It is not yet widely recognized that the livestock industry has become a major threat to the world's economy, the environment, consumer health, and the food security of nations and generations to come. Farm animals do have a place in ecologically sound agriculture, but, as will be shown, they have not been properly integrated either in the United States or in other developed and less-developed nations of the world.

Basic Issues and Solutions

The world's 4 billion livestock (and some 10 billion poultry and rabbits) are raised under either pastoral, rangeland conditions, or more intensive husbandry conditions in less arid regions (see Figure 1). There is a clear correlation between pastoral and nomadic livestock production and the spread of deserts worldwide (see Figure 2). Areas of desertification in various countries are caused in part by ecologically unsound livestock husbandry practices. Improper livestock practices and destruction of vegetation combine to cause environmental degradation. Overstocking results in overgrazing, soil erosion, and poor herd nutrition and productivity. These problems are often compounded by diseases and inadequate veterinary preventive medicine. According to the United Nations Environment Programme, the role of the veterinary profession in contributing to environmental degradation through expansion of nonsustainable livestock practices is very significant (see Figure 3). Deserts continue to spread as a consequence. Overgrazing has now degraded 73 percent of the world's rangeland.

Table I: Numbers (Millions) of Livestock in the World in 1985

Livestock	Number	Livestock	Number
Cattle	1,269	Asses	41
Sheep	1,122	Camels	17
Pigs	791	Mules	15
Goats	460	Chickens	8,287
Buffaloes	129	Turkeys	216
Horses	65	Ducks	169

Source: FAO (1986).

The FAO estimates 1 million tons of rabbit meat were produced in the 1980's. Which would require an estimated 1 billion animals per annum.

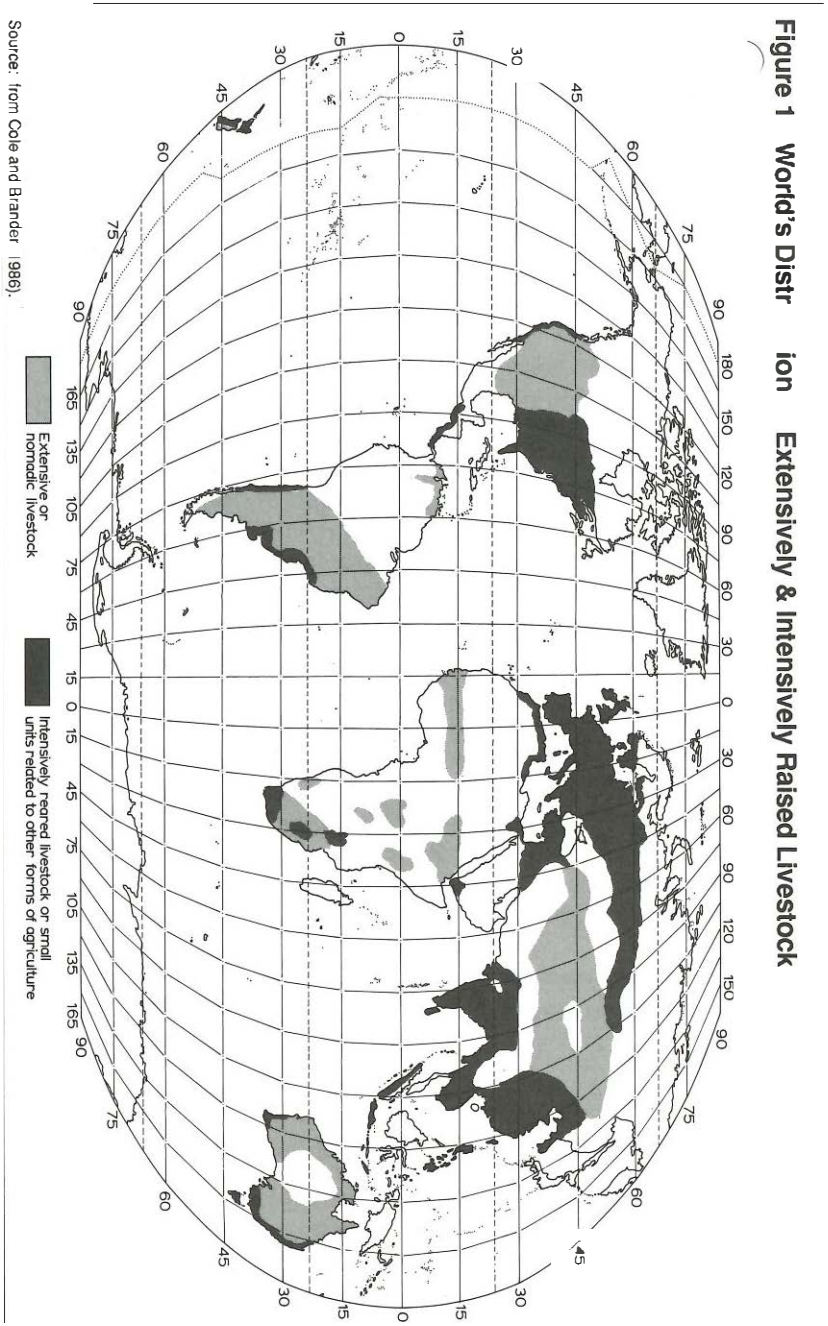
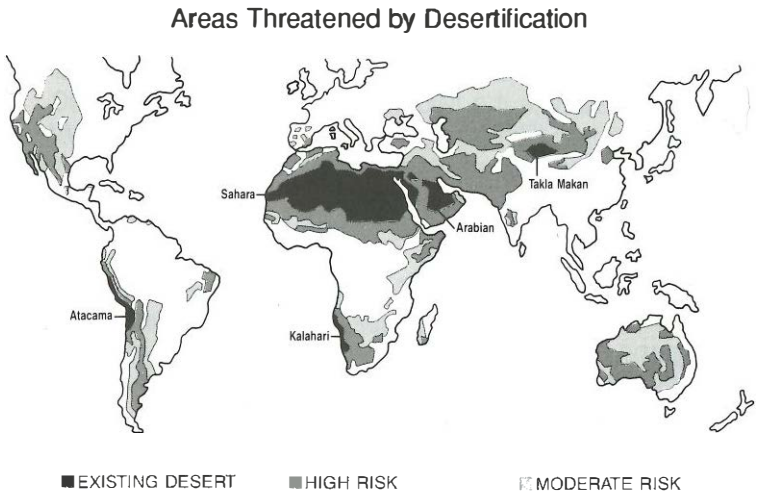


