

**AGRICULTURAL POLICY FOR THE 21ST CENTURY:
TOWARDS A SOCIALLY, ECONOMICALLY AND ECOLOGICALLY
SUSTAINABLE GLOBAL SYSTEM**

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Abstract

Current agricultural policy debates are dominated by short term economic considerations. This leads to a singular focus on how to compete in an increasingly competitive international market, with little regard for the social and ecological consequences. This paper argues that the real agricultural question is not economic, but social and environmental. Modern technology makes it possible to feed the global population with only a fraction of the labour force that at present depends on agriculture for its livelihood. Yet unlike has happened in the past in the rich countries, the superfluous labour in agriculture cannot be absorbed in the other sectors of the economy. The main question, therefore, is not to make modern production more competitive, but to ensure that those who depend on agriculture for their livelihood are helped to produce in remunerative and environmentally sustainable ways. Ideas to achieve this are discussed, including land management fees, progressive land taxes, agricultural planning, and agricultural knowledge management.

The rich countries: subsidies for the rich

Agriculture today presents us with a problem that may soon appear in the non-agricultural sectors as well: a growing gap between productivity and demand. Demand for agricultural products is fairly stable, as there are limits to the number of uses to which agricultural products can be put. Competition between farmers to satisfy this demand leads to increased efficiency, productivity and hence, to higher production. Higher production and stagnating demand combine to depress product prices, forcing farmers to produce even more efficiently. As a result, there is more oversupply, and prices drop even further. The less efficient producers are forced out of business, those remaining keep running the competitive rat race until they fall out of the treadmill themselves.

The result of this process is that today, in the rich countries, only a few percent of the work force is still employed in agriculture. In the U.S. and Northern Europe farmers make up only some 2% of the working population - compared to close to 50% a century or so ago. Even so, many economists consider the agricultural sector as inefficient. Especially in Europe and Japan there are still large numbers of relatively small farmers who, according to economic criteria, should have gone out of business long ago. Protection from imports, subsidies and artificially high prices help them survive. If market forces were given free reign, most of this group would be forced out of business in a matter of years. Even with subsidies, the number of farmers is likely to go down to 1% or less of the working population in the not-too-distant future. In other words, in modern agriculture, productivity has been raised to such levels that in principle, only 1% of the working population can satisfy all demand.

With efficiency and production, the costs of farm support measures have also increased. In the first half of the 1990s, the European Community and the US alone spent some US \$75 billion

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annually to support their farmers. Even though in the 1990s official policy has given market forces freer reign, governments still purchase and store surplus production on a large scale. A significant part is subsequently dumped on world markets at prices at which no non-subsidised producer can compete. The result is economic disaster for producers from countries that do not protect their farmers. Particularly hard hit are small farmers in poor countries who do not have the high quality land nor the access to capital and technology to switch to more lucrative crops. Those who do manage to produce exportable crops face the protectionism of the same nations doing the dumping. For example, US sugar policy in the 1980s led to US producers being paid three times the world market price. The required closure of the US market for cheaper imports has been estimated to depress international sugar prices by one third - at a cost of US \$300 to 500 million to the world economy, and \$110 million for the Caribbean countries alone.

Officially these costly and damaging support programs were created and maintained to raise the incomes of farmers whose earnings stay behind those of the rest of society. But do they really do what they are supposed to do? Hardly. In the early 1990s, 80% of the European Community subsidies went to the wealthiest 20% of farmers.² In the U.S., this figure was about 70% - with the richest 1% of farmers receiving close to 30%: about as much as the bottom 80%.³ This is less surprising than it may seem: after all, one does not have to be an economist to figure out that the biggest beneficiaries of price supports and programs to keep land out of production are those who produce the most and have the most land. Those are large farmers and in the US, where in some fields of agricultural production family farming has all but disappeared, agro-industrial corporations. Thus, the \$75 billion the European Community and the US government dish out each year mostly benefit the rich. Considering this skewed distribution of benefits, it is hardly surprising that in spite of all the billions spent, the income situation of smaller farmers continues to deteriorate.

The poor countries: subsidies for the rich

There are many differences between agriculture in rich and poor countries, but there is also a remarkable resemblance: subsidies go to those who need it the least. Moreover they are, directly or indirectly, paid for by those who can least afford it. As in the rich nations, governments of almost all developing countries have, since the sixties, heaped billions of dollars of subsidies on the agricultural sector. Most of those funds have gone to the commercial farming sector, meaning medium and especially large scale farmers. While the large majority of small farmers in developing countries have to live off small plots without recourse to credit, inputs, technical assistance or irrigation, commercial farmers have benefited from state financed-irrigation projects, infra-structural development and subsidies on credit and inputs. Irrigation water, generated through projects that have contributed significantly to getting the countries involved into debt, is provided to beneficiaries free of cost or for a symbolic fee. That means not only that the public debts incurred to finance the projects do not even begin to pay for themselves, but also that scarce water is squandered on a large scale. This, in turn, leads to shortages and falling ground water levels in farming communities adjacent to the irrigated areas, as well as to the salinisation of soils. Subsidies on farm inputs and their consequent excessive use lead to more waste, costs to the public and damage to the environment.

