Why Our Food Is So Dependent on Oil

By Norman Church
From The Wilderness

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> ***"Concentrate on what cannot lie. The evidence..."***
> *- Gil Grissom*

"Eating Oil" was the title of a book which was published in 1978 following the first oil crisis in 1973 (1). The aim of the book was to investigate the extent to which food supply in industrialised countries relied on fossil fuels. In the summer of 2000 the degree of dependence on oil in the UK food system was demonstrated once again when protestors blockaded oil refineries and fuel distribution depots. The fuel crises disrupted the distribution of food and industry leaders warned that their stores would be out of food within days. The lessons of 1973 have not been heeded.

Today the food system is even more reliant on cheap crude oil. Virtually all of the processes in the modern food system are now dependent upon this finite resource, which is nearing its depletion phase.

Moreover, at a time when we should be making massive cuts in the emissions of greenhouse gases into the atmosphere in order to reduce the threat posed by climate change, the food system is lengthening its supply chains and increasing emissions to the point where it is a significant contributor to global warming.

The organic sector could be leading the development of a sustainable food system. Direct environmental and ecological impacts of agriculture 'on the farm' are certainly reduced in organic systems. However, global trade and distribution of organic products fritter away those benefits and undermine its leadership role.

Not only is the contemporary food system inherently unsustainable, increasingly, it is damaging the environment.

The systems that produce the world's food supply are heavily dependent on fossil fuels. Vast amounts of oil and gas are used as raw materials and energy in the manufacture of fertilisers and pesticides, and as cheap and readily available energy at all stages of food production: from planting, irrigation, feeding and harvesting, through to processing, distribution and packaging. In addition, fossil fuels are essential in the construction and the repair of equipment and infrastructure needed to facilitate this industry, including farm machinery, processing facilities, storage, ships, trucks and roads. The industrial food supply system is one of the biggest consumers of fossil fuels and one of the greatest producers of greenhouse gases.

Ironically, the food industry is at serious risk from global warming caused by these greenhouse gases, through the disruption of the predictable climactic cycles on which agriculture depends. But global warming can have the more pronounced and immediate effect of exacerbating existing environmental threats to agriculture, many of which are caused by industrial agriculture itself. Environmental degradation, water shortages, salination, soil erosion, pests, disease and desertification all pose serious threats to our food supply, and are made worse by climate change. But many of the conventional ways used to overcome these environmental problems further increase the consumption of finite oil and gas reserves. Thus the cycle of oil dependence and environmental degradation continues.

Industrial agriculture and the systems of food supply are also responsible for the erosion of communities throughout the world. This social degradation is compounded by trade rules and policies, by the profit driven mindset of the industry, and by the lack of knowledge of the faults of the current systems and the possibilities of alternatives. But the globalisation and corporate control that seriously threaten society and the stability of our environment are only possible because cheap energy is used to replace labour and allows the distance between producer and consumer to be extended.

However, this is set to change. Oil output is expected to peak in the next few years and steadily decline thereafter. We have a very poor understanding of how the extreme fluctuations in the availability and cost of both oil and natural gas will affect the global food supply systems, and how they will be able to adapt to the decreasing availability of energy. In the near future, environmental threats will combine with energy scarcity to cause significant food shortages and sharp increases in prices - at the very least. We are about to enter an era where we will have to once again feed the world with limited use of fossil fuels. But do we have enough time, knowledge, money, energy and political power to make this massive transformation to our food systems when they are already threatened by significant environmental stresses and increasing corporate control?

The modern, commercial agricultural miracle that feeds all of us, and much of the rest of the world, is completely dependent on the flow, processing and distribution of oil, and technology is critical to maintaining that flow.

Oil refined for gasoline and diesel is critical to run the tractors, combines and other farm vehicles and equipment that plant, spray the herbicides and pesticides, and harvest/transport food and seed. Food processors rely on the just-in-time (gasoline-based) delivery of fresh or refrigerated food. Food processors rely on the production and delivery of food additives, including vitamins and minerals, emulsifiers, preservatives, colouring agents, etc. Many are oil-based. Delivery is oil-based. Food processors rely on the production and delivery of boxes, metal cans, printed paper labels, plastic trays, cellophane for microwave/convenience foods, glass jars, plastic and metal lids with sealing compounds. Many of these are essentially oil-based. Delivery of finished food products to distribution centres in refrigerated trucks. Oil-based, daily, just-in-time shipment of food to grocery stores, restaurants, hospitals, schools, etc., all oil-based; customer drives to grocery store to shop for supplies, often several times a week.

Energy, Transport and the Food System

Our Food System Is Energy Inefficient...

One indicator of the unsustainability of the contemporary food system is the ratio of energy outputs - the energy content of a food product (calories) - to the energy inputs.

The latter is all the energy consumed in producing, processing, packaging and distributing that product. The energy ratio (energy out/energy in) in agriculture has decreased from being close to 100 for traditional pre-industrial societies to less than 1 in most cases in the present food system, as energy inputs, mainly in the form of fossil fuels, have gradually increased.

