

Groundwater is now extensively used for drinking water in Bangladesh and present estimates indicate that there are some 6–11 million tubewells in Bangladesh. It is now apparent that approximately 1/4 of these wells contain arsenic at concentrations exceeding the Bangladesh drinking water standard (**50 $\mu\text{g L}^{-1}$**). As many as 35 million people may be drinking arsenic-affected groundwater. We discuss a national survey of groundwater quality in Bangladesh that attempted to map the distribution and nature of affected wells. Other solutes measured included Na, K, Ca, Mg, Fe, Mn, P and SO_4 . The worst-affected part of Bangladesh lies in the south-east of the country where the sediments are of Holocene age and where concentrations of arsenic frequently exceeded **200 $\mu\text{g L}^{-1}$** . Where sampled, deep groundwaters (>150 m) were only rarely affected as were shallower groundwaters from older sediments including the aquifers underlying the Barind and Madhupur Tracts. Seven groundwater samples from the capital city of Dhaka also suggest that the city is not affected. The arsenic is undoubtedly of natural origin and the problem arises even though the sediments do not contain abnormal quantities of total arsenic. There is no evidence to suggest that the dissolved arsenic is derived from the oxidation of pyrite as some have suggested. Rather it appears that the high concentrations reflect a combination of factors: (i) young sediments undergoing rapid change from an oxidizing to a reducing environment following sediment burial; (ii) the release of arsenic by one or more mechanisms which are poorly understood at present but which probably involve the desorption and dissolution of arsenic from iron oxides which are quite abundant in many of the worst-affected sediments; (iii) the very low hydraulic gradients throughout much of Bangladesh mean that groundwater flow is very slow which, combined with the 'young' age of many of the sediments, means that the natural flushing of the shallow aquifer will be slow allowing any released arsenic to accumulate. The rapid rate of deposition of sediments in Bangladesh and the Bengal Basin means that the chance of a well intercepting arsenic-rich water is likely to be relatively high compared with smaller deltas and other alluvial environments where the sedimentation rate is much lower.