



Globalisation and the sustainability of farmers, livestock-keepers, pastoralists and fragile habitats

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In the second half of the twentieth century, industrial agriculture together with the integration and globalisation of the food chain successfully increased the quantity of food and reduced unit prices to the consumer in Western society. Many policy-makers now advocate expansion of this industrial model into the developing regions as the only feasible way to feed the 9.6 billion people expected by 2050. However, industrial agriculture is unsustainable, costly and damages the environment. Expansion of this food production model to Africa, Asia and Latin America will force migration to the cities of several billion people from small farms, including those who manage dryland habitats and other fragile ecosystems, thus exposing these rich areas of biodiversity to neglect or abuse. The alternative way to increase world food supply is to empower small-scale farmers and pastoralists, a policy endorsed in principle by governments in 2012 but lacking major implementation to date. Proposals are made for realistically redressing current economic policies for agriculture and food to empower these historic guardians of agro-bioresources so that they may increase food security and ensure the conservation of vast areas of dryland and other natural habitats.

Keywords: small-farm; pastoralist; ecosystem; biodiversity; industrial agriculture; globalisation; empowerment; sustainability; food security

Introduction

The exploding world population is expected to plateau at 9.6 billion by 2050 (UN 2014). The natural resources needed to feed so many people are available globally, and the world can be fed provided the resources are managed intelligently with wisdom as well as knowledge. Policymakers and governments commonly think that science and free-market economics are the keys to solving the problem. While appropriate science and economics are essential, alone they are unlikely to succeed and will inevitably lead to other costly and unacceptable consequences. Why? Because there are other components which must be included in the equation for overall success. Policies, programmes and projects for food must do more than produce sufficient calories and protein to satisfy 9.6 billion people. The consequential costs are too high when, in the process, ecosystems are destroyed, biodiversity is irretrievably lost, land and water are exhausted and polluted, and significant contributions are made to global warming. Conserving the resources of the biosphere to ensure sustainable human life in perpetuity is equally as important as producing food. Sustainability must remain at the centre of agriculture. Sustainability means increasing the output of healthy and nutritious foods and improving the life quality of farming

communities by activities within the capacity of the supporting resources without destroying or depleting the natural environment. The older concept of good husbandry met these standards. Today, it is recognised that the overall system of intensification of food production in general is depleting the Earth and incurs costs that are not included in the market price of food. A few holistic policies for intensive production have been shaped to limit damage and loss to the natural resources; but the engine driving intensive food production today does not include components to avoid these serious, negative consequences. The issue will remain a global problem while governments do so little to regulate business and the free-market that together now drive the international food chain.

However, in addition to loss of the Earth's natural resources, there is another important issue which is overlooked when policies for feeding the world are decided. This is not a trivial or irrelevant detail, but a major issue: it concerns the human and social capital located in the huge population of 2.5 billion people on small farms in the rural communities in Africa, Asia and Latin America (FAO/WB 2001). Globalisation places these farming folk at risk of losing their ability to farm; and the world is at risk of losing this vital human resource that will be

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needed for food production when the present global scenario changes.

Viewed in the longer term, the typical globalised intensive agriculture models for feeding the world that are currently favoured and promoted by many policymakers, businessmen and governments are simply unsustainable. Business models that focus only upon increased food output without including drivers that respect social and environmental issues have seeds of destruction built into their DNA. The model with profit alone as its driver inevitably leads to rapid increases in scale of production and has already disposed of the majority of small-scale family farmers in the West; the few remaining struggle to survive and the exodus continues. These models are already doing the same in the developing world. Because agriculture and food are integrated systems at the heart of sustainable life, the loss of traditional farmers and farming communities is linked to the loss of the natural resources; it is a systemic loss. Good farmers not only produce food, they also care for and conserve the agro-resources they use and the ecosystem of which they are a part. The conservation of dryland areas, together with other fragile ecosystems, has always been linked with the socio-economic system within which the people live and market their food products. For centuries this local or national process of trade has been a relatively stable system providing, in most cases, conservative, sustainable management of the natural resources. Since 1995 the movement to globalise world trade has grown. Globalisation is an economic ideology and process which, to date, has specifically excluded social issues. The economic globalisation of agriculture and food aims to include all the components of the world food chain into a single free market. These components include the classical economic resources of land, labour and capital - of all types. The concept of a free market excludes tariffs, taxes and subsidies and unrestricted movement of goods, services, people, capital, profit and information. Although the totally free market has not been achieved in agriculture and food, the process of globalisation has encouraged national businesses historically working within countries to consolidate into multinational corporations operating globally. Increasingly they own activities upstream and downstream from the farms thereby moving towards vertical integration and place further pressure on farms to intensify and increase the scale of production. Thus, globalisation of food sweeps farming, biodiversity and ecosystems into its orbit. The consequences flow back to the ecosystem and challenge its survival.

