CAN ORGANIC FARMING FEED THE WORLD ?

Lawrence Woodward, Director of Elm Farm Research Centre,
discusses the favourite question posed by critics of organic agriculture

'Can organic farming feed the world?' is a question that is generally posed as a put-down by those people who are against organic farming, and is used as part of a defense of conventional agriculture. It is hardly ever raised by people who are seriously contemplating the subject and rarely by someone prepared to even briefly consider that feeding the world - whether by organic or conventional methods - has hardly anything to do with agriculture and is mainly to do with finance and power.

The sort of people who normally put this question are like the former and unlamented United States Secretary for Agriculture, Earl Butz, who, when asked why he was not doing more for organic farming, reputedly replied: *"Show me the first 10,000 Americans who are prepared to starve to death and then I'll do something."*

Or like Dennis T Avery, Director of the Center for Global Food Studies at the supposedly prestigious Hudson Institute, who wrote in a recent report, *"high yield farming is the only way to save most of our wildlife unless we are willing to destroy 3 billion living human beings and forcibly abort most of the babies now being born in the world"* [1].

At the core of these comments is the notion that because yields of organically grown crops are assumed to be lower than those conventionally grown, organic agriculture cannot technically produce enough nutrients, carbohydrates and proteins to feed the world's increasing population.

But is agriculture today is really concerned about preventing hunger?

At a recent meeting which was organised to discuss the need to reform agriculture within Europe, a conventional farmer and National Farmers Union stalwart forcefully asserted that of course organic farming could never feed the world, but conventional farming - which he was proud to represent - certainly could. He was then asked what his crop rotation was and without the slightest hint of irony replied Oil Seed Rape, Barley and setaside. We live in a curious world!

The answer to the question, *'Can organic farming feed the world?'* depends on what is meant by *"feed"* - a diet which is varied, fresh, low in fat, saturated fat and cholesterol, high in vegetables, pulses, fruits and grain products, or a diet that is rich in the *"higher"* proteins, convenient to a developed world lifestyle and high in short term gratification? - and it depends what is meant by *"the world"* - everyone on the planet, with similar nutritional standards for both rich and poor peoples?

It has little to do with the technical ability of organic farming to produce adequate nutrients, proteins and carbohydrates but has a great deal to do with systems of distribution, markets, finance and political structures. To use what is now a rather glib, but still largely true phrase, *"hunger is not caused by lack of food it is caused by lack of money. No-one with money starves."*

As Tansey and Worsley describe in their informative analysis of the "The Food System", *"Hunger and malnutrition persist in many poor countries and even in rich countries."* In 1991, the United States spent $29 billion on the worlds largest food aid programme. Most of that was spent within the US and directed at its own poor citizens. Wherever they are in the world, *"The poor lack choice and are nutritionally disadvantaged"* [2].

Elm Farm Research Centre, Hamstead Marshall, Nr. Newbury, Berkshire RG20 0HR
Tel: + 44(0)1488 658298 Fax: +44(0)1488 658503 E-mail: elmfarm@efrc.com
www.efrc.com Registered Charity Number: 281276 Company number 1513190

In order to begin to address the problem of providing food for all the peoples of the world we have to examine the nature and role of the global food system within the global economy. And it is a global economy, although concentrated in a few hands. According to the World Bank, two thirds of world trade is controlled by 500 Transnational Corporations (TNCs). The 15 largest TNCs have a gross income larger than the Gross Domestic Product of 120 countries [(3)]. Amongst the large TNCs are the half a dozen or so companies who dominate the trade in food or more accurately food commodities and the land use that goes with it [(2)].

The role of intensive and to my mind inhuman and unethical livestock production within this global food system is a notable one. When organisations such as The Farm And Food Society argue for a change in abhorrent practices within livestock management, you are not simply confronting a technical welfare issue you are opposing an integral part of world trade and the global economy.

To quote Dennis T Avery, *"People are not content with the low quality protein from vegetable sources. In every country where incomes are rising, demand is rising rapidly for cooking oil, pork, fed lamb, eggs, poultry and other resource-costly foods that provide higher quality protein"* [(1)]. He does not say cheaply and therefore intensively to allow value to be added by processing and packaging but that is what he meant.

Organic farming cannot feed that kind of world . But I do not believe the world can afford for much longer anything that is so '*resource costly'*.

What can organic farming do?

There have been a number of studies that give an indication. The three quoted below have made an effort to address that ludicrously impossible but politically potent question of what would happen if a whole country *'goes organic'*?

An early study carried out at Iowa State University using a computerised linear programming model forecast that if the United States *'went organic'* all that countries domestic food needs would be met, but export supplies would vary from year to year [4]. A study at around the same time found that in years of draught organic farms in the mid-western US states had greater resilience and hence more cropping stability [(5)]. As a result of this and other empirical studies the United States Department of Agriculture concluded that organic farming employed best management practices for soil and water conservation [(6)].