In many countries, large farmers have also benefited greatly from subsidised credit from state-run agricultural banks. Often neither interest nor principal is paid back: it is not uncommon for state banks to have repayment rates of as low as 20%. In some nations, blanket debt pardons

² Estimates of the Australian Bureau of Agricultural and Resource Economics, on the basis of EC information.

³ *The Economist*, June 27, 1992.

have become almost a tradition. Even if debts are not forgiven little or no pressure is exerted on large, politically powerful land owners to ensure repayment of old debts. Almost always, such farmers retain their access to credit as before.

The losses caused by the above practices are, of course, borne by the state and hence, the general public. The cost is paid either directly, through the taxes that finance the system, or indirectly, as less funds remain for investment in education, health, and the infrastructure needed for economic development. Measures to curtail the abuses are blocked by powerful farm lobbies, led by large landowners with close links to, or forming part of the national political and economic elite.

As regards its economic potential, the agricultural sector in the poor countries has three major drawbacks. The first is limited demand, due to the very characteristic that defines countries as poor: their poverty. Low purchasing power leads to low demand for even the most basic foodstuffs, and especially, for higher value products such as meat and dairy products. Since the 1980s structural adjustment policies have worsened the problem: the elimination of subsidies raised prices whereas cutbacks in government spending pushed people out of jobs, decimating real incomes.

The second drawback hampering the development of agriculture is the distortion of world market prices by the protectionism, subsidies and dumping practices of the rich countries. Many poor nations have large areas with climates and soils favourable for agricultural production. They could produce much more food than would be needed to feed their populations, at internationally competitive prices. But as we've already seen, export possibilities are severely limited because of the protection the rich countries provide for their own producers. Moreover, the rich countries' practice to dump their surplus production on world markets depresses prices and thus, the possibilities for poor countries to earn much needed foreign exchange.

The third factor inhibiting poor countries from developing their agricultural potential is the skewed distribution of land. Although in some poor countries there is simply not enough arable land to go around, in most the problem is not so much the quantity and quality of land as its distribution. Small groups of large, often extremely wealthy land owners possess most or all of the high quality arable land. They usually live in the cities, where they have business interests in the industrial and service sectors as well, and occupy high positions in government. Often, agriculture is not even their main source of income. Much of their land is not or only very extensively used, and maintained simply as an investment.

In contrast, millions of small farmers have to make a living on small plots of marginal land, often on hill or mountain sides vulnerable to erosion. Without fertile land, capital, technical support and adequate marketing channels they are limited to growing their traditional food crops. Due to the competition from grains and other foodstuffs dumped by the rich countries, prices for their products are low. Production decreases as diminishing returns make it virtually impossible to invest in maintaining soil fertility. If the decrease in farm income is such that survival is impossible, these small farmers sell their land or simply abandon it, joining the constant stream of people flowing to the cities in search of better opportunities.

Land reform

Considering the social imperative of keeping people in agriculture a key element of agricultural development should be to increase the access of the rural poor to better quality land. The importance of doing so has been recognised since the early 1960s, when land reform was one of the major issues in agricultural development. In practice, however, the redistribution of land to small holders has been only marginally successful. Only in a very limited number of countries, such as Taiwan and Japan (under the US occupation after World War II) has it really had the desired impact. There, small and medium-sized farms were created that supply the urban

population with food while making a decent living in the process. Elsewhere only minor stretches of agricultural land, often of only marginal quality and belonging to the state, have been distributed. In almost all cases, efforts to redistribute private holdings were effectively blocked by large land owners. Even there where progressive governments did make a serious effort to redistribute, litigation, drawn out until a government less inclined to land reform came to power, proved effective in blocking the effort. In some cases *coups-d'état* were resorted to. In others it did not even come to the stage of legislation: the economic and political clout of landowners proved sufficient to abort any initiatives long before they could be turned into law. Simultaneously, the influence of large land owners in the police and military, and their practice of sending vigilantes to remove settlers invading their property, effectively prevented the illegal occupation of land. Particularly in Latin America, landless families occupying small tracts of unused land have frequently paid for it with their lives.

Even where land reform has been implemented the projects involved have mostly failed. This fact has been used handily by opponents of land reform to emphasise that small farmers are inefficient and backward producers, at best fit to work as labourers on (their) large modern farms. However, as a rule these failures could hardly be blamed on the land recipients. Mostly, the distributed land was of low productive potential to begin with. Moreover, after having been given the land the new owners were often left to their own devices. Without credit, inputs, seed, adequate technical advice and the possibility to bring their produce to the market, they were hard put to develop and maintain a viable farm enterprise. In other cases, beneficiaries were practically forced to cultivate new crops they were not familiar with, sometimes with technical advice not adapted to the local situation. Thus many land reform projects effectively failed, leaving the settlers in poverty and in some cases, forcing them to abandon their land in search of better opportunities.

In the 1980s, with cash-strapped governments and international organisations focusing on privatisation, land reform practically disappeared from the development agenda. Thus the huge inequality in access to land endures. In many countries land distribution is becoming even more skewed as government land is put up for sale and land reform beneficiaries are allowed, and sometimes even encouraged, to sell their land so as to stimulate the formation of "economically viable production units". In marginal areas, more and more families are pushed off the land as soil conditions deteriorate, plots become too small to sustain a family, prices of inputs rise and those of produce fall. Those that do not migrate often face a permanent state of underemployment and an overall decrease in living standards. The situation is worsened by deteriorating support and social services traditionally provided by the government, such as extension, input supply, education and health care. Population growth leads to further marginalisation, especially in areas where upon the death of the farmer his land is distributed among his children.

