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# **S U S T A I N A B L E A G R I C U L T U R E A N D F O O D A R E A T R I S K**

This Editorial is the last that I shall write. In it, I look forward to the near and longer term future of agriculture and the world food supply. Although there are bright prospects, there are also new and threatening risks on the horizon. These hazards have an entirely new origin. They result from human activity — not from the identifiable decisions of any individuals but from the system under which Western agriculture is

now managed. That system poses real threats to sustainability.

### **Agriculture reshaped**

Agriculture is being restructured at an incredibly fast pace as we enter the 21st century. The pace has been and continues to be higher in the West where innovations during the 20th century, especially during the last 50 years, have changed farming from the oldest, even the original, human activity of civilization into a new world of economic drivers and values. The process involves not only technological change but also the sociological movement of millions of people from rural to urban lifestyles. This massive migration continues in the developing world and in the New Independent States (NIS) of the former USSR. In the West it has already resulted in a strange isolation of farmers who are now numerically a very small minority of national populations. The contrast is shown by the former 15 country member and the new 10 country member states of the European Union. In the 15 member EU, where only about 5% work on farms, few city dwellers were born on a farm and very few have any relatives who farm today. In the 10 new EU countries, the rural population is still around 25% and many people come from a farm background. Further east in the states of the former Soviet Union, the percentage is higher at 30–50%.

In the West farmers are becoming an endangered species as intensification and scale are driven by the large public companies which now control the upstream and down-stream flow of resources and income to farmers under the banner of Cheap Food. What are the prospects for the next 10, 20 or 50 years? Most obvious is a growing level of unsustainability.

### **Unsustainability**

The present pattern of continuous change in farming and food production cannot go on indefinitely without serious consequences. All thoughtful people, both inside and outside agriculture, acknowledge that the current pace of change is a high risk process. Naturally, the hazards are not so obvious to those who control the economic drivers. They appear to be unaware that they are on a collision course with reality and that collapse and maybe calamity are strong possibilities. One reason for their blindness is that lack of sustainability creeps

up slowly and is therefore less evident to those who are within the system. A second reason is that those who drive the system are focussed primarily upon economic returns that continue at present. Corporate executives express frustration with those who talk about unsustainability, sometimes calling them prophets of doom who are out of touch with the realities of the market — which is still doing very well. The profits of the large supermarkets and the upstream suppliers of seeds and chemicals to farmers are thriving. They feel that opposition comes from uninformed minorities who have limited, marginal or personal agendas. A third reason is that the decision-makers in the up and down stream power centres provide themselves with moral arguments for their existing ideology of increasing intensification, scale, cheap food and global trade in food. The view commonly expressed from the Boardrooms of the large and economically successful food chain companies in the West is that the world needs more food and therefore it is imperative to pursue economic and biological efficiency in food production. They seem able to ignore the fact that the West already has over-capacity for food production and, despite over-consumption and growing obesity under the pressure of massive advertising, the fantasy that they are feeding the poor provides a feel-good factor for their business success.

But the system is unsustainable. The pursuit of ever cheaper food to the Western consumer is driven primarily by competition among a small clutch of large supermarkets in the West who seek market dominance and are not called to account for the effects of their agenda on the agro-resources, the farming community, the commons, and the environment which are the foundation resources for agriculture. Consequently there are many external costs which are carried by society through taxation, health, reduced environmental standards and depleted rural life.

### **What are the longer-term risks of continued unsustainability?**

We are not speaking of tragedies of natural origin like hurricanes Katrina and Rita nor the Tsunami in the Indian Ocean on 26 December 2004. We are thinking rather of tragedies that have their origin in human behaviour. Progress in human society is imperative. Everyone would agree that, in principle it should be

progress which improves the quality of life for all, builds community on a foundation of respect for universal human rights, acknowledges the integrity of the biosphere and the dignity of sentient species and pays positive attention to the inanimate resources of the earth. However, despite these high aspirations, human history records that the perverse nature of mankind, particularly those who seek and then use power for selfish ends, has repeatedly marred the achievement of those high ideals. The human story is a sorry one — full of noble aspirations and goals and short on fulfillment. The tragedies of man's inhumanity to man is well documented in the archives of centuries past and resides in the living personal memories of millions alive today who suffered at the hands of other men in the 20th century. But even in the recent past of the 20th century the abuse of other humans, though horrific, was limited in time and space.

