Nuffield Farming Scholarships Trust

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Farm Local; Eat Global

Growing exotic vegetables in the UK:
A potential vehicle for utilising an underdeveloped market and promoting agriculture in the UK

by

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Executive Summary

The UK ethnic food market has seen huge growth in recent years. The consumers of this food are black and minority ethnic (BAME) groups, along with the white British population, who have become more adventurous in their eating habits. This study aims to outline the possibilities such trends hold for British farmers.

Primary research in the UK has shown that BAME groups consider freshness of vegetables and herbs a key consideration when buying produce, and that the preference would be for locally grown crops if it meant that the quality was higher.

The terms local and sustainably produced food are currently extremely fashionable within the popular press, which is, in part leading to increased sales of such food. Farmers are beginning to take advantage of this popularity by developing new markets to supply this new demand.

Though the concept of local food, when purely defined by the number of miles a product has travelled is currently receiving some criticism, with examples of how British produce can have a larger 'carbon footprint' than food imported from the other side of the world. This highlights the fact that British producers cannot only rely on the concept of food miles when marketing the benefits of local food; the sustainability of the product must also be addressed.

One way in which the sustainability of food can be improved is by developing infrastructure which supports effective local food, and by using direct marketing which tends to attract consumers who are keen to buy new and exciting products, which includes more unusual vegetables. This marketing style currently only suits a relatively small number of producers, though there is potential to scale up local food supply chains, to serve outlets including those which serve ethnic food, and supermarkets which are also attempting to become more sustainable.

Throughout this report, all suggestions for production would be using organic methods. Organic systems have huge benefits in terms of energy use, bio-diversity, human health, and have a much lower reliance on oil based agricultural systems.

Another reason for considering growing more exotic crops is the phenomenon of climate change. Though there are many uncertainties about how the phenomenon will manifest itself, it is extremely likely that the UK will become warmer. Although focus should be on ways to mitigate climate change, government research is also beginning to assess the possibility of growing alternative crops, and there are already examples of individuals and companies successfully growing exotic crops in this country.

Other government initiatives are aiming to tackle the causes of climate change. These include attempts to reduce the amount of carbon being released into the atmosphere. Pressure is currently being exerted on the government to curb the aviation industry which is a large contributor to greenhouse gas emissions. Some exotic crops are currently air freighted; therefore reductions in such forms of transport could offer further opportunities for local production.

Along with more extreme climatic conditions, the world is also being faced with what is known as 'peak oil' which suggests that we will soon run short of oil, and that the increased price of oil will make our current system of food production and distribution untenable. This would mean

that we will be unable to easily import our food from around the world. It also means that current oil dependent agricultural practises such as the use of artificial fertilisers, pesticides and heavy machinery are likely to become uneconomic. Therefore it is important we develop strong local food systems in light of both of these phenomena.

One criticism of the local food movement, and the suggestion of growing exotic vegetables in the UK, is that it will be damaging to producers in poor countries. My Nuffield experience demonstrated that this is often not the case and that by far the greatest beneficiaries of exporting vegetables grown in poor countries are large Western multinational companies and that smallholder farmers often actually end up in a worse off position than they had been before vegetables for export were being grown in their area.

Much has been written about the rising levels of obesity in the UK, particularly amongst children, and government initiatives are advocating the importance of eating more fresh fruit and vegetables because the majority of the population's diet is so poor. The report suggests ways of engaging people in food production, and how this can improve individual's diets and make their lifestyles healthier. Such schemes are already common in some of the countries I visited, and some of the more innovative ideas are presented as examples. Such schemes can also offer diversification benefits for the farmers involved.

Farming in the UK has been suffering from a lack of new entrants to the industry, and research has shown that many people would relish the opportunity to become more involved in vegetable growing, and would pay for the privilege of doing so, either as a hobby, or a small scale commercial enterprise. Comparable systems have been shown to work well in Australia, particularly for highly perishable crops grown close to urban wholesale markets.

Crops which already grow well in unprotected environments in the UK include a wide range of roots, leaf crops, along with grains which are showing increased popularity amongst consumers. Some crops are being successfully grown in the UK, for purposes other than human consumption, and crops often fall in and out of fashion, even if they grow extremely well here.

Other crops, more sensitive to cold temperatures, can be grown under poly-tunnels, and new varieties, more suited to our climate are being developed. Other high value crops, such as herbs grown under protection, can bring excellent returns due to their short shelf life, and the rise in popularity of exotic ingredients amongst the UK population.

This report highlights some of the benefits which growing more exotic crops may bring, including new markets for existing farmers, along with additional benefits in the form of new diversification opportunities. This idea aims to emphasise the importance of the industry for the whole UK population, by highlighting the fact that farming produces the food we require for our very survival, rather than the perception that agriculture is only important for the privileged rural few.

Background

My upbringing on a mixed family farm has ensured that I am aware of the importance of farming for the UK, both in terms of food production for the nation, and the vital role which farming can play in developing the population's appreciation of the food they consume. Such a general understanding can have personal health and social benefits, can encourage people to eat more local, seasonal and organic food, and realise the importance of farming in producing such food. An obvious link to those involved in the industry, but not to a large proportion of the general public!

This view was further confirmed by my role at Sustain: the alliance for better food and farming. My job focused on developing supply chains for local food, and promoting the importance of good food. This work has highlighted just how far removed the general public, and even those who are involved in food, such as public sector caterers, are from farming. This experience and knowledge continues to develop within my role in food and farming policy and campaigning at the Soil Association.

My interest in growing non-indigenous (from here on termed exotic) crops arose when I was studying for an MA in sustainable development advocacy, based at an agricultural college near Birmingham. I realised that a huge potential market lay relatively untapped by regional farmers, in terms of the large black and minority ethnic (BAME) population in the city. It was also apparent that most of this population had very few, if any links with farming and the countryside.

Introduction

This study aims to explore the feasibility of growing more unusual and exotic vegetables, and to gauge whether ideas of this type hold opportunities for British farmers. We are living in a fast changing world; in terms of agriculture, population structure, and even the earth's physical climate. British farming has opportunities to adapt to these changes, and this study examines one example of how this might be done.

Many exotic vegetables, herbs and other crops are grown extremely successfully in gardens and allotments across the country, and this study assesses how this production might be expanded to a commercial scale. The possibility of growing exotic fruit or other crops which will not easily survive has not been explored; clearly, growing mangos or bananas in the UK is not feasible in the current climate! The study also explores some of the additional benefits that growing exotic vegetables may have, for example in linking farming and growing with modern social policy considerations such as engagement with hard to reach communities, and how a point of difference within an existing traditional farm business might be developed as a result.

Such a view links with policy recommendations regarding potential new directions for farm businesses, particularly linking farming to the standpoint of sustainable development. The overall message of the Policy Commission on the Future of Farming and Food review, which was lead by Sir Donald Curry, was to 'reconnect' (Strategy for Sustainable Farming & Food: Facing the Future, 2003). That is, to reconnect with the market and consumers, and to provide them with the goods which they desire. The scheme proposed in this study will also build on the idea of growing 'new food crops', which is part of Defra's strategy for Sustainable Farming & Food (HM Government, 2002).

The Growing Demand for Ethnic Food

"If successful, it won't be long before we hear characters from the radio soap opera The Archers talking about harvesting crops of okra and chilies around Ambridge."

(Chris Wibberley, ASDA referring to the company's trials of exotic crops)

In 2004 the UK ethnic food market had a retail value of £1.29 billion, and between 1998 and 2002 the market sector saw growth of 44.1%. The consumers of this food are ethnic minority groups, (one in eight people currently of working age in the UK were not born here), along with the white British population, who have become more adventurous in their eating habits as a result of increased access to foreign travel, the rise in popularity of celebrity chefs etc.

