

The City Food Lecture – 2008

By the Rt. Hon. The Lord Haskins of Skidbury

“Are the Malthusian chickens coming home to roost?”

Over the past 20 years the world has become increasingly concerned about the consequences of global warming. But it is only in the past few months that the most dangerous possible consequence of this change – a global shortage of food, has become a possibility. The prices of most cereal crops, wheat, barley, maize as well as soya and palm oil have doubled or even trebled in the past 2 years. This has happened many times in the past, but has quickly resolved itself because farmers responded by increasing their production. But could it be that in a world, whose population is growing fast and where climate change may prevent farmers from increasing their outputs, that there is now a long term concern about whether there will be enough food to go around?

In recent years, the EU and North America have been much more concerned about what to do about food surpluses rather than shortages, because, following the supply crisis created by the second world war, farmers were encouraged to produce food irrespective of cost, resulting in obscene mountains of surplus food, which were either “dumped” on markets in developing countries – or even destroyed. And this despite a trebling of the world’s population in my lifetime. Indeed globally, although many parts of the world still suffer from food shortages, this is not because of the world’s farmers, but rather because the politicians have been unable to find equitable means of moving food from areas in surplus to those which are short. In Darfur the problem is not that there is a food shortage in the world. It is that for political, economic and logistical reasons it cannot be made available to those poor people.

The chronic oversupply of food in the more affluent parts of the world has caused the price of food to drop dramatically, making it far more affordable to poor people, though even so there remains a problem of affordability for millions even in this country. And the economic benefits of cheap food in a consumer society have been substantial – because it has left people with more money to spend on other consumer goods.

And with supply running slightly ahead of demand, shops and supermarkets have been able to buy keenly, thereby further reducing food prices. Supermarkets are not the cause of the problem, real or imagined, which farmers complain about. The cause is supply constantly running ahead of demand.

So why I am suggesting that this 60 year trend may be about to change, with possible dramatic consequences for the world? Let me start with a bit of history.

A somewhat unappealing cleric of the 18th century, the Reverend Malthus, predicted that the world was heading for a crisis because population was going to grow faster than food

supplies. Malthus had rather draconian and reactionary proposals to deal with the problem, by restricting the right of especially poor people to breed. When Malthus wrote his dire forecasts, there were about 1 billion people on the planet, but thanks to improvements in agriculture and medicine, the population was beginning to accelerate in the late 18th century.

But Malthus pleas for birth control were largely ignored – the global population doubled to 2 billion by 1925 and in my lifetime has actually trebled to over 6 billion.

So how did the world avoid a disaster caused by food shortage during the past 200 years? The answer lies in extraordinary human ingenuity reflected in scientific and technological innovation and enterprise. In the first part of this period, it was enterprise which led the way, albeit backed by technological innovation and political astuteness. Since the last war science and technology have been the dominant factor, sometimes leading to irresponsible developments and unacceptable consequences – DDT being a classic example of this.

Over the past two centuries there have been three crucial turning points in the development of food production. Firstly the introduction of the Norfolk rotation principle which raised farm outputs significantly, and led to the demise of the enclosures in the early part of the 18th century. Next, as industrialisation gathered pace, so did political discontent in the big cities, frequently caused by the high cost of food. British farmers were heavily protected from imports, so much so, that the price of wheat in 1815 – the year of the battle of Waterloo was never matched until 1960. Sir Robert Peel, a Tory Minister, changed all that when he repealed the Corn Laws in 1846, and opened up British markets to supplies from the rest of the world, notably America.

The third turning point was after the second world war in 1947, when a Labour Minister of Agriculture, reintroduced protection for British farmers which became even more substantial when Britain joined the Common Market in 1973. Britain, and Europe, had, during the two world wars experienced severe food shortages because of the interruption of supplies from other parts of the world, and this was the justification for a reversion to protection.

The opening up of vast new tracts of land in North and South America, Australasia and Eastern Europe transformed food supplies in the 19th century and wouldn't have happened without the engineers who developed boats and trains to move food in quantity and speedily from areas which had been previously inaccessible. The achievements of the Stevensons and Watts were matched by agricultural engineers such as McCormick and Deere in America, who through mechanisation made large scale farming possible for the first time. And of course none of this would have happened without those extraordinary pioneers who emigrated from Europe to exploit these vast virgin lands.