Figure 1 World's Distr ion Extensively & Intensively Raised Livestock

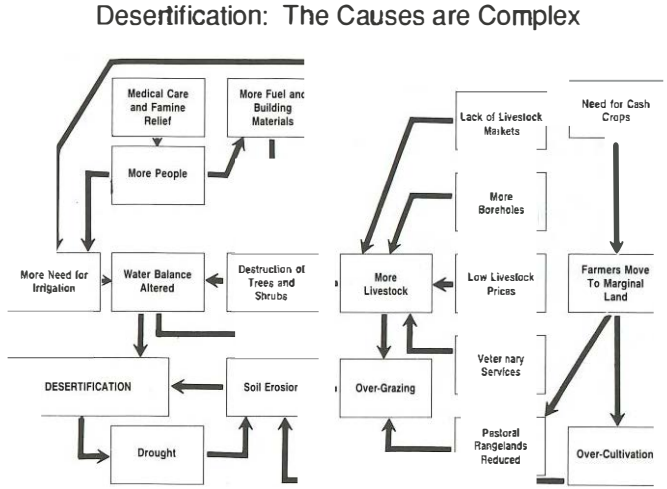
Source: from Cole and Brander (1986).

Figure 2: United Nations Environment Programme



Source: 1987 UNEP Environment Brief No. 2

Figure 3: Factors (Including Veterinary Services) Leading to Desertification



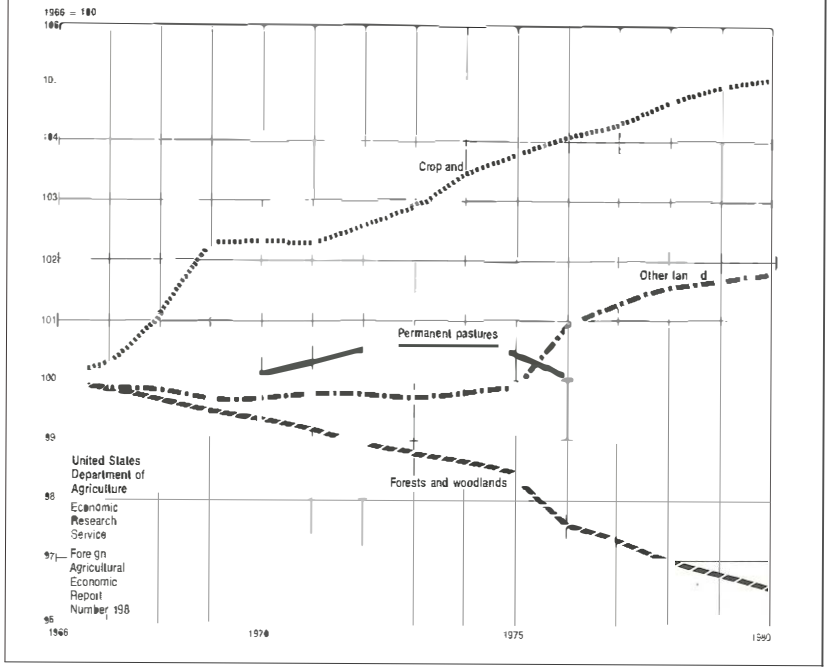
Source: 1987 UNEP Environment Brief No. 2

Nonsustainable agricultural practices have led to the demise of past civilizations. The U.S. Department of Agriculture, Soil Conservation Service report "Conquest of the Land Through 7,000 Years" has documented how deforestation and poor livestock husbandry practices have led to the demise of civilizations and empires, especially in the Middle East, over the past 7,000 years. Cattle once thrived some 3,000 years B.C. in the Algerian Central Sahara, which is now a desert. Rock paintings from Tassili-N-Ajjer, Algerian Central Sahara, 2,900 B.C., show how abundant cattle once were in this region.

Nonsustainable agricultural practices and poor range management continue to create deserts today. Poverty and famine in many regions of the world are linked with destructive livestock and other agricultural practices. The increasing human population, now at 5.4 billion, necessitates a radical shift toward a more sustainable use of natural resources, as well as rigorous constraints on population growth. Increasing human population growth has resulted in deforestation in many parts of the world for fuel and to clear more land for crop as well as livestock production (see Figure 4). Deforestation is a major contributing factor to the greenhouse effect of global warming, since trees absorb carbon dioxide, one of the greenhouse gases that traps heat in the lower atmosphere. This problem is compounded by the widespread practice of burning rangeland to stimulate new growth for livestock and to control brush. Regular burning may actually lead to a loss of soil nitrogen. Deforestation, especially in the Amazon, is a significant contributing factor to global warming, as hundreds of thousands of acres of tropical forests are burned or felled to clear land primarily for livestock production by government-subsidized cattle ranchers.

Regions where livestock are raised intensively, especially in Europe, have been linked with the destruction of forests through acid rain derived from ammonium sulfate and other gases from animal wastes. Livestock wastes also result in significant quantities of methane production, which is now recognized as a major greenhouse gas, the accumulation of which contributes to global warming.

Figure 4: World Land Use Changes, 1966-80



Overstocking and overgrazing by livestock not only contribute to environmental degradation but also result in the so-called albedo effect. This phenomenon entails the reflection of sunlight from the land back into the atmosphere, which inhibits cloud formation and thus contributes to increased arid conditions.