A more recent study in Germany which was commissioned to provide information for the Federal Government evaluation of '*future frameworks'* concluded that if the whole of Germany converted to organic agriculture, domestic food requirements could be covered in spite of lower outputs *"on the basis of vegetable production"*[(7)].

A UK study which was undertaken by the University of Aberystwyth in association with Elm Farm Research Centre came to a similar conclusion. If the UK was to convert to an organic faming system, the structure of farming would have to change dramatically but all food needs would be met. Rotational farming would be necessary which would mean a reduction in certain crops in some areas but a reintroduction in other areas. Output of Cereals, Oil Seed Rape and Sugar Beet would be significantly reduced (30%, and around 60% respectively) whereas vegetable production would increase and legumes, in particular grain legumes would have to increase by around 175% [8].

Which begs the question what on earth does one do with all these beans? Technical developments would be necessary to increase the UK varieties grown for human consumption, but this would not present an insurmountable problem. Much more home-grown protein would be available for animal feed, which would reduce the massive importation of such feed into the UK.

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Those who praise the success of agricultural productivity in the UK often omit the fact that a good deal of livestock production is based on using land elsewhere. Overall, Western Europe consumes nutrients from nearly 5 times its agricultural area. Most in the form of animal feed and most going into intensive factory farming of pigs and poultry products [2].

One of the biggest changes in organically fed Britain would be the massive reduction in output of pig and poultry products. This would occur because of the feed supply and because of welfare requirements in organic standards. Indeed an important change in diet would have to be brought about in order for the UK to feed itself organically - with more vegetable protein and less meat being consumed - a diet in fact in line with recommendations made by nutritionists to prevent coronary disease and obesity.

Whilst technically there would be no overwhelming problems in feeding the UK, Europe and even the United States organically, the structure of agriculture would have to significantly change with massive implications for land access, investment, labour and skills. Which leads right back to the original contention that the question of feeding the world organically has less to do the technical ability of organic farming to produce adequate nutrients and is more about systems of distribution, markets, finance and political structures.

Developing countries

However, it is all very well to argue that developed and industrialised countries could be fed organically but what about the undeveloped world where the hungry people live and die?

Agricultural techniques will be discussed later, it is most important to first of all consider the structural problems facing these countries. The predominant one being indebtedness which shackles and misshapes all economic activity in these countries and in particular fatally obstructs most attempts to achieve food security.

It should be remembered that the "debt" began as a result of the need of Western banks to recycle Petro-dollars in the mid seventies. Hence pressure was exerted by governments and agencies like the International Monetary Fund on "Third World" countries to take out loans to pay for "development". A strategy that the rich "elites" in those countries welcomed with open arms and hands. It is estimated that the countries of Africa pay $1 billion per month in interest payments. Yet in 1990 the debtor countries were 61% more in debt than they were in 1982 [2].

In order to service the debt single commodity agriculture - such as plantations and cattle ranches - producing commodities for export have been encouraged at the expense of using land for the production of food within the country. So obscene anomalies are created, as for example Ethiopia exporting agriculture produce during the famine that sparked off the Band Aid and Live Aid events.

Commodity trading is critically important in the world food system. No more than 15 TNCs account for the bulk of this activity with only 6, (5 of them privately owned) dominating. They account for 90% of trade in pineapples, 65% of bananas, 85% of tea, 90% of cocoa beans, 70% of rice, 85% of coffee, 85% of corn, 60% of sugar, 85% of wheat [2].

It is instructive to look at the operations of one of these, Cargill, and how it has positioned itself to be feed supplier, banker, buyer of finished cattle, butcher and wholesaler - everything but the farmer. The Cargill policy is to maximise the return on low priced commodities by operating at three strategic levels; it trades grain internationally and therefore buys as cheap as possible, it adds value to that cheap grain by using it as raw material for livestock feed manufacture which it markets globally, then as a buyer of finished cattle it adds further value by turning it into meat and meat products again on the

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global market [2].

There is not much room in this strategy for policies aimed at feeding the world. Trading and processing to add value to cheap raw materials is the driving force of the global food system and intensive livestock systems are an important component. Feeding people simply does not figure.

Technical fixes

Much of the above has dwelt on the political and structural factors involved in *"feeding the world"*. What are the technical problems involved in achieving this organically?

There are no really significant ones in the developed world. Of course there is room for improvement - for example weed control techniques could be better, progress can still be made on certain disease problems such as finding more blight resistant potato varieties - but there are no technical obstacles that would prevent organic farming producing enough food in the developed world. Just as long as it is not expected to maintain the chicken at 36p per pound type of diet. The obstacles to organic farming are economic and are governed by policy. Where this is sympathetic as in Germany and Denmark, a significantly large switch from conventional to organic production can occur without major difficulty.

In resource poor countries organic farming with its emphasis on biological Nitrogen supply, on maintenance and enhancement of organic matter, and on soil and water protection, is arguably the most appropriate farming system and the most sensible approach to feeding people.

