

A look at Ethical content in agriculture today

Einallah Hesammi *, Zabehellah Shabaze, Tahmaseb Maghsoudii

Department of Agronomy, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

Abstract: In ecology, sustainability refers to how biological systems remain diverse and productive. Long-lived and healthy wetlands and forests are examples of sustainable biological systems. In more general terms, sustainability is the endurance of systems and processes. The organizing principle for sustainability is sustainable development, which includes the four interconnected domains: ecology, economics, politics and culture. Sustainability science is the study of sustainable development and environmental science. The industrial agriculture system consumes fossil fuel, water, and topsoil at unsustainable rates. It contributes to numerous forms of environmental degradation, including air and water pollution, soil depletion, diminishing biodiversity, and fish die-offs. Meat production contributes disproportionately to these problems, in part because feeding grain to livestock to produce meat instead of feeding it directly to humans involves a large energy loss, making animal agriculture more resource intensive than other forms of food production. The proliferation of factory-style animal agriculture creates environmental and public health concerns, including pollution from the high concentration of animal wastes and the extensive use of antibiotics, which may compromise their effectiveness in medical use. At the consumption end, animal fat is implicated in many of the chronic degenerative diseases that afflict industrial and newly industrializing societies, particularly cardiovascular disease and some cancers. In terms of human health, both affluent and poor countries could benefit from policies that more equitably distribute high-protein foods.

Key words: *Ethical content; Ecological; Agriculture; Food*

1. Introduction

Agricultural ethics is about choices for people engaged in agriculture either directly as farmers, or indirectly as government regulators, extension agents, researchers, CEOs, industrial workers, lawmakers, technology developers, consumers, or protestors. Although all of us make choices, few of us actively engage in an ethical analysis of our actions or can provide reasons for the choices we make.

Healthy ecosystems and environments are necessary to the survival of humans and other organisms. Ways of reducing negative human impact are environmentally-friendly chemical engineering, environmental resources management and environmental protection. Information is gained from green chemistry, earth science, environmental science and conservation biology. Ecological economics studies the fields of academic research that aim to address human economies and natural ecosystems.

2. Ethics for weeds

Environmental goals for agriculture are linked to social goals. Sustainability is regarded by those in agriculture as primarily a production and secondarily an environmental goal, but others see it as a social goal. The view depends on what one wants to sustain. In agriculture, to sustain usually

means protecting the productive resource (soil, water, gene pools) and maintaining production. Others argue the productive resource is important, but ranks below sustaining environmental quality, family farms, rural life, small agricultural businesses, and small communities. This debate goes to the heart of what agriculture ought to be. Agriculture has a major responsibility because it is so widespread and has the potential to care for or harm so much land. This is a different view from protecting only the productive ability of land. Land is not simply a productive resource. It is the basis of life. Without the land there will be no agriculture, no life, so land must be regarded as something more than other productive resources (e.g., fertilizer, machines, irrigation water, pesticides, or seed). To harm or destroy the land is to destroy something essential to life, and that certainly raises a moral question. The challenge of social and environmental goals for agriculture is that they involve values. It is generally not recognized in agricultural science that values are not external to the science and technology but its basis (Capra, 1996). A comment by the Russian author Leo Tolstoy about art is relevant. Tolstoy urged us to question and debates the correctness of our scientific and moral assumptions. We need to examine our ethical foundation and our values. Tolstoy said: "I know that the majority of men who not only are considered to be clever, but who really are so, who are capable of comprehending the most difficult scientific, mathematical, philosophical discussions, are very rarely able to understand the

* Corresponding Author.

simplest and most obvious truth, if it is such that in consequence of it they will have to admit that the opinion which they have formed of a subject, at times with great effort, - an opinion of which they are proud, which they have taught others, on the basis of which they have arranged their whole life, - that this opinion may be false". To preserve what is best about modern weed science and to identify the abuses modern technology has wrought on our land, our people and other creatures, and begin to correct them will require many lifetimes of work (Berry, 1999).