Since its beginnings some 8,000 years ago, livestock farming has waged war against predators, which has led to the further degradation of natural ecosystems and the loss of biodiversity. Modern indiscriminate methods of predator control, including traps and poison baits, have resulted in serious ecological imbalances and the eruption of pest problems, especially of small rodents, which compete with livestock for forage in the absence of predators that normally keep their numbers in check. As a consequence of the livestock industries' war against predators, costing billions of dollars over the years in the United States at taxpayers' expense, many predator species are now endangered, like the wolf in North America, Europe, and Asia. In 1988, the

Animal Damage Control program (ADC), run by the U.S. Department of Agriculture, intentionally killed 4.6 million birds, 9,000 beavers, 76,000 coyotes, 5,000 raccoons, 300 black bears and 200 mountain lions. (The various poisons that the ADC uses are a major reason why the California condor is close to extinction.)

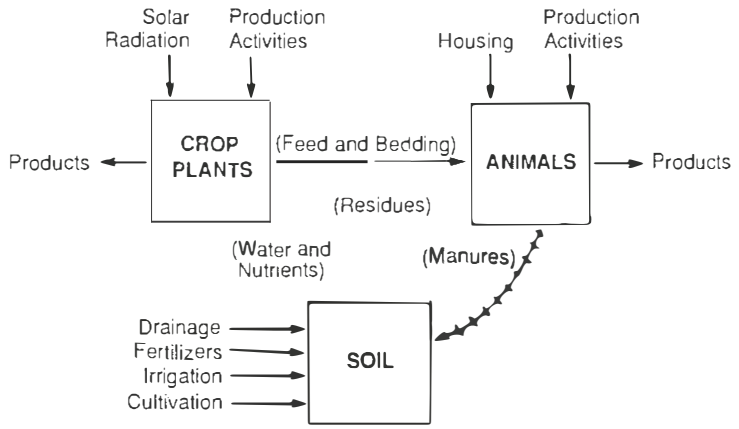
With skilled rangeland management, however, natural biodiversity can be preserved, if not enhanced. But in many regions of the world, poor rangeland management, price supports, and ill-conceived aid and development programs have resulted in a drastic loss of biodiversity reflected in the decline of wild herbivorous animals that compete with livestock and sometimes harbor and transmit disease to livestock. Once vast herds of buffalo, or bison, roamed the open ranges and prairie plains of the United States. Uncontrolled hunting and poor rangeland management have resulted in the virtual extermination of not only the buffalo but also of bighorn sheep, elk, and pronghorn. Such loss of biodiversity is a cardinal sign of environmental degradation and means an overall loss of rangeland productivity.

More intensive livestock husbandry practices entail the use of confinement buildings that were considered pathogenic and not conducive to livestock health, and feedlot operations. These intensive systems of cattle production are responsible for many health and welfare problems. According to the U.S. National Research Council report "Alternative Agriculture," the total death and disease losses in U.S. livestock are estimated at **$4.6 billion** annually, losses in cows from mastitis are around **$2 billion** annually, losses from pneumonia in hogs and cattle are some **$800 million,** and losses from crippling lamenesses in confinement-raised hogs were estimated at more than **$24 million** for 1988–1989. According to the 1992 USDA National Swine Survey, 15% of live-born pigs die before weaning.

Intensive livestock production is not adequately integrated with other agricultural practices. The nutrient loop (of recycling animal manure) that once connected crops and livestock has been broken (see Figure 5), resulting in high fertilizer bills, high waste-disposal costs, and widespread pollution of surface and ground waters. Farm animal wastes contain potentially harmful quantities of nitrogen, phosphorus, bacteria, and feed additive residues, including a variety of drugs and chemicals, like arsenic, selenium, copper, and zinc.

Another related problem associated with livestock production is the need for water, cattle (cows in particular) having a very high water requirement averaging more than 9,000 liters per year per animal. Some 300–400 gallons of water are used in the United States to produce one pound of beef (see Table II).

Figure 5



Source: from Beauchamp (1990).

Relationships between soil, animals and crop plants and inputs and outputs of an ideal agroecosystem. In intensive animal production systems, the manure nutrient cycle has been broken.

Table II: Estimated Total Water Requirements for Animals

	Average water use (liters/yr)	Animals in world (1,000)	Total water use (million m^3/yr)
Horses	5,475	63,871	350
Mules	5,475	15,279	84
Asses	5,475	39,866	218
Cows	9,125	221,546	2,022
Cattle	9,125	1,272,541	11,612
Buffalo	9,125	126,102	1,151
Camels	9,125	17,207	157
Pigs	1,460	786,668	1,149
Sheep	730	1,139,520	832
Goats	915	459,575	421
			17,994

Source: U.N. (1986).

A reduction in the production and consumption of meat is clearly necessary, not only for economic and environmental reasons, but also for reasons of public health. There is increasing medical evidence of the contribution of high animal protein and fat consumption to a variety of human diseases, such as various forms of cancer, osteoporosis, arteriosclerosis, heart attack, kidney disease, gallbladder disease, obesity and diabetes. Human illness costs are estimated at more than $4 billion annually when millions of people develop bacterial food poisoning from contaminated meat and other animal produce. The widespread practice of feeding animal wastes and renderings back to farm animals is a major source of such bacterial contamination and can cause serious animal health problems also.

Demographic studies reveal a very clear correlation between the per capita meat consumption and the incidence of bowel cancer and heart disease. In the more developed nations where per capita meat consumption is higher than in poorer countries, there is a greater incidence of colon cancer and death from heart attacks and arteriosclerosis. Likewise, a correlation has been found demographically between daily per capita intake of animal fat and death from breast cancer. It is a tragic irony that many human health problems that arise as a result of excessive animal fat and protein consumption and that could be prevented by a change in dietary habits are modeled in animal experiments aimed at curing these diseases of conspicuous consumption among the affluent.

It is now becoming more widely recognized that planet Earth is endangered, and evidence is mounting that, without a change in agricultural practices, energy sources and uses, control of human population, and reduction of the livestock population, the quality of life on this planet will continue to decline. The world's meat industry needs to be drastically reformed to embrace the principles of humane stewardship, which includes the land ethic of an ecologically sound, sustainable, and socially just agriculture.

