

SUSTAINABILITY – FEEDING THE WORLD

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Sustainability

The fear of inadequate food has troubled human communities since the early days of civilization. Our effort today to combat that threat is called Food Security. The concept of sustainability was formally developed in 1798 by Thomas Malthus of Cambridge University, UK who stated in his famous essay that “Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio”. The concept of imbalance proposed by Malthus for food and populations can be extended to unsustainable progress in broader areas of life.

In the 1980s, new dangers of imbalance moved to centre stage in development circles when it was realized that over-use of natural resources would deplete their ability to regenerate. The word “sustainability” then entered international parlance and has been widely applied to the environment. But the concept of sustainability has even wider applications and can be applied to imbalance caused by extreme use in any or all human activities.

In the context of feeding the world, sustainability opens the concept far beyond simply balancing feed supplies against the numbers of human mouths – as though one were simply calculating the grain needed to feed a herd of cows. At that level of a simple equation, Malthus’ fears have so far been averted on a global scale. Some analyses of food production and population (Moore-Lappé et al, 1998) show that globally there is enough food but socio-economic systems inhibit equitable distribution, resulting in pockets of famine and hunger. Every year the World Food Programme (WFP) distributes Food Aid thus supporting the contention that there is no global shortage of food. In 2001 the WFP distributed 4.2 million metric tonnes of food to 77 million of the world’s poorest people in 82 countries at a total cost of US \$1.74 billion. The FAO World Food Summits of 1996 and 2002 identified approximately 600 million people or 10% of the world population which suffers from under-nutrition, malnutrition or famine.

The existence of large-scale poverty and need for Food Aid provoke an examination of the sustainability of the normal economic system which fails to meet the basic human needs of so many people while food and food producing potential is available. The national and international economic, financial and political systems within which world food is managed do not offer sustainability in feeding the whole world. Anyone who doubts the relevance of socio-economic systems to the sustainability of feeding people should reflect upon the failure of the political-economic system practised for 70 years in the USSR. This ideology forced the whole food system into collapse even though the agricultural land of Ukraine has been well described as the bread-basket of Europe. A decade later the common people of the successor states of the USSR remain in poverty and food deficit.

In this paper we consider the sustainability of the world food system. We identify the strengths and weaknesses of current socio-economic assumptions for solving the looming problems of feeding the growing world population which has doubled since 1950 and is projected by the UN to reach 8 billion by 2020 and 9.5 billion by 2050. Almost all the increases will occur in developing countries. There are varying predictive models for these estimates but the current exponential

increase in the family of humanity is expected to stabilize around ten billion. World cereal production must increase from 1.92 billion tonnes in 1990 to 2.88 billion in 2030 (ISNAR, 2002) to feed the extra people.

COMPLEXITY OF THE WORLD FOOD SYSTEM

Feeding the world is a complex task. This task is not the responsibility of one nation, organization or expert group in society. Food production has always been a community task. The world food system in the 21st century must be built upon the co-operation of multiple sectors and stakeholders in human society. Many individuals and institutions play a part: farmers, traders, processors, governments, scientists, regulators, experts in human, animal and plant health, economists, bankers, financiers, shops, supermarkets and customers. These, and others, all contribute directly to the food system.

Many major components of the modern world also play essential roles in feeding the world: the public and private sectors; the United Nations and several of its specialized agencies, Food and Agriculture Organization (FAO), World Food Programme (WFP), World Health Organization (WHO); the World Trade Organization (WTO) and other national groupings; and some NGOs are deeply involved. Balancing the inputs and agendas of these diverse interest groups is essential but not easy.

Further, the food system is dependent upon the integration of land ownership and use, availability of water, access to natural resources, farm supplies, credit, markets and levels of economic prosperity nationally and internationally. Local weather and regional climate are also major factors which, without prediction, can bring localized benefit or disaster.

The food system is also shaped by human need and response factors including dietary customs and preferences, food preparation and eating traditions, levels of education, poverty, greed, health, socio-economic structures and religious values. Built into these human needs and responses are the legacies of former broken ideologies, ethnic conflicts and wars. Current political ideologies, styles of leadership, taxation and price support policies also deeply affect international, national and local success in the food system.

