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KEY NOTE ADDRESS

Sustainability, the role of animal welfare and silvopastoral systems

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Abstract

In world agriculture, there will be increasing demand from consumers for the avoidance of adverse effects on human welfare, animal welfare and the environment. A system or procedure is sustainable if it is acceptable now and if its expected future effects are acceptable, in particular in relation to resource availability, consequences of functioning and morality of action. A production system might be unsustainable because of: inefficient usage of world food resources; adverse effects on human health and human welfare in general; poor welfare of animals; harmful environmental effects such as low biodiversity or insufficient conservation; unacceptable genetic modification; not being "fair trade" in that producers in poor countries are not properly rewarded; or damage to rural communities. Consumers might judge, because of any of these inadequacies, that the quality of the product is poor. Animal welfare has been developing rapidly as a scientific discipline. The welfare of an individual is its state as regards its attempts to cope with its environment. The welfare of cows in India is often very poor and policies should be changed to prevent this. Three-level plant production, including pasture and nitrogen-fixing shrubs and trees with edible leaves are an example of a silvopastoral system. The production of leaves and other material that can be eaten by the animals is much greater than can be achieved by pasture-only systems. Tree leaves are of great value during dry periods when pasture is not productive. Results in tropical and sub-tropical areas show that in semi-intensive three-level silvopastoral systems, production of cattle and other animals can be better, soil structure and water-holding capacity much improved, biodiversity and predators of disease-causing animals much increased and animal disease reduced. The increase in food, water, habitat choice, shade, and quality of social interactions, and the reduction in disease, result in substantial improvements in animal welfare. Industry, including organic producers, should be proactive and rapidly change policies relating to animal welfare and other aspects of sustainability.

1. Sustainability

Many members of the public are now concerned about whether or not a food production system is sustainable. A definition of sustainability is: a system or procedure is sustainable if it is acceptable now and if its expected future effects are acceptable, in particular in relation to resource availability, consequences of functioning and morality of action (Broom 2014). There has been a change from a push to a pull society in that, whereas producers used to determine methods of production, consumers now choose to buy products that they regard as ethical so they have much more control over methods of production. The ethics of food production is now included in consumers' evaluations of product quality (Broom 2010). If production methods are not acceptable, retail companies, production companies and countries that do not produce good quality, sustainable products are likely to be boycotted and hence forced to change (Bennett et al 2002, Broom 2014). If the consequences of genetic selection, feeding or housing result in the product being avoided by consumers, the production method is not efficient. The development of new, sustainable systems is urgently needed.

2. Factors that affect sustainability

World resources should be used efficiently. At present there is much waste of food.

Herbivores, such as ruminants and carp, that eat leaves or other food that humans cannot eat, are much more important than pigs, poultry or salmon which compete with humans for food or eat other animals (Broom et al 2013). Land and soil should be carefully conserved and improved.

Foods which are good for the health of the consumers are more acceptable to them.

In all aspects of farming, antimicrobial use will have to decrease because of the development of antimicrobial resistance.

Poor welfare of animals is probably the third most important reason for livestock production to be unsustainable. There are concerns about all animals but especially about sentient animals: all vertebrates, cephalopods and decapod crustaceans.

Many agricultural methods result in low biodiversity in farmed areas because of widespread herbicide and pesticide use. A combination of land-sparing, where areas are fully conserved, and land-sharing, where the biodiversity of the farmland itself is maximised, is needed. Livestock production can result in pollution locally and in greenhouse gas production which should be reduced but may have to be balanced against efficiency of use of world resources (Broom et al 2013).

Many people in the world are unwilling to accept the use of genetically modified plants and few people accept the use of genetically modified or cloned animals. All cloning of farm animals results in poor welfare while genetically modified animals may have welfare problems so there should be checks using a wide range of welfare indicators before they are used for any purpose (Broom 2008, 2014).

In recent years, consumers in many countries have been appalled to find that producers of food in poor countries are often not properly rewarded for their work and large profits go to distribution companies. Hence products like coffee, cocoa and fruit are among those that are independently checked and have a Fair Trade label.

When small-scale rural farmers are out-competed by large-scale production, local communities may disappear. The general public often find this unacceptable so schemes are introduced by governments to safeguard such communities. In the European Union, subsidies to preserve rural communities have minimised migration from the countryside and prevented large cities from becoming ever larger.

3. Animal welfare

The animals that are legally protected are generally those that are sentient (Broom 2014, 2016). The term welfare is used for individual animals of all kinds, including humans, but not for plants or inanimate objects. Welfare is the state of the individual as regards its attempts to cope with its environment (Broom 1986) so can be measured scientifically. For most species, consideration of needs is the first step in considering the welfare of an animal.

Topics that lead to changes in purchasing by consumers include close confinement of animals in conditions that do not meet their needs and painful procedures such as slaughter without stunning and hot-iron branding. Poor welfare may be a result of genetic selection procedures, for example fast-growing broiler chickens, dairy cows with high milk yields and dogs with compressed faces. Hence some widely-used animal housing systems management procedures and breeding methods are unsustainable (Broom 2017).

Organic standards are generally good in relation to sustainability but if welfare were not included in the standards, the system might not be sustainable. Some early organic standards prohibited chemicals for disease treatment so animal welfare was sometimes very poor. In India, cows are revered by many people. However, they are often not cared for so their welfare may be poor in that they may starve, eat plastic or have untreated disease. If old animals that have stopped producing milk can't be sold, owners have no money to replace the cows and can't produce milk at all. The answer would seem to me to be for older animals to be killed by people whose religion permits it. The money obtained from this would allow Hindu farmers to continue to produce milk. At present neglect means extreme cruelty to many cows. There is also illegal trade in which animals are sent out of the country, often in very bad conditions. I believe that neither of these practices is acceptable, either to Hindus or to other people in India.

4. Sustainable livestock systems for the future

An example of an animal whose management could be changed to be sustainable is the dairy cow. Dairy cattle can utilise pasture plants, a resource unavailable to humans as food. However, many are fed concentrates that humans could utilise and have poor welfare due to lameness, mastitis or reproductive disorders. Some high-producing cows are fed 40% concentrates with up to 96% of their dietary protein usable by humans. This system results in a net loss of nutrients for humans but if the cows were given a diet with 70% or more forage plants and 30% or less concentrates, the system would involve a net food benefit for humans. Cows selected for lower milk production, fed less concentrates and fed more forage plants have few welfare problems.

Three level plant production, including pasture, shrubs with edible leaves and trees that may also have edible leaves, is an example of a silvopastoral system. Semi-intensive silvopastoral cattle production systems are more productive than fertilised pasture systems, use less water, manage the soil taking account of worms and water retention, encourage predators of harmful animals, minimise greenhouse gas emissions improve job-satisfaction for stock-people, reduce injury and stress in animals and maximise good welfare (Murgueitio et al 2008, Broom et al 2013). Semi-intensive silvopastoral systems for beef production use one fifth of the land and between one quarter and one sixth of the conserved water that fertilised pasture or feedlot systems use.

Table 4. Summary of benefits of silvopastoral systems for animal welfare.
(Broom 2016)

Nutritional improvement because of shrub and tree intake
Thermal comfort resulting from more shade
Less risk of dehydration because more water in plants and soil
Less fear because of concealment
Health better because more predators of ticks and flies
Body condition better because of nutrients, shade and less disease
Food intake and social behaviour improved
Better human-animal interactions

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