ASPO-Australia

Australian Association for the Study of Peak Oil & Gas

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Agriculture, Fisheries and Food Working Group

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The ASPO-Australia working group on agriculture, fisheries and food feels it imperative that action is taken now to examine the way that oil depletion will affect the food chain from source to table. This submission is in three parts: production, distribution and consumption.

Production

Increasing oil prices will seriously affect Australian agriculture and fisheries, but the effects will not be uniform. Those industries heavily reliant on oil will be most seriously affected. These will include deep sea fishing, farming where high levels of oil and oil dependent inputs are needed. These include wheat farming on the outer fringes of the Australian wheatbelt, where sheep flocks have been reduced or removed and crop production is dependent on fertiliser nitrogen.

In other sectors, where production systems are more diversified, such as the central and high rainfall areas, the effects of oil price increases will be more muted. Wool production may well benefit due to increased costs of synthetic fibre.

Production of perishable food close to urban centres has a low fuel cost. It is therefore important to preserve good quality horticultural land close to urban centres from further expansion of urban areas.

Distribution

Increasing oil prices will also affect food transport, reducing the distance between producer and user. This should be beneficial for local horticultural industries, but detrimental for those industries with heavy transport costs (and those piggybacking on tourist flights), such as fresh tuna and crayfish to Tokyo.

Consumption

At present it is difficult to forecast the effects of oil price increases on food consumption. A world-wide overview suggests that two thirds of the world's human population is dependent on cheap oil to produce and distribute food and that therefore increased oil prices will create starvation for ever greater proportions of the world's human population. Certainly the rich will have better choices for food and a longer period in which they will have adequate food supplies. But it is difficult to determine how this will affect food production in Australia.

Most of the oil used in bringing food to the table is in driving to supermarkets to purchase food and other items. This can only be rectified by changes in urban retail structures and layout.

Recommendations:

1. The Australian Government needs to commission reviews on the effects of increased oil prices on both the producers and consumers of Australian produced food and fibre.

2. The Australian Government needs to review infrastructure investments for rural and regional Australia, concentrating attention on means of reducing oil dependency in the transport of Australian regional produce and supplies (e.g. road-to-rail).
3. The Australian Government needs to bring to the attention of state and local governments the importance of preserving horticultural land close to urban centres, so that transport costs of horticultural produce are reduced.
4. The Australian Government needs to bring to the attention of state and local governments, as well as to major retailers the high fuel cost of centralised shopping centres. Changes in urban planning are urgently required to produce more energy efficient food distribution systems.
5. The Australian Government should re-enter the field of rural adjustment so as to be prepared for rapid bankruptcies in those areas of agriculture and fisheries that are susceptible to price increases of fossil fuels.

These and other issues are covered in more detail below.

Senate Inquiry into Australia's future oil supply and alternative transport fuels

SUBMISSION ON AGRICULTURE FISHERIES AND FOOD– Supplementary Document

As at 20 February 2006

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Terms of Reference: Australia's future oil supply and alternative transport fuels, with particular reference to:

a. projections of oil production and demand in Australia and globally and the implications for availability and pricing of transport fuels in Australia;
b. potential of new sources of oil and alternative transport fuels to meet a significant share of Australia's fuel demands, taking into account technological developments and environmental and economic costs;
c. flow-on economic and social impacts in Australia from continuing rises in the price of transport fuel and potential reductions in oil supply; and
d. options for reducing Australia's transport fuel demands.

Submissions relating to Terms of Reference:

c. Flow-on economic and social impacts relating to agriculture and food supply

The dependence of agriculture on fossil fuels

In recent years Australian grain crop producers have adjusted their production methods as a consequence of low oil prices and low prices for inputs which are themselves dependent on low oil and gas prices. Cropping farmers have increased the proportion of their farms in crop, partly as a consequence of low fertiliser nitrogen prices, which have obviated the necessity for incorporating legume-sourced nitrogen from legume crops or clover pastures. They have also changed their cropping activities to reduce the amount of fuel used in crop production (i.e. from multiple passes to establish a crop to one-pass systems) and have few ways of further reducing fuel used (Kingwell and Plunkett, 2006)

The consequences of oil price increases on agriculture

Ross Kingwell of the WA Department of Agriculture has performed sensitivity analyses of the effects of increased oil prices which show that, with the Eastern Wheatbelt model farmers are caught between the rock of climate change and decreasing rainfall and the hard place of increasing input costs as a consequence of increased costs of and competition for fossil fuels (diesel, nitrogen fertiliser etc.). The price point at which it pays to grow biofuels is very close to the price point when it does not pay to grow crops, so the farm reverts to pastoralism.