This paper addresses the impact of globalisation on the dryland and other vulnerable ecosystems by analysing the impact of globalisation of food upon the small-scale family farmers and pastoralists who live there. Aggressive competition from the industrial, intensive

model of food production damages the economic prospects of the small-scale farmer and pastoralist driving many to move from rural areas to the megacities of the developing world. As a result of this radical change in activities and lifestyles of small-scale family farmers, the world community loses their traditional knowledge, values and culture as well as their care of the natural resources they tend.

The challenge lies in human behaviour, specifically in the type of socio-economic system society chooses and the way it is regulated. The increasing levels of education for the general population, especially in Western society over the last century, emphasise an indisputable fact: appropriate knowledge is power. It is self-evident that knowledge can be used ethically or non-ethically. The record of human civilisation shows that when used wisely in the interests of the community, knowledge brings prosperity and stability for all. But knowledge used solely in self-interest results in unsustainability, human suffering and ecological damage. Today, the most powerful economic resource is financial capital. Expert knowledge on how to use financial capital in the global market gives an individual, multi-national company or government disproportionate power to shape socio-economic events. This great power in a few hands is dangerous, as shown by the financial and banking crisis throughout the West that started in 2008. Globalisation of banking without market regulation encouraged unethical policies and behaviour leading to unsustainability, disorder and suffering.

In recent decades the food chain has been increasingly globalised and handed to unrestricted free-market forces. That decision encourages unlimited expansion of industrial food production – a system which yields high return on capital but brings with it some disturbing and unsustainable negative consequences to human social organisation and natural resources. Opening the oldest and most important human activity, namely food production, to unregulated free-market forces on a global scale takes opportunity and customers away from the experienced hands of small-scale family farmers and livestock producers in the developing world and gives control to an elite group in society who direct capital. The major impact is loss of market and of future market opportunities. In recent decades, small-scale food producers have become victims of ‘land-grabbing’ and ‘water-grabbing’ particularly in Africa but also in Asia and Latin America. Rich individuals, companies, sovereign wealth funds and some governments buy the best agricultural land and water sources, often at minimum prices. Pearce (2012) documents this practice over the first decade of the twenty-first century in 62 countries. The new owners create large-scale intensive plantations of crops and large livestock production units with high inputs of capital, technology and intellectual resources using minimum

local labour and controlling distribution channels and markets. The declared self-interest of large multinational businesses is profit; feeding the world is but a by-product - a means to that end. When economic circumstances change and profits disappear, the business venture will be folded. Then the small-scale farmers will again be needed, but they will no longer be available at such future times of crisis.

What is the answer? Instead of being replaced, small-scale farmers, livestock producers and pastoralists need to be empowered. Currently, they produce about 70% of global food (FAO 2013a). In each country they are national assets of great economic and social value using their traditional knowledge, local resources and experience to produce food sustainably. They are easily neglected and depleted for they are dispersed and poorly organised economically and politically. But they are the custodians of dryland and other important food producing ecosystems throughout the world. Without resident custodians, these extensive natural resources will either be abused or neglected. The resources include the grass and croplands at low elevations in dry, subtropical and tropical areas and the higher natural pastures of the mountains, plateaux and forests of the world. Some dryland pastoral systems at remote high elevations are under pressure from national socio-economic policies of a different type from those caused by globalisation. For example, in some dryland pastoral areas of the Himalayas, traditionally managed by nomadic herders, the government is removing them from the land and rehousing them in artificially created concrete villages, allegedly to provide better health care, but where closer political control can be exercised. Such policies not only place the ecosystem in danger but also forego the harvest of natural vegetation as meat and milk for human consumption.

The only rational and practical answer to these multiple challenges from globalisation and industrial agriculture, which are destroying the ability of traditional small-scale farmers to survive, is empowerment enabling them to compete and to contribute more effectively to sustainable food production. Empowerment means changing the socio-economic and financial environment in which small farms operate by making available the means for them to help themselves. The aim of empowerment is to enable them to become more effective by sustainably producing more food for family consumption and for sale, thus providing them with income to lift the quality of family life and of their rural communities. They need empowerment appropriate to their circumstances to increase their productivity and to preserve their traditional ways of life, their natural crop and pasturelands and the environments. This paper analyses the situation and discusses options for empowerment of small-scale farming and its impact upon biodiversity and fragile ecosystems. First, some important background

information is given on the role of livestock, on the origins and momentum of the agro industrial revolution and globalisation and on social capital, traditional knowledge and food security.