Environmental issues

The unnatural character of industrial agricultural production, with its continuous, intensive use of chemical fertilizers, pesticides and heavy machinery, affects soil composition, ground water supplies and the ecosystems in which such agriculture is practised. The affected land has a lesser capacity for water absorption and is more susceptible to erosion. The use of chemicals eliminates the natural enemies of insects that attack crops; without such predators, crops become even more dependent on pesticides. Moreover, insects, bacteria and viruses develop resistance to agro-chemicals, requiring a continuous search for new, stronger formulas.

Another alarming consequence of industrial agriculture is that diversity is replaced by uniformity. In the 1960s and 70s the "Green Revolution" led to the replacement of hundreds of traditional crop varieties with a handful of modern, higher yielding ones. Though the widespread

adoption of these new varieties, combined with the intensive use of chemical inputs, led to spectacular increases in production, the resulting disappearance of thousands of traditional strains entails great risks. In modern agriculture, scientists continuously have to outsmart the insects, bacteria and viruses for which large extensions of succulent, densely planted crops with few or none of their natural enemies are a treat. Though pesticides are effective initially, their intended victims soon build up resistance to them. And not only do pests adapt quickly to new chemicals, they also manage to overcome resistance in new crop strains especially developed to withstand them. The question is how long scientists can stay ahead in this race. In this respect the very disappearance of traditional crop varieties caused by the Green Revolution is a major danger, as it has resulted in a strong reduction of the genetic base from which breeding traits can be drawn. The weakening of this genetic base, combined with the growing dependence on only a handful of crops and crop varieties and the amazing capacity of crop pests to adapt, threatens global food security. If a major pest in rice, corn, wheat or another key crop would overcome the resistance of the most widely used cultivars and would itself develop resistance to the available pesticides, massive crop failures could occur. This, in turn, could lead to large scale starvation and famine.⁴

Another major environmental problem is the loss of agricultural land. Inadequate agricultural practices and the cutting of forests cause erosion and other forms of soil depletion. Each minute, close to 20 acres of the world's agricultural land are lost. In 1991, 17% of the total vegetated area on earth was found to be degraded to a larger or smaller extent.⁵ Twelve million km² - a surface larger than that of the U.S. and Mexico combined - has been affected so severely that rehabilitation is beyond the capacity of the individual farmer.⁶

The degradation problem is greatest in the developing countries. In India, for example, 800,000 km² is affected by erosion; six billion tons of top soil are lost annually.⁷ Ethiopia loses one billion tons of top soil each year. If current trends continue, over the next 25 years in this country alone, an area the size of former East Germany will change into desert.⁸ Yet erosion is also a problem in the rich countries. In England and Wales, 37% of the agricultural land is subject to erosion; some 4 billion tons of fertile top soil are lost each year. Similarly, due to inadequate management the wheat belt in Canada has lost half its organic material and continues to erode. In Australia, 23% of range and cropland is affected.⁹ According to the U.S. Department of Agriculture, in the U.S. one third of the total area used for crop production, some 430,000 km², suffers from unacceptable levels of erosion.¹⁰

In dry regions, erosion is followed by the formation of deserts. The United Nations Environment Program holds that 30% of the world's land surface is threatened by desertification. Three-quarters of this area, some 33 million square kilometres, are already moderately affected.

⁴ For a more detailed description of this issue see Richard Douthwaite, *Short circuit: Strengthening Local Economies for security in an Unstable World*, The Lilliput Press, Dublin, Ireland, 1996.

⁵ Data from The United Nations Environment Program (UNEP) and the International Soil Reference and Information Center in Wageningen, the Netherlands.

⁶ Brown, L.R., et al., 1994, *State of the World 1993: A Worldwatch Institute Report on Progress Towards a Sustainable Society*. W.W. Norton & Company, New York.

⁷ Goldsmith, E., and N. Hildyard, 1990, *The Earth Report 2: Monitoring the battle for our environment*. Mitchell Beazley, London.

⁸ Brown et al., 1994, *State of the World 1993*, op. cit.

⁹ Goldsmith & Hildyard, *The Earth Report 2*, op. cit.

¹⁰ Brown et al., 1994, *State of the World 1993*, op.cit.