We ought to see agriculture in its many forms productive, scientific, environmental, economic, social, political, and moral. It is not sufficient to justify all activities on the basis of increased production. Other criteria, many with a clear moral foundation, must be included. We live in a post-industrial, information age society, but we do not and no one ever will live in a post-agricultural society. Societies have an agricultural foundation within their borders or elsewhere. Those in agriculture must strive to assure all that the foundation is secure. One reason for our ongoing ethical dilemmas is that society's values are not immutable but change over time. Slavery, once acceptable in many cultures, is not acceptable any longer in developed societies although it still flourishes in many developing countries. Euthanasia, once totally unacceptable in nearly all cultures, is now becoming acceptable under certain conditions in some countries.

New ideas can and do enter our moral worlds. In developed countries, age old ideas about the treatment of nonhuman animals and the protection of the natural environment are gaining acceptance. These ideas are not new, having been espoused throughout human history by different groups of people. Do animals and the environment have defensible rights in the modern legal sense? Should species and ecosystems be saved only because they might be useful to the human species in the future or because we have a moral duty to do so? "Deep ecologists" certainly think the latter, and they aim to create a new moral system that is not utilitarian, meaning that it is not centered on the needs of humans alone. Even if we don't believe that the environment has rights in the same way that people have rights, we are slowly coming around to the notion that we must live within the natural laws that govern our Earth's ecosystems. The realization is dawning that we cannot escape from those laws and that we, especially in the United States, will have to modify our lifestyles accordingly. Similarly, many of us are uncomfortable with the notion that nonhuman animals have rights, but the idea that our food animals, because they are sentient beings, deserve a more humane treatment than they are now getting is slowly permeating our society and changing our cultural values.

Agriculture requires not only the replacement of natural ecosystems with crop fields and tree farms (with accompanying loss of biodiversity and massive

carbon dioxide release) but results in groundwater pollution, soil erosion, aquifer depletion, soil degradation, pesticide pollution, and other environmental stresses. In the last one-half of the 20th century, a different model emerged from developed countries: sustainable and multifunctional agriculture. In these places, farming is not just about cheap wholesome food but about stewardship of the land, preservation of the resource base, the health of farm workers, the preservation of the small biota that are rich in biodiversity and are interspersed with fields, the value of rural communities, and, in world, the value of the agricultural landscape. From an ethical viewpoint, agricultural sustainability in the developed world may depend also on increasing food production in the developing world, so that the agricultural practices that foster rock-bottom commodity prices become unnecessary. Rapid agricultural development in developing countries would have enormous economic and political benefits both in the developed and the developing world. It is appropriate to remember the four food security goals of the International Food Policy Research Institute, which envisions food security for all humanity. These goals are: (a) Every person has access to sufficient food to sustain a healthy and productive life; (b) Malnutrition is absent; (c) Food originates from efficient, effective, and low-cost food systems; and (d) Food production is compatible with sustainable natural resource use. In the final analysis, in addition to working on tangible enforceable policies and educating both ourselves and the public, we all must evolve our own personal social consciousness to be equipped to deal fairly and ethically with our changing world.

3. Ecosystem effects of expanding conventional food production

The Earth's natural environment provides the platform upon which all life is based. Ecosystems provide regulating as well as supporting services that are essential for agriculture and fisheries. These include provisioning of food, fiber and water; regulating services such as air, water and climate regulation, pollination and pest control; and providing resilience against natural disasters and hazards. Despite its crucial role in providing food, agriculture remains the largest driver of genetic erosion, species loss and conversion of natural habitats. Globally, over 4,000 assessed plant and animal species are threatened by agricultural intensification, and the number is still rising.