The role of livestock

Civilised life started with settled agriculture about 12,000 years ago. Since then farming systems which are integrated into the local ecology have been developed in a huge variety of ways leading to diverse cultures, diets, traditions and work activities. An outstanding common feature of all these traditional farming systems has been the integration of crops, livestock and poultry with local biodiversity, land and water supplies, broadly described as mixed farming. By contrast, intensive industrial agriculture frequently breaks up the integrated model and designs large scale, single purpose production units. Thus, intensive agriculture moves into monoculture. A crucial factor of this reductionist policy is the removal of livestock and poultry from the process. Their vital role for food and conservation of ecosystems is now briefly considered.

Livestock play a central role in providing quality of life for humanity. Domestic livestock and poultry contribute health-giving proteins to the human diet, principally meat, milk and eggs. The urban consumer today buys these products in a convenient form and has little contact with or knowledge of the animals which are kept in other locations. But half the population of the world still live in rural areas where food production is mainly practised on small and medium-scale family farms where livestock and poultry are integrated into the mixed farming system or in larger flocks and herds under nomadic and transhumant systems. In these agricultural communities animals contribute immensely more than food to the quality of life: they work on the land, transport people and goods, provide wool, leather and other clothing and, in many parts of the world, manure from cattle, yak, camel and other ruminants is valued as fuel. Ruminant livestock have a unique role in harvesting natural forage which would otherwise not enter the human food chain. Understandably in simpler rural communities livestock have often served as currency and as a wealth bank. In the early days of human civilisation when wild animals were first domesticated, livestock were integrated into the lifestyle of the community. In fact, the domestication of animals was a major factor empowering humans to move from hunting and gathering to settled agriculture; and later, livestock were key resources in the slow but vast migration of people over the whole earth. A major consequence of this long historic process is the traditional knowledge based upon millennia of experience which has been an indispensable resource for sustaining local management practices. While these management

systems are capable of improvement, it is false to view them as old-fashioned and therefore obsolete for modern development and increased food production. For billions of people today in poorer rural areas of Africa, Asia and Latin America this close interdependence with their livestock, land and local biodiversity remains vitally important for life itself. Many livestock-keepers manage traditional species and breeds on natural and sown grasslands at low elevations and use the by-products of local crops as supplementary feed; while at high elevations, for example in the Andes and Himalayas, these pastoralists are the natural custodians and managers of the environment and natural vegetation.

Throughout human civilisation livestock have been a major resource in sustaining community life and conserving the natural environment. But today these historic mixed farming and pastoral systems are threatened by the new forces of globalisation that favour large-scale crop plantations and the intensive industrialised animal production system.

Farming practices and agro-ecosystems are quickly destroyed by the introduction of large scale food production systems which by their very nature require external inputs of water, chemicals, fossil fuel and access routes to move in and out the large quantity of needed physical resources and products – all with the aim of producing food at cheaper unit cost. Small-scale family farmers, livestock keepers and pastoralists are endangered by this new model. Main threats are the loss of their livelihood and of their prospects for entering the rapidly growing markets in the cities of developing countries which are being colonised by Western supermarkets with imported food from industrial farm systems. These Western supermarkets, sometimes in partnerships with newly formed supermarkets in Africa, Asia and Latin America, aim to dominate the food supply in the huge and growing city populations in these countries (FAO 2004).

Origins and momentum of the agro-industrial revolution

An understanding of the nature and challenge of industrial intensive agriculture is enriched by some historical background. The agro-industrial revolution slowly emerged in the West about 200 or 300 years ago. In 1700 more than 50 per cent of the population in Europe lived on the land, while in America, still a British colony, the farm population, including slaves, was 90 per cent of the total. Gradually new sources of energy became available for use on the land replacing farmers' own labour and power from domestic animals, water and wind. Steam power, oil and chemicals were introduced to the farm, thus releasing farmworkers who migrated from the land to urban centres for work in the newly established factories. Western society gradually changed

from agriculture to manufacturing so that today in the USA farming employs less than 2% of the population (USDA 2008). Industrialisation presented Western governments with a new problem: how to feed the rapidly growing city populations with high birth rates who no longer had access to the land. At the same time, many governments in Europe and North America realised the danger of depleting domestic agriculture. In different ways they began to provide substantial financial and technical support in the form of grants and subsidies to empower farming families. This support had two major aims: to provide enough cheap food for the exploding urban population and to maintain agriculture as an essential national heritage of great value. This investment in family farms was provided in many innovative ways. In the nineteenth century, for example, in each state of the US, Land Grant Colleges were established by the federal and state governments to provide teaching, research and extension in agriculture. They continue today.