Food systems reflect national cultural histories and values and are influenced by the stage of human development, rural and post-rural economics, level of industrialization, availability of transport, communication facilities, economic and financial infrastructures, private capital and national wealth.

Finally, but not in any sense completing the list, the food system is surrounded by many organizations with legitimate concerns about the local and global impact of the food system: environment, health and medicine, population growth, birth control, family structure and size, climate change and others.

Thus, it is clear: feeding the world is a complex system, very different from any other large-scale operation. It needs a special and unique approach different from the methods used in other businesses. The production of food is the way of life of at least half of the human family and the consumption of food is a daily activity of all members of the human family.

FOOD IS CLOSE TO COMMON GOOD

Such a catalogue implies that in speaking of food we speak of the whole of human life. Yes – and yes again. Food is life. There is no life without food. Food and the system of food delivery are not optional extras like some new technology. Food is basic to human life from the poorest to the

richest. Without food human life and society is finished. Food scarcity leads to human violence. Inadequate food leads to malnutrition, ill-health and premature death. Abundance of food leads to improved quality of life. Super-abundance of food leads to greed, over-eating and ill-health.

Food is truly at the heart of human life from primitive survival to prosperity. There are some valid arguments for viewing food as part of the Commons (Common Property Resources) along with water, air and natural resources. But although food can never be free and never be fully part of the Commons, the concept carries an important message: Community. In primitive societies food always binds people together. In simple communities all contribute to producing food and all share in the benefit. All suffer in natural disaster or war.

Even in the modern world, attempts to form communities or communes, whether based upon social, political, religious, humanist, ideological or new-age views of reality nearly always place food at the heart of the activities. Large-scale examples may be found in communism of different styles – Soviet and Maoist where the resources needed for food production were quickly placed under state or local administration –with tragic results in the Soviet case and better results in China. Examples under capitalism are found in the kibbutzim and mishavim of Israel and in the Amish settlements of North and South America.

Older traditional communities always recognized the centrality of food for quality of life. For millennia and even today, the upward movement of human civilization is sustained by improving the food system using domestic animals and plants often seen as community assets along with land and water.

A sustainable food system must supply food continuously. Failure of supply can arise from natural causes – crop failures, animal epidemics, floods, violent climatic fluctuations etc. Human conflicts are another cause of temporary unsustainability. Such natural and induced tragedies are usually limited geographically and are temporary. But our primary concern in this paper is not the natural causes of local unsustainability. We must examine the sustainability of a world food system which is now being shaped by powerful leaders in the capitalist economies of the West. They plan to globalize the world food system. Will such a system be sustainable?

AGRICULTURE AND FOOD IN DEVELOPING COUNTRIES

The West, broadly described as Europe and North America together with Australia, New Zealand and Japan, is in general food surplus but represents less than 20% of world population. Further, in Western society, only about 5% work in agriculture. By contrast the developing countries, including the Least Developed Countries (LDCs) many of which are in Africa and South East Asia, suffer from poor food security, malnutrition and patches of famine. The majority of the 6.3 billion people in the world at the start of the 21st century are still found in locally organized farming communities with limited capital, market development and dependence upon self-sufficiency. These traditional farming economies are labour-intensive which contrasts markedly with the capital-intensive agriculture of the West.

COMMUNITY OF LIFE

Community of life is fundamental to developing economies and community is the way life is sustained. For example, typically there are no Homes for Old People and no Orphanages. This social system contrasts with the anonymity and self-dependence of individual life in the West. These community features of life are imponderable to the Western mind for they are not easily quantifiable in the economic equations of capitalism. They are, nevertheless, essential features for

sustaining life. Changing a system suddenly means losing people. The ultimate meaning of sustainability is to enable people to enjoy quality of life as they define it. Sustainability of world food supply is a vital component to gain this end, but is not the end of itself.