If present trends continue the total area of arable land will be halved within a century. Already, the cost of land degradation in arid regions, in the form of reduced crop yields and livestock productivity, is huge: world-wide annual losses are estimated to run to more than \$42 billion. Losses in the more humid regions, including the U.S. corn belt and Europe's most productive regions, have yet to be estimated.¹¹

Land is also lost to faulty irrigation practices. Excessive use of water, due to high losses before the water actually reaches the crop, causes salinisation and water logging. The United Nations World Commission on Environment and Development has estimated that as a result, each year some 10 million hectares of irrigated land are abandoned.¹² Salinisation greatly reduces agricultural potential, as many crops do not tolerate soils with a high salt content. The areas affected are large: for Argentina, for example, the Commission indicates that nearly 50% of the irrigated area has salinisation problems. For Iran and Iraq, a figure of 40% is given; in the U.S., 25-30% of the total irrigated area is either threatened or already affected by salinisation.¹³

An overall view

So let's resume the agricultural situation. In the rich countries, we have agriculture that is overly productive, energy inefficient, and mostly, harmful to the environment. Under pressure from the farm lobby, dominated by rich farmers and, especially in the US, large corporations, governments maintain artificially high prices and protect their internal markets. Part of the resulting excess production is dumped on world markets, handicapping already disadvantaged producers elsewhere even further. In name, these enormously costly programs serve to keep farm incomes at acceptable levels. In practice, most of the benefits end up with already rich farmers and agri-business, whereas smaller farmers remain poor and continue to be pushed out of business. Tax payers are duped twice: they finance programs that benefit the rich and pay too much for their food.

In poor countries, small elites own the best agricultural land and command the bulk of other scarce resources, whereas a large proportion of small farm families have to make a living on marginal soils with minimal resources and little or no support. Prices for the foodstuffs they produce drop precipitously because of the dumping practices of rich countries, whereas export possibilities are limited by the import restrictions of same. With low prices, poor land and lack of access to such key facilities as inputs, credit, marketing, adequate technical assistance and transport, small farmers are hard put to remain on the land.

As for the environment, modern industrial agriculture causes large scale pollution, squanders disproportionate quantities of non-renewable energy and water, and destroys soils. Moreover, it becomes increasingly doubtful that the impressive gains in productivity that up till now were used to justify these drawbacks, can be sustained. Because of the problems of pest resistance and the loss of genetic material, society's almost total dependence on industrial agriculture puts humanity at considerable risk. Simultaneously, small scale agriculture in marginal conditions, especially in mountainous areas, threatens the global resource base through huge losses of fertile top soil and the destruction of natural and man-made water management systems.

¹¹ U.N. estimates, cited in Brown et al., 1994, *State of the World 1993*, op.cit.

¹² World Commission on Environment and Development, 1987, *Food 2000: Global policies for sustainable agriculture*. Zed books, London/New Jersey.

¹³ Goldsmith, E., and N. Hildyard, 1990, *The Earth Report 2*, op. cit., and Brown et al., 1994, *State of the World 1993*, op. cit.

Sustainable agriculture

The above described problems make it obvious that, from a social, economic and ecological perspective, a new approach to agriculture is needed. From a social point of view, the main characteristic of this new approach should be to allow the large majority of today's agricultural producers to (continue to) make a decent living through farming and complementary land management activities. From an economic point of view, such farming should be sufficiently productive and efficient to satisfy both local needs and the demand of a growing non-agricultural population, guaranteeing acceptable agricultural incomes as well as affordable prices for consumers. From an ecological point of view, this new approach should aim at creating ecologically sustainable agricultural systems, adapted to local climates, ecosystems, soils and the availability of water. All three perspectives call for a large scale reorientation of most of today's agricultural activity.

The starting point for a more ecologically oriented agriculture is the development and application of new, integrated production systems. Rather than aiming at maximising the production of a single crop with high inputs of energy and agro-chemicals, such systems should make optimal, sustainable use of the available natural resources. Integrating crop, livestock (including fish) and tree production can minimise the loss of natural nutrients and pollution. Instead of relying almost exclusively on using chemical fertilisers to replenish soils, nutrients taken out of the system should be recycled through organic waste such as crop residues, livestock manure and compost from urban refuse, and from the use of green manure and other nitrogen-binding crops. Instead of the widespread use of chemical pesticides for the elimination of pests, diseases and weeds, plant protection should be based to the extent possible on biological measures, including the use of resistant crop varieties, natural enemies of pests, crop rotation and intercropping.

The above does not imply the outright rejection and hence, overnight elimination of all chemical inputs. Such a drastic turnaround would be impractical and in some cases, impossible. It may take years to restore a more natural balance in deteriorated soils and agro-ecological environments. Soils will have to be "weaned off" chemical fertilisers through special measures which during the first few years, may still require (reduced) amounts of certain chemical nutrients. Other land, already strongly deteriorated through unsustainable practices, will need special treatment to be restored to its original fertility. Still other soils are naturally so poor or lacking in specific components that chemical additions may be needed for years to come. Overall, though, the new global agricultural strategy that is needed should focus on minimising the use of all artificial, potentially harmful inputs. At the same time, scarce natural production factors, notably irrigation water, should be used as sparingly as possible.

To foster the required changes, a combination of positive and negative incentives should be given to producers. Positive incentives could consist, especially initially, of technical assistance free of charge to farmers willing to experiment with and convert to sustainable farming. In some cases, subsidies might be required for environment-friendly inputs and investments in the conversion to more sustainable forms of agriculture. The latter would be feasible for, for example, the cost of terracing or other works to limit or eliminate soil erosion, or for such technology as drip irrigation equipment.

Negative incentives should take the form of rising prices for fertilizer, pesticides and other non-sustainable or scarce inputs, including water. That would provide farmers with the opportunity to change in a gradual way to more sustainable forms of agriculture. The height of the levies on harmful inputs should be related to their toxicity or otherwise damaging effects. This would encourage farmers both to use more environment friendly inputs, and to use those harmful inputs for which no substitutes are available as economically as possible. Contaminating

products for which less harmful alternatives are or would become available should be phased out altogether, through bans on their sale and production.

