# Food Availability in Stroud District

*Considered in the context of climate change and peak oil.*

for
Local Strategic Partnership: Think Tank on Global Changes
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TRANSITION STROUD

Written on behalf of Transition Stroud by
Fi Macmillan 01453 832892 fi.mac@virgin.net
Dave Cockcroft 01453 753595 dave@cynatech.co.uk

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INDEX

EXECUTIVE SUMMARY

*'existing patterns of food production are not fit for a low-carbon, more resource constrained-future'*

*Food: an analysis of the issues. Cabinet Office 2008*

This document examines the impacts of climate change and peak oil on food availability in Stroud District. It sets out actions which can be taken to address vulnerabilities in food supply and harness new opportunities for the district.

Stroud District has 110,000 inhabitants. Nationally, 80% of our food is bought through major supermarkets. Local food accounts for 1.5% of national food consumption, including that distributed by supermarkets. That is likely to be reflected locally.

In the district farming is centred around beef, dairy and sheep production. There are 356 farms, covering 37,000 hectares of land and employing 1,700 people in full and part-time jobs. The production of grains and other carbohydrates is not strong in Stroud District. Livestock feed requires large quantities of grain. Some vegetables and fruit are produced in this district.

Food prices and availability are closely coupled with oil prices as 95% of our food is dependent on oil through energy-intensive agriculture and food supply chains, from fertiliser and fuel to distribution and retailing.

Climate change brings further uncertainty to difficult trading conditions for farmers. Varying temperature and rainfall bring new challenges, along with freak weather events and rising sea-levels.

Food availability in Stroud is affected by global issues. 40% of our food is imported, and even 25% of indigenous foods are imported. Most of our bread wheat comes from the US. 95% of our fruit is imported. Food prices are coupled with global oil and gas prices. Economic downturn, linked to world markets, affects food-purchasing decisions especially by the least well-off in Stroud District.

Reducing the energy intensity of our food chain in Stroud District meets the agenda to cut carbon emissions and develop resilience to energy scarcity. Given climate change and peak oil, we cannot determine what imports are available to us here in the future. However we can affect what can be grown in our district, and what links we have with other regions with their particular agricultural capacity.

Local food does not solve issues of food security. However it creates a more resilient food chain in Stroud district and consuming local food creates a multiplier effect in the local economy, supporting jobs and creating

community viability. Developing local food production capacity is one of the ways to optimise food availability in the future.

There is considerable interest in re-localisation of food in Stroud District with two established community-supported agriculture projects, an award-winning Farmers' Market in Stroud, a co-operative allotment project and nascent food distribution hub for local producers.

Opportunities exist to create more join-up between producers and consumers, making use of two local centres of excellence at the Royal Agricultural College in Cirencester and Hartpury College (University of the West of England) near Gloucester. Local farmers need more information about the implications of climate change and peak oil, as well as engagement from the community about how we can work best together.

The potential for local food might be brought together by a local steering group which represents the interests of groups along the food supply chain. Such a group might, for example, assess the benefits of food distribution hubs and a single marketing desk to link producers and public sector food procurement. In addition, our diverse local food initiatives in Stroud District need further support to link the energy of community volunteers and the grant bodies which might make their work more sustainable.

## 2. IMPACTS ON FOOD AVAILABILITY

### 2.1 BACKGROUND

The vulnerabilities of food supply in Stroud District are broadly a reflection of those nationally. Before looking at the impacts of climate change and peak oil, what else affects how food gets onto our plates in this area?

*Supermarkets*
In the past 30 years, food distribution has shifted away from smaller, specialist independent food retailer to supermarkets. 80% of our food now comes from supermarkets. With four large supermarkets in Stroud itself and many other supermarket outlets in the district, this is likely to be echoed here.

*Globalisation*
Britain is 60% self-sufficient in food. 40% of our food is now imported. 25% of our indigenous foods – for example, root vegetables and dairy products – are also now imported. There has been a drop of 12% in the production of indigenous foods in the past 10 years[1]. This country has been dependent on imported food stuffs for 100 years but now more so than ever.

*Labour*
There are less agricultural workers than ever before and the average age of farmers in Stroud District is 54 years old[2]. Agricultural employment is at an all time low, and getting lower; from 40% in 1900 to 2% today nationally, and around 3.5% in Stroud District. Across Britain casual, seasonal workers are brought in from abroad to do agricultural jobs which cannot be filled by local workers.

*Soil*
As farmers have become more reliant on nitrogen fertilisers to optimise yearly production, soil fertility has become a more transient entity reliant on annual top-ups. A more traditional farming approach was founded on crop rotations and long-term fertility build-up with animal manure in a more diversified agricultural system.

Soil erosion has increased in the past 50 years. 2.3 million tonnes of soil were lost between 1995 and 1998 due to intensive farming and mechanisation [3]

