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# SUSTAINABLE AGRICULTURE

A short report by Compassion in World Farming  
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## SUSTAINABLE AGRICULTURE

For global agriculture to be sustainable it needs to meet several criteria. It should:

1. provide a reasonable living for those working in agriculture and contribute to the viability of rural communities
2. reduce as far as possible its negative impact on the environment and particularly the climate
3. protect biodiversity in all its aspects
4. protect the welfare of farm and working animals
5. produce the kind of food which will contribute to healthy and affordable diets for both humans and farm animals.

### 1. Providing a reasonable living for those working in agriculture and contributing to the viability of rural communities

The trend in global agriculture has been to enlarge agricultural units in the interests of productivity and profitability. This has led to monocultures of cropland and large, industrial livestock farms. This trend is usually at the expense of small farmers, who cannot make such investments themselves and whose products cannot compete in the market place due to lower volume of output and inability to ensure regular supply (e.g. of pigs for slaughter). Indeed, a World Bank report has stressed that industrial livestock production presents “a significant danger that the poor are being crowded out”.<sup>1</sup>

Many small farmers have been forced to work off the land to sustain their families. Often they drift to the cities, where they increase the number of poor urban citizens, unable to afford proper housing and living in shack-type accommodation, with a likely lack of both sanitation and drinkable water supply.

Governments and international agencies should support sustainable agriculture by helping small farmers to maintain and improve their holdings, should invest in training programmes to upgrade farming skills and should encourage co-operatives for sharing the costs of equipment, such as harvesting equipment, and for marketing their produce. Farmer field schools are a good example to emulate.

When local farmers can make a decent living from their land, then rural communities will benefit from their economic viability and from the personal enthusiasm and energy which they can then share with others. Sustainable agriculture must aim to achieve vibrant rural communities.

### 2. Reducing as far as possible its negative impact on the environment and particularly the climate

Agriculture can have a significant impact on the environment, some of it beneficial, some of it damaging. Animal agriculture is responsible for 18% of global anthropogenic greenhouse gases (GHGs).<sup>2</sup> Tilling the soil in itself produces GHGs as does the use of nitrogen fertilizers – widely used throughout the world. Nitrogen fertilizers can cause eutrophication (nutrient enrichment of ecosystems), resulting, for example, in growths of algae and bacteria in water. However soils can act as a sink for carbon and for methane.<sup>3</sup>

There are a range of methods to reduce the environmental impact of agricultural land use, and which may have added benefits in promoting soil fertility, such as: conservation or zero-tillage; mixed rotations with cover crops and green manures to increase biomass in the soil; applying composts and manures to the soil; using agro-forestry, especially in marginal lands, to increase the standing biomass of carbon; cultivating perennial, rather than annual grasses as they have more biomass below the soil; and use of soil conservation techniques to prevent erosion.<sup>3</sup>

The use of inorganic nitrogen fertilizers (which are energy-intensive to produce and used widely in growing crops for human consumption and animal feed) should be reduced and replaced with targeted and slow-release fertilizers. Integrated pest management should be adopted rather than pesticides, as these are also energy-intensive to produce and should be restricted, as far as possible, to emergency use.<sup>3</sup>

With 60 billion farm animals used globally every year, and global meat production predicted to double by 2050,<sup>2</sup> there is an urgency to address the issue of production of animal protein. As Henning Steinfeld, chief author of the FAO's *Livestock's Long Shadow* report says, “Livestock are one of the most significant contributors to today's most serious environmental problems. Urgent action is required to remedy the situation”.<sup>2</sup>

The current rates of livestock production are already responsible for 9 per cent of total human-induced CO<sub>2</sub> emissions, 37% of human-induced methane emissions and 65% of total human-induced nitrous oxide emissions - both the latter gases having a much higher global warming potential (GWP) than carbon dioxide (methane 23 times the GWP of CO<sub>2</sub> and nitrous oxide 296 times).<sup>4</sup> Animals excrete nitrogen in urine and faeces, contributing to water pollution. The resulting manure, which is not absorbed by plants, produces large amounts of nitrous oxide and ammonia. In fact livestock production produces 64 per cent of total human-induced ammonia emissions. Ammonia, although not a

greenhouse gas, is highly damaging as it contributes to the production of acid rain.<sup>4</sup>

Another serious environmental problem is over-grazing. Already 73 per cent of the world's dry rangelands are degraded and pastures are under threat.<sup>4</sup>

If numbers of livestock increase as predicted, their environmental impact will be severe indeed. Sustainable agriculture must therefore reduce large concentrations of livestock, where the potential for environmental damage is heightened, as well as reducing overall numbers of animals. Ideally farms should grow their own animal feed and absorb their own animal wastes. If farms are not large enough or well placed to do so, then co-operative grouping of farms may be the best solution.<sup>3</sup>

Methane digesters and biomass cook-stoves are useful ways in which to harness animal and other waste materials, but they cannot possibly provide a solution to the total impact of livestock farming.<sup>3</sup>

### 3. Protecting biodiversity in all its aspects

Already industrial farming, with its tendency towards mono-cropping and industrial animal factory farms, has devastated local biodiversity, causing reduction or loss of wild species of plants, birds, animals and insect life. Trees and bushes have been cut down, the very places where many creatures live and eat.