We must look closely at the real costs of livestock production. Producing beef under feedlot husbandry is the most inefficient way of producing animal protein. Rangeland lamb and beef production are much more efficient, provided the rangeland is not irreparably degraded. Another way of looking at this is at the

number of pounds of protein derived per acre. Soybeans produce 360 pounds of protein per acre, while beef produces less than 40 pounds per acre of good land. In other words, one hectare of land will supply one person with beef for only 190 days, increasing to 5,495 days if soybeans are raised on that same land.

The estimated inputs of grain, energy, and water to produce one pound of meat, eggs, and milk reveal a clear trend of decreasing efficiency with confinement-hog and beef-feedlot operations in the United States showing the greatest inefficiencies, principally because of the high costs of grain and soybean production (see Table III). Yet in the United States, public taxes underwrite some 50 percent of these costs via subsidies to the animal feed industry, a cost not fairly reflected in the price of meat in the grocery store. Ironically, contract-meat producers tend to overproduce, which lowers their revenues while the grocery store prices remain the same.

Table III: Inputs Used to Produce One Kilogram of Meat, Eggs or Cheese, United States, 1991

Product	Grain[1] (kilograms)	Energy (thousand kilocalories)
Pork	6.9	30
Beef	4.8	17
Chicken	2.8	13
Cheese	3.0	10
Eggs	2.6	10

[1]Includes soybean meal.

Source: Durning and Brough (1991).

It should not be forgotten that, in order to maintain meat as a staple in the diet, richer nations rely upon imports of animal feeds from other countries, which too often results in the loss of productive land to feed the people of these countries. This affirms Mahatma Gandhi's contention that "the cattle of the rich steal the bread of the poor."

In the United States, 70 percent of the annual grain crop is fed to livestock and poultry (see Table IV). Worldwide, farm animals

consume an estimated 38 percent of the total grain harvest according to World Watch Institute analysts. The production of soya meal in the United States and Brazil for export as livestock and poultry feed is illustrative of how fertile land is being wasted to raise feed for animals rather than food for people (see Table V). In 1990, the governments of industrialized countries spent $120 billion to subsidize farm animal production, including the feed that livestock consume.

Table IV: Grain Consumed by Livestock, 1990

Country/Region	Share of Grain Consumed (percent)
United States	70
Eastern Europe	64
EC	57
Soviet Union	56
Brazil	55
Japan	48
Middle East	33
China	20
Southeast Asia	12
Sub Saharan Africa	2
India	2

Source: U.S. Department of Agriculture. Foreign Agricultural Service, "World Cereals Used for Feed," (unpublished printout), Washington, D.C., April 1991.

Table V: Major Exporters of Basic Agricultural Commodities Traded Worldwide

Wheat	Feed grains	Soybeans and soybean products	Beef	Pork
United States	United States	United States	European Community	European Community
Canada	Argentina	Brazil	Australia	Eastern Europe
Australia	Canada	Argentina	Argentina	
France	South Africa	European Community	New Zealand	
Argentina	Thailand		Brazil	
	Australia		Canada	
	France			

Source: U.S. Department of Agriculture, *Agricultural Yearbook 1985.*

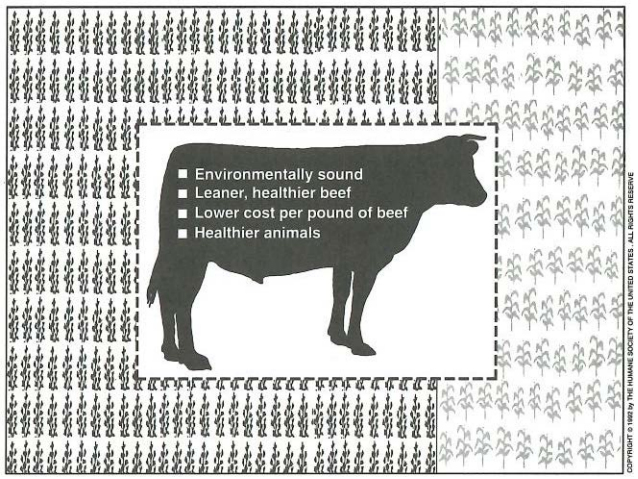
Intensive monocultures of wheat, corn, and soybean raised to feed farm animals require costly and harmful inputs of synthetic fertilizers, herbicides, and pesticides, which have increased dramatically in recent years. Tilling the soil and adding these chemicals to raise these same crops year after year not only sterilizes the soil and reduces its organic nutrient content, but it also releases more nitrous oxide, a greenhouse gas, into the atmosphere. Bacteria in the soil that help take methane out of the atmosphere also are destroyed. Uncultivated grassland acts as a methane sink or "sponge," thus playing a vital role in reducing global warming and in taking up methane from forage-consuming livestock. The ecologically and economically unsound use of arable land to raise feed for farm animals and not food for people first must become a thing of the past if we are to develop a sustainable and socially just food production system. Governments should consider imposing an energy tax on agricultural petrochemical fertilizers and pesticides. This would raise the cost of feedgrain and encourage farmers to use more forages for their livestock (see Figure 6). It would also help reduce the overuse of such potentially harmful chemicals.

Government subsidies for farmers adopting alternative, low-input, and certified organic practices of crop, livestock, and poultry production would also do much to help rectify the chronic problems of overproduction and help keep more farmers on the land. In addition, marginal and environmentally fragile land should be taken out of production, natural ecosystems (especially swamplands and natural deserts) protected from further agricultural encroachment, and their restoration encouraged.