I found a similar situation in Australia which boasts a strong 'fusion food' culture. The country's fruit and vegetable wholesale markets sell a huge diversity of fruit and vegetables, with varieties indigenous to many parts of the world, but which have been grown in Australia. Of course many of the variables, particularly in terms of climate are different in the UK, but the example highlights the way in which domestically grown crops are the norm, rather than being a niche product as is often the case with local food in the UK. Many of the 'Sydneyites' I spoke to believed that this wide variety of foods from the many nationalities found within the city, and the country as a whole, aids community cohesion.

I believe that such expansion of the local food market also mitigates against the attitude in some sectors of society that local food is only for the white middle class. This study attempts to broaden the horizons of those who believe this, and to enlarge the market for farmers producing such foods of all types – not just exotic crops. Sustainable food systems should, and need to appeal to everyone.

Primary research in the UK has shown that BAME groups consider freshness of vegetables and herbs a key consideration when buying produce. The same piece of research found that imported exotic vegetables and herbs were often not as fresh as required, and that the preference would be for locally grown produce if it meant that the quality was higher.

A recent case study analysis and overview of the UK horticultural production industry and its future over the next 10-20 years, prepared for the national horticultural forum stated that consumption of fresh produce in the UK has remained relatively static in the past 10 years. 'Growth has often come from imported exotics, rather than from more traditional fruit and vegetables'. This perhaps gives further opportunities for local production of exotic crops.

Supermarkets are also attempting to become more sustainable. For example Asda is beginning trials of exotic crops in order that it can be the first company to produce what it terms 'a truly British curry', with locally grown ingredients. Initial trials will concentrate on growing doodhi, mooli, baby aubergines and karela in temperature-controlled glass houses in Lancashire and Lincolnshire. The supermarket chain Sainsburys is also conducting trials of the first commercial crop of avocadoes under glass at West Dean gardens

Supermarkets are recognising the potential within the market for supplying the ethnic minority population, with special areas for such produce. The disposable income of the ethnic minority population is around £40 billion, and it is a growing area for supermarkets. For example the Asian market is growing by 40% per year for Sainsbury's. There are two million Muslims in the UK, which highlights what a large potential market this is.

Expensive ready prepared food has been found not to be what the average ethnic consumer wants. They would prefer to cook their meals from scratch with fresh ingredients. This emphasis on freshness gives further possibility for the UK market to supply such produce.

One of the benefits of visiting a country such as China was to gain a greater understanding of the types of foods people now living in the UK eat in their own countries, but which perhaps there is not the opportunity to eat in the UK. Such research is also useful in terms of gauging possible new crops which might hold interest for the general population of the UK, in the rapidly developing and evolving food market.

Figure 1. A Chinese wholesale fruit and vegetable market.

For example, in China, the green shoots of the garlic plant are a very popular vegetable. This crop is not imported, as it does not transport well, and is not currently marketed in the UK, but grows extremely well here. The fact that garlic has been found to contain beneficial properties for our health means that as well as it having potential as a new and interesting vegetable, some, perhaps even quite limited research is likely to yield positive results in regard to it's benefits to our health.

Figure 2. Garlic tops being sold in a Chinese market.

The Market for Local and Sustainable food

The terms 'local' and 'sustainably produced' food are currently extremely fashionable within the popular press, which is, in part leading to increased sales. The market for what is termed ethical food is now worth over £5.4 billion per year in the UK. Farmers are beginning to take advantage of this popularity by developing new markets for such food.

Though the concept of local food, when purely defined by the number of miles a product has travelled is currently receiving some criticism. For example I found that the New Zealand government has, amongst other marketing tools, commissioned research to show that lamb produced in New Zealand and consumed in the UK has a lower environmental impact (as measured by it's carbon footprint) than the same lamb produced in the UK. The results of this study have been questioned; for example the research did not take into account the energy used in refrigeration whilst the lamb was being shipped to the UK. A visit to the government agency responsible for agriculture in New Zealand (MAF) highlighted for me how passionate and determined the New Zealanders are to see their agricultural industry succeed on the world stage.

Agriculture is such a central part of the New Zealand economy that a great deal of campaigning against the concept of food miles is taking place. There is also a growing interest in sustainability; and even more in the marketing of the concept, particularly using the strap line 'clean and green' as a tool. Though many, even within the country say that you only have to scratch the surface to realise that this is not always the case, and that there are environmental problems such as eutrophication and salination occurring. Though the lamb study may be incorrect, this example highlights the fact that British producers cannot only rely on the concept of food miles when marketing the benefits of local food; the sustainability of the product must also be addressed.

One way in which the sustainability of food can be improved is by developing infrastructure which supports local food, for example by making use of Farmers' Markets and setting up vegetable box delivery schemes, as this often cuts travel times and ensures that a greater proportion of revenue remains with the producer. This type of marketing tends to attract consumers who are keen to buy new and exciting products, which includes more unusual vegetables. This marketing style, along with vegetable box delivery schemes is currently very niche, and only suits a relatively small number of producers. Though there is potential to scale up local food supply chains, for example to serve the growing number of specialist food shops, and many restaurants, including those which serve ethnic food and are using local and sustainable food as a marketing tool.

Figure 3. A popular vegetable stall at a local Farmers' Market.

Fashionable trends which link to the possible growth for the market in niche food, highlighting the potential for new types of food, particularly in socio-economic group AB include:

- Local Food - the concept has grown massively in recent years, with initiatives such as 'British Food Fortnight' now regular events on the calendar, and many supermarkets now have dedicated 'local' sections.

- Wild Food - foods which have been harvested directly from nature. In Australia the market for 'Bush tucker; type foods have become very fashionable in recent years.

- Organic Food - the market in the UK has now reached sales of just under £2 billion per year, and is set to grow further. Although of course organic is much more than a fashionable trend; it is a production system which also has huge benefits for the environment and people's health.

- 'Safe Food'- although not a new trend as such, I believe that there could be more anxiety in the future regarding issues such as unsafe pesticides being found on imported fruit and vegetables. In New Zealand this has already become an important issue as a result of the tonnes of vegetables being imported into the country which do not have proper labelling. The severe underutilisation of the testing facilities we visited at the Chinese wholesale markets gives further cause for concern. Many Chinese products have already been causing safety concerns in countries such as the USA, and this is likely to have a knock on impact on the food sector.

Suitable Infrastructure to supply such Food

'Queer Gear'
(Colloquial term used by wholesale fruit and vegetable market sellers to describe exotic produce)

Figure 4. Exotic vegetables being sold on a market stall in Birmingham.

Many of the exotic vegetables currently sold in the UK, particularly those not sold in supermarkets, are sold in the UK via a relatively small number of wholesale markets. These markets include New Covent Garden Market and New Spitalfields Market in East London. Such markets have shown some decline, particularly in light of the growth of the supermarkets, which tend to use their own separate distribution chains. Most of the London markets are now under threat; one of the methods being used to attempt to highlight the need for the markets to continue has been to make the markets more sustainable. For example, New Covent Garden Market has gained funding to employ a manager to engage more local producers and to improve the sustainability of the market overall. The market for locally grown, exotic vegetables could fit extremely well into such a model.

The wholesale markets in Australia differ from those in the UK in that they are still extremely vibrant and successful. The forward thinking nature of many of the companies based within the markets could provide valuable lessons for UK producers. For example 'Perfection Fresh' is based at the Sydney Wholesale Market, and has developed a range of niche products which has given the company a competitive advantage because it's new products, the most popular of which are Broccolini (a small headed version of broccoli) and Grape tomatoes have since become popular over large sections of the country. The company asked for, and gained exclusivity for these varieties in Australia. They have rolled out the principle to a further twenty products. They work directly with the 'right growers in the right areas' and also undertake 10,000 tasting sessions with forty growers in stores every year to give the label strength. Forward thinking companies in the UK could perhaps think of marketing locally grown exotic vegetables in the same manner.