In many European countries in the nineteenth century, governments and some private individuals established the first agricultural research institutes. Demonstration and husbandry farms were opened to show farmers how to use new technology appropriately in local circumstances. Grants were made to encourage farmers to use new techniques; for example, with farm animals for better nutrition, reproduction, breeding, quality forages, disease control and hygiene in milk and egg production. Similar examples of appropriate technology were subsidised for good husbandry of land and crops. Governments also set up infrastructures to facilitate farmer cooperatives. Overall, these innovative programmes were highly successful, for although farm workers migrated to the cities, family farmers were kept on the land by empowerment enabling them to produce more and cheaper food for the exploding urban populations. These programmes prevented the famine predicted by Malthus (1798), provided economic stability and averted social unrest. These are lessons for today in Africa, Asia and Latin America. Governments, UN intergovernmental organisations, development agencies and NGOs should likewise empower poor, small-scale farmers, protect domestic food production capacity and avoid hunger in the burgeoning cities. In the developing countries nearly 3 billion – 50% of the population – live in rural locations and 2.5 billion of these live in farm families (FAO/WB 2001). These family farmers, livestock keepers and pastoralists are a national heritage of great value.

The dangers of allowing small-scale and family farms to disappear are evident from British government policy from the end of the nineteenth and beginning of the twentieth century at the height of the British Empire when vast quantities of food from cheap labour were imported from the colonies. It was an early type of globalisation;

and British agriculture was sacrificed to the extent that, at the start of the Second World War in 1939, the UK produced only 60% of its food. War reduced access to imported food. Food was short and rationed. A new hasty programme to revitalise British farming with financial and technical support was started, but this takes time and food rationing in the UK did not end until 1954, nine years after the end of the war. Governmental inputs to Western farming continue today through the EU Common Agricultural Policy (CAP) supporting farming and, more recently, care of the environment. American agriculture also receives substantial financial support from government. In total in 2012, the countries of the Organisation for Economic Cooperation and Development (OECD) provided \$258 billion in agricultural subsidies (World Watch Institute 2012). The tragedy of this continuing financial support is that most of it now goes to large-scale production units often owned by companies, rather than to small family farms (McCullough, Pingali, and Stamoulis 2008; World Watch Institute 2012).

However, in the 1960s a change with massive repercussions took place in Western agriculture: multinational business was attracted to the food chain because of its size, guaranteed market and profitability. The West was no longer short of food and governments were happy to withdraw from regulation in favour of commerce and the free market. Whereas government programmes had introduced fossil fuels, chemicals, improved seeds and management systems, business brought in external capital to replace farm labour with emerging technology and mechanisation and to increase the scale of production, leading to larger farms with employed managers and remote owners. As a result of these structural changes, most small family farms in the West have disappeared. For 50 years governments encouraged this process and today the food supply chain in the West is market-driven. Farmers are dependent upon contracts with large multinational companies for upstream supplies and with supermarkets for sale of farm products. This system of farming now known as the 'intensive food model' is sometimes described as industrial farming. This intensive model has been so successful in producing an abundance of cheaper food and profit for large corporations that it has been taken beyond its capacity to deliver sustainably, resulting in neglect of good husbandry, abuse of the environment and animal welfare issues. This so-called 'cheap food' comes at high cost to society. This scenario has caused many policy makers and governments to think that the intensive model combined with globalisation is the answer to feeding the world. It has become the favoured model of 'development' for Africa, Asia and Latin America using technology transfer and imported capital. It has little to offer the small family farmer who has been largely neglected in development programmes.

Origins and momentum of globalisation

Globalisation is a powerful force in the world today. As an all-embracing worldwide system, it is very new. The formal movement to globalise trade originated in the West and started toward the end of the twentieth century. In the 1990s, globalisation was adopted by many governments and businesses as a universal economic ideology and applied to almost all tradable commodities and services including food and agriculture. Governments founded the World Trade Organization (WTO), an inter-governmental organisation (Narlikar 2005) whose only mandate is to promote globalisation. To become members, national governments must remove barriers to trade. Globalisation is based upon the economic principle of Comparative Advantage (Ricardo 1817) that can offer great benefits, especially for manufactured goods. The aim of globalisation is to make the world an open marketplace for everything. Goods and services are produced where they are cheapest and shipped to customers throughout the world. Globalisation has elements of an ideology whose believers consider it the key to economic prosperity. It is an untried hypothesis. Globalisation depends upon oil, rapid transport, mobile capital and instant communication. Shipments by air, sea and road contribute substantial volumes of greenhouse gases adding to the burden carried by the whole world. The dominant resource in globalisation is capital which makes land and labour subservient. In the globalised economy capital seeks maximum return which is normally repatriated away from the country of investment. Globalisation of food has only two drivers: cheaper food and profit. These are short-term objectives and are unsustainable as they fail to take account of the external, unrecorded costs to the environment, lost biodiversity, global warming and the human suffering caused by the destruction of existing sustainable farming systems. The worldwide open market undoubtedly results in cheaper manufactured products although shipping costs, minimised by large-scale, must be added. For agriculture and food, globalisation offers the apparent benefits of cheap food but with substantial negative consequences and a limited horizon of success.