With mounting evidence that most contemporary agricultural practices are nonsustainable in the long-term, the urgency to develop alternative, ecologically sound agriculture is considerable. One definition of humane sustainable agriculture is as follows:

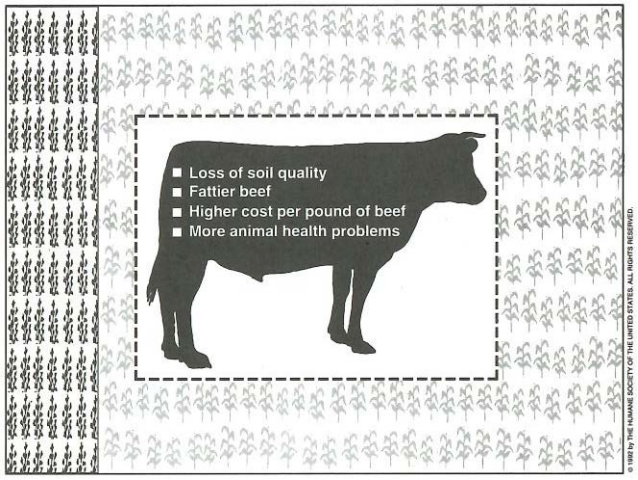
> *Humane sustainable agriculture (HSA) produces adequate amounts of safe, wholesome food in a manner that is ecologically sound, economically viable, equitable, and humane. HSA meets farm animals' basic physical and behavioral requirements for health and well-being through a food and agricultural system that respects all of nature — humans, soil, water, plants, and animals, wild as well as domestic (see Addendum I describing the seven principles of HSA).*

Figure 6a: Benefits of High-Forage Diet



70% alfalfa diet 30% corn diet

Figure 6b: Consequences of High-Grain Diet



10% alfalfa diet 90% corn diet

While social justice is one cardinal aspect of a humane sustainable agriculture, there are additional important considerations. A sustainable agriculture minimizes the agricultural pollution of the environment. It reduces soil erosion and compaction. It conserves energy. It avoids dependence on expensive, uncertain, and costly sources of petrochemically based and potentially harmful fertilizers and pesticides. It helps preserve the family farm and other more sustainable, agricultural, and pastoral farming practices. It increases net farm income by lowering production costs. And it helps ensure both food quality and safety and the health and well-being of the soil, crops, and farm animals.

There are several other characteristics of sustainable agriculture. It is biodynamic. Soil quality is regenerated and not depleted. It is ecologically sound with rotations of locally adapted crops and fallowing to control pests. There is no net loss of biodiversity. It is also humane, with small farm animal populations in seminatural husbandry conditions or under natural rangeland conditions with good stockmanship.

Intensive livestock farming practices are energy intensive rather than labor intensive. This results in local unemployment and decline of rural communities. These practices also are capital intensive and rely upon economies of scale and size. This results in the elimination of small farms and alternative agricultural systems. With large herds and flocks, there is increased incidence of animal disease and problems associated with pollution and manure disposal. Overcrowding and other husbandry practices result in animal deprivation, distress, stress, disease, and suffering. The increased dependence on drugs results in consumer and animal health hazards.

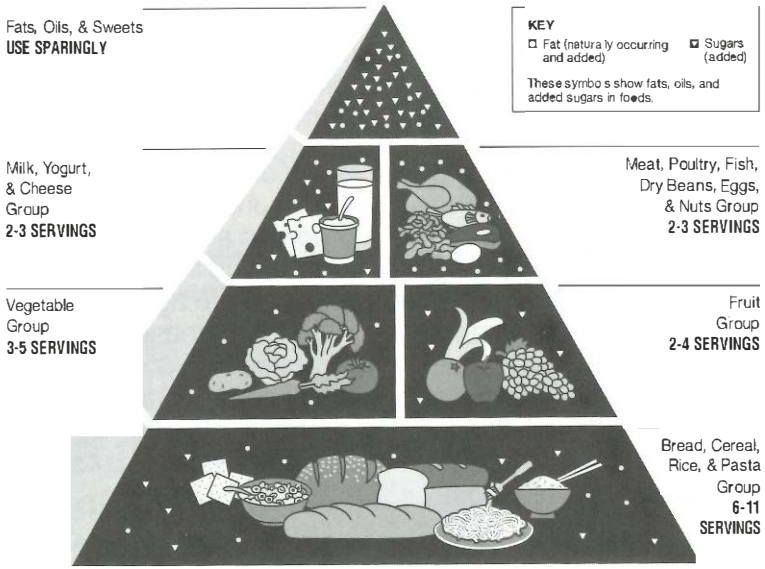
A humane sustainable animal agriculture recognizes that refinement, reduction, and replacement are important animal husbandry principles. Refinement of husbandry practices is needed to reduce stress and disease.

A reduction in the numbers of farm animals being raised for human consumption is essential for humane, economic, and environmental reasons. Their replacement with high-quality cereals, legumes and other vegetables, fruits, and nuts is a wise economic and public health decision. The U.S. Department of Agriculture's "Food Guide Pyramid" clearly recognizes the im-

portance of reduced animal fat and protein consumption for most American consumers (see Figure 7).

Humane sustainable animal agriculture recognizes ensuring the basic rights of animals as a human responsibility. These include right breeding to increase disease resistance, right rearing and socialization, right nutrition, and right environment to optimize overall animal health, well-being, and productivity. Animal health and well-being are too often sacrificed in order to maximize productivity.

Figure 7: Food Guide Pyramid — *A Guide to Daily Food Choices*



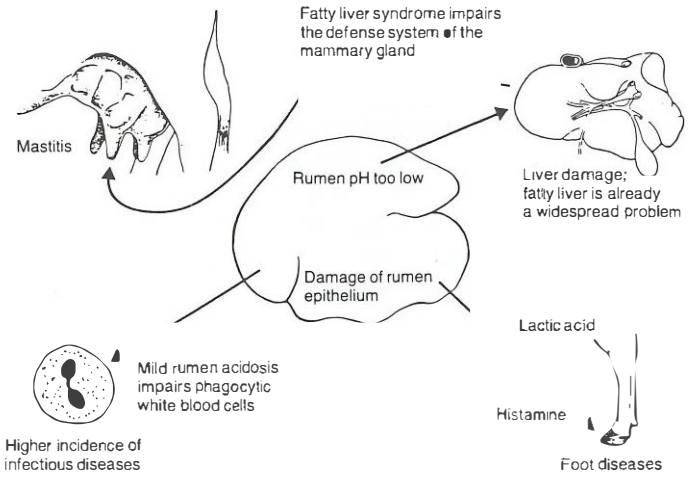
Source: USDA

The U.S. Department of Agriculture's "Food Guide Pyramid" clearly recommends a reduction in the consumption, and therefore in the production, of foods of animal origin.