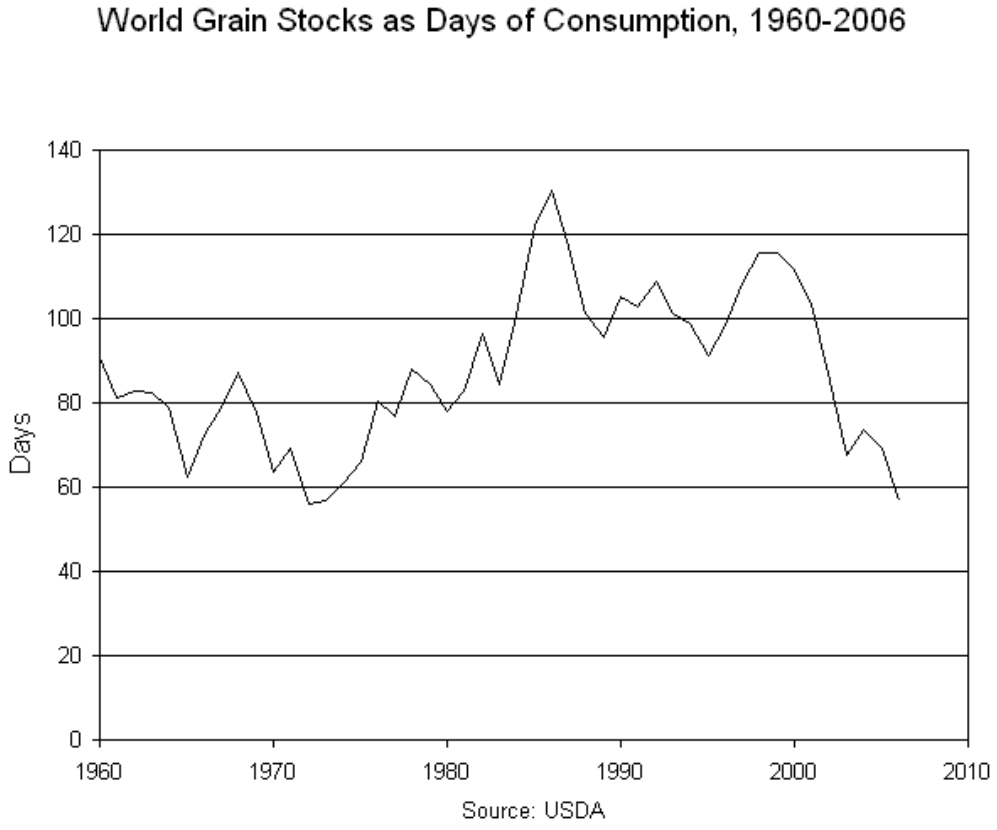
*Peak phosphate*
Other inputs apart from oil and gas are becoming rapidly depleted. Phosphate is an essential nutrient for agricultural production. Mineral reserves of phosphate are forecast to last 30-60 years, with 700% price increases in the last year. Britain imports 80% of its phosphates.

[1] Tim Lang, Professor of Food Policy, City University 2008
[2] Conrad Moore, Stroud District Council, December 2008
[3] The State of Soils in England and Wales, Environment Agency 2004.

Composted food and animal waste (even human waste) can be used to help maintain phosphate levels in the soil.

*Increasing world population*
More people need to eat. Increasingly affluent countries (e.g Brazil, India and China) are consuming more meat creating greater demand for animal feeds from grain. This competes with grain for feeding humans and conversion to bio-fuels.

*Productivity plateau*
World grain shortages exist as productivity plateaus. China's grain harvest fell by 34% between 1998 and 2005. Given world population increases in the past 50 years, per capita world food reserves are at historically low levels. The result of this was seen with the global food riots (e.g. Egypt and Mexico) in Summer 2007.

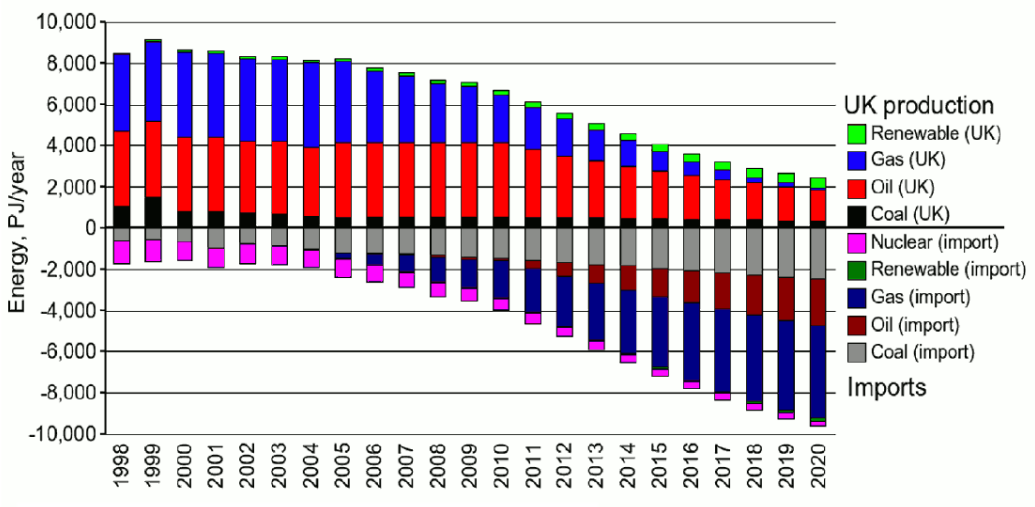


## 2.2 PEAK OIL

For clarity, 'peak oil' is the point at which half of the total oil known to exist has been consumed and beyond which extraction goes into irreversible decline. In 2006 a US government report by the US Office of Petroleum Reserves identified that 'world oil reserves are being depleted three times as fast as they are being discovered … a practical supply limit will be reached and future supply to meet conventional oil demand will not be available'.

UK oil production peaked in 1999 and has been declining since, despite increased investment and development of new oil fields in the North Sea. Domestic sources of gas supply are also starting to decline and by 2020 we will become dependent on imports for 90% of our energy supply, much of this from Russia and Middle Eastern states. Supply will be much more susceptible to disruption and energy prices unstable and unpredictable.