A basic factor in sustainable community life is trust. Fukuyama (1995) identifies trust in human society as the key feature which has enabled humanity to survive. Regrettably, but almost inevitably, the capital-intensive economic system of the West has replaced trust with legal contracts and by a proliferation of lawyers seeking damages for broken and allegedly broken contacts. Trust is easy in a small community. It is more difficult, but not impossible in a global community. If the proposed growing world food trade lacks trust and is built only upon contracts, then the weak and the poor will suffer. How can rural farmers in Africa go to court against a multi-national corporation or Western government if Genetically Modified (GM) seeds produce negative consequences? Recently the US government ruled that Starlink, a GM corn, was unfit for human consumption after it had been released because it produced allergies. A total of 300 food products had to be withdrawn at very high cost. It is alleged in the press that supplies of Starlink corn were subsequently sent to Nicaragua. This is disconcerting news for those who know that integrity must be a key factor in world food trade.

The concept of community has been eroded in the West by over-emphasis upon the individual as the unit of power. In that sense, community has become unsustainable in the West (Hodges, 200). Many citizens regret this loss of social capital. Consequently the restoration of family values (community) is now a major topic among Western politicians. Plans to globalize the world food supply must not be developed on the Western model which severs the connection between people, their land and their community. There are lessons from history which emphasize these dangers.

LESSONS FROM THE FORMER USSR

Revisiting both the introduction of Soviet communism in 1917 and also the decade since it collapsed in 1991 provides two powerful lessons for those who want to learn. After the revolution of 1917 the leaders of Soviet style communism forced their ideology on a huge population of people, living at that time in a simple socio-economic system. The existing system provided only a low level of economic prosperity to the common people but, living in village communities on the land, the people had food. The revolution forcibly took away local control of the land in favour of the state and introduced a new system that used the language of community, but actually destroyed the ability of people to feed themselves, reduced traditional human dignity and broke the community of life. For 70 years, the Soviet Union experienced multiple famines and food shortages and was obliged to import food even though the state was very advanced in physical and military sciences.

Following the collapse of Soviet communism in 1991 the West, sensing that Adam Smith had beaten Karl Marx, urged upon the Newly Independent States (NIS) the necessity of democracy, market economy and privatization. The assumptions that this package would be an automatic success have been shown as false. Proven success of this package in the West was not a guarantee. The West totally failed to understand the culture and mindset of the people after 70 years of Soviet style communism. The 12 years from 1991 to 2002 in Russia, Ukraine and the NIS have been and continue to be extremely difficult. The food system remains in chaos, people are hungry and food is still imported for the very few who can afford it. Why? Because the changes did not empower the common people enabling them gradually to change the existing system themselves. On the other hand the Western economic model has become established, with much pain, in the Central

European Countries. The lesson we must learn is that for the food system, there is no single model to suit all countries and conditions. Plurality by adaptation to local conditions is essential.

EMPOWERMENT, DEMOCRACY, MARKET ECONOMY AND PLURALITY

Western society today places great emphasis upon democracy, and the market economy as winning formulas in the public domain of socio-economic systems. Western society also emphasizes plurality in private choices. In our highly-motivated attempts to ensure the world is fed in coming decades we, in the West, must allow the stakeholders in developing countries to choose what they want (democracy – of which there are many forms); and alternative forms of community (plurality). We must also be cautious about forcing sudden and complete adoption of the Western economic model (market economy) as a package for changing the global food system. While the package may suit other consumer products, food is probably the most difficult of all sectors to transform. The art and science of the true economist is to present the costs as well as the benefits of any economic change which always involve trade-offs producing winners and losers.

The most effective way to help anyone or any community is to empower them. Then they help themselves. True education, in contrast to simply giving information, is built upon this principle. The best development aid in agriculture has always been to empower people to feed themselves. The essential design feature of any food system, national or global, is to empowering poor people to produce their own food. The existence of poor people today and the prospect of billions more joining them in poverty in developing countries make it imperative to support them with the means of feeding themselves. The concept of the West selling food to the poor in a global trading system is not a sustainable option.

Examples of the empowerment approach to poor rural people in the developing world may be found in biotechnology. Two billion people have no access to electricity. Three billion people depend upon wood, charcoal or dung for energy. Biotechnology could be researched to provide new technologies to provide energy using local resources. This empowerment would release much daily manual labour for other activities including the improvement of traditional food production systems. But sadly the private biotechnology sector in the West is committed almost exclusively to the promotion of genetically modified (GM) seeds as the solution to feeding the poorest millions in Africa and elsewhere. Such simple communities have no capital and are unable to buy GM seeds at this stage of their development.