The widespread myth that productivity and farmers' profits correlate with farm animal health must be dispelled. We must accept the reality that disease incidence increases once animals' productivity is pushed too far. Effects of concentrate overfeeding of dairy cows and beef cattle contribute significantly to a variety of health problems, including fatty liver disease, mastitis, crippling foot diseases, and overall weakening of the immune system, with a resulting higher incidence of infectious diseases (see Figure 8). Hogs and poultry also suffer from a variety of other so-called production-related diseases, in part due to concentrate overfeeding — a gross waste of food indeed.

Advances in genetic engineering biotechnology to make livestock more productive and disease resistant should be based upon the principles of humane sustainable agriculture; otherwise, today's problems of nonsustainable livestock husbandry practices will simply be intensified.

Figure 8: Effects of Chronic Concentrate Overfeeding in Dairy Cows and Fattening Beef Animals



Source: Boehncke (1985).

The use of good arable land to feed farm animals and not people first must become a thing of the past. The gentle cow has harmed no one; but by exploiting her to the degree that we do today, we harm her kind and all of creation, including ourselves.

Farm animals can have a significant role to play in sustainable agriculture. Grazing different species together, like cattle and sheep, are traditional, natural farming practices that help preserve the countryside. Because of high levels of nutrient cycling, pasture and forage-grazing systems are among the most efficient of farming practices in maintaining soil fertility.

The greatest challenge today facing agriculturists, the veterinary profession, policymakers, and others involved in the livestock industry is to articulate and practice the principles of humane planetary stewardship. Such humane planetary stewardship is not only a moral or ethical choice, it has become a survival imperative essential to the future and integrity of Earth's creation.

We do not inherit the land, we borrow it from our children, and it is ours only in sacred trust. We are being called upon to develop an Earth- or Creation-centered world view that no longer makes life a commodity, commoditizes life and parasitizes the planet, but seeks to live in harmony with and reverence for all life. This new world view impels us to develop appropriate technologies and agricultural industries that are life-sustaining and enhancing, like organic and biodynamic farming practices. While increasing numbers of people regard meat consumption as unethical, a reduction in meat production and consumption, especially by more affluent nations, is an essential step toward restoration of the planet and the adoption of humane sustainable agricultural practices. Already, for reasons of health and economy, people are shifting toward a more vegetarian diet and endorse the new environmental dictum "Eat With Conscience." With 5.4 billion people on the planet and 4 billion livestock, such changes in dietary habits and agricultural practices are crucial for the future well-being of all our relations.

International Dimensions of Humane, Sustainable Agriculture

Native, peasant farmers of the third world should not be encouraged to emulate the industrial nations' addiction to meat, and their low-input sustainable agricultural practices should be respected and not obliterated by colonial agribusiness "aid and development" enterprises.

Through careful study of their often highly efficient, traditional agricultural practices and the various environments or bioregions they inhabit, peasant farmers can be assisted to help restore the land where needed, such as by reforestation, and feed themselves and their livestock more sustainably. Small-scale livestock-improvement programs, like those of Heifer Project International in Tanzania, East Africa, have combined soil conservation and regeneration with other sustainable agricultural practices, where the production of crops and forages is closely integrated, ecologically and economically, with humane, small-scale dairy cow milk production. Such programs have benefited countless families and village communities, where women, in a polygamous society, are the main work force.

A handful of small, nonprofit organizations are making a difference by linking other appropriate aid and development projects, like bio-gas production and improved garden-field soil-enrichment by nutrient animal-waste irrigation. Other examples are improved animal breeding and husbandry practices, and developments like a crop-integrated small-scale dairy goat enterprises, and improved cart and plough design and utilization.

But these organizations face the ideological and economic opposition of such larger organizations as the World Bank, IMF, AID, and FAO, who, for example, have helped underwrite a variety of nonsustainable colonial-style agricultural projects, especially monocrop plantations and livestock development projects that benefit the rich and further disenfranchise the poor.

These organizations have done little to improve standards of humane slaughter, basic hygiene and safety in third world slaughterhouses, the care and handling of livestock in transit to slaughter in their programs designed to increase meat consumption

amongst the indigenous urban affluent and beef production as an export commodity. They have done little to protect indigenous cultures or endangered wildlife species, like the African wild dog (which the Botswana government permits hunters to shoot without any limit). Irreplaceable wildlands have been given little protection from total obliteration by these agencies aiding and abetting the expansion of the global cattle industry.

Such agencies have done little to date to prevent further loss of biodiversity and land degradation in subsidizing the nonsustainable and nontraditional raising of cattle primarily for meat. Pastoralists suffer further when their traditional grazing lands are taken away by private ranchers and government or privately-owned plantations. In Central and South America, forests are still being cleared for timber, cattle, and other cash-crop exports, which destroy the forest economy and culture of indigenous peoples. This ultimately harms the entire world, for all things are connected, and when we harm any part, we harm the whole.

One of the most destructive of all long-term aid and development programs, funded in part by the World Bank and the EEC, is in Botswana. It has led to the extinction of zebra in the south of the country, and to the demise of hundreds of thousands of buffalo, wildebeest, and other wildlife by encouraging an export beef industry.