The prospect for damage in the future is far greater. The world is shrinking. Globalization makes the earth a village. The scope for petty dictators is still restricted even though they may have global ambitions. But the threats we describe here have a new origin and dimension and they are frighteningly powerful and wide in their effects. They will come from an error, lack of foresight, mistaken judgements, inadequate scientific understanding sheer greed or collapse of the economic system. Because the food chain is going global their impact will be enormous.

Climate change is a current example of such a world-scale tragedy that is already upon us. Largely caused, to date, by the economic and lifestyle behaviour of the West, climate change is affecting the whole world population. Who is responsible? It is a collective responsibility because the tragedy that is still building derives from the system of economic lifestyles embraced by millions — mainly in the USA and Europe. In such a global situation everyone is a stakeholder and liable to suffer. Similarly tragedies in the global food chain will also impact everyone. The unsustainability of our lifestyle of excessive energy usage will increasingly affect future generations in many unpleasant ways some of which are unforeseen.

### **Risks to the agriculture and food systems**

Risks of three types threaten agriculture and food as we enter the 21st century. The origin of each risk lies

within the economic system now being pursued in the West with singleness of purpose for immediate benefits. The three likely causes of potential tragedies are briefly discussed here without full details that are available elsewhere.

1. *Environmental damage*
2. *Gene-technology in food production*
3. *Capitalist economic system for agriculture and food on a global scale*

### **Environmental damage**

The damage to the natural resources of the earth is overstressing the ability of the environment and its complex life-supporting systems. The recent Millennium Ecosystem Assessment (MEA, 2005) is the result of 1200 scientists studying the global ecosystems over four years. Their conclusions are devastating. They issue a stark warning that irreversible damage is being imposed upon the biosphere, that the natural machinery which recycles life processes is being degraded, and that the planet will no longer be able to sustain future generations. The UN Environment Program (UNEP, 1995), reported to the Convention on Biodiversity that there are 1.7 million known species of plants and animals and, including all other lower forms of life such as insects and micro-biological species, there are an estimated 12 million not yet identified. All species, classified or not, are disappearing at an accelerating rate. UNEP also gave the following expected loss of species: mammals (25%), reptiles (20%), amphibians (25%) and fish (34%). Wilson et al., (2005) are so concerned at the rate of extinction of mammals and primates that they wrote to the US Senate asking for the Endangered Species Act to be strengthened rather than weakened.

A major activity of EAAP in the last decade has been to activate sustainable use of livestock biodiversity. The loss of animal genetic resources is part of a larger problem of unsustainability. It is a measurable benchmark of other irreparable damage being inflicted upon the environment. The loss of breeds is serious for they have been thousands of years in the making and their unique adaptation traits are valuable. At least 1000 breeds have been lost in the last 100 years though lack of earlier documentation makes estimating difficult. The rate is accelerating with 300 breeds

gone in the last 15 years. Today 2000 breeds are at risk (FAO, 2000). Those who suffer most from this long-term threat of lost biodiversity are the four billion rural poor people in developing countries, 50% of whom are dependent upon livestock to maintain basic quality of life. The lives of these people are being placed at risk by the Western agricultural system as domestic markets in their mega-cities are targeted by Western food exports (Hodges, 2005a). So far the programmes for conservation of animal genetic resources have not stopped the loss as shown by three successive editions of the FAO World Watch List from 1995 to 2000. Even from an economic point of view it is foolish to discard unique genotypes which may have commercial value in the future. These examples are but an indication of how the environment and biodiversity in general are being eroded by human activity and how the resilience of the natural cycles is overloaded. There is a certain risk that if we continue as we are going we will destroy the capacity to farm effectively (Hodges, 2005b).