Research with public rather than private funds is needed to produce new biotechnology which could empower local people. This view is supported by ISNAR, (2002) which also recently launched the Sustainable Livelihoods Framework to consider the vulnerability, context and policies and thus to identify how biotechnology can best help poor communities in developing countries. A further positive example is found in the biotechnology research and development of the Joint FAO/IAEA Division in Vienna by targeting some traditional problems of infertility and inadequate nutrition in tropical livestock without trying to move labour-intensive community systems into capital-intensive systems.

PRIVATIZATION, BIOTECHNOLOGY AND CONTROL OF WORLD FOOD

Today the world faces a new challenge to the sustainability of its food supply. This challenge has its intellectual origin in the West. It is the movement which wants to classify food together with all other consumer products in modern society such as electronic equipment, automobiles, houses, furniture, travel, recreation, etc. That attempt is as foolish as trying to view food as part of the

Commons. Food is clearly in a different category from either normal consumer good or the Commons. Food is unique. There are substantial reasons why decision-making cannot be dominated by one sector, such as the private sector or science alone. They must be partners with the public sector and the other stakeholders. Allowing the private sector and trade to dominate world food will place its sustainability at risk.

But privatization of the world food system is nevertheless the intent of some Western governments and is the ambition of some multi-national businesses. The process of privatizing the world food system is debated in the WTO, by the G8 group of governments, and is advocated by some economists and some scientists. Several multi-national companies, with budgets and capitalization larger than some developing countries, have already started to use biotechnology to colonize the food system, especially the staple foods – corn, soya and wheat - which they argue is the only way to feed the world in the future (Hodges, 1999, 2000). Many developing country governments are fearful of this movement. Some Western governments support this view. Their fear is that, unless they support the new concepts, they will be left behind in the economics of the biotechnology race.

Privatizing world food is a specious argument, apparently sound and convincing but which, in reality is fallacious. The world food system is far too complex and vital to human life for key decision-making to pass into the hands of large-scale business where major control rests with a few people whose agenda is share-holder profit. As we know, decision-making in food systems involves a multitude of people integrated into a complex but mainly successful system. To allow one small group in the private sector to make key decisions will lead to a new type of lost sustainability. To understand this we must first understand the implications of the ideology driving the movement to privatize the world food system. This ideology is market economy capitalism (MEC).

MARKET ECONOMY CAPITALISM (MEC) & GLOBALIZATION

Market Economy Capitalism (MEC) has proved to be the most successful means yet devised by mankind for increasing overall material wealth. In recent centuries under MEC the developed world has increased human wealth, at first slowly and then accelerating astronomically. It is a remarkable success story. But MEC does not possess built-in mechanisms for equitable distribution of newly created wealth. Basically MEC is a ruthless system built upon self-interest. It is a product of social Darwinism. The successful thrive; the weak perish. MEC is efficient at producing material goods at low cost. But, pushed to the extreme, MEC shows some negative consequences even for the rich survivors. We are all aware that MEC is unsustainable when applied without restraint to the use of natural resources. That issue lies at the heart of several current international concerns such as: climate change, oil spills, deforestation, depleted fishing grounds and lost biodiversity.

We are learning the hard way that the negative consequences of uninhibited MEC adversely affect the Commons – the natural resources of the world which most people regard as human heritage. Privatization challenges ownership of the public Commons and uses legal means such as intellectual property rights and patents to possess them for use by business (Food Ethics Council on TRIPS, 2002). Exploiting the Commons with unrestrained MEC often results in suffering by people who do not gain the benefits. The negative aspects of globalization and privatization also include the flow of benefits away from local people to those in more distant locations and economies. While able to increase overall wealth, globalization and privatization are, by nature, liable to divide the world community rather than bring it together. The main beneficiaries of unrestrained MEC are generally a relatively small group of outsiders. This is not a good model for a successful food system. Sustainable food systems always suffer by division whether caused by war, social or ethnic

strata, or economic discrimination. Food systems need political and economic peace and co-operation for sustainability.