### UK Energy Sources – Change in Energy Imports




Source:

UK Joint Energy Security of Supply (JESS) Committee

How will peak oil and emerging energy scarcity impact food availability in Stroud District? That partly depends on when it happens and how prepared we are for it.

#### *2.2.1 When will peak oil occur?*

We don't know but we know it's coming soon if it's not here already.

> '*Analysts are far from a consensus on this issue, but several prominent ones now believe that the oil peak is imminent*'.

*US Dept of Energy, 2005*
*'Select Crude Oil spot prices'*

The International Energy Agency forecasts an 'energy crunch' around 2012.

The Industry Task Force on Peak Oil and Energy Security identify 2013 as the likely end of cheap, easily available oil.

There are many views but the peak of world oil production is widely thought to occur before 2020.

Some industry commentators believe that the energy price hikes of Summer 2008 were the first signs of oil supply peaking.

As a result of the 'credit crunch', there has been a rapid drop in oil prices in late 2008. This has resulted in dramatic cutbacks in exploitation of new reserves. Millions of barrels a day of new production is necessary each year to offset the decline of existing oil fields. Projects due to come on stream in the near future have been cancelled. As demand creeps back up, there is likely to be an even higher oil price spike.

### *2.2.2. What are the impacts?*

The impact of peak oil and increasing energy constraint centres around the relationship between oil and food.

*Declining oil supply means declining harvests*
95% of food grown is directly dependent on fossil fuels[4].

The expansion of food production in the past 100 years has been the result of harnessing oil and gas to replace human/animal labour through mechanised farm machinery, nitrogen-based fertiliser inputs (one tonne of gas creates one tonne of nitrogen fertiliser) and petroleum-derived herbicides and pesticides. Since the Green Revolution of the 1950s world grain harvests have increased 250% yet industrialised agriculture uses 50 times more energy than traditional systems, and up to 100 in some cases.

In today's mechanised food production system, it takes 400 gallons of diesel to feed one American each year. In energy terms this means that it takes 10 calories of energy to produce one calorie of food[5]. Before industrialisation, and the intense use of fossil fuels, man could only survive if there was a net energy gain in his food production effort.

Declining oil and gas supplies mean reversing this trend.

*Significant drop in food availability in Stroud District*

[4] 'Joining the Dots' Energy Institute Conference, London 2004, Chris Skrebowski.
[5] Grazing Lands: RCA Issue Brief 6, US Dept of Agriculture Nov 1995

Not only will food production falter at the beginning of the food chain, the food chain itself will be under great strain.

2000 Fuel Strike saw the Chief Executive of Sainsburys write to the Prime Minister to warn that food supplies would run out 'in days rather than weeks'. Supermarkets rationed bread, sugar and milk. This was simply the short-term and temporary effect of the distribution chain breaking down. Long-term energy scarcity reaches back down the supply chain to agricultural production and processing more fundamentally than just distribution.

*Unprecedented food price inflation*
Input costs, notably nitrogen-based fertilisers, will rise in tandem with the oil price[6]. Food processing and distribution will also rise in tandem. This has already been demonstrated with food price rises in 2007. In 2007 the Sustainable Development Commission developed a model predicting 10% food price increases when oil reached $100 per barrel. This point was reached in July 2007 and food price inflation for that year was 8.9%.

Food price inflation from July to Sept 2008 reached 13.8% as oil reached $150 per barrel.

This impact will hit the poorest areas of Stroud District worst. As a proportion of their total income, individuals with the least income are spending most on food. Experience with the energy crisis in Cuba (when Russia withdrew) was that this can lead to malnutrition, starvation and social unrest. The average Cuban lost 22lbs during this two year period[7].

*Competing land use – energy resilience or food resilience?*
Major food price increases due to competition for land between fuels and food. Oil price rises create greater demand for bio-fuels. After increased agricultural input costs, this is a second layer of price pressure on food prices. This has already been witnessed during the past two years. For example, 20% of US maize production was diverted to bio-fuels in 2006. Subsequently global maize prices doubled affecting poorest countries most.[8]

*Less food available to import*
UK imports 40% of its food, and 25% of indigenous foodstuffs. Export restrictions will be seen net exporting countries to protect domestic supply e.g. 2008 restrictions by Argentina, Russia, Ukraine and Kazakhstan affecting 1/3rd of the global wheat market[9].

The figures show that the UK is reliant on the other countries for many basic inputs into the food chain including grain for animal feeds (where the meat would be considered to be a UK output). In addition, there are foods that

[6] 'Food Security and Sustainability', Centre for Food Policy, City University, 2008
[7] 'The Power of Community' DVD
[8] 'Food and Fuel Prices', IMF, 2008
[9] Agricultural Policy Analysis Centre, University of Tennessee, 2008

are perceived as basic, such as bread, where we are reliant on imports. Most of our bread flour comes from North America.

## 2.3 CLIMATE CHANGE

### 2.3.1 *When will climate change impact food availability?*

The impacts of climate change have started. These centre on how climate affects agricultural production.

The Hadley Centre have already observed the following trends in recent years:-

- Temperatures in England have increased by around one degree Celsius since 1970's.
- Average mean precipitation has remained stable with decreased summer rainfall and increased winter rainfall.
- Contribution to rainfall from 'heavy precipitation events' has increased in the last 45 years.
- Sea-levels have risen by 1mm per year in the past century with larger rises in the past two decades.

'Farming Futures', a joint venture between the National Farmers Union, Defra and the Foundation for the Future, predict the following climate change in the South-West. All figures are against a 1990 baseline and are based on the UK Climate Change Impacts Programme.

