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"Bridging the gap between increasing knowledge and decreasing resources"

Integrated Assessment of Human and Animal Waste

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Abstract

We developed a conceptual framework for improving health and environmental sanitation using an approach combining health, ecological, socio-economic assessments. The framework has three main components: health status, physical environment, and socio-economic environment. Information on each of these three components can be obtained using standard disciplinary methods and an innovative combination of these methods. In this way, analyses lead to extended characterisation of health, ecological and social risks while allowing the comprehensive identification of critical control points. Interventions deriving from the comprehensive analysis consider biomedical, engineering and social science perspectives or a combination of them. Moreover, interventions encompass not only technical solutions but also behavioural and social changes, which are derived from the identified resilience patterns. The framework is conceptualised and validated for the context of urban and peri-urban settings in developing countries focusing on waste, such as excreta, wastewater, and solid waste, their influence on food quality, and their related pathogens, nutrients and chemical pollutants.

We have applied this framework for integrated human and animal waste assessment in Vietnam. We conducted a combined assessment of the impact of human excreta and animal manure reuse in agriculture on health, environment and society to propose sustainable and adapted interventions for improving health and environmental sanitation. Thus, health impact was assessed by microbial risk analyses. Environmental impact was assessed for sanitation and agriculture systems focusing on nutrient flows. Perception and behaviour on health risk and ability of people to prevent health risk caused was evaluated. Results from this case study and insights on proposed intervention will be presented.

Keywords: Agriculture intensification, environmental sanitation, health risk and impact, integrated approach, urban, waste management

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