Wise people see this paradox. The thoughtful recognize the main deficiency of MEC arises from the value system at the core of its success: self-interest. Even within a country, untamed MEC does not serve well the whole national community. It divides and widens natural economic differences by multiplying the prosperity of some and separating them from those who are poorer. Naked MEC increases the gap between rich and poor in a country. When MEC is applied globally, as Singer (2002) describes it, the electronic herd of currency brokers, stock and bond dealers and analysts for the multi-nationals moves in with ruthless self-interest. While this is undoubtedly the way to make fast money out of other people's money, it is not a realistic infrastructure for feeding the world. As the staunch advocate of MEC, Nobel Prizewinner, Milton Friedman has observed: "The most basic truth about globalization is that no-one is in charge". That is the complete opposite of sustainable food system communities.

THE MAIN DEFICIENCY OF MARKET ECONOMY CAPITALISM

MEC is a wonderful system for creating material prosperity in consumer goods. Without doubt, its benefits are potentially great and in some cases are increased by globalization and world trade. This fact underlies the assumptions of the WTO. But in the process MEC breaks up community. That is, as yet, an unsolved problem. This difficult issue is at the heart of the debate between alternative political parties and systems of government. Everyone wants the proven economic prosperity of MEC but politicians are constantly challenged to balance this prosperity with equity. Europe has made more attempts than the USA to cloth the ruthless aspects of MEC and gain a more just society economically. As Robert Kagan said recently "Americans are from Mars; European are from Venus".

The arguments for making MEC the driving power of the future world food system are simplistic. They are based upon the evidence that MEC has produced unprecedented quantities and varieties of consumer goods in the developed West. But this simplistic view ignores the negative characters of MEC which would have appalling effects in the food system. First, MEC is subject to economic cycles, to bull and bear experiences, to over-production and depression, to high and low interest rates, to fluctuating levels of employment, to inflation and deflation. These severe negative characteristics disrupt the economic system. The market for non-essential consumer goods can absorb these swings, but the food system cannot be subject to such uncertainties.

MARKET ECONOMY CAPITALISM AND SUSTAINABILITY

It is argued that MEC is robust and always recovers. But the price of that recovery can be very severe. The bull market in the 1990s eventually collapsed and will no doubt recover in time. But the reduced and even lost pensions of millions of people will never be recovered. In the last decade millions of new individuals and families were attracted by the prosperity of the stock market, which is the hub of MEC. They invested, gained temporarily and then many lost their savings and now live a reduced quality of life. It was the excesses and greed by some Western banks that over-invested their capital in developing country economies, such as Mexico, leading to the collapse of the Savings and Loans Associations in the US. These institutions were sustained artificially, outside MEC principles, only by governmental intervention requiring billions of dollars of public funds to save them. Most recently the excesses within the framework of MEC have led to the largest bankruptcies in US history with negative repercussions throughout the world.

Consequently there are now moves to introduce stricter regulation of the US securities market. Who is going to regulate the world food trade to avoid excesses?

These features of MEC are part of its inherent nature. This is perhaps the price of increased wealth creation and material prosperity. But governments, especially in the US, are now deeply concerned about the ethical behaviour (greed) of decision-makers in MEC which causes suffering and instability.

A GLOBALIZED AND PRIVATIZED WORLD FOOD SYSTEM?

Is it a good idea to privatize and globalize the world food system? Will it be sustainable? Can unrestrained MEC be the driving power of the world food system? These questions lie at the heart of this paper. They are not easy questions. There are many factors to consider.

There are no convincing rational arguments for placing the world food system into such risk. Increases in food supply need to be linear not cyclical. Making unregulated MEC the main driving force in the world food system would bring a new and catastrophic form of cyclical unsustainability. The debate needs a more profound understanding of existing food production systems before key and irreversible changes are made. Our Western society today is impatient for change. But wisdom calls for reflection on the past. Therefore we now review briefly the remarkable story of agricultural development in the West.

DEVELOPMENT OF NATIONAL FOOD SYSTEMS IN WESTERN SOCIETY

Production of locally grown food in a traditional mediaeval European village community changed very gradually over many centuries into the present integrated system. This change was accompanied by industrialization, by the movement of people from rural to urban areas, from food production to manufacturing. These changes were brought about under the overall economic and political philosophy of Market Economy Capitalism (MEC) within emerging democracy. This powerful combination underlies much of the wealth generation and increased standards of living in Western society from the 17th century to the present. Within this remarkable success story there are two key points which we must never overlook in our enthusiasm to transfer our system to the poorer countries.