- By 2020s summer temperatures will be 1.5 degree Celsius higher. By 2080s this rise can be expected to increase by as much as 5 degrees Celsius, depending on the emissions scenario.
- By 2020s summer rainfall will be 10% less. By 2080s this is expected to be 20-50% less.
- By 2020s winter temperature is likely to 1 degree Celsius higher. By 2080s this is expected to be 1 to 3.5 degrees Celsius higher.
- By 2020s winter rainfall will be 10% higher. By 2080s this is expected to be up to 35% higher.

### 2.3.2 *What are the impacts?*

*Lack of preparedness*

Farmers are finding it hard to plan for climate change due to other short-term problems in agriculture, many connected with input prices, and lack of definite projections about climate change impacts[10].

[10] www.iger.ac.uk Impacts of climate change on UK Agriculture

*Loss of farmland due to sea-level rises*
Loss of crops and farmland in coastal area. In our district, this will particularly affect the Severn area. However in addition it is likely that, due to regional strengths, Stroud District will be reliant on grain from low-lying Eastern England. 57% of grade 1 arable land in Eastern England is currently below sea-level. Sea levels are predicted to rise 26-86cm in this area by 2080.

*Loss of food growing capacity due to bio-fuels*
With more international action on climate change, bio-fuels are being advocated as one of the answers to cutting carbon emissions. If bio-fuels are a more valuable crop than food, farmers may choose to switch existing land from food production to biomass production. In addition, energy constraint may necessitate growing bio-fuels to provide on-farm liquid fuels. Fuel security may undermine food security.

*Pressure on agricultural production from drought*
Higher summer temperatures may create the possibility of a longer growing season. However, agriculture is water-intensive. Dutch researchers calculated that each 150g beef burger 'contains' 2,400 litres of embedded water when all the water used to grow the grain, feed and water the cow, wash equipment, and in processing is accounted for[11]. During the unprecedented European heat wave of 2000, crop yields in Italy and France fell by 25-30%[12].

Increased need for irrigation, owing to reduced summer rainfall and higher temperatures. 'Global water stresses in grain exporting areas may affect world food security'[13].

*Loss of soil quality*
Intense rainfall during 'heavy precipitation events', is likely to cause top soil loss due to runoff.

*Panic buying*
Extreme weather events, and a sense of vulnerability, can cause panic buying as witnessed in supermarkets during the July 2007 floods.

*Vulnerability of crops*
Potential increase in pests and diseases, including species new to the region. This may be compounded by lower availability of pesticides due to energy constraint.

[11] Chapagain &Hoekstra 'Water footprints of nations', Value of Water Research, Rep Series 16, Unesco-IHE 2006
[12] www.decc.gov.uk and www.ipcc.ch
[13] www.iger.ac.uk 'Farming and Climate Change; adapting to the challenges'. IGER.

### *2.4 Combined Impacts*

In summary, peak oil and climate change both fundamentally impact agricultural production. The past few years have given us glimpses of these impacts with flooding, 2000 Fuel Strike food shortages, drought, and, this year, sharply rising energy and food prices. Both global energy constraint and climate change have hit together, and will continue to do so.

Peak oil affects the whole food supply chain. Whilst climate change impacts agricultural production most strongly, there are huge opportunities to mitigate climate change along the whole food supply chain. This report focuses on adaptation to the impacts.

Again, these impacts will affect all of society but none more so than the most deprived areas of Stroud District. In addition to food price inflation, energy scarcity will inevitably be accompanied by economic decline and, some say, collapse. This means rising unemployment and less public money.

## 3. FOOD POLICY

The requirements for adaptation to peak oil and climate change in Stroud District are found all along the supply chain; production, processing, distribution and retailing. There are many different responses to these challenges. Some deny the challenges, others believe technology will win the day, for some organics is the answer and others believe the back garden can feed us. These voices compete.

Let's see what sense Government makes of the challenges.

The 2002 Curry Commission on Food Policy recognised the value of local food in strengthening the economic position for farmers. Changes to the Common Agricultural Policy encouraged farmers to follow profitability. Neither recognised the importance of food security. Defra's 2006 report on Food Security made scant mention of the twin challenges of climate change and peak oil. At this time Defra, and HM Treasury, believed that free trade and globalisation held the key to food security. Any kind of focus on our ability to feed ourselves as a national was seen as anti-trade and regressive.

Since then the policy climate has changed to some extent. 2008 energy spike and food inflation have put food security on the political agenda. In addition, international action on climate change has stepped up and the impacts of agriculture on greenhouse gas emissions are in the spotlight. Around 20% of British household emissions are directly attributable to the food supply chain.

Gordon Brown's first policy review on taking office as Prime Minister was on Food. Subsequently, with the creation of an Energy and Climate Change Department, Hilary Benn sees the prime role of the Department of the Environment, Food and Rural Affairs as ensuring UK food security. The Environment, Food and Rural Affairs Parliamentary Committee was set up in November 2008 and is currently taking evidence on food security, for review in 2009. It seems that local food is once again regarded as part of the answer to food security.

## 4. FOOD PRODUCTION CAPACITY IN STROUD DISTRICT

What is clear is that adaptation requires planning for reduced energy inputs into our food chain. In this respect local food meets much of the agenda for climate change and peak oil adaptation.

In addition, we need to know that farmers in Stroud District have received the information which is available to plan for changes in climate and the impacts of energy scarcity. Pioneering work is currently being done by the University of Liverpool using Oil Vulnerability Audits in different sectors to assess the latter.