### **Gene-technology in food production**

The topic of Genetically Modified plant foods has been discussed in previous Editorials in some detail and will not be repeated here (Hodges, 1999, 2000). However there is one new aspect to the threat of great moment for animal scientists and for livestock production. The new issue is the use of transgenic animals in the food chain. To date genetically modified food has been of plant origin. But scientists and the large multinational companies in this area have been working for some years to produce and eventually market genetically modified meat and milk and eggs from genetically modified animals. Symptoms of this policy can be seen, for example, in the vast investment in gene-transfer technologies creating transgenic seeds and soon transgenic domestic animals. These products are accompanied by patent applications which will eventually turn staple foods into proprietary products with royalties. An example of this type of business is shown by the current multiple applications made by Monsanto in many countries in 2005 for patents affecting pig production (Monsanto, 2005). These patent applications are very extensive and if granted will also give Monsanto rights over some aspects of pig management systems including the use of MA-BLUP, IOD and

PCCG algorithms and other tools designed over many years by animal scientists funded by public support. Monsanto argues that their application to patent their particular approach to the use of these algorithms is made together with some specific genes for which they claim patent right because they have developed a particular approach in applying many of these elements together with other innovations. Monsanto blandly states that their primary interest is in protecting their freedom to practise these approaches in the particular way described by the applications.

This Monsanto approach raises some new issues for animal scientists, for livestock production and for the consumption of animal products. On the issue of conservation, patented transgenic farm animals will hasten the demise of the traditional breeds and the issue of conservation of animal genetic resources will be completely reshaped. Although some consumers may now eat crop plant GM food without concern, the issue of transgenic livestock products will raise a new and negative image in the public mind about animal products and probably turn more people off eating meat altogether or to eating organically produced animal products.

These business intentions to create monopolistic trade within the food chain, protected by intellectual property rights, are already becoming plain to farmers, small processors and retailers whose survival is threatened. Gene-transfer technology, like all technologies, has potential both for good use and for abuse (IAEA, 2005). Doubtless it can make contributions to improved food production under the surveillance of independent scrutiny where Due Process is practised and all stakeholders are represented. The problem is that gene-technology has been launched into the staple foods of the world food chain, without public consultation, by a few private interests who take unethical legal protection and a proprietary stance over major components of agriculture and food.

Many may be comforted by the specious argument that gene-technology is only doing more quickly what breeders have been doing for a long time. That statement is, of course, untrue. Gene technology moves genes across the boundaries of widely separated species which is an entirely novel technique for breeders to use. The threat of risks arising from this technology are evident in principle since species have

been millions of years in the making and have achieved a remarkable level of genetic homeostasis within the reproductive boundary of each species. Abnormalities caused by mutations (natural analogues of transgenes) are usually negative and have been ruthlessly culled from the population genome by natural selection. When mutations are created artificially by human intervention using gene transfer technology, the process of natural selection is changed. The modified genome, chosen by human rather than natural selection, is multiplied by massive and rapid breeding programmes and released on a large-scale into the natural gene pool of the food chain. Although the immediate effect may appear to be benign, the longer term results are uncertain and risky. Later, when an unexpected and negative genetic consequence occurs in the modified genomes of the food chain, the impact will be wide-spread, even global, and containment will be impossible. We now have glimmerings of new knowledge about the potential dangers now emerging from recent research into BSE, vCJD and CJD (Hodges, 2005c). There are unsuspected genetic interactions between the genomes of cattle and humans, and experimentally with mice, which affect the health and survival of individuals.

When genetically modified food, plant or animal becomes the normal fare in the diet of the global population, which is clearly the business plan of some multi-national companies, the occurrence of a genetic error with deleterious effects upon the human populations or upon the agro-resources used for food will be awful. It will be too late to stop the tragedy which may be a global epidemic or fill-off. The terrible experience of BSE is a warning of the enormous difficulty involved in tracking down the mechanisms of a new and unsuspected aberrant genetic process which silently insinuates itself into the human food chain and is already established in the animal and human populations before recognition and continues to defy diagnosis.