Thousands of kilometers of veterinary fences have been put up to control the spread of foot-and-mouth disease to cattle, primarily by buffalo. These fences have caused animals great suffering and the demise of hundreds of thousands of migratory wildlife species who are blocked by and even become ensnared in these fences of death. It is a tragic irony that Botswana's heavily subsidized beef, produced at such great cost to wildlife, is exported to Europe where half a million tons of European farmers' surplus beef is being held in cold storage by their governments at taxpayers' expense. Countless other species have been harmed by pesticides sprayed over thousands of square miles to kill the tsetse fly, carrier of sleeping sickness, a disease that affects cattle but is harmless to wildlife that have natural immunity.

A disrupted, but once relatively sustainable, African livestock culture will mean the end of Africa's Eden unless governments and development agencies alike recognize the role of livestock in sustainable agriculture in Africa and elsewhere in the world.

The cattle cult of other countries like India is contributing to irreparable loss of wildlife habitat, and thus to the end of the tiger, wild dog, and lion.

Increasing the "offtake," or rate of slaughter of cattle for sale as beef as a measure of population control, cannot be sustainable when these animals compete with people for land and food, and with cows, which provide milk and manure for fuel and fertilizer, replacement heifers, and young bulls to work the ox cart and plough.

The cattle herds of traditional pastoralists are like a bank that earns around 50 percent annual interest (one calf per cow per year), provided there are no droughts or animal disease epidemics. But when they become overcapitalized and keep more cattle than the land can sustain, what remedies remain? They cannot have more land. Keeping their herds small by killing more at a young age for beef is one logical solution, provided it is sustainable, done humanely, and does not contribute to the demise of wildlife.

Another solution is to improve the health, nutrition, and husbandry (or care) of their cattle and explore the potential for genetic improvement. However, until there is more effective control of the human population, and alternative, sustainable agricultural practices established, all controls of the livestock population will fail as long as people continue to multiply, need meat and milk, and raise cattle for status and economic security.

Furthermore, Western, sedentary, cattle-only, ranch-type operations, do not work well in other cultures and climates, and it is imprudent to encourage the third world countries to emulate the West's addiction to meat. We should not forget the devastating environmental consequences of the "opening" of the West to the cattle industry in the 19th century. The old cattle trails provide living evidence today of how extensive the cow cult became in a few decades, from Montana and the Dakotas to New Mexico and Texas. Millions of cattle were raised on the range, causing

irreparable damage to the wild grasslands of the West and Southwest in order to provide the growing industrial centers of the East with beef.

Government subsidies of this sector of the livestock industry continues today, ranchers too often abusing low grazing fees on public lands in the West by overstocking and other poor range-management practices. Only 2 percent of U.S. livestock meat is produced on public land in the West, the environmental costs of which do not justify the continued destruction of public lands and extinction of wild plant and animal species caused by the cattle industry.

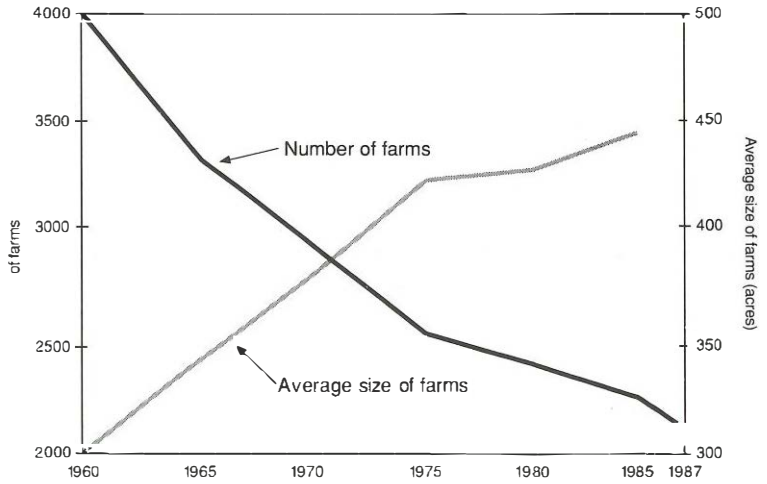
Government subsidies and consumer support of intensive feed-lot operations of inhumane veal production systems and of intensive poultry and hog farming systems in the industrial world should be opposed by all — and their adoption by less-developed countries strongly discouraged.

For economic and ecological reasons, fattening livestock on heavily subsidized feedgrains should be greatly reduced, and more forages used that are an integral aspect of crop rotation and ecological farming. Greater public support is needed for local producers of food and fiber. No beef, nor any other food or feed, should be imported from another region or country if the end result is to jeopardize local farmers who practice humane, sustainable agriculture. If alternative, socially just, humane, and sustainable agriculture is to ever find a safe and secure foothold for our future stewards of the land, it must be based upon local and regional public support of farmers and ranchers who care for the land and supported by state and federal governments.

In the United States, more than 400,000 family farms have gone out of business since 1985 (see Figure 9), and the same trend — fewer and larger farms — is evident in other developed nations. But these large factory-scale agribusiness farms are overproductive and, in the long-term, nonsustain-able. Their wholesale use of pesticides and synthetic fertilizers is not only harmful, but also not cost effective.

The agribusiness alliances of the livestock and poultry industries with multinational grain merchants and the petrochemical-pharmaceutical industrial complex must be confronted.

Figure 9: Farms — Number and Acreage — 1960-1987



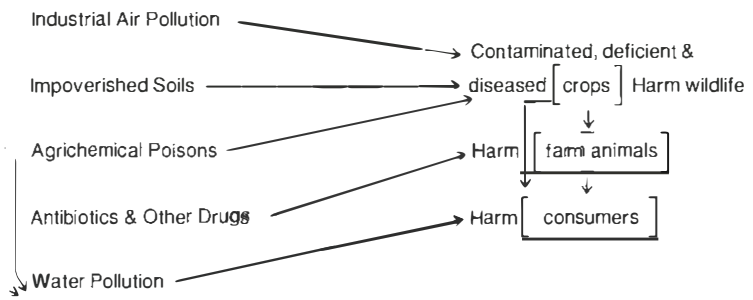
Source: Statistical Abstract of the United States. 1988.

