ARSENIC EXPOSURE IN LATIN AMERICA BY DRINKING WATER: EXPERIENCES FROM 14 COUNTRIES

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In Latin America, the problem of arsenic (As) contamination of groundwater and to less extent of surface water is known from 14 out of 20 countries comprising Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru and Uruguay.

The occurrence of As in drinking water and related health effects were identified in the 1910s in Bellville (Córdoba province, Argentina) but recent studies in mummies from northern Chile proved that the impact of chronic arsenicosis affected human populations already 7000 years ago. Arsenic contamination was detected for the first time in 10 Latin American countries only within the last 10-15 years. It has been roughly estimated that at least 4.5 million people in Latin America are chronically exposed to high levels of As (>50µg/L), and at least 14 million if we consider the WHO provisional drinking water standard (10 µg/L). Health effects due to chronic exposure to As from drinking water comprise internal and external caners, reproductive outcomes, and childhood cognitive function, etc.

In Latin America, As in the water resources is predominantly of geogenic origin; in most cases it is mobilized from Tertiary to recent volcanic rocks and their weathering products. In the Andean mountain range, oxidation of sulfide minerals is the primary mobilization process. Rivers originating in the Andes, transport As to the more densely populated lowlands (e.g. Rímac river in Peru and Pilcomayo river in Bolivia). In the Andes and the Central American and Mexican mountain ranges, As-rich geothermal waters locally contaminate fresh water resources. In alluvial aquifers, As is mobilized from Fe, Al and Mn oxyhydroxides (secondary As sources) under oxidizing or slightly reducing conditions (e.g. Chacopampean Plain Argentina and many sites in Mexico).

Although the As problem has been known since one century; the problem has not received enough attention by national authorities or international cooperation agencies to mitigate the problem. Furthermore, the rural people are often unaware of the situation and/or dependent on As-contaminated water as their only drinking water resource. Thus, although suitable remediation methods were developed (e.g., solar oxidation methods, phytoremediation, use of natural materials as adsorbents for As removal) they were mostly tested only on laboratory scale, and only few pilot studies on field scale exist even today.

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