Ensuring that imports are available to our district in the decades to come is beyond the scope of this Local Strategic Partnership enquiry. However we do know that the production and consumption of local food keeps our communities healthy and strong – physically and economically! There is a strong multiplier effect within the local economy when local food is purchased.

What does food security mean in Stroud District? Do we have the land, skills and other agricultural inputs in Stroud District to feed ourselves? If we do, how? And what are the impacts on growing liquid fuels, in times of energy constraint, and heating our homes?

Transition Stroud have developed a model which examines these issues. This does not mean that all our food needs to come from the District. In fact, with two large urban areas near us, Gloucester and Cheltenham, it is likely impractical to do so as they have little agricultural production capacity. In addition, the larger bioregion, with the woodland of Forest of Dean, and the arable capacity of Cotswold District, mean that some agricultural input is more efficiently produced outside our district. However, it allows us to gain an understanding of the possibilities.

The capacity model is continually being updated, assumptions being verified or modified and data checked and double checked. The results here are from v1.3 of the model. We are able to make the worksheet available to interested parties and hope later to make it generally available, although it needs some work to get it into a more comprehensive format and the additional of interpretation notes.

Taking as a starting point Simon Fairlie's article from The Land, "Can Britain Feed Itself", we have assessed whether there is capacity to provide a simple, yet balanced, diet for Stroud District population of 110,000 from the 37,000 hectares of available farm land, of which there is approximately 15000ha arable, 20000ha grazing and 2000ha woodland. The diet contains

significantly less meat than most people consume today, around one quarter of the current UK average of 80kg per person per year (and much less sugar) – however it's probably healthier as a result.

Here's a summary of the current results.

**Mixed diet with livestock - chemical inputs**

| | Consumption g / day | Calories kcal / day | Required tonnes/yr | Yield t/ha t milk/cow | Land req. ha |
|---|---|---|---|---|---|
| Cereals for people | 450 | 1530 | 18068 | 7.3 | 2475 |
| Potatoes | 300 | 200 | 12045 | 44 | 274 |
| Sugar | 30 | 100 | 1205 | 9 | 134 |
| Veg & fruit | 500 | 150 | 20075 | 25 | 803 |
| Dairy (mixed) | 500 | 300 | 20075 | 7 / cow | 1154 |
| Beef | 50 | 140 | 2008 | 0.43 | 4669 |
| Cereals for dairy cows | | | 10038 | 7.1 | 1414 |
| Cereals for beef cows | | | 16060 | 7.1 | 2262 |
| Sheep | 15 | 40 | 602 | 0.5 | 1205 |
| Eggs (half an egg) | 30 | 45 | 1205 | | 80 |
| Cereals for chickens | | | 2409 | 7.1 | 339 |
| totals | 1875 | 2505 | | | 14807 |

**Land Required for Food Production (ha)**

| | | |
|---|---|---|
| Arable | 7701 | grain, potatoes, fruit & veg, sugar |
| Grazing (cattle) | 5822 | dairy and beef |
| Sheep (grazing) | 1205 | |
| Chickens | 80 | |
| **TOTAL** | **14807** | **we have sufficient land** |

Clearly the diet is nothing like as varied as we are used to and does not include many staples, like citrus fruits, tea, coffee or even essentials that we could produce locally like beer. However the conclusion is that using conventional farming practices we could feed ourselves, in fact there's enough land to increase the meat production to closer to the levels most people enjoy today.

However as we've explained farming with high levels of inputs, derived largely from fossil fuels, is not as viable in the near future as it has been in the past 50 years. We're also not taking into account competing land needs, for example for sustainable energy production. So we've also modelled an organic approach and biofuel production.

| **Mixed diet with livestock - organic** | | | | | |
|---|---|---|---|---|---|
| | Consumption g / day | Calories kcal / day | Required tonnes/yr | Yield t/ha t milk/cow | Land req. ha |
| Cereals for people | 450 | 1530 | 18068 | 4.3 | 4202 |
| Potatoes | 300 | 200 | 12045 | 25 | 482 |
| Sugar | 30 | 100 | 1205 | 7.5 | 161 |
| Fruit & veg | 500 | 150 | 20075 | 20 | 1004 |
| Green manure | | | | | 4325 |
| Dairy (mixed) | 500 | 300 | 20075 | 5.8 / cow | 1384 |
| Beef | 50 | 140 | 2008 | 0.3 | 6692 |
| Cereals for dairy | | | 10038 | 4 | 2509 |
| Cereals for beef | | | 16060 | 4 | 4015 |
| Sheep | 15 | 40 | 602 | 0.35 | 1721 |
| Eggs | 30 | 45 | 1205 | | 200 |
| Cereals for chickens | | | 2409 | 4 | 602 |
| totals | 1425 | 2505 | | | |

| **Land Required for Food Production (ha)** | | |
|---|---|---|
| Arable | 17299 | grain, potatoes, fruit & veg, green manure |
| Grazing (cattle) | 8076 | dairy and beef |
| Sheep | 1721 | |
| Chickens | 200 | |
| TOTAL | 27296 | we do not have sufficient arable land |

The outcome here is that we have insufficient arable land due to lower productivity for grain production and extra required to produce green manure for nitrogen. Although the lack of land is marginal there are many other factors not included in the calculation, such as the time and effort to convert to organic land use and the real yields that could be obtained from organic farming on this scale.