In the agriculture and food sector, globalisation typically leads to plantations for crop production; and for animals it results in large-scale mechanised units using fossil fuel in which livestock are crowded on minimum land with little caring labour. These livestock units hold tens of thousands, even hundreds of thousands of livestock or birds in one location. Such units cannot be supported by land in the vicinity. Feed must be trucked-in while manure must be trucked-out. While the European Union has regulations to control excessive use of manure per hectare – a topic reviewed by Oenema (2012) – authorities in many developing

countries give this issue little or no attention. Animals are bred and managed for a short life and slaughtered leaving huge quantities of offal while animal products are shipped to distant world markets through the vertical integration of multinational companies. This mass production monoculture needs animals of similar age, gender, size and genotype and must be supplied with uniform feed crops all of which leads to narrowing of the genetic base of crops and livestock and the loss of indigenous genetic resources. Research currently seeks a commercial cloning technique for animals as the globalised free-market system likes uniform products. This intensive system not only destroys the traditional relationship between animals and their keepers but also causes deep concern over animal welfare and biodiversity. Globalisation often results in livestock production units that are beyond the legislative reach of the countries supplying capital and markets. Without doubt this freedom from compliance to foreign laws and the absence of enforceable international laws reduces the costs of animal products particularly in standards of employment, animal welfare and environmental pollution. But there are external costs that bear heavily upon people living in the country of production. Clearly the impact of globalisation is vast and reaches every corner of the earth, even having a major impact upon remote drylands and other fragile ecosystems.

The practice of globalisation under the legal provisions of the WTO is new. Like every human innovation it offers consequences of two types: unknown new effects and loss of existing benefits. Wisdom is always needed to apply new knowledge constructively. Wise leaders seek balance and harmony and are careful to ensure that enthusiasm for unproven novelty does not destroy the existing stability of society. Wise leaders also plan an exit strategy. In the modern world, national leaders responsible for the food chain carry enormous responsibility for the long-term good of huge numbers of people. They need long-sight to see beyond immediate economic prosperity and evaluate the social impact. Confucius (551–479 BC) called for moral behaviour by government and leaders to build harmony, justice and equity for society by retaining the best of the past while slowly introducing changes to bring about better human cooperation in work and neighbourly relationships. Such harmonious values and behaviour leads to higher quality of life that includes more congenial living conditions, healthier diets, reduced infant mortality, sanitary facilities, moderate labour, longer life expectancy, improved education, less stress and other associated benefits. Such ancient wisdom is especially needed today in relation to the impact of globalisation upon family farmers and traditional livestock-keepers, their pastures, natural ecosystems, historic cultures, quality of life and the needs of the future.

Social capital, traditional knowledge and food security

Agriculture and food, as the oldest activities of civilised society, have created social and intellectual capital, often called traditional knowledge, which is bound up with the management of local natural resources of land, water and biodiversity. This social capital is essential for sustaining human cultures and values but is poorly valued in modern market-economics. Globalisation of agriculture and food is undermining these ancient relationships and neglecting the wealth of human capital located in farming communities. Unless modified or regulated appropriately, the globalised intensive food chain will destroy much historic human capital, traditional knowledge, bio-resources and ecosystems. Once lost, they cannot be regained. The situation is serious. Food is not an optional extra for life and civilisation. The food chain is not too big to fail. Like the banks, it can be overstretched and collapse. In the world today half the people live in cities (UN 2014). Food supply to cities in the West is dependent upon a sustainable capitalist and free-market economy system. When the global food chain eventually collapses there will be immense chaos and panic. Many people will suffer as they did in the 2008 financial and banking collapse. Governments were able to put the financial system back on track again by printing money and by massive financial injections. When the food chain collapses there is no vast store of food sufficient for years that governments can release onto the market, as was the case for the Biblical patriarch Joseph during seven years of famine in the time of the Egyptian Pharaohs (The Bible, Joseph). Today, world stocks of grain are rarely more than enough for one year. A modern famine in the urban areas of society, caused like the financial crisis by blind greed, will bring misery and hunger to billions of city dwellers. It is incredible that business and government leaders who promote the case for further intensification and globalisation of food appear blind to the growing vulnerability to famine of the cities where they live. Pursuit of ever cheaper food by the intensification model is unsustainable and will rebound on those who promote it.

Ethics: the heart of the issue

Since settled farming gave birth to civilisation, a sustainable and secure food chain from production to consumption has always depended upon good relationships between people. Ethics are central to human relationships. Positive behaviour builds community, whereas selfish behaviour degrades and destroys community. Ethics is not an abstract philosophical or ideological construct but a practical way of living to ensure harmony in life. Ethical behaviour was defined simply and powerfully by Jesus: 'Do to others what you would like them

to do to you; do not do to others what you would not like them to do to you', which has become known widely as 'The Golden Rule'. If the global food chain is to be successful and sustainable it must be built upon this ethic. Today we all live in a world described by Marshal McLuhan in his 1960 books as 'The global village' where everyone is our neighbour. The alternative of concern for neighbours is ruthless self-interest. This is already the characteristic of the unregulated market-driven economy in which competition and self-interest are encouraged and where international trade can easily operate outside national laws. Capitalism has more advantages and fewer disadvantages than any other economic system, particularly in the creation of wealth. But capitalism fails in the equitable distribution of new wealth and is particularly weak in those sectors of the economy, such as food and agriculture, which are interwoven in the fabric of life. The answer for agriculture and food is not rejection but regulation of capitalism nationally and internationally to take account of social as well as economic issues.

