The security of food worldwide is increasingly being challenged by several anthropogenic, sociopolitical and policy factors, including population growth; urbanization and industrialization; land use changes and water scarcity; income growth and nutritional transition; and turbulence in global energy and food markets. My presentation uses arsenic as a quintessential example of an environmental pollutant that can influence the food safety and security at three critical levels: (i) the environment surrounding food production, (ii) the food production chain from farm to fork, and (iii) consumers. The focus will be on the “Food Production Risks” with limited discussion on the use of arsenic in “Food Terrorism”. A unique feature of South and Southeast Asia is the heavy dependence on groundwater irrigation for economic development and food security; this region is the world’s largest user of groundwater, accounting for withdrawal of over 200 km³ every year. In many parts of the region, the groundwater is naturally contaminated with high levels of arsenic. The heavy demand and non-sustainable exploitation of groundwater in South Asia implies that South Asian agriculture is highly environment-intensive in a manner that leads to the enrichment of soils with arsenic. The presence of arsenic in irrigation water and soils at elevated levels can hamper not only the normal growth and development but the yield of rice plants, the main food crop in the region. Furthermore, the arsenic in polluted water used for irrigation is readily bioaccumulated in rice grain to levels that can pose a threat the health and livelihoods of the local population. Since most of the world’s rice export comes from South and Southeast Asia, the risk on the supply chain for a critical food product (rice) has been heightened in both the producing and importing countries. I argue that contamination during production drives the safety and security of rice supply through reducing the yield, by affecting the health of millions when ingested at elevated doses, and by the likely disruption of the export market for a critical food product.