



## Livestock impacts on the environment

### The challenge is to reconcile two demands: for animal food products and environmental services

A new report from FAO says livestock production contributes to the world's most pressing environmental problems, including global warming, land degradation, air and water pollution, and loss of biodiversity. However, it says, the livestock sector's potential contribution to solving those problems is equally large, and major improvements could be achieved at reasonable cost.

Based on the most recent data available, *Livestock's long shadow* takes into account the livestock sector's direct impacts, plus the environmental effects of related land use changes and production of the feed crops animals consume. It finds that expanding population and incomes worldwide, along with changing food preferences, are stimulating a rapid increase in demand for meat, milk and eggs, while globalization is boosting trade in both inputs and outputs.

In the process, the livestock sector is undergoing a complex process of technical and geographical change. Production is shifting from the countryside to urban and peri-urban areas, and towards sources of animal feed, whether feed crop areas or transport and trade hubs where feed is distributed. There is also a shift in species, with accelerating growth in production of pigs and poultry (mostly in industrial units) and a slow-down in that of cattle, sheep and goats, which are often raised extensively. Today, an estimated 80 percent of growth in the livestock sector comes from industrial production systems. Owing to those shifts, the report says, livestock are entering into direct competition for scarce land, water and other natural resources.

**Deforestation, greenhouse gases.** The livestock sector is by far the single largest anthropogenic user of land. Grazing occupies 26 percent of the Earth's terrestrial surface, while feed crop production requires about a third of all arable land. Expansion of grazing land for livestock is a key factor in deforestation, especially in Latin America: some 70 percent of



previously forested land in the Amazon is used as pasture, and feed crops cover a large part of the remainder. About 70 percent of all grazing land in dry areas is considered degraded, mostly because of overgrazing, compaction and erosion attributable to livestock activity.

At the same time, the livestock sector has assumed an often unrecognized role in global warming. Using a methodology that considered the entire commodity chain, FAO estimated that livestock are responsible for 18 percent of greenhouse gas emissions, a bigger share than that of transport. It accounts for nine percent of anthropogenic carbon dioxide emissions, most of it due to expansion of pastures and arable land for feed crops. It generates even bigger shares of emissions of other gases with greater potential to warm the atmosphere: as much as 37 percent of anthropogenic methane, mostly from enteric fermentation by ruminants, and 65 percent of anthropogenic nitrous oxide, mostly from manure.

Livestock production also impacts heavily the world's water supply, accounting for more than 8 percent of global human water use, mainly for the irrigation of feed crops. Evidence suggests it is the largest sectoral source of water pollutants, principally animal wastes, antibiotics, hormones, chemicals from tanneries, fertilizers and pesticides used for feed crops, and sediments from eroded pastures. While global figures are

unavailable, it is estimated that in the USA livestock and feed crop agriculture are responsible for 37 percent of pesticide use, 50 percent of antibiotic use, and a third of the nitrogen and phosphorus loads in freshwater resources. The sector also generates almost two-thirds of anthropogenic ammonia, which contributes significantly to acid rain and acidification of ecosystems.

The sheer quantity of animals being raised for human consumption also poses a threat of the Earth's biodiversity. Livestock account for about 20 percent of the total terrestrial animal biomass, and the land area they now occupy was once habitat for wildlife. In 306 of the 825 terrestrial eco-regions identified by the Worldwide Fund for Nature, livestock are identified as "a current threat", while 23 of Conservation International's 35 "global hotspots for biodiversity" - characterized by serious levels of habitat loss - are affected by livestock production.

**Two demands.** FAO says "the future of the livestock-environment interface will be shaped by how we resolve the balance of two demands: for animal food products on one side and for environmental services on the other". Since the natural resource base is finite, the huge expansion of the livestock sector required to meet expanding demand must be accomplished while substantially reducing its environmental impact.

Greater efficiency in use of resources will be "the key to retracting livestock's long shadow". Although a host of effective technical options - for resource management, crop and livestock production, and post harvest reduction of losses - are available, current prices of land, water and feed resources used for livestock production do not reflect true scarcities, creating distortions that provide no incentive for efficient resource use. "This leads to the overuse of the resources and to major inefficiencies in the production process," FAO says. "Future policies to protect the environment will therefore have to introduce adequate market pricing for the main inputs."

In particular, water is grossly under-priced in most countries, and development of water markets and various types of cost recovery will be needed to correct the situation. In the case of land, suggested instruments include grazing fees, and better institutional arrangements for controlled and equitable access. The removal of livestock production subsidies is also likely to

improve technical efficiency - in New Zealand, a drastic reduction in agricultural subsidies during the 1980s helped create one of the world's most efficient and environmentally friendly ruminant livestock industries.

Removal of price distortions at input and product level will enhance natural resource use, but may often not be sufficient. *Livestock's long shadow* says environmental externalities, both negative and positive, need to be explicitly factored into the policy framework. Livestock holders who provide environmental services need to be compensated, either by the immediate beneficiary (such as downstream users enjoying improved water quantity and quality) or by the general public. Services that could be rewarded include land management or land uses that restore biodiversity, and pasture management that provides for carbon sequestration. Compensation schemes also need to be developed between water and electricity providers and graziers who adopt grasslands management strategies that reduce sedimentation of water reservoirs.

Likewise, livestock holders who emit waste into waterways or release ammonia into the atmosphere should pay for the damage. Applying the "polluter pays" principle should not present insurmountable problems for offenders, given the burgeoning demand for livestock products.

**Consumer pressure.** Finally, FAO says, the livestock sector is usually driven by diverse policy objectives, and decision-makers find it difficult to address economic, social, health and environmental issues at the same time. The fact that so many people depend on livestock for their livelihoods limits the policy options available, and leads to difficult and politically sensitive trade-offs.

Information, communication and education will play critical roles in enhancing a "willingness to act". With their strong and growing influence, consumers are likely to be the main source of commercial and political pressure "to push the livestock sector into more sustainable forms", *Livestock's long shadow* says. Already, growing awareness of threats to the environment is translating into rising demand for environmental services: "This demand will broaden from immediate concerns - such as reducing the nuisance of flies and odours - to intermediate demands for clean air and water, then to the broader, longer-term environmental concerns, including climate change and biodiversity loss".