In Australia there are still a large number of successful street markets, selling a wide range of food, including fruit and vegetables. Of course such markets were once one of the major ways that people bought their food, but a number of factors, including the meteoric rise of

supermarkets means that they are now less popular in the UK. The markets I experienced in Australia were extremely vibrant, with high quality food available, rather than the sometimes somewhat low quality which is often found in old style food markets in the UK.

The larger cities of London, Birmingham etc still have a strong culture of ethnic minorities buying fruit and vegetables from such markets. The vegetables have been imported long distances, and are often somewhat poor quality. Primary research has shown that such consumers would much prefer to buy locally grown exotic crops if they are fresher and of better quality.

In Adelaide some of the larger scale stall holders were Asian, and had begun their careers as growers when they first moved to Australia and had then moved on to the retail sector.

It was fascinating to see the diversity and vibrancy of Chinese vegetable markets, with high quality, and very fresh crops on sale. Many of the consumers were extremely exacting in their requirements, and it made me wonder if such high quality markets were available in the UK, whether it would encourage more people to use markets. The personal link with the stall holder (whether they were a farmer or not) as I saw in China is likely encourage people to be more adventurous with their buying and eating habits, thus consuming a larger volume and variety of vegetables. Eating high levels of fresh produce has been consistently proven to be the underpinning of a healthy diet, and which we in the UK, are failing to achieve. This has subsequent high costs for the health service as a result of diet related ill-health, and knock-on costs to the nation, for example through lost work days.

Such examples highlight the fact that there is certainly potential to develop such markets here. There is of course already a growing movement of Farmers' Markets, but regular and high quality street markets perhaps give an even wider possibility to supply more local food.

Farmers' Markets and other forms of direct selling are growing in popularity. This is a relatively new phenomenon both here, and in Australia and New Zealand. The first UK market was in Bath in 1998. There are now over 500 certified markets, and in 2006 Britains spent around £125 million at Farmers' Markets. Farmers' Markets were unheard of in Australia five years ago, and there are now a large number in both Australia and New Zealand. Such markets can also attract people from ethnic minority populations who are taking part in growing. For example, the head of the New Zealand Farmers' Markets has a Chinese stall holder at one of his markets. The phenomenon of local markets is of course commonplace in many other cultures, such as in the rest of Europe. These markets have benefits for consumers and farmers alike.

Climate Change and Peak Oil

Another reason for considering growing more exotic crops is the phenomenon of climate change. Though there are many uncertainties about how this will manifest itself, it is extremely likely that the UK will become warmer, and indeed many studies highlight the fact that our climate is already doing so (see figure 5).

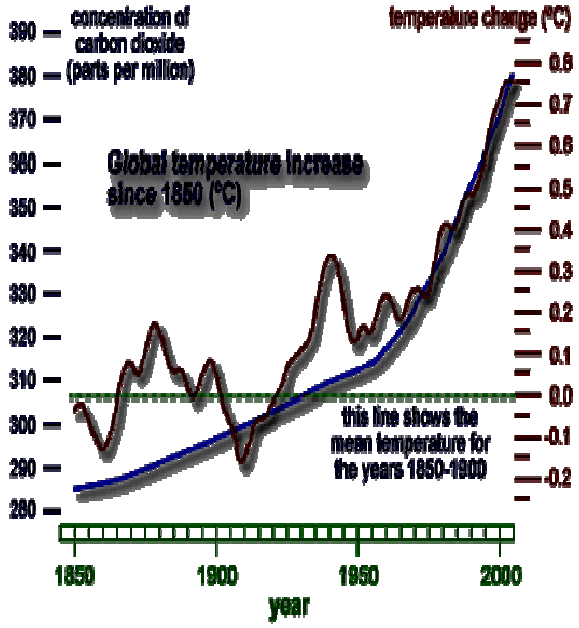

Figure 5. Global temperature increase. Source: www.climatechoices.org.uk

Analysis of the UK climate has shown that:

- The thermal growing season for plants in Central England has lengthened by approximately one month (see figure 6).
- Heat waves have become more frequent in summer, while there are now fewer frosts and winter cold spells.
- Although there might be lower rainfall levels overall, when it falls it is more intense and less evenly distributed.
- Met Office research suggests the move to earlier springs and the upward curve for average temperatures will continue over the coming decades.
- There are likely to be more extreme weather patterns and weather events as a result of climate change.

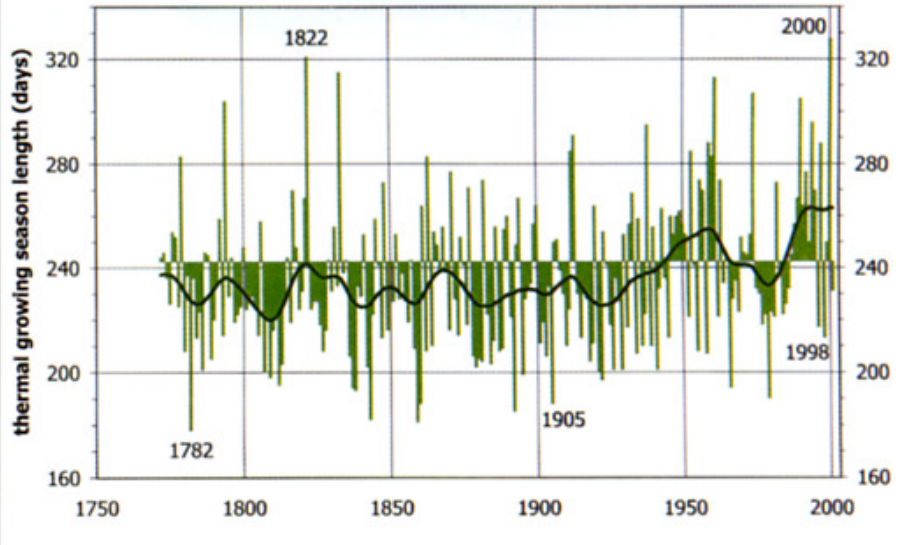

Figure 6. The increase in length of the thermal growing season in England
Source: Hulme et al 2002.

It has been asserted that: "Higher temperatures produce faster seed germination, bud burst, leaf expansion and flowering". Such changes could give added opportunities to grow vegetables that require more heat than has usually been experienced in England. Government research is beginning to assess the possibility of growing alternative crops, for example at the Institute of Grassland and Environmental Research (IGER) and at Harper Adams University College.

After the summer of 2006, which saw the hottest July since records began, a Defra spokeswoman stated in *Farmers Weekly* that farmers would need to "adapt by planting more exotic crops such as apricots, almonds and avocados". Seasonal climate variability is expected to alter, causing extremes of weather (rainfall, storm force winds, heat waves, and periods of extreme cold) that are damaging and problematic to society.

Government initiatives are also aiming to tackle the causes of climate change. These include attempts to reduce the amount of carbon being released into the atmosphere. Pressure is currently being exerted on the government to curb the aviation industry, which is a significant contributor to carbon emissions. A recent Defra report highlighted that transport of food by air has the highest C02 emissions per tonne and is the fastest growing form of food transport. Many exotic vegetables are currently air freighted, and such a reduction in this type of transport could offer further opportunities for local production.

Along with more extreme climatic conditions, the world is also being faced with the possibility of what is known as 'Peak Oil'. Proponents of the concept argue that we will soon run short of oil. Obviously food security for the UK will become of greater concern if we are not able to easily import our food from around the world, and therefore it is important we develop strong local food systems (which are less dependent on oil), in light of both of these phenomena.