Simon Fairlie also looks at vegan diet which although requiring less land overall doesn't make best use of pasture and lacks the inputs of nutrients from livestock manure. He also suggests there are advantages to lower productivity dairy herds that are exclusively grass fed but this, although interesting, goes beyond the scope of our current work.

In addition to food there are other land based products that are also essential for our basic needs. Building materials, wood, straw, hemp and other plants all have useful construction properties and are increasingly favoured for use in low energy buildings and development of a local supply chain building materials would have multiple benefits similar in many ways to those of local food production.

Textiles are also 'land based' and production of wool is of course traditional in these parts. Other crops such as hemp or other woody plants can also be processed into a variety of different textiles.

We have not currently attempted to model capacity for production of either building materials or textiles. However we have started to look at conflicts that arise from land use for the production of biomass and biofuels.

| **Stroud District Fuel Use 2005** | | | | | |
|---|---|---|---|---|---|
| | Diesel | Petrol | | | |
| Litres (gross yield) | 82000000 | 78000000 | | | |
| Land required (ha) | 63077 | 14891 | sugar beet (ha) | | |
| Land required (ha) | | 28487 | wheat (ha) | | |
| *Net yield is much lower when energy inputs accounted for (eg. ethanol distillation)* | | | | | |
| | | | | | |
| **Stroud District Domestic Heating** | Avg use | | 19000 | kWh/yr | |
| | Woodland Coppice | S.R.C Willow | Miscanthus | Straw | |
| Land req./home (ha) | 1.8 | 0.4 | 0.3 | 1.1 | |
| Total land req. (ha) | 86699 | 19413 | 14175 | 52529 | |
| | | | | | |
| | | | we have nowhere near enough land | | |
| | | | | | |
| **Stroud District Electricity Use** | Total use | | 590 | GWh/yr | capacity factor |
| Wind turbine yield | 3 | MW rated | 7.7 | GWh/yr | 30% |
| Nympsfield turbine (for comparison) | 0.5 | MW rated | 1.1 | GWh/yr | 25% |
| Total required (turbines) | 3 | MW | 76 | | |
| | | | | | |
| *Note: total water power available from Frome catchment is comparable to 1-2 turbines* | | | | | |

The conclusions here are simple, we have nowhere near enough land to produce a significant proportion of our current level of use of transport and heating fuels.

Interestingly local electricity consumption could be met from wind turbines, although not practical without significant grid strengthening, whilst not significantly effecting the available area of productive land.

Interestingly the results for Gloucestershire as a whole closely resemble those for Stroud District. There is about the same ratio of land per head of population in the county as for this district with roughly 3 people per hectare of farmland. Cheltenham and Gloucester have relatively little farmland for the population whilst Cotswold has a lot more on average.

# 5. ADAPTATION TO IMPACTS OF PEAK OIL AND CLIMATE CHANGE

The most successful responses to adaptation are likely to come from those who are already working in agricultural production and distribution. There are two levels to this; awareness and engagement

## 5.1 ENGAGING WITH FARMERS

Farmers in Stroud District are in a difficult spot. Farming inputs (fertilisers, fuel, feedstuffs, abbatoir and distribution costs) have all increased significantly in the last year. Uncertainty is not new to farmers but it just got worse. Commodity prices are volatile and freak weather creates new pressures.

The capacity to produce food here is key to food security in this district. However, it may be in co-operation with farmers' from other regions who have different strengths – such as Cotswold or Eastern England with grain surpluses.

Engaging with farmers will require the building of bridges with farmers and of building confidence, listening to their concerns and to how they make decisions and creating mechanisms through which farmers can have a greater confidence for any investments that they make. Co-investment with consumer groups and community organisations is a possibility.

It is interesting to note that although 70% of farms in the district are owner-managed, and 30% tenanted at the Stroud Farmers' Market 70% of producers are tenants and only 30% owner-managed. Therefore tenanted farms are disproportionately represented in this short supply chain. Can more owner-managed farms be encouraged to distribute more locally?

It is the view of Stroud Farmers' Market organisers that many producers do not have the commercial skills or personal disposition to market their produce to consumers or retailers. There is an opportunity here.

Decisions have to be made about whether it is appropriate to shorten the chain between producer and consumer. This would require significant levels of investment by farmers. This investment has to date been made mainly by the supermarkets in terms of equipment for storage, for adding value and for local distribution.

A solution to this would be food hubs. Food hubs have been developed as a way of distributing local food through a central point to consumers, local shops, restaurants/pubs and supermarkets. Would such a venture encourage larger farms to distribute more locally? Would it be beneficial to distribute some local food to local supermarkets?

A pioneering model of such a food hub is Plumgarths in Cumbria. This was set up on an uneconomic agricultural unit after the foot and mouth outbreak. It now has a farm shop, food processing units and a distribution centre. The distribution centre takes local produce to local food businesses and to several outlets of Asda who wanted to source local food. This model is attracting national interest as an efficient vehicle for joining up local food and supermarket chains[14]. In the context of peak oil we might consider whether supermarket distribution will be viable given that this part of the food supply chain accounts 1/3rd of the overall energy use[15].

Near the district we have two interesting groups which study farming and best practice. Cirencester's Royal Agricultural College and the Countryside and Community Research Institute (joint venture University West of England, Hartpury College and University of Gloucester). These two institutions are already running research programmes and it would be interesting to use their expertise and contacts to forge links between the community (LSP/SDC/Transition Stroud) and farmers in the district to this end.

In addition, farmers need information about what they can expect with climate change and peak oil. Farming Futures has done a lot of this work and it needs to be made available to farmers in the district.