During a recent exchange we had with the Department of Agriculture in Malawi, they rightly pointed out that organic farming has little to offer intensive Maize plantations or any other capital intensive monoculture commodity production system used to trade and raise foreign exchange. Organic farming was therefore dismissed *"as only good for small scale, local vegetable production"*. But this is what feeds people.

It is easy to dismiss this approach as extreme and forget that the *"Dig for Victory"* campaign during the war was a very important part of the British governments efforts to ensure food security and health. The garden and in particular, biologically-intensive gardens are more productive in terms of nutrients per ha than any *"farming"* system.

Organic farming based on locally adapted, intensive biological systems work extremely well and can be highly productive particular across a range of basic food crops.. They are stable and relatively secure on vulnerable soils and in volatile climatic conditions due to their focus on *"living"* organic material which provides a buffer for soil and water. As such they are very appropriate to Southern countries. There are of course problems and in some regions pests and disease are a threat. In such cases, cropping diversity reduces the threat and spreads the risk thus ensuring stability and security. Organic farming is found and on a technical level can be seen to provide adequate food in all parts of the world. Where it does not, issues such as access to land and political problems including the role of women are often the major obstacles. Matters of power and economy, not technical issues.

Population and industrialisation

Of course it might be thought that considering whether organic farming can feed the world is largely irrelevant compared to the question of is it possible to feed the world's increasing population at all?

The world population is forecast to double in size to 10 billion within the next 50 years, yet we annually lose productive land to desertification and building and those parts of the world with largest population growth projections - in particular Asia - have the smallest reserves of potentially productive

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land [2].

Again the issue is not really one of agricultural technology nor just about population growth. As the US research team who produced the original Club of Rome report *"Limits to Growth"* have pointed out in a recent study, major changes to current practice in the areas of population control, reduction in industrial output and the intensive development and application of technology for pollution abatement, improved land yield, soil protection and resource conservation needs to be implemented before 2015 to avoid a structural breakdown in the global economy around the mid-century [9]. One does not have to accept this entire thesis to recognise that a major change is needed in our growth and consumption orientated global economy if we are to tackle these fundamental problems.

In a recent book *"Who Will Feed China?"* Lester Brown gives a graphic illustration of what is facing us. He points out that China is entering the phase of industrialisation and development that all the developed countries have gone through, but with a population of 1.2 billion. As incomes rise so diets change and on this scale will have global consequences. *"Two more beers per person in China would take the entire Norwegian grain harvest. And if the Chinese were to consume seafood at the same rate as the Japanese do, China would need the annual world fish catch"* [10].

Whilst population growth is a major factor , so is the drive to industrialisation on the back of the consumption of finite resources. No system, organic or conventional, can hope to feed the world whilst land is used to produce commodities for trade not food; whilst we tolerate massive depletion of productive soil through erosion and desertification; whilst we deplete and pollute our increasingly vulnerable water supply. In other words, whilst we allow our consumption based global economy to destroy the biological base of our planet.

Of course there are those like the Hudson Institute who see the application of biotechnology and free trade as the way out of this problem. Yet this industry directed, secretive, undemocratic technology has not yet shown it can produce healthy food for hungry people, let alone safeguard the environment from potentially greater damage than that wrought by agro-chemical technology. An inventory of crops so far produced by gene technology includes a tomato that can more easily be transported from the US to the shelves of European Supermarkets, herbicide-resistant rape and herbicide-resistant-tobacco.

However there are things that can be done to help in the task of feeding the world. We could write off the Third World debt, as was proposed by Al Gore prior to his election as Vice-President of the United States; we could stop subsidising crops like tobacco and create a favorable fiscal environment for the production of food security not agro-industry commodities for trade; we could face up to the need for land reform in order to provide access to land so that people, especially those facing insecure food supplies, have the opportunity to grow food for themselves; we could develop a global strategy for soil and water conservation, in which organic farming would have a major role to play. But fundamentally we have to change the growth/consumption imperative that drives the global economy.

In his book *"Small is Beautiful"*, E.F. Schumacher outlined the need to replace this imperative *"by evolving a new lifestyle, with new methods of production and new patterns of consumption: a lifestyle designed for permanence."* This lifestyle must be built upon the principle of limitation, *"because the environment in which it is placed is strictly limited"*. It must only employ methods and equipment *"which are cheap enough so they are accessible to virtually everyone; suitable for small-scale application; and compatible with Man's need for creativity."* Out of these three characteristics *"is born non-violence and a relationship of Man to nature which guarantees permanence"* [11].

Schumacher gave three, what he called *"preliminary examples"* of activities that could make significant contributions to the evolution of his world of *"peace and permanence"*. The one he was most associated with was intermediate technology, *"technology with a human face"* as he called it. Another was new forms of partnerships, even common ownership. But the example he gave first of all was

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organic farming.

So for me the question should not be *"Can Organic Farming Feed The World?"* but what are we doing to help to change it? The hungry of the world will not be fed until we bring about a global *"lifestyle designed for permanence"*.

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