Figure 7. Local food infrastructure in a post peak oil world?

One movement in the UK is attempting to prepare people for a world which has had to 'power down'. The movement is developing what are known as 'transition communities'. The concept aims to engage local communities with transforming their lives and communities in light of a potential world without oil. Actions include programmes to cut transport in all its guises, including when associated with our food. Such transition communities might be located in towns or even cities, therefore they also include plans for urban growing, for example planting fruit trees in streets, using public spaces such as parks for food growing, as well as the traditional allotments. Such a movement uses local agriculture and food supply chains in an attempt to supply food using as little oil as possible. Such systems have of course been in use for many centuries in the UK, and around the world.

Whilst in China we were lucky to experience such a system still in use. As in the community we visited, many villages in China still produce food on an extremely local level. It is very basic by our standards; using a large amount of labour, and oxen to plough the land.

Figure 8. A traditional production system in China.

Communities have a fixed amount of land for each person, and use highly efficient methods, to produce food using a low level of inputs, mainly because of the high cost of such inputs. They use ancient principles such as mulching and composting in order to achieve high soil fertility. Such a

regime might be seen by some as being rather backward, yet perhaps we can all learn from this in light of the possibility of severely restricted and rapidly increasing oil prices.

The Chinese are extremely keen to be, and to remain self-sufficient in food. New, more intensive systems, very different from the one described above are being employed, to satisfy the extremely large and growing appetite for meat within the country. Though such methods may not be possible in light of a post oil world, and therefore could actually cause lower levels of food security for the country.

Although such predictions of Peak Oil and climate change may be perceived as apocalyptic, many scientists and other eminent thinkers believe that we will have very serious problems very soon. Even if the scenarios are not as bad as some might imagine, education of the population to the potential threats to our food system is helpful to UK farming PLC in that it emphasises the fragility of our food system, and the vital role which British farming plays in our very survival.

Existing Examples

Examples of people growing exotic crops are often in the media, including a farmer in Devon who has begun to plant olive and apricot trees. Perhaps such a diversification scheme has more links to the resultant publicity than a serious attempt at commercial production, but I believe that such initiatives have a place in the agricultural mix, partly because they promote the fact that the industry is dynamic and forward thinking.

There are also a number of chilli farms dotted around the country that are making good returns, as this is a surprisingly easy crop to grow in this country, though mainly using protected cropping. A wealth of added value products has been developed, including chilli jams and chutneys, and even chilli vodka!

Figure 9. Locally grown chillies and okra.

An Australian example is ‘Only Natural Ingredients’ (ONI), a company which began from very small beginnings, in a farming family which had a recipe for chutneys that always received huge

compliments. Larger batches began to be made in the farm kitchen, and sales from stalls at high quality speciality food fairs were very successful. A client base began to build up, and a system for mail order sales via the internet was set up. A larger range of unusual products has now been developed, including flavoured sunflower seeds and marinades. The production has now expanded into a specially developed kitchen which was built in a farm building. This venture now runs alongside the existing farm business.

Figure 10. ONI products.

There are many other examples of people setting up on a small scale, for example based on market stalls. Such production could remain on a small scale, as above, or can grow, as I saw in Griffith, Australia where production has expanded into a factory scale, yet the company still supplies small scale delis etc, as well larger stores.

The benefits of engaging the broader community in growing and food production are many and varied. One way this occurs is through allotments. Allotment holders in the UK and other countries are growing a huge variety of unusual vegetables and herbs. This is particularly the case in those from ethnic minority groups, who often grow the crops they would have eaten in the countries they have moved from. A surprisingly large number of such crops grow very well in our climate. As well as regular allotment holders, who use their plots to grow vegetables for family and friends, there are also good examples of growing plots being used on a larger scale for commercial production.

For example in London the 'Concrete to Coriander' club engages ladies from the East London Bangladeshi community in growing crops on Spitafields City farm. The amount and diversity of crops gown on the site is staggering. Cooking classes are also given to a range of people in the surrounding area. Many of the ladies don't speak English, and to mix in wider society is frowned upon in their culture. This project gives them a chance to socialise and an element of independence. In Brisbane, the Northey Street City farm engages people in growing, but also uses art within the plots, and an in a gallery which surrounds the plots.

In the Gambia, women are also given the opportunity to gain greater independence, through growing vegetables in organised women's gardens. Work is shared, and crops are marketed through the Gambia is Good (GIG) project, run by the charity Concern Universal. Crops are then sold to local markets and to hotels, rather than relying on the vagaries of international markets.

Mr Shah grows Bangladeshi vegetables on a two acre plot at Ashlyn's organic farm near Ongar in Essex. His crops include lau (bottle gourd), khira, an egg shaped fruit, and dugi. He then sells the

vegetables back to local shops in his London community. Mr Shah had been successfully growing these, and other vegetables on his allotment for a number of years before beginning to grow them commercially. The seedlings are sown under glass in February, and then planted outside in May. They are harvested in June, July and August. Mr Shah described how his greatest problem is finding skilled workers:

"At the moment I am just relying on friends and family, you need to be skilful because the plants are very delicate and can easily be damaged."

From August to September the vegetables cannot be grown in Bangladesh, and people "see that the ones we have grown [in England] are fresh". Customers have been very positive about the quality of the vegetables, including the flavour, which Mr Shah attributes to the use of an organic system.

David Mwanaka moved to the UK from Zimbabwe, where he was employed as a journalist. He missed the staple food of his country: White Maize, so he decided to attempt to find a plot of land to begin growing the crop. He found making this link extremely difficult and eventually resorted to putting an advert in a local paper to rent some land. As a result he found a plot in Essex, and after trials he now grows around 25 acres of the crop and sells the crop back to the African community across the country.

Growing the Local Asian Foods Market' is a partnership project between the 'Grassroots Food Network', and Asian Healthy community project. Robert Barraclough is the third generation to farm at Farnly Tyas near Huddersfield in West Yorkshire. He has developed a pioneering scheme to produce locally grown Asian speciality crops such as spinach and coriander on his Yorkshire farm. This scheme has delivered a 'financial lifeline' to the dairy and cereal farm. On the advice of members of the local Asian community gardening group who work on the nearby allotments, the farmer has turned over several acres of land to the crops. This successful partnership is the first of its type between the Asian community of Huddersfield and the farmer. The elders who formed the gardening group were farmers before they left Pakistan in the 1960s. Haneef Asad of the Asian Healthy Community Project is keen to encourage more of his community to use their farming skills. He is convinced that exercise and healthy eating can help combat Western afflictions such as diabetes, heart disease and strokes.

Potential Impacts on Markets in Poor Countries

"We have a situation where those countries that are net exporters of food are facing starvation at home. The fact is that the global food economy is failing producers, consumers and the environment. Only the conglomerates are winning, which is why we need to look at the system and do everything we can to take back control of the food economy."
(Zac Goldsmith)

One criticism of the local food movement, and the suggestion of growing exotic vegetables in the UK, is that it will be damaging to producers in poor countries; on the scale I am suggesting, I do not believe that would be the case. When I visited the small African country of Gambia it was clear that in examples we saw, that by far the main beneficiaries of the export of fresh fruit and vegetables to Europe were the large, mainly Western companies which owned them. Smallholder farmers often experienced negative impacts as a result. They had often been moved from their land with little or no compensation when the large companies moved in, and jobs on the resultant

farms were few and far between as a result of greater mechanisation. In some examples, forested areas had been cleared to make way for new farms. Such clearance caused problems, for example to soil structure, meaning greater erosion, particularly in the rainy season. Forest clearance also causes other problems, such as reducing biodiversity, and subsequent opportunities for hunting and foraging.