1. Changes in the food system were slow.
2. These changes were fostered by government financial policies to protect domestic food production capability from the ruthless aspects of MEC and to regulate competition.

During the 19th and 20th centuries governments in Europe and North America sponsored agricultural research, extension agents, subsidies to farmers, tariffs on some imported foods, and legislation to encourage co-operative movements among agricultural producers. These and other steps were taken because national governments recognize that it takes time to shift large numbers of people away from the land and to equip those who remain on the land to be more efficient. But the concept and practice of sustainability in the food system has been well understood by food producers and Western governments for several centuries during periods when populations in these countries were exploding.

Western governments also recognized that stability combined with steady increases in efficiency ensured cheaper food for the consumer – always an important political issue. Even today in Europe and the USA, governments and the EU provide various forms of financial support,

encouragement and protection for their domestic farmers. The lesson from history is clear: opening the food system to uninhibited MEC was not the essential ingredient in a sustainable food system even when the human population in the West was growing rapidly. The mixed socio-economic model, regulated by wise national government policy, produced sustainability in food throughout the developed world for several centuries. As a consequence Western society today has food surpluses and a generally sustainable food system. These facts provide a strong historical and continuing warning against imposing ruthless MEC on global food production and world food trade.

PLANS TO GLOBALIZE AND PRIVATIZE THE WORLD FOOD SYSTEM

But, the voice of history is muted today in world councils. Instead there are strident voices which tell us that the best way to feed the world – in fact the only way to avoid starvation – is to allow privatization and globalization to dominate the food market which is it alleged will lead to great increases in world food trade. The arguments come largely from the developed and highly capitalized Western society which now has capacity to export surplus food on a large scale. The US Secretary for Agriculture stated at the 1996 UN/FAO World Food Summit in Rome: “American farmers are no longer producing food for the government but for the world market”. Such a stance is based upon the concepts of division of labour and reduced unit costs. This undoubtedly works in some cases of consumer products. With some consumer goods it can bring benefits to both parties, for example when a Western company closes its production at home and moves the plant to a developing country with cheap labour. There is no such mutual benefit when food and food resources like Genetically Modified (GM) seeds are produced by capital-intensive, low-labour input in the USA. But the concept is being pushed constantly by the USA in the WTO that developing countries must open their markets.

It is essential that special provisions are made within the WTO for agriculture and food to allow those poorly developed countries where human populations are expanding rapidly, to move through the same food system development which brought Western nations to their present position of food surpluses.

Developing countries should be encouraged by the West to follow the mixed socio-economic model used so successfully by the West. When a country is capable of feeding its own people then it is strong enough to join world trade by exporting surpluses and products which are in demand in other countries. This model combines a careful blend of the private and public sectors with a regulated approach to international and domestic food interests.

In summary, unrestricted MEC is notoriously unsustainable and unpredictable in the short-term. In the longer-term MEC has the capacity to recover from economic slumps, to rebuild and to continue. The world food system cannot risk this type of cyclical unsustainability.

PROBLEMS IN THE ECONOMIES OF DEVELOPING COUNTRIES

Many larger developing countries and Russia have encountered huge economic problems in recent years leading to massive devaluations of their currencies, recession, unemployment and lost markets. Although these are problems of the whole economic and financial infrastructures, they also deeply affect the agricultural and food sector. These structural problems have now been addressed in his new book by Joseph Stiglitz (2002) former Chief Economist at the World Bank, former Senior Advisor to President Clinton and Nobel Prize Winner. In essence, Stiglitz rejects what he calls the Washington Consensus with its emphasis upon privatization, liberalization of trade

and capital flows, deregulation and for ignoring the role of government in developing countries. He considers this to be a flawed concept on what makes MEC work. It fails adequately to assess risk and the dangers of increased debt. Stiglitz blames “too rapid financial and capital market liberalization plus failure to provide adequate safeguards on deregulation” – by which he means dismantling the existing system. Capitalism, he says, is always characterized by huge fluctuations and this is true even more so in the developing world. While strong capitalist economies in the West can absorb this, developing countries cannot. Stiglitz concludes that the enforcement of the neo-liberal agenda has shown a spectacular failure to bring prosperity and in some areas has brought more inequality and poverty. There is, he says, not one dominant form of capitalism – which leads us again the importance of a plurality of food systems depending upon the varied local and national conditions. Each country must choose.