But if the achievements of farmers in the 19th century were stunning, those of the 20th century were even more remarkable. In the past 75 years the world's farmers have trebled

their outputs. This time, although extra land was brought into production in the Americas and Europe, it was not on the scale of the earlier expansion. This time the growth came from the increased output per hectare and per breeding animal. There had already been significant benefits from the use of chemicals, notably the invention of oil-based fertilisers by Sir John Lawes in Harpenden. But agricultural scientists really came into their own after the last war. They developed wheats whose straws were short enough and stiff enough to withstand extremes of weather, thereby enabling India, for example, to become a net exporter of wheat. They developed fungicides to enable plants to resist diseases, pesticides to destroy predators such as aphids and slugs, and herbicides to control competing weeds. They bred plants and animals which were much more fertile and productive, and developed medicines which prevented disease and cured illness in livestock.

Simultaneously engineers have developed fast, high output machines which vastly increased farmers' capacity to cultivate land and harvest crops whilst at the same time massively reducing the volume of labour needed for the job. The productivity improvements are breathtaking, yields of crops up threefold, outputs per lactation of cow also trebled. My father would aim to harvest an acre of potatoes per day, 5 acres of wheat. My son harvests 10 acres of potatoes per day, 50 acres of wheat. My father on 200 acres employed 7 or 8 people, my son on 900 acres employs one. My father was happy to grow a ton of wheat on an acre. My son is disappointed when he does not achieve 4 tons.

So if we have succeeded in trebling outputs in the past 60 years (that is in the affluent zones of the world) why should there be a problem in maintaining this progress at a slightly lower rate?

One of the difficulties I have had in developing possible answers to this question is in finding sound evidence on which to build assumptions, because of deep differences and animosities between the conflicting pressure groups. Environmentalists have played a crucial part in highlighting the excesses of modern farming – originally with Rachel Carson's famous book "Silent Spring" (which pointed to the devastating impact on biodiversity through the reckless use of agrichemicals). More recently it was the environmental pressure groups who warned of the dangers of climate change arising from the wider excesses of the modern consumer society. Sadly it took farmers and politicians too long to wake up to these concerns.

At last the penny seems to have dropped, but the warring factions still persist in distorting facts to make their case. A leader of the organic movement told me solemnly that there would be no oil available by 2020 to manufacture artificial fertilisers, so farming would have to become wholly organic by then. He did not explain how the consequent collapse in food production of over 50% was going to be made up.

A day later I happened to be chatting to a retired Chairman of one of the world's biggest oil companies and he said that unlimited oil, albeit at a huge financial and environmental cost, would be available for the rest of this century.

Campaigners against GM foods warned against the dangers to human health which have proved to be completely wrong whilst the developers of GM, initially suggested that there was no environmental risk, which was also a false claim.

Some people argue that energy crops are preferable to nuclear energy, in terms of public safety, but others say that nuclear is perfectly safe and that energy crops are of marginal environmental benefit and exacerbate the food supply problem, by switching land from food to energy production. There are disputes about the amount of spare land which could be cultivated, profound differences about the benefits of Free Trade in agricultural commodities as against protection, and, in Britain especially, strong contradictory views about the dangers of intensive livestock production.

There is even a big debate about how many people will be around in 2050 – with a spread from 8 to 12 billion! So, against this background, let me make my assessment of the developing situation and suggest possible responses which would confound Malthus once more, without at the same time incinerating us all.

First some assumptions about the future

1. The world's population will rise by 30% over the next 50 years to about 8.5 billion.
2. More affluent human beings will eat more meat, which suggests that the world's calorie intake will increase by 50%.
3. Land availability. Unless we are prepared to pull down rain forests, with a devastating impact on global warming, there may be less than 10% of new land which could be cultivated effectively. Climate change will probably make land in Siberia and Canada more productive, but it may flood land currently being cultivated (Bangladesh) or create deserts around the Mediterranean. I would, therefore, be reluctant to assume that any significant areas of land can be brought into cultivation – a far cry from the 19th and 20th centuries. And some of the jeremiah forecasts make the Rev Malthus sound bullish – water availability per person to halve, 50% of existing arable land unusable by 2050!
4. A decline in the productivity of existing land: The extremes of weather anticipated as a result of climate change – floods and droughts – must overall reduce existing outputs, although there will be winners (Britain) and losers (the Po valley).
5. Environmental regulation and taxes: Environmental regulation and taxes have already caused dismay amongst farmers but there is more to come, if governments face their responsibilities. Farming's carbon footprint is very bad thanks to the high use of energy and agrichemicals and it does seem anomalous in the face of global warming that they still pay a modest amount of tax on their tractor diesel. Many existing farm practices will become less and less viable, and other techniques will have to be found instead.

