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## ZINC FERTILISER USE AND ITS IMPACT IN HUMAN HEALTH: GLOBAL CASE STUDIES

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Zinc (Zn) fertilisers are underutilised in many countries despite the widespread occurrence of Zn-deficient soils. Zinc fertilisers can increase not only the yield, but also the Zn concentration of crops with the potential to improve human nutrition. We have conducted studies to explore the potential benefits of increased Zn fertiliser-use scenarios. These include case studies for wheat production in Pakistan (Joy et al., 2016; doi:10.1007/s11104-016-2961-7), and for crops in several countries in sub Saharan Africa (Joy et al., 2015; doi:10.1007/s11104-015-2430-8). For example, in the Pakistan study, we estimated potential financial returns from both the potential yield gains as well as health gains in the population due to increased grain Zn composition. “Disability-adjusted life years (DALYs) lost” are a common metric of the burden of a condition with an estimated 245,000 DALYs y<sup>-1</sup> lost in Punjab and Sindh Provinces due to Zn deficiency. Baseline Zn fertiliser-use of 7.3 kt y<sup>-1</sup> ZnSO<sub>4</sub>.H<sub>2</sub>O was obtained from published and industry sources. The wheat area currently receiving Zn fertilisers, and grain yield responses of 8 and 14 % in Punjab and Sindh, respectively, were based on a recent survey of >2500 farmers. Increased grain Zn concentrations under Zn fertilisation were estimated from literature data and converted to improved Zn intake in humans and ultimately a reduction in DALYs lost. Application of Zn fertilisers to the area currently under wheat production in Punjab and Sindh, at current soil:foliar usage ratios, could potentially halve the prevalence of Zn deficiency, assuming no other changes to food consumption. Benefit-Cost Ratios (BCRs) for yield alone are 13.3 and 17.5 for Punjab and Sindh, respectively, and potentially much greater in terms of health benefits, if each DALY is monetised at 1-to-3 times Gross National Income *per capita*. There are market- and subsidy-based incentives to increase Zn fertiliser-use in Pakistan and elsewhere.

**Key-words:** agronomic biofortification, health, fertilisers, zinc

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Promoção



Realização