The same paper using the Great Southern Model points out that high rainfall animal farming is far less susceptible to oil price increases.

'Agriculture will need to adapt . . . switching to more efficient rail transport rather than trucks. This transition will need assistance and subsidized diesel is not helping. A crash program in diesel phase-out could change agricultural oil vulnerability in a five year period.' (Newman 2006)

The consequences of oil price increases on food supply

The amount of fossil fuel energy needed to put food on the table depends on:

- the amount of fossil fuel in the production of food;
- the amount of fossil fuels used to transport and process foods to the shop (supermarket); and
- the amount of fossil fuels used to transport the food home and to cook it at home.

Thomas Starrs states 'Then I read an astonishing statistic: It takes about 10 fossil fuel calories to produce each food calorie in the average American diet. So if your daily food intake is 2,000 calories, then it took 20,000 calories to grow that food and get it to you. In more familiar units, this means that growing, processing and delivering the food consumed by a family of four each year requires the equivalent of almost 34,000 kilowatt-hours (kWh) of energy, or more than 930 gallons of gasoline (for comparison, the average U.S. household annually consumes about 10,800 kWh of electricity, or about 1,070 gallons of gasoline).

'*In other words, we use about as much energy to grow our food as to power our homes or fuel our cars.*

'. . . Eating a carrot or an apple gives the diner all the caloric energy in those foods, but feeding these foods to a pig reduces the energy available by a factor of 10. That's because the pig uses most of the energy just staying alive, and stores only a fraction of the energy in the parts we eat. All told, it takes 68 calories of fossil fuel to produce one calorie of pork, and 35 calories of fuel to make one calorie of beef.

'Interestingly, the path to reducing the energy intensity of the food system dovetails nicely with the path to a healthy and nutritious diet. It can be summarized in three simple suggestions.

'First, eat lower on the food chain. That means more fruits and vegetables, and fewer meats and fish. Meats, poultry and fish contain necessary proteins, but most American diets contain too much protein - about twice the recommended amount. Since 80% of the grains go to feeding livestock, the amount of energy used indirectly to support our diet of double bacon cheeseburgers is staggering. And, if you do eat meat, then try to avoid animals grown in feedlots or factory pens. They take far more energy calories to raise than free-range, grassfed critters, which have only about a third of the embedded energy.

'Second, eat more fresh foods and fewer processed foods. Fruits and vegetables again, but also whole grains, legumes and other less-processed foods, have much less embedded energy. In general, the more packaging, the more processing - and the more energy associated with its production.

'Third, buy local. Incredibly, the food items on U.S. grocery store shelves have traveled an average of 1,500 miles. And some foods are much worse. Table grapes grown in Chile, transported by ship to California and shipped by truck to Iowa have traveled over 4,200 miles. In response, some agricultural scientists have proposed ecolabeling programs based on CO2 rankings or broader lifecycle assessments.'

See http://www.sustainablebusiness.com/features/feature_template.cfm?ID=1275

To quote from a paper by Fleay (2005) 'For simplicity we will assume transport of grain from farms in NSW to a cereal factory in Sydney, then transport of the cereal from Sydney to supermarkets in Perth via a warehouse and buyers travelling by car between homes and supermarkets in Perth. We will estimate the distance travelled per tonne of grain and fuel used per tonne for each transport segment. The details for each transport segment

are described in the Trip Descriptions below. The estimates are based on a similar study by the World Business Council, "Mobility 2001 - World mobility at the end of the twentieth century and its sustainability", p.6-18 www.wbcsdmobility.org. The table below summarises the outcome:

Trips	Distance km	Load tonnes	Litres fuel	Km per tonne	Litres per tonne
Farm to railway yard by truck	30	10	10	3	1
Rail to Sydney terminal, 90t hopper car	200	90	90	2.2	1
Sydney, by road to and from factory	20	20	8	1	0.4
Rail, Sydney to Perth, Kewdale yard	3,500	30	800	115	27
Road Kewdale yard to Supermart	35	15	12	2.3	0.8
Sub-total	-	-	-	***123***	***30***
Home-Supermarket-Home	***400***	***1***	***33***	***400***	***33***
TOTAL	**-**	**-**	**-**	**523**	**63**