CONCLUSIONS

A major factor is not covered in this paper because there are specialist papers on the topic at this conference. The issue is the spread of animal and human diseases which becomes much more critical as a global system of trade in animal products grows.

Feeding the world must be a sustainable activity. The arguments for making market economy capitalism (MEC) the powerhouse of global economic activity are very strong, mainly because there is no better system yet devised by mankind. But MEC has recognized weaknesses even at national levels which are multiplied at the global level. The MEC is not a sustainable system but moves in cycles which are not predictable. Therefore, the pressures which are now emerging to globalize the world food system within the MEC socio-economic system must be treated with suspicion. Lack of sustainability in the MEC system is itself sufficient grounds to argue for special provisions for agriculture and food within the WTO.

Further the basic concept that capital-intensive Western agriculture can supply either food or resources for growing food such as GM seeds runs counter to all the development philosophy of the last 50 years. The aim of that philosophy is to empower poor, rural, domestic producers to feed themselves adequately and then, at a later stage of development, to build capital and a market economy which reaches beyond the borders of extended family and local community. To rush the change from a labour-intensive system into a capital-intensive system will cause lost sustainability. Beyond this aspect there are many in the West with reservations about the use of GM foods for a variety of reasons (Hodges, 1999 and 2000).

In the private sector of Western society the huge multinational corporations, which for a while designated themselves Life-Science Companies, are newcomers to development agriculture. They decided that the only way to save the world from famine is to promote the use of biotechnology, especially GM seeds, in food production. The arguments for and against this position are not conclusive. Doubtless there are very good prospects for using biotechnology to solve some of the long-term intractable problems in crop and animal production as advocated by Hodges, (1986). However the enthusiasm of the private sector to make money from their science is premature and could have a highly disruptive effect upon the sustainability of feeding the world. There is no evidence of a new emergency and, at present, there is adequate food and further potential for feeding all the peoples of the world from conventional production systems, for example by bringing Ukraine back into conventional grain production.

In the global food system there is a place for the large-scale intensive operations as well as for the small, often family-sized rural system. The pressures to promote the efficiency of the former

should not reduce the sustainability of the latter which is the system which feeds billions in many developing countries and is likely to continue for many decades.

REFERENCES

Food Ethics Council. 2002. TRIPS with everything? Intellectual property and the farming world. Independent Council for Ethical Standards in Food and Agriculture, Minister Chambers, Church Street, Southwell, Nottinghamshire, NG25 0HD, UK.

Fukuyama, Francis. 1995. Trust: The social virtues and the creation of prosperity. London, Penguin.

Hodges, John. 1986. Prospects for using biotechnology for livestock improvement. *World Anim. Rev.*, 56. 2-10.

Hodges, John. 1999. Genetically modified food muddle. *Livest. Prod. Sci.* 62: 51-60.

Hodges, John. 2000. Polarization on genetically modified food. *Livest. Prod. Sci.* 63: 159-164.

Hodges, John. 2002. Connectedness and community in the food chain. *Livest. Prod. Sci.* 75: 59-62.

ISNAR 2002. Briefing Paper 54. Biotechnology and sustainable livelihoods – findings and recommendations of an international consultation. ISSN 1021-2310. Laan van Nieuw Oost India 133, 2593 BM The Hague, The Netherlands.

Malthus, T. 1798. An Essay on the Principle of Population and a Summary View of the Principle of Population. Flew, A. (ed. 1970) Re-issued Penguin Classics, London 1985, pp. 1-291.

Moore-Lappé, F.J, Collins, P. Rosset and L. Esparza. 1998. 12 Myths about Hunger based on World Hunger: 12 Myths. 2nd ed. New York: Grove/Atlantic and Food First Books.

Singer, Peter. 2002. One world: the ethics of globalization. Yale University Press. USA.

Stiglitz, Joseph. 2002. Globalization and its discontents. Allen Lane.
