



The hidden impacts of air pollution on the poor: a case study of heavy metal contamination of vegetables in Indian cities

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Vegetable crops are often grown in polluted and degraded environmental conditions in the peri-urban (or urban fringe) zone and are subject to further pollution from vehicles and industries during marketing. There is therefore significant cause for concern regarding the potential impacts of air pollution on crop yield and quality.

Levels of contamination of Cu, Zn, Cd and Pb were measured in spinach beet (palak), cauliflower and okra at market and field sites in Varanasi, and in palak in Delhi, and were compared with national (Indian) and International permissible limits. In Varanasi markets, the mean heavy metal contamination levels significantly exceeded the Indian prevention of food adulteration act (PFA) limits for Cd, Cu and Zn for much of the year for all three crops. Pb did not exceed the PFA limits, but the majority of samples did exceed the more stringent EU or CODEX permissible limits. In Delhi markets the majority of palak samples contained Pb concentrations that exceeded the Indian PFA limit. The considerably lower contamination levels measured in crops at field production sites indicates that a significant proportion of the contamination occurs during transport to market or at the point of sale. Heavy metal contamination could be reduced, often to below PFA permissible limits, by twice washing in clean water.

This paper is one of a series of outputs from a major interdisciplinary research project carried out to assess the nature and significance of aerial deposition of heavy metals on the safety of vegetables consumed in urban India (with particular emphasis on

impacts on the poor); to explore appropriate technical and institutional measures to address the issue, and to draw lessons for policy approaches to improve food safety in India. The study brought together a cross-sectoral team to develop new types of partnerships and new ways of working, in order to understand and address the impacts of newly emerging environmental threats to the food system on the livelihoods of the poor. The study is a pointer to the inefficacy of current policy approaches towards ensuring safety of food to the consumer. Current policy relates to food standards, environmental standards, industrial siting, peri-urban agriculture and consumer rights separately and is inadequate to tackle the issue comprehensively. Whilst progress is being made with the proposed new integrated food safety bill, there is still no emphasis on fresh produce rather than processed food, or recognition of environmental pollution as a threat to food safety.