6. Intensive livestock methods: May also become less productive if widespread health problems, already being experienced by pig and poultry farmers, and to a less extent dairy farmers, accelerate out of control.

7. Energy crops: If governments rely too heavily on crops for alternatives to fossil based energy then there will be less land available for food production.

8. Labour shortages: Climate change will shift agricultural production away from regions of the world with an abundance of cheap labour, to richer areas such as North Europe where there is an acute shortage of indigenous labour for intensive farming activities.

These are gloomy and disturbing forecasts, just as Malthus would have relished. But I believe there are 6 ways which taken together can successfully thwart the Reverend gentleman whilst at the same time helping to tackle the problems of climate change.

1. Existing Science and technology

a) Properly regulated existing science and technology is only available in richer parts of the world where farmers can afford to purchase these benefits. If food prices remain high they will enable poor farmers to acquire existing knowledge. If poor farmers had access to high speed mechanical harvesting equipment they would dramatically reduce the losses they incur because of the weather. They would reduce waste further if they had the storage facilities enjoyed by rich farmers. Output in the developing world would rise significantly through the application of existing science and technology.

b) Electronic technological development could also transform farming. For example, fertilisers and chemicals tend to be applied haphazardly and wastefully. Satellite mapping of the details of individual fields will enable them farm machines to apply these materials much more precisely, thereby increasing the potential of the appropriate plant and reducing environmental damage.

2. Further Scientific Innovation

Genetic modification is one aspect of bioscience which can both increase yields per hectare and reduce the environmental harm caused by existing farming methods. If plants can be grown with a natural resistance to disease and predators they will be more productive but there will also be less need for fungicides, herbicides and pesticides, thereby increasing the biodiversity of the land. So rather than worry about the potential dangers arising out of genetic modification we should be championing its potential benefits. There are risks involved in all scientific development, and these need to be evaluated carefully before approval. But having decided the risk is either negligible or acceptable, the science must be supported.

3. Energy Crops

In recent years many governments have been incentivising farmers to grow crops like cane sugar, oil seed rape, palm oil and wheat to provide energy rather than food. They justify this firstly for environmental reasons (less emissions of CO₂), secondly security (less reliance on unstable parts of the world like the Middle East for oil supplies) and thirdly as another, means of subsidising hard up farmers. But in my view these three objectives are flawed. First, the environmental benefits are not as great as imagined, if, for example, you hack down rain forests to produce sugar cane and then transport the bioethanol half way round the world.

I believe that for security alone reasons the nuclear option is preferable to energy from crops, unless new technologies can improve the performance of crops. Furthermore it could be dangerously irresponsible to jeopardise food supplies by incentivising farmers to switch to energy crops. Finally if these high agricultural prices persist, any lingering justification for subsidising farmers will disappear. But the US and the EU together are subsidising energy crops by 10 billion dollars per year in 2007.

4. International Trade

Climate change will, as I have suggested, dramatically change patterns of production across the world. Some would suggest that this would require more restrictions on international trade, as countries try to control inflation and protect supplies by limiting exports. This is already happening in parts of the world. I believe this is the completely wrong reaction. We should press for more rather than less trade liberalisation so that food can move more freely from those, largely temperate and rich zones in surplus, to the poorer countries in deficit. Food should always be produced in regions which are most appropriate environmentally, and allowed to move freely around the world. I got into trouble recently when I pointed out that New Zealand lamb was potentially less damaging to the environment than Welsh, because its reduced reliance on fertiliser and chemical inputs more than offset the higher levels of transport emissions.

As part of this, “deal” labour intensive manufacturing activities should continue to migrate from the richer to the developing countries, but human migration will also be necessary in the other direction to enable the farmers in the richer countries to grow and harvest their crops. This two way traffic, between rich and poor countries is already well underway.

5. Waste

But even if all these opportunities are taken I believe that there could still be a crisis, unless we can achieve radical changes in, especially, modern rich consumer behaviour. Put simply we waste far too much food, energy and goods, and we eat too much. And this is where there is a common theme between ensuring global food security and combating climate

change. Waste is the most unappealing by-product of a self-indulgent, Western consumer society.

In Britain no less than 30% of the food that is bought in shops is wasted in our homes. Our eyes are bigger than our stomachs. Encouraged by supermarkets and low prices we buy far more food than we could possibly eat. Buy one get one free promotions, especially in perishable food, have become a social evil. And the amount of packaging, particularly of perishable food, seems to be growing out of control. Our obsession with sell-by and use-by dates result in our dumping food which is perfectly safe and acceptable. We have lost the knack of using left-overs from one meal, to create another, or perhaps we are just too idle, and food, for most people, seems to be too cheap and throw-awayable. The portions recommended and designed by supermarkets are much too big. The waste of food in restaurants, institutions like schools and hospitals is equally obscene and unnecessary.