Savings in the use of chemical inputs could also be obtained by locating specific agricultural activities in areas where conditions are optimal for them. This ties in closely to the above suggestion to adapt agricultural systems to local agro-ecological conditions. In many irrigated areas in arid regions, for example, water-devouring crops such as rice and sugar cane are grown. The cultivation of crops demanding less water would allow the cultivation of larger areas, whilst reducing the risk of water logging and, especially at the irrigation systems' margins, salinisation. Similarly, relocation of agriculture practised in marginal areas to more fertile lands could greatly reduce the use of chemical inputs, notably fertiliser and pesticides. In 1992 the Dutch Scientific Council for Government Policy, referring to the countries of the European Community as a whole, estimated that by limiting cultivation to the most apt soils fertiliser use could be reduced by almost 80%, from 11 million tons to less than 3 million tons. Similarly, the use of pesticides could be diminished from an annual 400 million to 20 million kilos.

Towards new agricultural policies

A radically different approach to the techniques and management of agricultural production should be paired with new policy measures, aimed at fostering small and medium sized family farms. Such measures should avoid, however, the large scale squandering of funds and resources on the production of unneeded commodities that characterises today's agricultural support systems. This can be achieved by combining two principles that at first sight, appear to be radically opposed, even mutually exclusive: agricultural planning and a return to free market principles. The resulting economic efficiency should be linked to the even more important aims of ecological sustainability and social equity, to be achieved through the introduction of two complementary concepts: land management fees and progressive land taxes.

Land management fees

A land management fee would consist of payment for the ecologically sustainable management of land - agricultural or other. The idea is based on two principles. One is that all land where human activity has disrupted the natural ecosystem needs to be managed. The second is that even though land may be privately owned, it is in the final instance a public resource - as are air and water. People who incur costs to manage this public resource adequately should receive adequate compensation by the community, represented by the state, for doing so.

In practice, then, a land management fee would amount to governments paying all land owners an amount of money for each hectare of land managed adequately, that is, in a sustainable manner. The fee would depend on the productive potential of the land, its past use and the consequences thereof (including the degree of deterioration), its present use, and the general wage level in the country involved. Thus, land management fees would provide a minimum income for land owners, including farm families, to be supplemented by farming, forestry, recreation services and other productive activities that would be ecologically and economically feasible.

For farmers, the system of land management fees would mean that they would be agricultural producers as well as paid caretakers of natural resources. They could gain additional income from agricultural processing, forestry and tourism. Price supports for agricultural products would disappear, and market forces would again be the mechanism that would create a balance between supply and demand. Yet the basic income provided by the fees would avoid the social problems now caused by the workings of the market.

In exchange for receiving the land management fee farmers would have to comply with a number of conditions. First, as said, agricultural production as well as any other forms of land use should become ecologically sustainable. That implies land use that would correspond to the natural productive capacity of the land so that the use of harmful external inputs, such as agro-chemicals, could be minimised. Second, land managers would have to co-operate with the authorities in adjusting their activities to local, regional and national land use plans – as they already have to do in many, especially rich countries today. That could mean, for example, reforestation of land previously used for agriculture, or the use of parts of agricultural land for recreational purposes.

There would, of course, be a tendency for farmers to continue with the present high input - high yield, environment unfriendly but remunerative forms of farming. As was already indicated, that tendency should be suppressed by making environment unfriendly agriculture more expensive while prohibiting the most damaging practices and products altogether. Simultaneously, compensation could be arranged for farmers with huge debts due to investments already made, often under pressure from government and banks, to further intensify their farming. That compensation should cover the losses due to the change to more sustainable forms of farming. It could take the form of debt relief, including the partial or total exoneration of debts.

Land management fees would, of course, not go unopposed. Even the small family farmers in the rich nations who would benefit the most would be likely to challenge the idea. Most farmers like to consider themselves as self-reliant entrepreneurs, not dependent on hand-outs from the government (government price supports and other subsidies are often not considered as such, even though in practice they are). Land management fees would be seen to compromise that status. Yet apart from the fact that in truth, farmers have long since stopped being independent entrepreneurs, there is no real choice. If the forces of the free market were left at play many, if not all small farmers would lose out altogether. Maintaining the enormously costly, hugely unjust and largely ineffective current system of support will not be possible either, certainly not in the longer run. What farmers would certainly have to realise would be that things are liable to get worse rather than better: that even with the giant support programs now in place, only the most efficient among them will survive economically.

The progressive land tax

If current land tenure patterns would persist the benefits of land management fees would, as the benefits of current agricultural support measures, accrue mostly to those who need it the least: large land owners. Therefore, the introduction of land management fees should be combined with another measure: the introduction of a progressive land tax. Any land holdings over a certain minimum (the height of which would depend on land quality and consequently, productive value), would be taxed at rates that would increase with the size of the holding.

The combination of land management fees and progressive land taxes would mean that at a certain land size income received from fees would be less than the cost of taxes. For even larger holdings, the marginal tax rate would become so high that it would be more remunerative for the owner to sell the land to which that rate would apply. That way, land would become available for redistribution to people wanting to start a small rural enterprise or land management unit. For a significant number of people in the rich nations this is a dream that today, due to the high cost of land and the investments needed for modern agriculture, is impossible to realise. The proposed system could make such dreams come true and possibly, contribute to reducing long-term unemployment.