Thinking and acting in the best interest of neighbours can be a positive force in free-market capitalism if practised both by leaders and participants at every stage of the food chain. Clearly in international trade today, such positive behaviour will not be voluntary. The task of ensuring equity and justice lies in the purview of governments. The excesses of self-interest must be regulated to harness the best qualities of capitalism and the market economy. The food chain and agricultural development need ethical cooperation under the rule of law by all the parties. A basic change is needed to ensure that the industrial intensive model and small-scale family farms no longer compete but work together in harmony. Thus, government policies are required that support parallel systems recognised as having equal merit and value. One is the intensive system with appropriate limits and regulations in the global context; the other is empowerment of the small-scale family farmer. The two must work in harmony, whereas at present one is devouring the other.

What is empowerment?

The challenge facing leaders in government, science and business is to recognise that intensive large-scale agriculture is not enough. Family farmers need empowerment to enable them to move into the twenty-first century, get their foot on the capitalist ladder, contribute even more to food production and improve the quality of life in their rural communities. Empowerment must be adapted to their local conditions and resources. Research over the last 12 years, of which that by Pretty, Toulmin, and Williams (2011) is an excellent example, shows that small-scale family producers, when adequately empowered, can produce substantially more food beyond the

needs of their immediate family that can be processed locally, thus adding value and increasing employment. This process increases local wealth and prosperity enabling the community to build a higher quality of life.

Many examples of targeted empowerment can be found from grassroots projects in developing countries in recent decades. Pretty, Toulmin, and Williams (2011) give details of 40 projects and programmes in 20 countries where sustainable intensification has been developed during the 1990s and 2000s with documented benefits for 10 million small-scale farmers with improvements on approximately 12 million hectares. Using targeted empowerment, by 2010 yields per hectare had increased on average by 2.13 times by appropriate management of crops, livestock or fish. The authors consider these results can be effective for many more millions of small-scale farmers and pastoralists. Four examples are briefly mentioned from the authors' experiences as indicators of the way alternative and adapted methods can substantially increase food production from small farms: conservation or no-till agriculture which reduces the use of fossil oil, conserves soil quality and increases yield; the System of Rice Intensification (SRI) which started in Madagascar is now used widely, needs less water and increases yields on average by 25%; grazing land on the banks of the Awash River in north eastern Ethiopia which has returned to livestock production from intensive sugar and cotton is now more productive; and camel milk and milk products are marketed successfully through a locally owned small business in Mauritania. Targeted empowerment is successful.

Empowerment promotes social harmony and gives hope and prospects for improvement to the rural community. Empowering family farmers and livestock keepers is in the national and international interest as it is sustainable, equitable and ethical and is built upon the available human capital.

Empowerment recognised

A major step toward change was taken at the 2012 UN Conference on Sustainable Development (Rio+20) described by FAO (2013a). Governments agreed unanimously in principle to encourage Green Agriculture. This political agreement acknowledges that industrial intensive agriculture alone cannot feed the world of 9.6 billion people by 2050; and it recognises that empowerment of the 2.5 billion in farming families identified by FAO/WB (2001) is a necessary parallel sustainable system. Following this endorsement by all governments of the world, United Nations designated 2014 as the Year of the Family Farm.

A major UN study by 400 independent scientists – the largest ever on this topic – and endorsed by 60 governments concluded that the only way to feed the

increasing world population sustainably is to harness the small farms of the developing world since, in their view, industrial intensive agriculture had reached its acceptable limit (IAASTD 2009).

How does empowerment work?

To implement empowerment it is essential that national governments take direct legislative action and together redirect international development aid by setting-up new mechanisms to provide various types of support including investment in infrastructure, technical and financial inputs, local extension services, research and farmers cooperatives. These can be modelled on the support systems provided earlier in the West to family farms.

The WTO is the best forum for international legal action to provide small-scale farmers with improved support, more protection and empowerment. The WTO rules should recognise agriculture and food as a special case in globalisation; their rules should be modified to take account of social as well as economic realities. The Doha Round could be renewed, not to focus again upon the previous agenda of seeking to remove support to agriculture, which it failed to achieve, but rather to design and instigate creative ways that international trade could itself provide funds for small-scale food producers in the developing world.