In addition the genetic diversity of both farm animals and crops has been reduced, with efforts being concentrated on those varieties or genotypes reckoned to be most productive. Nearly all broiler (meat) chicken breeding globally is now based on stock produced by just three companies.<sup>5</sup> Dairy farming is hugely biased towards the use of Holstein cows, although their stamina, climatic adaptability and longevity are problematic. Around a third of livestock species are deemed under threat<sup>6</sup> and some fear that valuable genetic inheritance of beneficial traits may be lost.<sup>7</sup>

On-farm solutions to maintaining and promoting biodiversity include minimising or abandoning use of toxic pesticides, maintaining or planting hedgerows and wide borders around crop-land, and planting trees, which can also be used to provide shelter for free range pigs, cattle and chickens, promote better air quality and are vital to bird life.

Agricultural wetlands should also be preserved and farmers compensated for maintaining them. They provide a haven and often a breeding ground for certain species.

There is evidence that organic farming can have a beneficial effect in maintaining and promoting biodiversity.<sup>8</sup> At the other end of the spectrum, the IAASTD Report (2008) says that the use of GM crops is "contentious" and that "data based on some years and some GM crops indicate highly variable 10-33% yield gains in some places and yield declines in others."<sup>9</sup>

Farmers should be encouraged to rear traditional or local breeds of animals, who are often hardier and well suited to local conditions. In the transition phase (towards sustainable farming), farmers should be assisted in finding premium markets for products from such animals.



Cattle in a biodiverse environment

Photo: © Compassion in World Farming / Martin Usborne

#### 4. Protecting the welfare of farm and working animals

In industrial farms large numbers of animals are kept in conditions which adversely impact their welfare and their health. They may live long enough to yield a profit, like the broiler chicken, who will be slaughtered at around six weeks of age, or the dairy cow, usually culled by the time she is five or six years old, but their fundamental health and longevity are no longer sustainable. If not slaughtered, the broilers would have difficulty in living even to their puberty at around 18 weeks, as many would have died as a result of lameness or heart failure.<sup>10</sup> After two or three years of intensive milk production, many cows are culled for failure to get pregnant or due to frequent bouts of mastitis or lameness.<sup>11</sup>

In industrial conditions the fact that each animal is a sentient being, capable of emotional and physical feelings, is largely ignored. The animals are often unable to carry out normal behaviours, such as rooting in the soil for pigs, ground-scratching and nesting for hens. Sometimes the physical space is so limited that even basic behaviours such as walking and turning round are prevented, as in narrow crates for veal calves or pregnant sows. In addition the animals endure a series of damaging psychological events, such as the separation of cow and calf at a day old (in the dairy industry), isolation from their peers, as in the keeping of sows in sow stalls (gestation crates) and over-crowding, as with hens kept in battery cages and broilers or pigs being fattened for slaughter in crowded sheds.

Working animals, whilst often incredibly important to farmers, are frequently worked too hard, are fitted with ill-fitting harness or badly balanced carts. They often suffer from hunger or thirst and may not be fed or watered throughout the working day. Parasitic diseases and sores are common and many farmers can ill afford to seek veterinary treatment for them.

Sustainable agriculture must be sustainable for the animals too. For farm animals this means keeping them in conditions which promote their health and welfare. Ideally they should have an outdoor range for grazing or foraging and for exercise, fresh air and play and carrying out grooming behaviours. Where outdoor access is absolutely impossible due to the size of holding or severe climatic conditions, they should at least have an exercise yard. Indoor housing must be kept clean, but also requires provision of material such as straw, wood shavings or rice husks as bedding material to encourage foraging and play behaviours and to provide a comfortable place to rest and sleep. Large groups should be avoided, as should isolation, except in cases of illness.

Schemes to allow farmers on low incomes to access veterinary care for livestock and working animals should be a priority for governments. Schemes should also help with provision and maintenance of equipment. In certain areas a shared tractor may have less adverse impact on the environment than a couple of working bullocks.