Trip Descriptions

- Movement of grain in 10 tonne truckloads from NSW farms 30 km to a rural rail terminal (3 km/tonne @ 3.4 km/litre, or 10 litres of fuel for the trip, or 1 litre/tonne).
- Rail transport in 90 tonne wagons 200 km to a Sydney rail grain terminal (2.2 km/tonne @ 5 litres of fuel per 1,000 tonne-km – 90 litres, or 1/litre/tonne for the trip).
- Road transport within Sydney for grain from the rail terminal to a cereal factory and return to rail terminal with packaged cereal - 20 tonne loads and 20 km for the return trip (1 km/tonne @ 2.5 km/litre - 8 litres of fuel, or 0.4 litres/tonne).
- Rail transport of the 1 kg cereal packages in seatainers 3,500 km from Sydney to Perth terminal at Kewdale (30 tonnes cereal net per rail wagon, 115 km/tonne @ 8 litres of fuel per 1,000 tonne-km – 800 litres, or 27 litres/tonne).
- Road transport from Kewdale to supermarkets via a warehouse – two15 tonne loads net for 35 km (2.3 km/tonne – 12 litres of fuel, or 0.8 litres/tonne)
- Buyers 8 km return car trip between home and supermarket to buy one 1 kg packet of cereal (1,000 trips for 1 tonne – 8,000 km/tonne @12 km/litre = 670 litres of fuel. *Allocate 5% of each trip to the cereal purchase* = 400 km/tonne using 33 litres of fuel).

Comment

'These estimates should be taken as indicative only as they are dependent on important generalisations and assumptions made. Nevertheless they do indicate that car trips by customers to supermarkets dominate the transport task in getting foodstuffs from farms to households, even when the product is transported from one side of the continent to the other. There is additional transport on farms and upstream of farms to deliver goods and services to farms.

"It reinforces the urgent need for transport/energy assessments of the entire food supply chain from farm inputs to the kitchen table. These are becoming exceptionally long and energy intensive (petroleum based fuels) and vulnerable to disruption with dire consequences. The

Greens WA policies on Transport and Planning specifically call for such transport impact assessments of projects in the context of oil depletion.' (Fleay, 2005)

So changes in shopping behaviour and urban design are indicated. Reductions is the second part can be achieved by local production, though Peter Newman has pointed out that the transport costs of living systems where the house is surrounded by the food production area are less energy efficient than concentrated cities (assuming that access to health, education, business and other services are required).

The need for both urban and rural land use planning

As Newman in his submission to this Inquiry has pointed out 'One of the ways we can do this in Australian cities is to establish **Horticultural Precincts** immediately adjacent to our cities. These areas need to set aside the good soils and ensure they are retained in perpetuity for horticulture rather than always being seen as 'market garden superannuation' for the next suburb. In these areas we can then get serious about recycling wastewater as Water Corporations cannot invest in the pipes and technology for this unless they have certainty about the future for the area.

'One of the obvious ways that agriculture will need to change is to become more localized. When a flash flood cut the Nullarbor a year ago there were trucks caught on either side and some food deteriorated, including a truck load of tomatoes on one side and a truck load of tomatoes on the other side. Such silliness will fall away when transport costs become significant in food distribution. There may be a reduction in choice as regional produce will be favoured over imported produce but this can be part of regional identity and the slow food movement, rather than deprivation. Do we really need to import vegetables from China – by plane? Wheat however is a bulk commodity which can be transported by train and ship at low oil or no oil cost. Agriculture needs to be more localized as well as creating surpluses which are traded for the benefit of regional and urban opportunity.' (Newman, 2006)

References

Fleay B (2005) How Much Transport to Get Cereal to the Breakfast Table? 4 February 2005

Kingwell, R and Plunkett, B (2006) Economics of biofuel production. Paper to the WA Sustainable Energy Association and the Sustainable Transport Coalition "Bioenergy and Biofuels in WA: Initiatives and Challenges Conference, February 10th 2006

Newman, P (2006) Submission to this Inquiry