Governments of developing countries should follow the policies of Western governments by providing appropriate infrastructure support in the form of roads for access to isolated areas as well as financial and technical support to empower their small-scale farmers, livestock producers and pastoralists. It may be argued that many developing countries are so poor they cannot allocate funds for small-scale farms; international aid is needed to launch empowerment policies. Two options are proposed to facilitate the wider spread throughout the world of empowerment, although there are doubtless alternatives and variations in specific circumstances. First, the existing support facilities, resources and activities of the UN Food and Agriculture Organization (FAO), the UN International Fund for Agricultural Development (IFAD) and the World Bank should be specifically directed to provide funds and technical assistance to developing country governments. These three intergovernmental organisations already have small farms on their agendas; however, the issue is so critical and lies at the heart of feeding the world that small farm empowerment should be given top priority, especially as other important UN programmes such as the eradication of poverty, the place of women, care of the fragile environments, biodiversity, minority groups and other UN concerns are integrated into the empowerment of small-scale farmers. The second option is new; namely, for the governments of developed and developing countries to work together

with the WTO to design new ways to finance the empowerment of small-scale food producers funded by a tax on international shipments of food.

Structural support should be provided by national and local governments for equipping and financing local universities to redirect their teaching and research programs to local circumstances by providing local part-time training for small-scale farmers in the improved management of their resources and the use of appropriate technology. Further, free extension services should be financed and delivered either through universities or by other means suiting local circumstances to reach into the local farming community with empowering resources, information and advice. Free extension services include the formation of groups facing similar problems using lead farmers, demonstration farms, farm walks and discussion groups. Further structural support will include support for farmers to set up their own farmer cooperatives for buying and selling and sharing equipment. Empowerment should be accompanied by investment in local farmer-owned processing facilities, thus providing employment in the local community and adding value to the locally produced products before they are sent to market.

Here are some general observations on the nature, effect and results of empowerment. By giving hope to family farms, empowerment seeks to stimulate deeper personal interest and care of crops and animals for the short and long term. It seeks to turn subsistence farming into a viable commercial enterprise with the prospect of more products for sale in a guaranteed market beyond provision of food for family and neighbours. Empowerment works by harnessing human resources at grassroots level in contrast to most former development policies which tried to transfer industrial style farming and high technology from the West into traditional small farms in the developing world, rarely succeeding. Empowerment practices diversity rather than uniformity by enabling small-scale farmers to make better use of what is already available locally with which the farmers are familiar and which provides foods for regional dishes. These resources include land with its particular characteristics and the bio-resources of indigenous vegetation, livestock and poultry. Empowerment introduces knowledge and technology that builds on the existing competence, knowledge and experience of farmers and avoids taking them suddenly beyond their management skills. The aim is to change the most responsive components of the existing system. Examples are prevention, treatment and possible eradication of diseases and genetic improvement of local livestock instead of importing improved breeds into inappropriate environments where they fail to perform. A further important issue is to use strains of local crops that have been improved by conventional plant breeding so the farmer can use his own harvested seed

for the next crop instead of buying expensive genetically modified (GM) seeds every year which need more external inputs and higher levels of management to increase production than can be provided by the typical small-scale farmer in developing countries (IAASTD 2009). Empowerment assists the small-scale farmer to do better what he already does. Mini-loans are an effective way of introducing appropriate proven technology with minimum use of financial capital. The issue of gender relations is also important because the division of labour in small family farms usually means the husband and wife are both involved in care of crops and animals. By contrast, industrial-scale production employs few workers who are usually men.

Empowerment policy recognises that small-scale farmers are already sustainable; otherwise they would not exist, even though their output per unit is low by the standards of industrial agriculture. Small-scale farmers are short of financial capital and rich in social capital. Work on small farms comes from the extended family which is able to invest more care in individual animals compared with industrial agriculture. Their animal products are competitive in local markets where they are often favoured with higher price for their better quality, flavour and freshness, as reported by many papers for different livestock and poultry species in the special issue on adding value in *Animal Genetic Resources* (FAO 2013b).

Small-scale farms may be able to contribute positively to climate change. Natural grasses are used for part of the year on many mixed farms and for most of the year in pastoral systems. Pastures are effective carbon sinks which make a positive contribution to reducing greenhouse gases. This question needs further research to provide more precise measurements and is currently a major cooperative project in China between the FAO, the Chinese Academy of Sciences, the World Agro-Forestry Centre and the Qinghai Regional Government (FAO 2011). In addition, FAO has a Grasslands, Carbon Working Group (GCWG) with representatives from biophysical and social sciences, farmers' and pastoralists' and development organisations, carbon trading groups and intergovernmental organisations among others to provide science and market-based information for land managers, scientists, development practitioners, traders and policy makers in support of sustainably managed grasslands as a means of adapting to and mitigating the impact of global climate change (FAO 2014).

