

## Research Brief

# Total Diet Study of Bangladesh: Analysis of Contaminants, Toxins and Harmful Residues in the Foods and Assessment of Dietary Exposure

### Research Questions

1. What is the level of trace elements and heavy metals in major foods consumed by the people of Bangladesh?
2. Is there risk of cancer risk from dietary intake of heavy metals?
3. What could be the policy options for reducing dietary exposure to heavy metal intake?

### Answers from the Research

The level of trace elements (Zn, Fe, Cu & Se) and heavy metals (As, Cd, Pb and Cr) varied between food groups, between items within a food group, and between divisions (Mymensingh, Rajshahi, Khulna and Chattogram). Higher values for trace elements and heavy metals were mostly noted for Chattogram and Khulna division.

Population of all four divisions showed sufficient dietary intake of Cu and Se. More than 85% household adults across the divisions revealed dietary intake of Zn and Fe below the Recommended Dietary Allowances (RDA). The contribution of rice was found to be highest, towards dietary intake of all elements: 68-71% for Zn, 57.4-71.5% for Fe, 54-91% for Cu and 46.71-68.54% for Se. Vegetable consumption exhibited contribution of 5.38-14.16% for Zn, 12.3-24.2% for Fe, 3.6-4.4% for Cu and 9.41-25.43% for Se.

The population of Mymensingh, Khulna and Chattogram show greater estimated cancer risk due to dietary intake of Pb, As and Cd respectively.

### Implications for Policy

- Develop rice varieties that accumulate less arsenic (As), cadmium (Cd) and lead (Pb), to minimize the transfer of these elements from soil to the paddy grains and from grains to the body.
- Contribution of cereals, especially rice to the intake of heavy metals (As, Pb and Cd) by adults in four divisions is the highest compared to other food items. Awareness campaigns for decreased consumption of rice and increased consumption of wheat, potato and vegetables can help reduce the dietary risk exposure from heavy metals, while contributing to a more balanced diet.
- Biofortification of major food crops (rice, lentil) with micronutrients (Zn, Fe) by either varietal development or use of micronutrient fertilizers could be adopted to enhance the micronutrient level in crop produce.
- Define and enforce regulations and controls to treat industrial effluents and their disposal, to minimize heavy metal contamination of food.

This fact sheet presents the summary of a research study undertaken by the *Department of Soil Science, Bangladesh Agricultural University (BAU), Mymensingh*, with support under the Research Grants Scheme (RGS) of the Meeting the Undernutrition Challenge (MUCH) project. MUCH is implemented in collaboration with the Food Planning and Monitoring Unit of the Ministry of Food with technical support from the Food and Agriculture Organization of the United Nations (FAO).

MUCH is financially supported by the European Union (EU) and the United States Agency for International Development (USAID). The opinions expressed in this fact sheet are attributed to the research team and do not necessarily reflect those of the Government of Bangladesh, FAO, EU or USAID. For further information and comments: [fpmu.gov.bd](http://fpmu.gov.bd), Food Planning and Monitoring Unit (FPMU), Ministry of Food, Khaddya Bhaban, 16 Abdul Ghani Road, Dhaka-1000, Bangladesh