Figure 11. Chillies being grown for export in the Gambia.

Even when local, small scale farmers have had the opportunity to supply larger companies, this is not always successful, and can be hugely damaging. An example was given of women's cooperative growing two tonnes of chillis as agreed with a company, the women transporting the crop to the pick up point at a designated time, and the company not honouring the agreement to pick them up or buy them.

Mandla Mentoor, a community leader from South Africa stated:
"I am shocked to see so much South African fruit and vegetables on British shelves when we are reeling with hunger back home. If there is so much money coming from exports, where is it? We don't see the money or the vegetables.

Such problems are not peculiar to the Gambia, or even Africa, and have been well documented. Although many still follow the mantra that international trade is the only way for poor countries to escape poverty, many now believe that more appropriate scales of trade and development will really help the poorest of the population. Schemes are being developed by charities such as the one I travelled to Gambia with – Concern Universal, which runs a number of health, business and social projects. There is potential for farms in the UK, particularly those which are perhaps growing non-native crops to make links with projects and initiatives, perhaps from the countries where such crops originate. This would be particularly apt for farms which open to the public.

Some developing countries which currently export vegetables do so using air freight. As a result of the problems around peak oil and climate change this is likely to become an untenable option

in the future. Forward thinking policies, such as the new standard being developed by the Soil Association after an extensive public consultation period, are aiming to reduce dependence on air freight by encouraging cuts in use, and only licensing companies which put fair trade standards in place. Most crops are exported using sea freight, and many of the crops transported in this way, such as yams, plantain, and almost all tropical fruit are unsuitable for production in the UK.

Many of the more traditional, particularly staple grain crops, including manyok, cassava and findi are being lost in African countries, in favour of crops for export, or grains which have become more popular, but are often not as nutritious, and not as well adapted to the climate, such as maize, or even worse, dependence on wheat and rice, which can't be grown in such African countries, therefore providing very low levels of food security,

In some of the market gardens I visited in the Gambia, some vegetables were being grown for local markets, which is an important step forward, but only a very limited range of varities were being grown. This is a risky strategy if such crops fail, which obviously happens for a variety of reasons. It does not make sense to grow acres and acres of the same green cabbages, which are not even particularly well suited to the climate. It would surely be more logical to grow a range of crops, and to spread the timing of planting, rather than, as happens at the moment, for there to be gluts on the market at particular times of year.

Figure 12. Cabbage growing in the Gambia.

The 'Gambia is Good' (GIG) project was set up with the support of the company Haygrove, which supplies strawberries to UK supermarkets. The company is extremely forward thinking and has set up GIG with the belief that one day it will be a good investment, and will also offer a large number of poor people in the country with a good chance in life. The project has set up the infrastructure to enable small farmers from a relatively large area the opportunity to supply hotels and restaurants serving the tourist trade within the country. Fruit and vegetables are collected from central locations, and then marketed, packed, and distributed to the organisations involved.

The Gambian Women's garden enables women to take on a stronger, more independent role, in an extremely male-dominated society, and to earn some money for their family. The garden also gives women the opportunity to gather and discuss other issues. The garden is split into plots and the women help each other to produce and market the crops produced.

Health and Education

"If the nation's health depends on the way its food is grown, then agriculture must be looked upon as one of the health services, in fact the primary health service".
(Lady Eve Balfour, 1943).

Much has been written about the rising levels of obesity in the UK, particularly amongst children, and government initiatives are advocating the importance of eating more fresh fruit and vegetables because the majority of the population's diet is so poor. One way of improving this situation and further highlighting the importance of farming, is for schools to rent parcels of land from farmers to grow fruit and vegetables. Working on plots would encourage children to exercise, eat more fruit and vegetables, and gain a greater understanding of where their food comes from.

Similar schemes already run in Australia, where practical growing and demonstration plots illustrating farming systems around the world, are combined with education facilities, and Farmers' Markets. Farms in Singapore have been developed in a semi-industrial area, with specific infrastructure to enable visitors to tour the farms. One site even has an on-site restaurant, which is supplied with produce from the farms, and has become a fashionable destination for the urban population.

Numerous pieces of research highlight the fact that a significant proportion the UK population has a very poor understanding of how food is produced. Having sites in the UK which combine education and production, in a similar manner to those in Singapore and Australia could provide positive publicity, and subsequent marketing benefits for UK farming, as well as offering individual farmers diversification opportunities.

Many schemes in the UK and further abroad bring children and others onto farms in attempts to engage them in growing and farming, by reconnecting them with where their food comes from. UK organisations such as Farming and Countryside Education (FACE), which is coordinating the 'Year of Food and Farming in Schools' are doing this on a practical level. In Australia, such work is sometimes carried out within government run agricultural facilities, for example at the Virginia Horticulture centre, which runs schemes based around the UK's 'Grab 5: eat more fruit and vegetables' scheme.

The Australian government agriculture department, (DPI) has a scheme called 'Land Learn' which aims to promote the message of sustainable agriculture, and encourage people to develop careers in the industry; a message which is somewhat lacking in the UK. The project includes working with teachers to develop resources, encouraging schools to develop their own gardens, as well as making links to commercial farms, and to organisations such as CERES (see below). This is perhaps particularly important for Australian people, the vast majority of whom live in cities, and therefore have extremely few links with agriculture.

At the Centre for Education and Research in Environmental Strategies (CERES) in Melbourne attempts are being made to engage the population with food production. The educational facility on the outskirts of the city, which engages the urban population in an innovative manner, has been running for 27 years, and is located on an old rubbish dump. With displays of farming from around the world, including an Indonesian village, complete with rice paddy. There is a Farmers' Market, and Care Farming is practised by engaging local people with disabilities in agriculture at the centre, along with a wide range of school visits. There are also community gardens, run along similar lines to allotments which have an eight year waiting list.

I was lucky to visit a number of other very positive examples of efforts to integrate the community into growing and food production. For example Vera Street community gardens in Brisbane, along with Northey Street community farm. Both of these examples were located in areas which are relatively deprived, therefore attempting to reach the sections of the population which are most likely to benefit from such facilities.

Figure 13 CERES, Melbourne.

At 'Bollywood Veg' in Singapore the Kranji express (a yellow bus!) shuttles tourists and residents from the train station on tours around the eight or so farms on the route, which include a crocodile, goat, and frog farm! 'Bollywood Veg' is the brainchild of business woman and politician Ivy Singh-Lim and her husband. School parties tour the gardens, and each plant is well labelled. The focus of the restaurant is on healthy, organic produce, and has had a huge amount of publicity.

Figure 14. The Kranji Express.

The Primrose Earth Awareness Trust (PEAT) is a market garden near Hay on Wye on the Welsh border. The organisation produces a huge output of unusual vegetables, salads and herbs on just 1.5 acres of land. It provides a box scheme to the local community, as well as supplying restaurants in the town. Some of the more unusual crops include a range of edible flowers which are included in diverse salad packs, along with wet garlic, unusual gourds and others.

The trust also had an education arm, where children from as far a-field as the Welsh valleys came to learn about food and farming, have individual plots which are the responsibility of the class. Teaching took place in a huge specially adapted poly tunnel, and practical tours were given around the farm and forest garden.

Potential New Entrants to the Industry?

UK farming has been suffering from a lack of new entrants to the industry, with the result that the average age of farmers is now around 56 years old. At the same time, research has shown that many people would relish the opportunity to rent plots of land, particularly for growing vegetables, either commercially, or as a hobby on allotment sites which could be rented from farmers. This type of initiative would be particularly popular on the periphery of urban areas, where there are often long waiting lists to gain council-run allotments. This could operate in a similar manner to the already popular farm diversification schemes of renting barns for office space, or fields for camping. A comparable system has been shown to work well in Australia, where migrants from Asia grow vegetables on plots of around five acres on the outskirts of Sydney for the wholesale fruit and vegetable markets in the city. The main crops grown are highly perishable, and include fresh herbs, and leaf crops including spinaches and Chinese greens. The DPI has a bilingual support officer to work with the estimated 350 growers in the Sydney basin, who have often been sponsored by relatives already in Australia. The growers use little mechanisation, and rely on labour from extended families.