## 5.2 EXISTING LOCAL FOOD INITIATIVES

In Stroud there are a number of local food enterprises that are held up as national exemplars. This is the food production that this year's Cabinet Office report is looking for, 'fit for a low-carbon, energy constrained future'. They need financial support and funded knowledge-sharing to expand and replicate. This in turn will benefit the whole district through retaining money in our local economy, generating jobs in our rural villages and providing healthful food for our communities.

*Farmers Market*
Stroud's award-winning Farmers' Market is one of the UK's busiest and most popular markets with 50 stalls every Saturday, and around 10 organic producers. Run by local enthusiast Clare Gerbrands, the market has won Cotswold Life best Farmers' Market 3 times, and has been SW Regional Winner for best national Farmers' Market. The market is a vibrant social hub every Saturday with a wide range of local food produce, organic and non-organic. It has been featured on television and in the national press many times.

In 2006 the market had a 'retail health-check' which indicated that £1,000,000 was spent annually at the market. This check also identified the

[14] 'Supplying Local Food to Mainstream Customers', Aug 2008, by Henry Brown and John Geldard
[15] 'Validity of Food Miles as an indicator of Sustainable Development', July 2005 by DEFRA

need for weekly markets. For a modest investment of £1,500 for the health-check, the market grew from twice monthly to weekly. This is the kind of regular support that our local food businesses need to keep them dynamic and growing.

*Community Supported Agriculture*
Stroud has two community supported agriculture projects – Stroud CSA (est 2001) and Stroud Slad Farm CSA (est 2007) together supplying 200 families with a weekly box of vegetables for around £30-£40 per month. Both are community-led enterprises supporting a farmer and part-time workers on a not for profit basis. Members decide policy and both ventures are fully inclusive with concessions so that no-one is excluded on cost. Both are organic with livestock to provide manure for fertility, and meat for sale.

Currently there is interest in CSA projects in Nailsworth and Chalford. The minimum number of families required for start-up is around 30 with greater ease of operation at 100. A lot of community input is required to get the schemes going. There is potential for more CSAs if there was funded advice and information sharing. Members are required to support farmers with some work during the year and an on-going involvement in the scheme.

Community Supported Agriculture has an important part to play in encourage local production of vegetables, and encouraging those involved to develop their knowledge of farming systems and how to grow produce.

*Food Hub*
Stroudco Food Hub is a social enterprise to provide locally-produced food to people in Stroud with a reasonable return to producer members. This is in the start-up phase. There are 200 consumer members and around 50 producers who are interested in supplying. Deliveries would be made to a central point where consumers can collect on a monthly basis initially, with a view to weekly collections. The collection point has been arranged at a local school. This is envisaged as local producers reaching consumers. Other opportunities for a food hub might lie in distributing local food to local shops, public sector purchasers, pubs and restaurants, and multiple outlet retailers.

In addition, the food hub will own items which can be loaned to members such as sausage maker, juicer, fruit press and roasting spit.

Currently the food hub is applying for start-up grant funding of £40,000 for the first three years. At this point it will be profitable as a standalone business with a part-time worker.

*Allotments*
Judging from the national press in 2007/2008 there has been a resurgence of interest in allotments. There are several allotment sites across Stroud District. Currently most are significantly oversubscribed. A private

allotment site in Nailsworth currently has 12 on the waiting list and this is typical across the district.

The Section 23 of the 1908 Small Holding and Allotments Acts requires local authorities to make available allotment land if demand is registered by at least six registered tax payers/electors. Section 25 of the Act allows local authorities to compulsory purchase land for this purpose.

Stroud has an innovative allotment co-operative project where a number of families work 5 allotments together providing year round produce. They meet on Friday mornings to work together. Their knowledge and the soil fertility has been built up over 7 years. They have a lot of interest from individuals wanting to join them but few with the courage to take on their own co-operative project. This project has been featured in a Channel 4 documentary.

Again, seed funding for advice and knowledge sharing would be useful in replicating this model.

*Community Orchards*
There are a number of community orchards in the Stroud area, including a linear orchard along the Ebley section of the Cycle Track (est 1994), Whiteshill and Ruscombe (est 2005) and Horsley (est 2006). Typically local varieties of apples and pears are grown and offer the opportunity for community building in working with the trees and fruit year round.

Whilst the Government recommends five fruit and veg a day, fruit consumption has been growing while domestic fruit production has been reducing rapidly. Agricultural subsidies have incentivised farmers to convert orchards to alternative land use. Britain grows only 5% of its own fruit, the lowest in the European Union, with even Germany producing 25% of its' fruit requirements.

## 5.3 SHORT-TERM MEASURES

There are three measures that very quickly improve food availability and may happen naturally in a time of energy constraint.

1. Reduce food waste either in retail outlets or at home.
2. Change diet to include less energy-intensive food; either processed food or meat/dairy.
3. Home-growing vegetables or fruit to supplement what is bought, with echoes of 'Dig for Victory' when gardens and public land were cultivated in World War Two.

## 6. OPPORTUNITIES FOR THE LSP

The Local Strategic Partnership has the opportunity here to work dynamically in support of the local economy. With the twin challenges of peak oil and climate change, local businesses will need all the support and protection. The LSP can develop food availability in the district with the following actions.

### 6.1 ENGAGE WITH OUR FARMERS

Make contact with Royal Agricultural College and Country and Community Research Institute to explore greater opportunities for local farmers to link with local consumers, and develop local food production capacity as well as increasing the amount of local food purchasing kept within the local economy.

Link this work with Local Food Steering Group.