Supermarkets produce excess waste in all sorts of ways. For presentational reasons they overstock their shelves. They refuse to accept perfectly good if slightly blemished fruit and vegetables, because their fussy customers will not pick them up. Perhaps they would if the discount was sufficiently attractive. Some of their shelf-lives are unduly short, because they are designed to protect the most idiotic of customers who leave their cartons of cream on the seat of a car for several hours in a heatwave. Supermarkets, also, give far too little advance notice of their orders to their suppliers, and reserve the right to cancel at the last moment, thereby creating costly waste. Go into any modern sandwich factory and you will see vast amounts of perfectly good food being dumped, either because of all-round incompetence or a sudden change in the weather. Although control systems in the affluent food chain have improved, there are far too many failures which result in waste, and in many parts of the developing world such controls are non-existent, creating a public health hazard as well as waste.

My guess is that throughout the food chain, 50% of the food produced on farms is wasted. If we could save even half of this, we would solve the Malthusian question, and we would also make a huge contribution to the environment by reducing the huge tonnage of greenhouse gases created in the production and disposal of this unnecessary waste.

6. Diet

Overweight is now recognised as the greatest new health problem facing the world. Changing lifestyles resulting in much less physical activities – especially among those billions who seem to spend their waking hours glued to a computer screen – has not been accompanied by an appropriate reduced intake of calories. Indeed, if anything, the trends are going in the other direction as rising affluence enables people to switch from a vegetarian to a meat-eating diet. We need to reduce our dependency on meat for a number of reasons too much meat is bad for you. There are possible intractable health and welfare problems developing in the livestock industry rising demand for animal feedstuff is a major aspect of the Malthusian crunch. Animals are a very inefficient form of protein conversion

Animal by-products are a major cause of global warming. The conclusion one has to come to is that the only high ethical food ground is the vegetarian one, and that livestock farmers, including the whole organic movement, are not contributing to a solution of the problem. As with other aspects of this issue, however, there have to be trade offs. I am not suggesting that the world should go vegetarian – it's just that we should eat less meat than we do.

Conclusion

In preparing this talk I have become increasingly struck by the similarities affecting the issues of climate change and food supplies, and that three groups of human beings are the main players, as the planet begins to face up to these realities – the scientists, the scientific luddites and the (mainly Western) self-indulgent consumers. Science is key to both problems. In the case of climate change, we need scientists to determine trends, to develop environmentally friendly sources of energy and to improve energy efficiency. As for food, only innovative and responsible scientific development will avert a potentially disastrous shortfall in supplies.

Climate Change and food security can only be solved on a global basis, and require an unprecedented level of international agreement, as anyone who studies the recent Bali discussions will be aware. In tackling climate change, all major governments must agree on effective regulations to restrict emissions, to invest heavily in research and to ensure that the benefits of such research are shared globally. And whilst I believe that the planet will produce enough food for the 9 billion people, there will be a catastrophe if trade agreements restrict the movement of affordable food from regions in surplus to those in deficit.

But there are, again in the Western world, those who would seek to resist scientific innovation like GM. To them I would say that it is one thing to question the benefits of scientific development that is an essential safeguard in a democratic society. But it is quite another to deny scientific progress, and to suggest that the world can survive without it. It cannot.

And finally there is the crucial problem of irresponsible behaviour in, particularly, affluent consumer societies across the world, where thoughtless self-indulgence leads to horrific unnecessary waste of energy and food, as well as ill health. How far can governments go in restricting such excesses without losing the support of the voters? Taxes are an option but are notorious vote losers. Regulations are equally unpopular, and if unpopular, almost impossible to enforce (prohibition in America). Most people play lip service to the immediacy of the threats, but the governments of the world must speak with one voice in informing their citizens of the developing situation – they must be careful to avoid using the apocalyptic card but instead emphasise the ways ordinary citizens, in making significant but manageable changes to their daily routines, must play the decisive role in avoiding disaster by dramatically reducing the excessive use of energy and the unacceptable levels of food waste which are a shameful feature of most modern consumer societies.

It will be a tight call, but I believe that a combination of skilful responsible scientific innovation, well thought out taxes and incentives, sound, effective regulation, unprecedented international cooperation, and the inherent common sense of most human beings will avoid a Malthusian disaster in food supplies.

And, if this can be done with food, it should also be possible to avert the catastrophe threatened by climate change.