#### 5. Producing the kind of food which will contribute to healthy and affordable diets for both humans and farm animals

Animals kept in industrial type farms eat mostly cereal and soya-based rations. In fact around a third of the world's cereal harvest and over 90 per cent of soya is used for animal feed.<sup>12</sup> This land could be used to grow crops for human food. In addition, feeding cereals to animals is an inefficient way to feed people. The 2008 IAASTD Report says that it takes for example 4.5 plant-derived calories to produce one calorie of egg or milk and nine plant-derived calories to produce one calorie of beef or lamb meat.<sup>9</sup>

Not only is this use of what could be a vital food source for humans a waste in many ways, it is often a profoundly unnatural diet for the animals. With a further use of cereals for biofuel production (being encouraged by governments afraid of the forecast falling-off of oil supplies), there is a looming global crisis as the price of cereals is becoming unsustainable for the poor. The result is a situation in which the hungry cannot afford to eat, the animals suffer health problems from eating foods which are not natural to their species and the wealthy drive their cars on clear-conscience fuels! This is clearly an unsustainable way in which to organize our world.

Farmers should be encouraged to allow their ruminants to graze where grass is available and crop residues such as chopped straw and stalks can also be fed, to reduce reliance on often imported cereal and soy feeds. Ideally animal feeds should be grown on the farm or at least locally.

However the bigger lesson to be learned is that current levels of global livestock production are unsustainable. The IAASTD Report says that "the rapid growth in demand for meat and milk is projected to increase competition for land with crop production and to put pressure on the price for maize and other grains and meals."<sup>13</sup> Reducing livestock numbers would free up food crops to provide food for the swelling human population.

Livestock production is also water-intensive, especially the indoor, intensive systems. Already 8 per cent of global human water use goes towards animal production: 7 per cent on feedcrops and the remainder for hydrating the animals themselves and at slaughter and food processing plants.<sup>14</sup>

Wise diets depend partly on wise land and water use.

The world is undergoing an obesity crisis, as the 'western' diet, with its high proportion of meats and dairy products, spreads globally. Related conditions such as Type-2 diabetes, certain heart conditions and cancers are also on the increase,<sup>15</sup> causing much human suffering and a massive strain on medical and health resources.

The perfect diet may not have been invented, but there is sufficient research to show that a plant-based diet high in fruits and vegetables, with minimal red meats is best.<sup>16</sup> Wealthier, health-conscious western consumers are already adopting such diets, but rapidly developing nations are undergoing the same damaging nutrition transition that the west underwent in the twentieth century, and meat consumption is rapidly increasing. Public health researchers are now promoting contraction and convergence policies, where those on western diets cut back their consumption of meat and dairy, whilst allowing people in the poorer developing areas, e.g. in sub-Saharan Africa, to increase their consumption, with both converging at a level which is sustainable for human health and for the planet's resources and the environment.<sup>17</sup>

Meat and dairy are expensive commodities to produce and can have adverse impacts on global food and water resources, can damage the environment, including the climate, and can end up contributing to high rates of certain non-communicable diseases in humans. In addition, large concentrations of animal numbers in intensive farms provide ideal conditions for transmission and mutation of zoonoses (diseases transmitted from animals to humans) and viruses.<sup>18</sup>

In the future, cereals and soya should be grown primarily for human consumption, with animal farming being undertaken in smaller farming units where farmers can take care of and pride in their livestock and where environmental and human health can be protected and promoted.

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**Ambassador for Compassion in World Farming**

## COMPASSION IN WORLD FARMING MATERIALS

**Global Warning: The impact of meat production and consumption on climate change (2008).** Major presentation by Dr R.K Pachauri, Chair of the Intergovernmental Panel on Climate Change, at Compassion in World Farming's 2008 Peter Roberts Memorial Lecture. Presentation (in English and Chinese) and film (English) available at [ciwf.org/lecture08](http://ciwf.org/lecture08)

**The Impact of Livestock Farming: Solutions for animals, people and the planet (2008).** Brochure examining the threats to animals, people and the planet from intensive animal agriculture and offering positive alternatives. Available at [ciwf.org/globalwarning](http://ciwf.org/globalwarning)

**Global Warning: Climate change and farm animal welfare (2007).** Referenced report on the impact of industrial-scale animal agriculture on animal welfare, climate change and the wider environment, on water and on human health. Referenced executive summary in English and Chinese. Available at [ciwf.org/globalwarning](http://ciwf.org/globalwarning)

### **Animal Welfare Aspects of Good Agricultural Practice**

Vital educational resource for agriculture, veterinary and animal science courses: *Animal Welfare Aspects of Good Agricultural Practice: Pig Production* (2006). Book, video and presentation available free of charge. Also available in Chinese. Film with Mandarin commentary. *Animal Welfare Aspects of Good Agricultural Practice: Broiler Chickens*: in preparation. See [ciwf.org/gap](http://ciwf.org/gap)

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