Figure 15. A Vietnamese farmer growing crops on the outskirts of Sydney.

There are also problems regarding engaging enough labour to work on UK farms. The traditional route in recent years has been to employ people from ethnic minority groups, often from Eastern Europe; such employees have a good reputation for working hard, though anecdotal evidence

suggests that this workforce is moving on to other, more skilled jobs and subsequently quality migrant labour is now much harder to employ. Perhaps one way of overcoming such issues is to give valued workers more autonomy and responsibility by renting out plots of land on some kind of franchise or similar basis.

In New Zealand the Maoris are recognised as being excellent, sustainable farmers. They tended to work within natural production systems, including using planting by the moon and tides, adopted new crops as they became available, and have tended to become well integrated into New Zealand society. Though there are now few Maoris who have the opportunity to farm on a large scale. Maoris had farmed autonomously in the past, and then had left the land to work in industry. Now that the factories have closed, the skills and motivation required for farming have been lost. MAF described how there are now some seed funded projects in an attempt to enable more Maori people to become involved in agriculture once again.

In Australia a strong system of support exists for what (compared to the UK) is a relatively established type of initiative. For example at the University of Adelaide, a network of people is based on the ground to assist migrant farmers. For example, there is assistance in gaining land to rent. There is also education on crop protection products, as there tends to be some over use of these chemicals. For example at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia, Hmong refugees are given intensive training via an extension agent. CSIRO also give information and other services to new land users, otherwise known as hobby farmers, who are often from the white middle classes.

In Sydney, the organisation Farmcare is assisting migrant farmers, mainly through training schemes. The organisation finds that there are specific problems associated with such a client group, including the fact that there is some use of illegal pesticides, and issues around gaining visas. As a result of a lack of formal education and English language skills there are sometimes health problems with the use of pesticides, yet people do not visit the doctor in order to get treatment.

The Viability of Growing Exotic Crops in the UK

'Today's novelties are tomorrow's crops'

Figure 16. Examples of exotic vegetables.

As stated at the beginning of this report, this study is only relating to crops which already grow well in the UK, for example those in allotments and gardens. Of course there is a huge difference between growing for a hobby, moving to market garden scale and then to a large field scale. This section explores the possibility of growing such crops within the current climate.

Crops which already grow well in unprotected environments in the UK on a commercial scale include coriander, chinese greens, including bok choi and pak choi, along with a wide range of gourds, including loofah and kabocha squash.

A few years ago no one would have dreamt of attempting to grow sweet potatoes outdoors, but with developments in breeding, for example the variety 'beauregard' this is now a possibility. Other crops, once entirely thought of as crops for warmer climes, are now receiving attention from plant breeders in the UK.

As stated in the Fresh Produce Journal re:fresh directory, a useful industry guide to the latest horticultural trends, a number of oriental crops have been taken up by British growers in recent years; these include mizuna, which has particularly caught the imagination of pre-packers and caterers who have seen it as a useful addition to salads. It can also be used as a vegetable, and is particularly popular in Japanese cuisine. The asparagus pea is readily found in ethnic shops, and is mainly used by West Indians. The crop has a very short shelf life and trials are being undertaken in the UK. The truffle potato is popular with ethnic communities, though has so far had limited appeal to the UK population as a whole, despite it's good flavour, trials are also taking place for this crop. Patty pan squash are produced (a popular Indian gourd), along with the popular pak choi and mustard greens.

Many of the vegetables we take for granted are of course not native to the UK. One of the most famous examples of such crops is the potato, which originates from the highlands of South America. The plant was brought to Europe in around 1570, and was grown in gardens as a botanical curiosity as the leaves are deadly poisonous, and the tubers are inedible if left in the light. For these reasons it was deemed unviable as a food crop. Despite this, the potato began to be accepted as a useful crop, and subsequently became one of Europe's most important food sources. When the disease blight found its way from South America the result was disastrous. The disease can now be managed to some extent, but it still causes huge problems every year.

Other plants have been rejected for food production in the UK, for example the peanut could equally have been brought to the country at a similar time to the potato. If the same breeding had been undertaken on such a crop it could well have been as successful as the potato. Many crops also fall in and out of fashion. I believe that 'exotic' vegetables are beginning an upward rise to popularity for growing in the UK.

Some vegetables will never become highly popular, for example if they are slow to reproduce, such as the Chinese Yam, which does not readily seed, but is propagated from small tubers which take around three years to develop into a useable sized root, and it is difficult to germinate the seeds from some crops. Other crops do not travel well, particularly greens and herbs, but such crops are useful in truly local production systems due to the speed with which they can be sold, and of course they are useful in non-commercial production systems.

Some crops mentioned in the section below require a small amount of heat to begin growing, but of course many crops we take for granted, such as cucumbers also require such treatment. This study has a strong leaning towards sustainability, therefore the question may be asked: how such

heated cropping can be recommended in light of peak oil and climate change. We saw some excellent examples of new sustainable energy installations in tomato and cucumber farms in and around Utrecht in Holland, and also in Australia, where ground source heat pumps were in operation. There are a number of other ways of heating such arrangements sustainably, for example there is a system of using manure to heat pineapples at Heligan gardens in Cornwall which was used in Victorian times to produce fruit as exhibition pieces for stately homes around the country. Though I am not suggesting that this would be a viable commercial option today!

Some crops are also being successfully grown in the UK, for purposes other than human consumption, for example quinoa is successfully grown as a game cover crop, and daikon radish (mouli), a very popular Asian vegetable is beginning to be trialled for use as a subsoiler in no-till systems.

Figure 17. Quinoa being grown as a game cover crop.

Other more high value crops, including a range of basil varieties are being grown under protection, and can bring excellent returns due to their short shelf life, and the rise in popularity of such ingredients amongst the UK population.

Figure 18. Green cover crops being grown under glass in the UK.

Seeds

One problem with growing such crops is that it is very difficult to obtain exotic seeds. Many are essentially smuggled into the country in the luggage of individual passengers. This rarely, if ever results in people being stopped. The only posters warning of the dangers of bringing foreign plant material into the UK are actually after the customs section of the airport. The Defra unit responsible for such issues allows up to five packets of seeds to be brought in within an individual's luggage, as this has been deemed a low risk activity. This contrasts with the situation

in Australia and New Zealand, where extremely detailed checks take place to ensure that no organic material reaches the country via airports and ports. The strict controls on the national seed register for the UK, mean that huge amounts of money must be spent on a particular variety before it can be sold in the UK is a controversial issue. It was originally put in place to guard against the high level of poor quality stock which was appearing on the market, yet it is a huge barrier to high levels of diversity and subsequent security in seed stock.

One of the strongest lessons I learnt on my travels, particularly on my trip to Africa, is the importance of keeping a wide number of species and varieties of crops viable, particularly in light of a changing climate. I believe that we in the West have become complacent in our reliance on outside inputs such as pesticides to 'guarantee' a crop. In light of climate change and peak oil, it will be much more difficult to obtain such inputs, even without considering other aspects of the sustainability of the system, such as potential damage to the environment. I believe that there is a dangerously low level of diversity amongst seeds, partly because most seed varieties are owned by large seed companies, and because it is so costly to bring new or traditional varieties on to the market due to the restrictions in the current licensing system.