4. Impacts of land use intensification

Intensive management to increase agricultural production - through irrigation and the application of fertilizers and pesticides - can further reduce the wildlife value of farmed land. From 1961 to 1999, the area of land under irrigation nearly doubled; the use of nitrogenous and phosphate fertilizers increased by 638% and 203%, respectively, and the

production of pesticides increased by 854% (Green et al., 2005). Such intensification has had major direct impacts on biodiversity, such as on farmland birds (Figure 28) and aquatic species. Large-scale use of fertilizers and pesticides, coupled with fragmentation and losses of important farmland habitat qualities, also reduces the number of flowers and plant diversity, diminishes insect biodiversity, and subsequently the survival of farmland birds, particularly the young that are dependent upon insects in their first weeks or months of life.

Aquatic ecosystems are also being widely affected by food production in terrestrial areas, through high nutrient inputs (Seitzinger and Lee, 2008) in run-off from agricultural and livestock production and alteration of freshwater flows. The ensuing reduction in water quality (Mitchell et al., 2005) is evident in increased eutrophication and subsequent algal blooms and oxygen-deficient waters, which when extreme, could result in dead zones (UNEP, 2001; 2008). In the northwestern Gulf of Mexico, nutrient enrichment mainly from fertilizer use in the Mississippi Basin has accounted for the world's largest hypoxic or dead zone (Turner and Rabalais 1991; Rabalais et al., 1999; UNEP, 2008). Without significant nitrogen mitigation efforts, marine areas will be subjected to increasing hypoxia and harmful algal blooms that will further degrade marine biomass and biological diversity (Sherman and Hempel, 2008; UNEP, 2008).

5. Agriculture and Water Pollution

Agricultural pollution is both a direct and indirect cause of human health impacts. The WHO reports that nitrogen levels in groundwater have grown in many parts of the world as a result of "intensification of farming practice" (WHO, 1993). This phenomenon is well known in parts of Europe. Nitrate levels have grown in some countries to the point where more than 10% of the population is exposed to nitrate levels in drinking water that are above the 10 mg/l guideline. Although WHO finds no significant links between nitrate and nitrite and human cancers, the drinking water guideline is established to prevent methaemoglobinaemia to which infants are particularly susceptible (WHO, 1993). Although the problem is less well documented, nitrogen pollution of groundwater appears also to be a problem in developing countries. The social, economic and ecological disaster that has occurred in Seas and its drainage basin since is the world's largest example of how poorly planned and poorly executed agricultural practices have devastated a once productive region. Although there are many other impacts on water quality in the region, improper agricultural practice is the root cause of this disaster. Virtually all agriculture is irrigated in an arid area.

6. Ecological and water quality impacts

- Salt content of major rivers exceeds standard by factors of 2-3.
- Contamination of agricultural products with agrochemicals.
- High levels of turbidity in major water sources.
- High levels of pesticides and phenols in surface waters.
- Excessive pesticide concentrations in air, food products and breast milk.
- Loss of soil fertility.
- Induced climatic changes.
- Major decline and extinctions of animal, fish and vegetation species.
- Destruction of major ecosystems.
- Decline in Sea level
- Decline in Sea volume
- Destruction of commercial fishery.

7. Mismanagement of agriculture is the root cause

- Increase in irrigation area and water withdrawals.
- Use of unlined irrigation canals.
- Rising groundwater.
- Extensive monoculture and excessive use of persistent pesticides.
- Increased salinization and salt runoff leading to salinization of major rivers.
- Increased frequency of dust storms and salt deposition.
- Discharge of highly mineralized, pesticide-rich return flows to main rivers.
- Excessive use of fertilizers.

8. Future accessibility to food

Accessibility to food is also determined by the long-term trend in food prices (which is a different issue from price volatility). The rising trend in global food prices is likely to persist in the next decade. In the long run, however, prices will decline (OECD-FAO, 2008).

