivers cost fortify near danger tailings; c) protect vulnerable groups in worst polluted areas (we installing drinking water filters in schools, kinder gardens and hospitals of Mailuu-Suu). All countries of CA are recommended to sign Protocols about Transborder Water Pollutions. All countries should be adopt Protocol and Register - of Transborder Water Pollution, and established multi-governmental (regional) network.