

# Identifying the Source of Carbon Fueling Arsenic Contamination of the Pleistocene Aquifer in Bangladesh

Katharine Scanlan<sup>1</sup>, Brian Mailloux<sup>2</sup>

<sup>1</sup>*Barnard College*, <sup>2</sup>*Columbia University*

Widespread arsenic (As) consumption from contaminated aquifers has been endemic in Bangladesh for many years. People have utilized inexpensive shallow wells that pump from the Holocene aquifer, which often contains high As levels and is associated with young organic carbon. Natural sedimentary (geogenic) As is released into the groundwater through microbial reduction of iron oxides coupled with oxidation of organic carbon. In order to get clean water, people have been drilling deeper wells to tap into the low As Pleistocene aquifer. The Holocene and Pleistocene aquifers are typically separated by a clay layer, which is thought to create confining conditions for the Pleistocene aquifer. However, some Pleistocene aquifer sites have high As levels. This project analyzes the age of the carbon metabolized by microbes in a contaminated Pleistocene aquifer site. Extracting and radiocarbon dating microbial RNA can determine whether young carbon (0-1k) is coming around the clay from the shallow Holocene aquifer or whether old carbon (>40k) is coming from or through the clay layer itself. 300µg of RNA has been extracted from a filter pumped with contaminated Pleistocene aquifer water, enough for two separate dates. The radiocarbon dates that come back will help identify the source of organic carbon and may provide insight towards the long term viability of Pleistocene aquifer wells as a source of water.