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“Bridging the gap between increasing knowledge and decreasing resources”

Environmental Sustainability of Livestock Systems – Challenges and Prospects

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Abstract

Greenhouse gas emissions, eutrophication of water bodies, pathogen contamination of vegetables fertilised with animal dung, and rangeland degradation through overgrazing are only a few of the many environmental threats ensuing from livestock production systems that have been summarised in FAO's report “Livestock's long shadow” published in 2006. Livestock scientists have long before started to investigate such challenges and identified options to substantially reduce or mitigate these. Yet, even if technically feasible strategies are available that, for example, lower methane emissions from rumen fermentation of cereal residues or reduce nitrogen volatilisation and leaching from herbivore manure, their adoption by farmers may be very low if livestock husbandry practices have to be changed substantially in order to establish the proposed improvements. In such cases the monetary and/or non-monetary benefits to be reaped by the extra efforts have to be immediate, tangible, and reproducible in order to assure farmers' adoption; these benefits must be honoured by the market, for example by better pricing of eco-friendly products, or transfer payments via governments or the international community. While in regions or countries with a stringent control system of animal husbandry systems, such as northern America, the EU and Australia the enforcement of adoption of specific husbandry practices through governmental legislation and punishment of non-compliance is common practice, such an approach seems not advisable for most of the resource-poor countries.

By focusing on such countries' smallholder livestock systems and addressing some of the environmental challenges that ensue from these, the range of mitigation options proposed by scientists is critically screened for their technical effectiveness, social acceptability, and economic advantages at the household scale. Since it is clear that any of the available options can mostly address several, but not all problems at once, the priorities to be set and approaches to be selected in a specific case will depend on the agro-ecological and socio-economic as well as institutional setting.

Keywords: Enteric fermentation, gaseous emissions, livestock, manure, nutrient leaching