Prices are driven by a complex combination of factors. Historically, productivity gains and increasing competition in trade have overtaken stronger demand, resulting in the declining trend of the past 100 years. Recently, food prices have been driven by a combination of rising fuel costs, production of biofuels, and unfavorable weather conditions, with trade restrictions boosting upward price pressures (World Bank, 2008). Overall, soaring food prices are blamed for their impacts on human vulnerability. However, there are two sides to this picture. Increasing food prices do have a positive effect on net food-selling households (FAO, 2008), augmenting their incomes and allowing more possibilities for farmers to afford investments in production inputs. This underlines the need to minimize short-term price volatility and stimulate slow increases in long-term food prices, in order to enhance investments in the agricultural system and

bridge the gap between developed and developing countries as well as between rural food producing and urban food consuming regions. Ideally, these developments should take the environmental aspects previously described into account to achieve sustainable agricultural systems that will meet the food demand of all the world citizens and eradicate hunger. However, increasing yield and food supply without simply continuing the conventional expansion of cropland and rangeland and use of fertilizers and pesticides – at the cost of biodiversity and future generations – will require major investments and implementation of food energy considerations in the entire food production and consumption chain.

Voluntary programs and technical help from technicians and scientists are being overwhelmed by pressure to push the land harder and harder. Pressure for all-out production is intensified by profound changes in land ownership. Misguided farm and biofuel policies magnify the perverse incentives of a marketplace that turns a blind eye to soil degradation and water pollution. It is time to make sure that the most basic, simple and traditional conservation practices that hold soil and watersheds together are in place everywhere they are needed. Science tells us that such practices dramatically improved the environment and sustain agricultural production in an increasingly volatile climate. These conventional practices will not solve all the problems we confront, but they will go a long way to building a foundation for more effective efforts. It is time to go back to what works — requiring farmers to protect soil and water in return for the billions in income, production and insurance subsidies that taxpayers put up each year. It is even more so now. The first step is to get back to full enforcement of the conservation compliance law that has been. The Natural Resources Conservation Service must intensify its annual inspections to determine whether farmers are maintaining the required soil conservation practices. The Farm Service Agency (FSA) must make full use of its authority to impose graduated penalties on farmers and landlords who fail to comply with conservation requirements.

Farmers were first asked to write and implement conservation plans. It is only reasonable that they now be asked to meet today's challenges in return for a continuing flow of income, production and insurance subsidies. Therefore, the environmental is working.

9. Group calls on congress to

Reopen and revise all legacy conservation compliance soil conservation plans. Practices prescribed in the revised plans must reduce soil erosion to the land's T value and prevent ephemeral gully erosion on highly erodible cropland.

Require treatment and or prevention of ephemeral gully erosion on all agricultural land — not just highly erodible land-owned by producers or

landlords receiving income, production, insurance And conservation subsidies.

Require producers participating in existing and new crop and revenue insurance programs to meet Conservation compliance provisions.

Bar producers who convert native prairie or rangeland to row crops from receiving income, production, Insurance or conservation subsidies on those acres.

Use a portion of the funding provided for income, production, insurance and conservation Programs to pay for the technical staff needed to plan and implement the required conservation Practices and to complete annual inspections to certify that those practices are in place.

10. Discussion

Public policies that encourage a shift toward a more plant-based diet could bolster individual actions in this area. These policies should include preventing factory farms from polluting and requiring them to pay cleanup costs when they do pollute. Without such policies, the products of factory farms will continue to be artificially cheap, in that prices will not reflect their impact on the environment, human health, animal welfare, or the economic and social stability of rural communities. Sustainable agriculture is not merely a package of prescribed methods. More important, it is a change in mindset whereby agriculture acknowledges its dependence on a finite natural resource base—including the finite quality of fossil fuel energy that is now a critical component of conventional farming systems. It also recognizes that farm management problems (weeds, insects, etc) .Cannot be dealt with in isolation but must be seen as part of a whole ecosystem whose balance must be maintained. In this paper we have introduced some of the environmental and human health problems inherent in industrial agriculture. In many respects, industrial-style meat production provides a worst-case example of these problems. It also provides an opportunity for dramatic improvements in environmental stewardship and public health. Because meat consumption is such a major component in the broader issues described here, its reduction—through both individual and collective action-can have profound effects on the health of humans, animals, and the environment.

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