Conclusion

The world will always need food. Therefore agriculture and food deserve wise leaders of vision in politics, science, business and development in governments, the United Nations, the World Bank and other international bodies. These men and women must see beyond the

immediate benefits of cheap food and legislate equitably for farmers and consumers at the national level and also, through international agreements, protect the rights of small-scale producers throughout the world, thereby ensuring global food supply in decades to come.

Although the changes proposed may seem to be limited to the food chain and the social issues of small-scale farmers, the outflow of the restructured food chain will inevitably have a positive effect upon dryland habitats and other ecosystems which are under threat. One cannot separate socio-economics and quality-of-life from biodiversity and conservation. Life on the planet Earth is community of life. We have to learn again the lessons that our ancestors understood so well that life must be sustained as a whole dynamic and integrated system. Seeking prosperity exclusively for one part inevitably depletes other parts. This clear truth was stated 2000 years ago by St. Paul, an early follower of Jesus (The Bible, St. Paul), who compared humanity to a body that consists of many parts. He pointed out that if one part of the body is hurt, then the whole body suffers; whereas if one part prospers the whole body benefits. This excellent analogy is highly relevant to the current food-chain scenario. The intensive, large-scale food production systems and the multinational businesses associated with them are prospering financially while half the world's poor are found among small-scale farmers (FAO/WB 2001). Unless balance and harmony are introduced to restrain power of the one and to empower the other, the whole of humanity will continue to suffer pain and loss. Small-scale farmers, livestock-keepers and pastoralists are a vital part of the global human community.

References

- FAO (Food and Agriculture Organization of the UN) 2004. "The Rapid Rise of Supermarkets in Developing Countries: Induced Organizational, Institutional and Technological Changes in Agrifood Systems." *eJADE* 1 (2): 168–183.
- FAO (Food and Agriculture Organization of the UN) 2011. "Opening the Door to Carbon Crediting for Restoring Degraded Grasslands." Joint Project with Chinese Academy of Sciences/World AgroForestry Centre/Qinghai Province, China. <http://www.fao.org/news/story/en/item/90042/icode>
- FAO (Food and Agriculture Organization of the UN) 2013a. "Coping with the Food and Agriculture Challenge: Smallholders' Agenda." In *Preparation and Outcomes of the 2012 United Nations Conference on Sustainable Development (Rio+20)*. Rome: Food and Agriculture Organization of the UN.
- FAO (Food and Agriculture Organization of the UN) 2013b. "Adding Value." *Animal Genetic Resources* (Special Issue 53).
- FAO (Food and Agriculture Organization of the UN) 2014. "Grassland Carbon Working Group." <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/gcwg/en/>

- FAO/WB (Food and Agriculture Organization of the UN/World Bank) 2001. *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World*. Rome: Food and Agriculture Organization of the UN; Washington, DC: World Bank.
- IAASTD (International Assessment of Agricultural Science and Technology for Development) 2009. *Agriculture at a Crossroads*. UN and World Bank. Washington, DC: Island Press.
- Malthus, T. 1798. *An Essay on the Principle of Population*. London: J. Johnson in St. Paul's Churchyard.
- McCullough, E. B., P. L. Pingali, and K. G. Stamoulis. 2008. "The Transformation of Agricultural Food-Systems: Globalization, Supply Chains and Smallholder Farms." In *Small Farms and the Transformation of Food-Systems: An Overview*, Chapter 1. Rome: Food and Agriculture Organization of the UN/Earthscan.
- Narlikar, A. 2005. *World Trade Organization: A Very Short Introduction*. Oxford: Oxford University Press.
- Oenema, O. 2012. *Livestock Production and Manure Management in EU-27*. Wageningen University. http://www.reusewaste.eu/events/kickoff/keynotes/key_note_01_Oenema.pdf
- Pearce, F. 2012. *The Land Grabbers: The New Fight over Who Owns the Earth*. Boston, MA: Beacon Press.
- Pretty, J., C. Toulmin, and S. Williams. 2011. "Sustainable Intensification in African Agriculture." *International Journal of Agricultural Sustainability* 9 (1): 5–24.
- Ricardo, D. 1817. *On the Principles of Political Economy and Taxation*. London: John Murray.
- The Bible, Joseph. Genesis, chapter 41.
- The Bible, St. Paul. First letter to the Church at Corinth.1 Corinthians, chapter 12: verses 12–26.
- UN (United Nations). 2014. *United Nations Population and Statistics Report*, Statistical Paper Series A. Vol. LXVI. New York: United Nations.
- USDA (United States Department of Agriculture) 2008. "National Institute of Food and Agriculture." <http://www.csrees.usda.gov/qlinks/extension.html>
- World Watch Institute. 2012. "Agricultural Subsidies Remain a Staple in the Industrial World." <http://www.worldwatch.org/agricultural-subsidies-remain-staple-industrial-world-1>