In poor countries where, as discussed, the lack of access to arable land is a major cause of both poverty and the destruction of natural resources, the introduction of the progressive land

tax would be the key to land redistribution. Because of high taxes, large land owners would be forced to sell large parts of their property. Particularly in poor countries with very unequal land ownership, land prices would plummet, since land owners would be forced to get rid of large tracts of land while there would be few buyers. Governments, with revenues from these same land taxes as well as external funding, could buy such land for minimum prices. Land fit for sustainable agriculture could be redistributed among landless farmers. According to its productive capacity and existing use, other land could be used for reforestation, kept as natural reserve, or given other destinations.

In principle, a progressive land tax would be hugely beneficial for the hundreds of millions of rural poor without adequate access to land. The same might be valid for urban poor with an agricultural background who would return to the countryside if given the opportunity. With a progressive land tax, it should be possible for governments to give such people access to land in a much more effective manner than through the, often tortuous, process of land reform based on expropriation. At the very least, the tax would force larger landowners holding on to their property to put it to productive use. Such productive use would create employment opportunities and contribute to economic growth.

Opponents - which are sure to include large land owners - will argue that the progressive land tax would lead not only to the splitting up of large private land holdings that are not productively used, but also affect the huge, highly capitalised modern farms and plantations that today are responsible for most of the poor countries' agricultural exports. That would greatly reduce the efficiency of agricultural production, as economies of scale would be lost and capacity to invest decimated. Splitting up land ownership would, however, not necessarily imply the fragmenting of economic activity. The companies involved could divide their holdings into small units, ownership of which could be given to small farmers and/or plantation workers. These units could be co-operatively managed, under a contract with the company that originally owned the land. That company would still be involved in processing and marketing, and could give technical and management supervision to guarantee product quality. This model is not new: it has been successfully applied in a variety of settings, to the benefit of both the new land owners and the company involved. In such cases, farmers and processors have a common interest: a steady supply of good quality raw materials means an assured income for farmers, while enabling the processing company to run its processing operations efficiently.

Another argument that will be put forth against the land tax and the redistribution of land that would be a consequence of its introduction, is the alleged backwardness of small farmers. Small producers are as a rule considered as inefficient, traditional producers, interested in supplying their families rather than the market, and unwilling to adopt new technologies that can raise production. Giving land to these farmers would therefore reduce farming efficiency, and result in a decline of production.

This is an old argument, and mostly untrue. First of all, it has already been mentioned that much of the land owned by large landowners is not used at all or only very extensively. On the other hand small farmers, including the poorest and least educated, have been shown time and again to be very efficient producers. Although yields per hectare may remain well below those obtained on agricultural research stations and modern, capital intensive farms, the conditions under which such yields are obtained are as a rule much less favourable. Indeed in such conditions, marked by poor soils, erratic rainfall and lack of irrigation and inputs, those "backward" farmers have frequently been found to out-produce researchers using the most modern technology.¹⁴ At the very least, they were noted to produce more profitably and in

¹⁴ See for example Chambers, R., 1993, *Challenging the professions: Frontiers for rural development*. Intermediate Technology Publications, London, and, Pretty, J. N., 1995, *Regenerating Agriculture: Policies and Practice for Sustainability and Self-Reliance*. Earthscan Publications, London.

accordance with local needs, proving the point that higher production does not necessarily mean higher net margins. Moreover, the small farm practice of combining different crop and livestock activities contributes to better, more complete diets and is often more ecologically sustainable than the single crop pattern that is the basis of modern agriculture. As for the oft-mentioned resistance to change: it is true that the ability of small farmers to make the best of their meagre production potential is based on practical experience and local knowledge, handed down through generations. In a situation where each mistake can mean the difference between a subsistence diet and starvation, some conservatism seems little more than prudent. Yet so-called “traditional” agriculture has been found, upon closer scrutiny, to include a surprising capacity to adapt to changing circumstances.¹⁵ Agricultural systems that at first sight seemed to be static proved, upon further analysis, to be highly dynamic, with farmers innovating almost constantly to adjust to changing production conditions such as decreasing soil fertility. There is no reason why they could not adapt to more favourable circumstances - when given the chance and the necessary support in the form of technical support and credit.

It is important to reiterate that the above call for promoting small scale farming does not imply the total rejection of larger production units. In some circumstances, large scale production may offer economies of scale that are attractive from both an economic and an ecological point of view. Likewise, highly intensive production units, with capital outlays going beyond the normal capacity of family farms, may be needed to efficiently supply large urban centres with specific products. Such large production units could, however, very well be run by co-operatives or joint stock companies involving several producers. The call, therefore, is not to relocate all agricultural production to the traditional mixed family farm. Rather, it is to search for measures that would allow farmers to keep farming, by countering the tendency of the strongest and richest farmers and increasingly, agro-industrial corporations to take over all agricultural production.

