

THE “GREEN REVOLUTION” AND TRACE METAL DEFICIENCY IN GLOBAL FOOD SUPPLY.

Jerome Nriagu

Department of Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, MI 48109

Since the dawn of agriculture, human beings have dramatically transformed natural ecosystems into managed areas. Today, 30–50% of the Earth’s land cover has substantially been transformed into agricultural land. The most dramatic intensification of worldwide land use occurred during the last 50 years under the rubric of “Green Revolution” (GR) which involved the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, mechanization of techniques and use of huge quantities of synthetic fertilizers and pesticides. The effects of large-scale modifications of the land surface on the nutrient cycles (especially carbon, nitrogen, and sulfur) have been well documented and are implicated in global change processes. We show that these perturbations have de-coupled the close natural relationships between the nutrient and trace metal cycles in the global biosphere. In particular, the GR has heightened the depletion of essential trace metals in food crops by popularizing high-yield cultivars with low capacity to accumulate trace metals. In addition, the massive use of NPK fertilizers often leads to rapid depletion of trace metals in agricultural soils. It is argued that the GR has significantly reduced the trace metal density in our food supply and is believed to be responsible for large-scale deficiencies in essential trace metals in many parts of the world. In my view, the First Green Revolution has saved millions of lives but has also sickened billions of people. The Second Green Revolution must treat the density of nutrients in our foods as a public health imperative.