### **Capitalist economic system for agriculture and food on a global scale**

The intention to globalize the world food market is clear. It is a major item on the agenda of the World Trade Organization (WTO) as well as the business plan of the multi-national companies that are

currently building control of the staple food market using intellectual property rights (IPR) associated with Terminator Gene Technology to give themselves near monopoly rights. The risks associated with this approach are clear. Based upon self-interest, capitalism quickly responds to the inevitable economic fluctuations, unpredictable cycles and variation in interest rates, exchange rates and returns on investment. Multi-national companies trading in the large food markets of the developing world will quickly stop activities to avoid losses when the world economy changes against their interest. Their prime contract is to their shareholders, not to feed their customers. Cutting supplies of non-essential manufactured goods is not fatal. Cutting supplies of food when local agricultural capacity has been diminished can be tragic. Future large-scale wars and terrorism will also disrupt world food trade leaving hunger in large urban populations who have neglected their local resources for growing food. There is no world government to ensure poor people are fed when the international trading system collapses. Division of labour offers no remedy for these inevitable tragedies. The West knows from experience that capitalism is volatile. World food supplies cannot be subject to such uncertainty any more than food in the West.

### **Conclusion**

How can the risks confronting agriculture and food be averted? The power-structures are fully committed to the idea of progress through the present system of intensification, scale and cheap food. The three risks of environmental collapse, of gene-technology producing large-scale tragedy, and of starvation following a severe economic recession all flow from the same source. The threats come from the ideology of capitalism which is a superb system for creating new wealth but which lacks any inbuilt mechanism to avoid excess and abuse by those who own the capital. Today most of the world's capital is held by the West. Vast sums of capital are largely owned by shareholders who are remote from the technical and economic management of the business and whose only interest is in profit and increased equity. The use of the capital is in the hands of a relatively small group of anonymous business executives who, unlike

politicians, are neither elected nor accountable to the stakeholders and communities affected by their decisions about the food chain. Customers are the only group with power to influence these executives' decisions and most customers are lulled into a sense of ignorant contentment and complacency about what is happening to the food chain by intensive advertising and the low price of food.

So what can be done? We may take encouragement from what happened once before in the West when the industrial capitalist barons of the 19th century were practising slavery and exploiting their workers ruthlessly (Hodges, 2005b). The system was modified by a small group of individuals, many motivated by their Christian values, who changed the socio-economic shape of Western culture by pressing for the abolition of slave trading and then of slavery itself. During the 19th century in the UK these few men and women of high moral conviction and social concern inside and outside parliament confronted the hard face of capitalism that grew under the influence of the British Empire. They include William Wilberforce, Lord Shaftesbury, Elizabeth Fry and others. Over a period of a few decades, against the prevailing economic interests of business, these few individuals led parliament to ban child labour in the mines, stop the exploitation of women in factories, limit the length of the working day, introduce prison reform, start compulsory and free education and make it illegal for ships to be loaded beyond the Plimsoll line painted on ship sides and named after the Member of Parliament who fought for it in 1876. Outside parliament these individuals pioneered the first care homes for the elderly and opened free hospitals for the poor. These proposals to improve the quality of life, to introduce equity and justice and to facilitate community activities were opposed by many of the owners of factories and mines who argued that these changes should be decided by the market and that the costs of such radical legislation would cripple the economy. As a result of much new legislation, ethical behaviour appeared in the market place. Changes in the socio-economic system were thus introduced which would never have been promoted by economic forces alone. Slowly life changed for the better.

The open question is whether such people of high moral character, having an informed grasp of what is

happening and a social conscience, are willing to act thus today. And will Western governments listen? And will any of these people rise from the ranks of animal scientists?

*John Hodges, Editor*

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