The heritage seed library, based within the Henry Doubleday Research Association (HDRA) enables seeds which would otherwise be lost to continue to be grown in the UK, even though they are not on the national seed register. Members pay a fee to join the organisation, and receive free seeds as a result. Perhaps a similar scheme could be developed for exotic crops being grown in the UK. HDRA is also growing a wide range of exotic crops as part of its displays of sustainable gardening methods at the Ryton Organic display gardens within the site which are open to the public, and are renowned for their new and exciting growing methods.

Figure 19. Exotic crops being grown at HDRA.

Examples of Exotic Crops which could be Grown in the UK

Leaf Vegetables

Calaloo
A native of South East Asia, tropical China, and India, this is a popular 'spinach' type crop. The plant is often used as part of oriental cuisine, and stir fried or boiled. This is a tropical plant but will grow well out of doors in hot summers, but will do well under glass or poly tunnels in cooler

years. The seeds germinate quickly, and are suitable as catch crops. They are also quite spectacular and very decorative. The plants will self seed if grown in polytunnels.

Chinese Celery
This is the same species as celery but has been bred to be smaller, and the whole plant can be eaten. The plant is used in oriental cookery, for example stir fried with sugar and sesame oil. It is a lot easier to grow than celery, and does not require blanching. It will grow from May until July; plantings can also be made in August for crops the following spring if protected by a cloche or similar. Germination is slightly erratic, and seeds require constant moisture.

Mitsuba
This plant has been cultivated for many years in Japan. The flavour has been likened to a mixture of angelica, parsley and celery. The crop enjoys UK conditions in spring and autumn, and will run to seed in high summer. It is a plant of woodland margins and clearings, and therefore will grow well in the shade. Plants are always raised from seed.

Turkish Rocket
This perennial herb is popular in Russia, where it is known as Sverbiga. It occurs naturally in wasteland and is naturalised in the UK and across Europe. Large quantities of the leaves can be produced early in the year when they are most appreciated. The leaves can be eaten as salad when young, or steamed. This crop is very easily grown, and will withstand heat and drought well, and cold winters. It can be treated as a perennial or annual, and will self-seed. The flowers are very attractive, highly scented and are good for bees. The small plants will grow quickly, and will need to be thinned; the thinnings can be eaten, as is the case with many salad leaves. Such 'micro leaves' are currently becoming very fashionable, particularly within the restaurant trade. They are highly prized for their attractive looks, and for the fact that they are highly nutritious.

Roots

Many root vegetables have been displaced by the overwhelming dominance of the potato; some can be used for their leaves as well. The Andean tubers (mashua, oca, ulluco, yacon) share their origins with the potato and are well suited to growing in cool temperatures. With more selection and careful cultivation they could become viable, blight resistant alternatives to the potato.

Potato Bean
Native to North America, this tuber was eaten by Native Americans. It is rumoured to have been a life saver to the Pilgrim Fathers, and some believe that this crop was the 'potato' which Sir Walter Raleigh brought to England. The flavour is similar to potatoes, but is slightly sweeter. The crop is not difficult to grow. It enjoys rich soil in shade or semi-shade, but is quite adaptable in cultivation.

Yam Bean
The crop originates in Tropical America. They can be eaten raw, stir fried, or added to stews. Its crunchiness denotes its other name of 'Mexican water chestnut' (true water chestnuts are difficult to grow, as they need to be submerged in water). Tubers begin to be formed in autumn in response to shortening day length.

Mashua
It originates in the high Andes, and is an ancient crop of Peru where it was cultivated by the Incas. It is a relative of the common garden nasturtium. The flavour is fragrant with a slightly vanilla taste. It was often a component of stews in the Andes. The flowers and leaves can be eaten.

Mashusha is a climber and needs some support, but apart from this it is grown in a very similar way to potatoes. It prefers warm, rather than hot weather.

Oca
This crop also originates from the Andes, and has been cultivated alongside the potato for thousands of years. It has a similar flavour and texture to potatoes, but is not troubled by the same pests and diseases, and is therefore a useful alternative. It has been grown and eaten in Britain since its introduction in the 1600s.

Sweet Potato
The crop originates from South America, and found its way to eastern Asia, and Polynesia. The Spanish introduced it long before the true potatoes, and early references to the potato, for example by Shakespeare, were in fact to this crop. New varieties, developed by the national institute for agricultural botany mean that it is possible for them to survive out of doors, but it is more successful when afforded some protection. They enjoy similar conditions to those enjoyed by melons; warm, rich soil with plenty of organic matter.

Mouli or Daikon radish

Jim England of the Trials department at RHS Wisley grew a number of unusual vegetables to assess how well they performed. The trials included mouli, three different types were grown: 'round black spanish', 'china rose' and 'april cross'. Such radishes should be sown after midsummer to prevent bolting. They can be harvested in the autumn or left in the ground through the winter and have a milder, though similar taste to radish varieties more commonly grown in the UK.

Crops which are botanically Fruits

Bitter Gourd
A native of tropical Asia, this is a very unusual looking crop with knobbly sections. It is as easy to grow as cucumbers, and is popular to eat, judging by the popularity of the crop in ethnic shops. Unfortunately often it looks soft and past its best after the long journey to the UK, and therefore could be popular if grown in the UK, as it will remain fresher. The crop is soaked to reduce its bitter taste and is then stuffed, fried, pickled or stir fried. Bitter gourd is simple to grow as long as it receives lots of heat and humidity.

Malabar Gourd
A spectacular climbing gourd, it produces enormous fruits which are used for making sweetmeats and the desert chilacoyote. It has been in production for around 4000 years in South America. It shows considerable resistance to many of the diseases which commonly afflict the cucumber family, it is also very cold tolerant.

Okra
This is a very popular tropical plant; it can be coaxed into performing well in temperate climes. It is a native of tropical Africa, or possibly India. Most of the Okra eaten in the UK is grown in Cyprus, Greece and Spain. They are an important ingredient of Indian cooking. Okra loves heat, and it is best to grow it under glass or in a tunnel. There are a few varieties which are suitable for growing in temperate climes; the best known of these is Clemson's Spineless.

Tomatillo

A native of Mexico, this is the correct ingredient for Salsa, and many other Mexican dishes. The crop is tangy and productive, and is grown in almost exactly the same manner as the tomato, though they suffer from few of the diseases which afflict tomatoes.

Grains

There is more to life than bread – and wheat, and there is increased interest in crops other than wheat, partly because of the intolerance that many people experience when eating wheat products. As well as these more exotic varieties, there is also interest in traditional English crops such as spelt. Such alternative crops are often highly nutritious, and offer fashionable alternatives to traditional grains.

Amaranth

This crop was grown up to 10,000 years ago by the Aztecs. It is more popularly known as an ornamental in the UK, and makes a particularly striking crop. The variety caudatus is more familiar as the ornamental form, and is being successfully grown experimentally in New Zealand. The grains are extremely tiny, but produced in huge quantities – around 100,000 per plant, which do not need processing. They are highly nutritious, and contain more protein than any other grain, and have a balance with amino acids and carbohydrates which many nutritionists consider almost perfect. The crop will yield a good crop, even in poor summer conditions in temperate areas. They enjoy similar conditions to sweet corn and pumpkins, i.e. high levels of organic matter, water, and situated in full sun.

Buckwheat

Originates in Siberia, and became an important crop in Russia and Eastern Europe where it is used to make the pancake blini. It is tolerant of poor soils, a short growing season and drought. The crop needs to be dried before threshing and does not lend itself well to mechanisation, though it is still grown commercially in a small number of countries. Buckwheat is very easy to grow, and is often grown as a green manure.