### 6.2 LOCAL FOOD STEERING GROUP

Identify a local food steering group representing the interests of producers, consumers, distributors and retailers (large and small) to promote local food and assess feasibility

- Food hub
- Marketing desk to link producers with Public Sector Food Procurement Initiatives[16]
- Education programme to put local producers in touch with issues of climate change and peak oil (e.g. Farming Futures)

### 6.3 DEVELOP LOCAL FOOD INITIATIVES

Fund knowledge sharing and start-up advice through

local food worker supporting community supported agriculture, orchards, co-operative allotments, home-growing and an 'Open Gardens' showcase (like 2008 Open Homes run by Transition Stroud and supported by Stroud District Council).

Stroud Local Food conference to bring interested parties together, with national speakers and bringing in best practice from elsewhere.

[16] 'Supplying Local Food to Mainstream Customers' by Henry Brown and John Geldard.

## Appendix I

## OVERVIEW OF AGRICULTURE IN STROUD DISTRICT[17]

There are 1,220 farm holdings covering an area of 37,032 ha. Whilst the average size is 30 ha, 46% of them are under 5 ha, a further 22% are under 20 ha and there are only 101 farms of more than 100 ha.

70% of the land is owner-farmed and 30% is farmed by tenants.

64% of the land is under grass. 51% is under permanent grass. 27% is cropped (or bare fallow). In terms of cereals, figures are available only for barley, which takes up 4% of the farmed land area – so there is a significant shortfall in the data. Clearly livestock farms predominate.

There are around 10,000 dairy cows, 21,000 beef animals, 3,000 pigs (of which 12% are breeding sows), nearly 45,000 sheep and less than 200 goats. There are no figures for poultry.

There are just over 100 farms classified as dairy farms, 270 as beef farms, 52 as pig farms (of which 55% have breeding sows and the balance only fatten), 290 as sheep farms and 35 have goats. Clearly many farms raise more than one type of livestock.

91 ha on 75 farms are classified as horticultural, including 54 ha of fruit on 56 holdings. There is no reliable breakdown within these broad figures.

500 farmers (and their wives) are engaged full time in farming (on 354 farms) – that is it is their only source of income. There is a further 800 part time farmers (and their wives) on 589 farms. There are only 29 full time farm managers (on 24 farms) and 10 part time managers (on 12 farms). There are only 143 full time workers (75% are men) and 111 part time workers (61% are men) plus 195 casual workers. With a total of 1,795 people employed this works out at one person employed per 20.5 ha, reflecting the fact that livestock are labour intensive. In comparison, in highly mechanised cereal-growing areas there might be only one person employed per 100 ha. Given that there are just over 52,000 people who are considered to be employable in SDC (i.e. aged 16-74), farming employs 3.5% of them. This is considerably higher than the national figure of less than 1%. However, it is clear that for those who are not farmers (full time or part time), the opportunity for paid employment in the farming sector (as managers or farm workers) is very limited.

In terms of food self-sufficiency, much more work is needed to assess both food requirements of the population and the food production capacity of the farms. However, in broad terms it is likely that the district could be self-sufficient in meat and dairy products (although it may not produce enough cereals for animal feed) and it probably has the capacity to produce much

[17] Based on Defra statistics available for 2006.

more fruit and vegetables. However, the district is unlikely to be able to produce enough basic carbohydrate (cereals for bread, potatoes etc) or sugars to meet people's basic needs. This is only a preliminary analysis and further work is planned.

Appendix II: REFERENCES

All Party Parliamentary Group on Peak Oil and Gas, www.appgopog.gov.uk

'Rethinking Britain's Food Security', Professor Tim Lang, London City University

'Supplying Local Food to Mainstream Customers', by Henry Brown and John Geldard, Aug 2008

'Food: An analysis of the issues', Cabinet Office discussion paper 2008

Farming Futures, 2008 www.farmingfutures.org.uk

An Inconvenient Truth about Food, Soil Association 2008

'Fuelling a Food Crisis' by Colin Hines, Caroline Lucas and Andy Jones, 2006

'Can Britain Feed Itself' by Simon Fairlie, The Land 4 Winter 2007-8

BERR Regional Energy Consumption Stats 2006 - URN 08/476b/REV3

Generalised Land Use Database Statistics for England 2005, Dept for Communities and Local Government

Biomass Energy Centre - www.biomassenergycentre.org.uk

BERR – Energy Markets Outlook, October 2007

(A range of other sources for yield and stocking density estimates – can be provided on request).

Appendix III: CONSULTEES

John Meadley, agricultural and international development consultant, Transition Stroud

Helen Pitel, Gardening Group, Transition Stroud

Hugh Barton, Reader in Sustainable Cities, University of the West of England and works with World Health Organisation's Healthy Cities in Europe programme.

Val Kirby, Head of Landscape and Geodiversity with Natural England

Nick Weir, f3 local food consultancy, Stroudco Food Hub and Stroud CSA

Jade Bashford, Stroud CSA

Martin Large, facilitator, social ecologist and publisher

AUTHORS

**Fi Macmillan** works in Transition Stroud's Business and Government Group and has a special interest in developing sustainable low-carbon community in Stroud District. Her work covers public transport, domestic energy efficiency and food availability. She is also a District Councillor for Nailsworth on Stroud District Council.

**Dave Cockcroft** is convener on Transition Stroud Energy Working Group and a town councillor in Stroud. He is a website developer working on ethical and environmental websites and is also studying for an MSc in Renewable Energy Systems Technology at CREST at the University of Loughborough.