Agricultural planning

To leave the agricultural sector entirely open to market forces, as proposed above, carries the risk of disaster: not only for producers but also for consumers. One of the few benefits of the storage of excess produce through agricultural support programs has been that in times of shortages, these supplies could serve as buffer stocks. If left entirely to market forces, the agricultural sector is unlikely to be able to cope with consecutive crop failures in major producing areas. The problem is compounded by the tendency of farmers to massively switch to other crops in case of a glut in the market, leading to shortages and price rises of the discarded crop in subsequent cropping cycles. To ensure food security, as well as some measure of price stability for producers as well as consumers, some measure of agricultural planning or at least, co-ordination, is unavoidable.

Agricultural planning would aim at two goals: the optimal use of land and water from a viewpoint of ecological sustainability, and the satisfaction of the global demand for agricultural products. Both goals should be reflected in an integrated framework for agricultural production - from the global, via the national to the regional and local level. The planning for this framework should take into account current land use as well as comparative ecological and economic advantages for regions and countries. Moreover, it should be based on local, regional,

¹⁵ See for example Box, L., 1989, *Knowledge, Networks and Cultivators; Cassava in the Dominican Republic*. In: N. Long et al (eds), *Encounters at the Interface*, Wageningen Studies in Sociology 27, and Chambers, R., 1989. *Farmer first. Farmer innovation and agricultural research*. Intermediate Technology Publications, London.

national and international demand, and the need to maintain supplies of non-perishable products as reserves in case of major crop failures.

On the basis of these plans it would be possible to establish which areas should remain under what forms of agricultural production, which ought to be taken into production, and which should be given other uses, such as commercial forestry or the restoration of natural vegetation. For areas destined for agricultural production, broad outlines should be sketched of agricultural systems that would be sustainable from an ecological, economic and social point of view, taking into account current and future demand for agricultural products.

The concept of agricultural planning, as part of land use planning, is bound to raise eyebrows at a time when free competition in an open world market is seen as the panacea for the world's economic (and other) problems. In reality, though, it implies no major change from the current situation in the rich countries. Practically all measures aimed at limiting (over)production, such as production quota and paying farmers not to cultivate land, have the same goal as agricultural planning – although their effectiveness is likely to be less. Moreover, the weak point in present policies is that, with the exception of the EC countries, they are not co-ordinated at the international level. The latter has been attempted for tropical crops, such as cocoa in the 1970s and 1980s. However, lack of willingness to agree on or abide by production quotas, with chronic overproduction as a result, have led to the failure of these initiatives. Again, agricultural planning could be more successful.

It should be clear that the call for agricultural planning is by no means a call to return to the detailed blueprints, defining production areas and targets to the hectare and metric ton, of the (former) centrally planned economies. In fact, actual adherence to the plan would be largely voluntary. Farmers would be strongly recommended to cultivate certain crops and not cultivate others, but would not be forced to do so. Growing crops that would be unfit from an ecological point of view would lead to reductions in or the total withholding of land management fees, and non-eligibility for other support services such as advice on, and subsidies for, the conversion to sustainable, integrated production systems. The choice for crops that would be unfit from the point of supply and demand would not be penalised at all. Thus, the proposed form of agricultural planning should be considered more as a form of global co-ordination between agricultural producers, aimed at maintaining acceptable price levels by balancing, to the extent possible, demand and supply. To make this form of planning effective farmer organisations, especially those at the national level, would have to be involved as much as possible or even, be pushed to lead the co-ordination themselves. This could materialise if farmers would become convinced that planning – or if preferred, co-ordination - would pre-empt to a significant extent the spectacular price drops and price rises resulting from over-supply and shortages today.

Costs and benefits

A primary objection to the measures proposed above would be their cost. In particular the price of a land management fee system would be steep. Then again, so are the costs of current agricultural support programs - and they do not even come close to addressing today's problems. A first step towards financing in the rich countries, then, would be to reallocate the funds used for current agricultural support programs. That should include those spent on the large bureaucracies needed to implement today's maze of rules and regulations: as the proposed alternative would be much simpler to apply, fewer staff would be required. Additional funding could be obtained through taxation: the progressive land tax would be one possibility, a minor tax on agricultural products another. Because of the enormous quantities of product involved, even a tax of only a few percentage points would go a long way towards generating the required revenue. The slight rise in food prices should be worth it: in exchange, consumers would get

better quality and healthier products and a cleaner and more attractive environment, offering more recreational opportunities.

The radical change involved in introducing land management fees and progressive land taxes would constitute a major challenge for the rich countries. However, the problems there would pale in comparison with those for poor nations. The greatest obstacle would be, of course, funding: the poorer the country, the greater the number of rural families and hence, beneficiaries, and the higher the cost of the system. Even though the fees paid per family would be low the sums required would be huge, whereas possibilities for funding would be limited at best. An additional problem would be the capacity to manage the system: the determination and administration of payments, the verification of sustainable management practices, and the implementation of sanctions against offenders. Consequently, whereas land management fees could, at least in principle, be introduced fairly rapidly in the rich countries, their universal application in poor nations would appear a long-term prospect at best.