Quinoa

(Pronounced keen-wa) is a fast maturing crop originating in the high Andes where it was grown by the Incas. It was a very important crop to most of South America, but is now restricted to being grown in Bolivia and Peru. It has been slow to gain acceptance world-wide, and remains mostly found in health food shops. The grains contain a highly balanced form of protein in large amounts. The grains are used in the same way as wheat and the crop grows well outside of the topics because it originates from high altitudes. The leaves can also be eaten, and taste like spinach. Once established, the crop can look after itself and requires no extra watering. The crop has undergone extensive trials in the US and Europe (including the UK) in the late 1980s resulting in a number of varieties which are suitable even in years with short cool summers, these include faro and isluga.

Other Crops

Capsicum Peppers

Many different varieties are available, including habanero (the hottest chilli in the world), and ‘purple tiger’. The seeds should be sown in compost in March or April in gentle heat, then grown on to small pots, before planting into a warm position in June.

Coriander

Coriander leaf is an important crop for Asian cooking and the seeds are ground as a basic ingredient in curry powder. The crop is well adapted to the British climate, and does not stay fresh for long periods of time during transportation, making it an important crop to consider for the UK (there is already some commercial production). Coriander grows up to 3ft tall, with white flowers, and is indigenous to Southern Europe. Coriander is well suited to growing on a range of soils, but performs best on well-drained sandy-loam soils. Suitable PH ranges are from 4.4 to 8.0, with an optimum of 6.3. The optimum temperature for growth is 18C. Row spacing can be 15-30 cm, with a seeding depth of 2.5 – 4cm. Because of coriander's slow emergence, weeds can be a problem.

Conclusions

As a vegetable grower in New Zealand told me, and something which has been repeated to me during my travels is that 'growing vegetables is a mug's game' and that is it one of the most undervalued activities in the world. Despite this I still believe that there is mileage in the possibility of undertaking activities in this area.

This report highlights some of the benefits which growing more exotic crops may bring, including new markets for existing commercial farmers, along with additional benefits in the form of new types of farm diversification. These schemes could bring people who have had relatively few links with UK farming out onto farms, whether as visitors, or even taking the opportunity to grow for themselves on a small scale commercial basis. This idea aims to emphasise the importance of industry for the whole UK population, by highlighting the fact that farming produces the food we require for our very survival, rather than the perception that agriculture is only important for the privileged rural few.

The perhaps somewhat unusual idea of growing exotic crops is just one element of what will need to be a raft of measures to mitigate and manage the potential impacts of climate change and a potential post-oil era, in terms of changes required to food and farming, both for government and the general population.

This study aims to highlight a way in which farming can gain greater links with, and attempt to publicise it's potential positive role in some of the more fashionable political topics of the day; namely education, race, climate change and health, therefore give farming a stronger voice amongst the clamour of competing policy agendas.

- There is a potentially good market for locally grown exotic crops: the BAME community, and a white population with more adventurous eating habits.

- It would not be practical or desirable to replace all the exotic crops with home grown ones, particularly given the current physical climate.

- There is potential to use examples such as growing exotic crops to illustrate the wider relevance of British farming.

- It is possible to use such crops as a 'hook' to engage people with the perhaps more usual types of British farming.

- There is potential for this as a 'niche' market, amongst middle class consumers, who are often looking for the next new fashionable product. 'Local exotics' has potential to do this.

- This type of venture is best suited to small scale production, partly because the increased cost of production means that it would be difficult for producers to compete with imports at present.

- Climate change has the potential to open new opportunities for such production, for example in terms of potential increased temperatures, and a requirement for more variety in local production in light of a post oil world.

- The labour intensive nature of this type of production means that it is more suited to schemes which are perhaps not directly run by the farmer, but perhaps using community involvement, such as renting plots of land for groups under licence or business tenancy agreement, therefore devolving some of the responsibility for growing and marketing the crop

- There is currently a shortage of seeds to supply this market (both on a commercial and individual scale), which could be a potential new market avenue to explore.

- The trends for healthy eating, new anxieties about levels of obesity, and government encouragement to eat more fruit and vegetables link well to schemes of this type.

- The trend of growing your own vegetables, particularly amongst new groups such as young people and families means that there is a shortage of allotment sites, and there is potential for commercial opportunities to rent plots of land.

Recommendations

- Further research is needed into the potential for growing such crops, particularly in terms of field scale trials for varieties which are already known to grow well in the UK, as well as further development of new varieties which are know to be suited to the climate of this country, but have not yet been tested for their commercial potential.

- Seek out multi-cultural BAME restaurants, along with those selling European food to sell crops directly to. Though they may be price sensitive, perhaps the freshness, and novelty value of marketing such crops will overcome such concerns, and the lack of middlemen may mean that the price is favourable to them in any case.

- Work out what grows well on your particular farm; with crops like this, viability will depend on which part of the country a farm in located in. Perhaps begin by undertaking trials at a garden level first.

- Research on the health benefits of various crops, for example the relative levels of vitamins and minerals. Anecdotal evidence suggests that there may well be the next group of 'Super foods' within the exotic crop bracket.

- Begin trials for seed use; there is potential for farmers to supply the small scale garden and allotment sector as well as larger scale growers. Such a system may well offer higher returns than trying to compete with the fresh crop market on price.

- Farmers interested in supplying such crops should talk to their local BAME community to understand the potential for selling crops to them, for example, what is the maximum price that they would be willing to pay, and how the crops could actually reach such market; i.e. build relationships with the suppliers, and develop the infrastructure required, such as efficient delivery systems and collection points.

- Full feasibility study carried out into the potential for such ideas, including SWOT analysis, and a business plan. This could be undertaken for a range of the project ideas mentioned here, obviously adapted for the individual farm business.

- Explore potential for importing seeds on a larger scale particularly in light of the restrictions which are in place as a result of the national seed register, particularly those from more traditional varieties which are in danger of being lost.

- Re-develop local infrastructure in order to gain more efficient distribution of local produce, for example 'food hubs' based on the outskirts of cities, and delivery schemes serving a range of farms in an area, perhaps to deliver such crops into urban areas.

- To ensure that farmers in developing countries are given good, sustainable farming advice from those working with them from NGOs, and that farmers from developed countries are asked their advice on the best ways of doing this.

Postscript

I found my Nuffield experience hugely valuable, and it has certainly altered my life. The opportunity to study one topic which I was passionate about was very important to me, but I feel that perhaps the greatest value is gained from travelling to different parts of the world to meet others involved in agriculture, even those not necessarily directly involved in the topic which I was studying. The opportunity to meet broad acre GM cotton farmers in Australia, and women's growing groups in the Gambia has been very important for my broader career in food and farming NGO's, both in project management at Sustain: the alliance for better food and farming when I first began my Nuffield scholarship, and now as a policy officer at the Soil Association. It has given me a broader insight into farming across the world, I hope, enables me to have a balanced and grounded view of how things are for farmers on the ground, and has made me even more passionate about the industry.

Developments include: talks between Sustain, East Anglia Food Links and Writtle college to begin crop trials, Mervyn Askew (Head of Agriculture and Rural Strategy Central Science Laboratory) is keen to undertake research work, and who stated: "I don't see crops for the ethnic sector being any different from growing sweetcorn and grapes, crops that have only been grown in the UK in the last 100 years." London Food Link (a department of Sustain) is developing a funding application to the London Food Strategy to develop a project to explore this area.

My study has made me realise that there is potential for growing new crops in the UK, and that by engaging others, and looking more openly at the industry, that opportunities are available for farmers. In terms of my own plans, I will continue in my current career, and then hope to gain some business experience within the sustainable farming and food sector, and will consider setting up my own business to grow such crops when I decide to move back to the countryside.

The field on my family's farm in Devon which my Dad has said would be ideal for vegetable growing, so watch this space!