Local family farmers who practice humane and sustainable agriculture must be supported; we must also support traditional, ecologically sound, "natural farming" practices, like rotational grazing, organic farming, and animal feed production, permaculture, and other alternative agricultural practices and innovations. We should also avoid the temptations and convenience of "fast foods," especially the hamburger, some 35 percent of which comes from spent dairy cows in the United States and may also contain beef from other countries where rain forests are fast disappearing and rangeland turning to desert.

The high-technology, utopian dream of industrial farming is not cost effective. Neither the land, nor farm animals, can be treated as nonliving resources, units of production, and mere commodities. The agribusiness experiment in such factory farming has shown its result: It doesn't work. Humane ways of raising livestock and poultry under less intensive and ultimately healthier conditions can be researched, adopted, and improved upon. They also can be better integrated with whole farming systems that are ecologically sound when livestock and people alike are

consuming in balance with the optimal carrying capacity of the region, and in the process helping to restore the natural biodiversity of the region they inhabit. Modern agriculture has many challenges to face today that cannot be put off until tomorrow. Industrial air pollution, impoverished soils, agrichemical poisons, antibiotics and other animal drugs, and water pollution variously harm wildlife, farm animals, the crops they consume, and all that we consume, especially the products of farm animals in whose bodies a host of harmful chemicals become concentrated. (See Figure 10).

Figure 10: Interrelationships Between Environmental Factors and Human Health



Source: Fox (1990).

All new developments in food animal agriculture, like the pharmaceutical industry's push to make dairy farmers economically dependent upon one of its first major products of genetic engineering biotechnology — Bovine Growth Hormone (which farmers are to inject to stimulate cows to produce more milk) — must be opposed. Opposed, that is, if they do not accord with the science, economy, and philosophy of humane, sustainable agriculture.

Making meat less fatty and "consumer friendly" will not suffice. Meat must be derived humanely and from sustainable agricultural systems. The adverse environmental impact of farm animals will only be remedied when they are once again an integral part of a humane, sustainable, and socially just society that will forego raising large numbers of animals inefficiently, primarily for their meat.

In the long history of agriculture, following the domestication of cattle, sheep, and goats, we find two disparate agricultural economies evolving. The conflict between sedentary agrarian peoples who tilled the soil and kept a few livestock, and the nomadic, warring, pastoralist livestock keepers has been mythologized in the biblical account of the conflict between these two cultures of Cain and Abel. Many communities were destroyed by or assimilated with such tribal pastoralists as the Kurgans, Aryan nomads and Hittites, in search of more land for their expanding herds and peoples. Their tradition lives on today wherever livestock are kept as the primary source of wealth and agricultural productivity. And, whether they are nomadic or sedentary, their livestock almost invariably continue, like locusts, to ravage the land.

The long historical tradition of animal exploitation and cruelty, as exemplified by pagan religious slaughter and 19th century bull-baiting, continues today in the bull fight, the cowboy rituals of the rodeo calf-roping contests, the hot-iron branding of cattle on the range, and the ritual slaughter that entails the shackling and hoisting of a fully conscious animal. We must not forget how well the bovine species has served humanity for millennia. It is now time to liberate them from all forms of cruel exploitation and extend to them the respect and compassion that is long overdue.

Past civilizations held cows, among other creatures wild and tame, in far greater reverence than does industrial society today.

We live by a different currency today, for the only reverence for the cow is as a commodity, mere chattel and capital. We should never forget that cattle have harmed no one, but in the process of treating them as we do, we have turned them into a sentinel, indicator species, whose overabundance is no longer a measure of wealth. Rather, their numbers are indicative of ecological imbalance and loss of biodiversity. Cattle, along with other livestock, have become a major cause of global ecological damage,

Addendum

The Seven Principles of Humane Sustainable Agriculture

- Humane sustainable agriculture (HSA) entails the production of domestic animal protein and fiber on the economically prudent basis of an ecologically sound animal husbandry and the wise and appropriate use of natural resources. Such husbandry aims to enhance or at least protect the natural biodiversity of indigenous wild plant and animal species, and does not result in environmental degradation and pollution.

- HSA is socially just, respecting human rights and interests, especially those of indigenous peoples and native, peasant, and family-farm cultures and traditions, since the preservation of cultural diversity has inherent value just as do the preservation and enhancement of natural biodiversity.

- HSA recognizes the connections between farm worker health and safety, consumer health and farm animal health and well-being. It respects the right of consumers of animal protein to wholesome and healthful produce derived from animals whose basic physiological, behavioral, and social needs and requirements, which are integral to their overall health and well-being, are fully satisfied by the methods of husbandry that are practiced. The use of veterinary drugs to maintain animal health and productivity is minimized by the adoption of humane animal husbandry practices, which in turn lowers consumer health risks. Furthermore, animals' health and overall well-being are maximized rather than sacrificed to maximize productivity. Optimal productivity is linked with maximal animal welfare, which in turn is linked with the optimal carrying capacity of the environment and availability of renewable natural resources.

- HSA is bioregionally appropriate, if not autonomous, linking livestock and poultry production with ecologically sound, organic, or minimally chemical dependent crop and forage production systems and environmentally sound rangeland management, as the case may be.

- HSA does not engage in the import or export of any agricultural commodities, especially meat, wool, hides and animal feedstuffs, that have been produced at the expense of natural biodiversity and nonrenewable resources, and which undermine the rights and interests of indigenous peoples who practice sustainable, ecologically sound and socially just agriculture.
- HSA, philosophically, is based upon the aphorism that we do not inherit the land — we borrow if from our children, and it is ours only in sacred trust. This means, therefore, that HSA entails respect and reverence for all life, its philosophy being Creation- or Earth-centered. It therefore embraces concern for the rights and interests of people, animals, and the environment. By so doing, it reconciles conflicting claims and concerns with the absolute right of all life to a whole and healthy environment and to equal and fair consideration.
- HSA provides the foundation for a community of hope and of a planetary democracy, whereby world peace, justice, and the integrity of Creation may be better ensured.

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