In selected areas of poor countries, though, it could be feasible to introduce land management fees on a smaller scale. This would apply to regions with adequate administrative and technical capacity, where the fees could contribute to an important extent to the urgent conversion from unsustainable to sustainable agricultural production. Financing could take place, partially, through progressive land taxes and, more important, through levies paid by parties with a direct interest in sustainable land management. Such parties can be found in the downstream areas of watersheds: factories and plantations that need a steady, good quality water supply, authorities responsible for reservoir and hydro-energy management (and hence, with an obvious interest in preventing sedimentation and the reduction of water flows), even flood management authorities. In short, potential contributors would include all institutions and private companies that are negatively affected by the consequences of erosion in up-stream water-catchment areas. The levies paid would be used directly for payments to up-stream farmers for erosion-preventing measures and reforestation, and for setting up an administration and control system.

For a more general implementation of land management fees in poor countries, financial and technical assistance from the rich countries and from international institutions would be indispensable. Apart from funding from traditional development cooperation funds, there would be considerable potential for fund raising through an international environmental tax. A tax on non-renewable energy, for example, would be a great income generator: each dollar of a worldwide oil tax levied per barrel of crude would raise some \$25 billion.

Information management

The shift to sustainable forms of agriculture will require a drastic re-orientation of agricultural research, extension and education. To be sure, much knowledge is already available. In rich countries, advanced production systems have been developed that combine high production levels with an efficient use of land, water and energy and, thanks to recycling, minimal emissions of pollutants. In poor countries traditional integrated production systems (which in some cases, have been developed further with technical assistance from non-governmental organisations), likewise combine high production levels with the efficient use of scarce natural resources and a high degree of recycling. The main difference, of course, is that whereas the former combine huge investments in costly equipment and a minimum use of labour, the latter have only minimal capital lay-outs but as a rule, require a huge labour input. Both types of systems, however, are feasible in the particular conditions in which they appear, marked by easy access to capital and an ample labour supply respectively. Agricultural research should focus on the further development of these systems, as well as the development of new systems adapted to local conditions.

In general, then, technology development for sustainable agriculture should help raise yields and lower production costs considerably. The potential is there: at present, only a minute proportion of agricultural research spending is dedicated to the development of more sustainable agricultural systems. Even so such forms of agriculture already have an impressive track record: for example, a study by the U.S. Department of Agriculture made in the 1980s showed that even then organic farming was already economically viable in the U.S.¹⁶ A larger research effort should lead to even better results, both from an economic and an ecological point of view. Still, a warning is in place: because of the local character and hence, diversity of ecological agricultural production systems, the outcome of such a research effort would not match the spectacular increases in yields obtained through the Green Revolution.

An even more important role than that of research lies with agricultural extension, aimed at making already existing relevant knowledge available to farmers not yet aware of it, or not yet applying it. Although there is still much to be known, the major problem in agricultural knowledge management is not, at present, the creation of new knowledge. Rather, it is the pooling of existing knowledge, of the scientific kind developed by research as well the practical kind developed by agro-industries and farmers, and to make it available to all whom would benefit from it. This could be fostered through the creation of some form of central databank, accessible (through e-mail) for farmers as well as extension workers, researchers and other development agents. This databank should provide information on technology options and production systems, in response to requests made by interested parties on specially designed formats specifying the agro-ecological and socio-economic conditions in which the technology would be applied. Simultaneously the bank should stimulate networking between organizations involved in agricultural development by bringing them into contact with each other to exchange information and experiences.

Probably the greatest need for adaptation to the aim of developing and implementing sustainable agricultural systems lies with agricultural education. Particularly in the poor countries, such education still includes the rote learning of, often antiquated, industrial agricultural practices for specific crops. The challenge would be to reorient the corresponding curricula towards an understanding of, and skills development for the analysis of complete agro-ecological systems. This would create the capacity to develop creative, integrated solutions for improving production and the sustainable use of resources. Such skills development would apply at all levels of agricultural education: from the vocational training of (future) farmers in agricultural secondary schools to the academic training of researchers at universities, and post-graduate training courses for research and extension staff.

Conclusion

Land management fees, progressive land taxes, agricultural planning and a world-wide conversion to sustainable agriculture are, today, no more than very roughly defined concepts. Even if the above described principles were widely accepted, there would still be enormous obstacles to their implementation. Vested economic and political interests would oppose changes in the support systems that benefit them so enormously today. Moreover, we are nowhere near the intensive international co-operation required to make these concepts operational at the global level. There would also be a host of practical issues to attend to, including the large-scale reorientation of agricultural bureaucracies. And there would, of course, be the problem of costs.

To propose radical change means exposing oneself to the critique that whereas it may be intellectually entertaining to play around with new concepts and ideas, actual change requires more practical, piecemeal, down-to-earth measures. The aim of this paper, however, was not to

¹⁶ Quoted in Goldsmith, E., and N. Hildyard, 1990, *The Earth Report 2*, op. cit.

come up with such ready-to-implement solutions, adapted to today's economic and political realities. Rather, it was to show that radical change is needed if we want to avoid ecological, social and ultimately, economic disaster, and that it is important to start developing ideas on what that change should look like. Such thinking should not, from the very start, be hemmed in by the limits imposed by the economic and political status quo. If we start the move towards change from what today is considered economically and politically feasible, we will not get any further than the piecemeal changes that today, tinker with the margins of the global agricultural system - but do not even come close to generating the fundamental change that is needed. If this paper helps to stimulate such thinking, and could contribute to putting it on the development agenda, it has achieved its objective.