However, transport energy consumption is also significant, and if included in these ratios would mean that the ratio would decrease further. For example, when iceberg lettuce is imported to the UK from the USA by plane, the energy ratio is only 0.00786. In other words 127 calories of energy (aviation fuel) are needed to transport 1 calorie of lettuce across the Atlantic. If the energy consumed during lettuce cultivation, packaging, refrigeration, distribution in the UK and shopping by car was included, the energy needed would be even higher. Similarly, 97 calories of transport energy are needed to import 1 calorie of asparagus by plane from Chile, and 66 units of energy are consumed when flying 1 unit of carrot energy from South Africa.

Just how energy inefficient the food system is can be seen in the crazy case of the Swedish tomato ketchup. Researchers at the Swedish Institute for Food and Biotechnology analysed the production of tomato ketchup (2). The study considered the production of inputs to agriculture, tomato cultivation and conversion to tomato paste (in Italy), the processing and packaging of the paste and other ingredients into tomato ketchup in Sweden and the retail and storage of the final product. All this involved more than 52 transport and process stages.

The aseptic bags used to package the tomato paste were produced in the Netherlands and transported to Italy to be filled, placed in steel barrels, and then moved to Sweden. The five layered, red bottles were either produced in the UK or Sweden with materials form Japan, Italy, Belgium, the USA and Denmark. The polypropylene (PP) screw-cap of the bottle and plug, made from low density polyethylene (LDPE), was produced in Denmark and transported to Sweden. Additionally, LDPE shrink-film and corrugated cardboard were used to distribute the final product. Labels, glue and ink were not included in the analysis.

This example demonstrates the extent to which the food system is now dependent on national and international freight transport. However, there are many other steps involved in the production of this everyday product. These include the transportation associated with: the production and supply of nitrogen, phosphorous and potassium fertilisers; pesticides; processing equipment; and farm machinery. It is likely that other ingredients such as sugar, vinegar, spices and salt were also imported. Most of the processes listed above will also depend on derivatives of fossil fuels. This product is also likely to be purchased in a shopping trip by car.

...Is Dependent on Oil...

One study has estimated that UK imports of food products and animal feed involved transportation by sea, air and road amounting to over 83 billion tonne-kilometres (3). This required 1.6 billion litres of fuel and, based on a conservative figure of 50 grams of carbon dioxide per tonne-kilometre resulted in 4.1 million tonnes of carbon dioxide emissions (4). Within the UK, the amount of food transported increased by 16% and the distances travelled by 50% between 1978 and 1999.

It has been estimated that the CO2 emissions attributable to producing, processing, packaging and distributing the food consumed by a family of four is about 8 tonnes a year. (5)

...And Is Unnecessarily Contributing to Carbon Emissions.

It is not that this transportation is critical or necessary. In many cases countries import and export similar quantities of the same food products (6). A recent report has highlighted the instances in which countries import and export large quantities of particular foodstuffs (6). For example, in 1997, 126 million litres of liquid milk was imported into the UK and, at the same time, 270 million litres of milk was exported from the UK. 23,000 tonnes of milk powder was imported into the UK and 153,000 tonnes exported (7). UK milk imports have doubled over the last 20 years, but there has been a four-fold increase in UK milk exports over the last 30 years (8).

Britain imports 61,400 tonnes of poultry meat a year from the Netherlands and exports 33,100 tonnes to the Netherlands. We import 240,000 tonnes of pork and 125,000 tonnes of lamb while exporting 195,000 tonnes of pork and 102,000 tonnes of lamb (6).

This system is unsustainable, illogical, and bizarre and can only exist as long as inexpensive fossil fuels are available and we do not take significant action to reduce carbon dioxide emissions.

Global Warming and Finite Oil

The Threat of Global Warming and the Need to Reduce Carbon Emissions

The Nearness of the Depletion Stage of Oil Supplies

Discovery of oil and gas peaked in the 1960s. Production is set to peak too, with five Middle Eastern countries regaining control of world supply (9). Almost two-thirds of the world's total reserves of crude oil are located in the Middle East, notably in Saudi Arabia, Iran and Iraq (10). An assessment of future world oil supply and its depletion pattern shows that between 1980 and 1998 there was an 11.2 per cent increase in world crude oil production, from 59.6 to 66.9 million barrels of oil per day (10). Current world production rates are about 25 Gb (billion barrels) per year. A simple calculation shows that if consumption levels remain constant, world crude oil reserves, at approximately 1 trillion barrels, could be exhausted around 2040 (11).

The oil crises of the 1970s when the Organisation of Petroleum Exporting Countries (OPEC) states reined in their production have passed into folk memory. However, they were accompanied by massive disruption and global economic recession. The same happened in 1980 and 1991 (12).

Colin J. Campbell, a pre-eminent oil industry analyst, believes that future crises will be much worse. "The oil shocks of the 1970s were short-lived because there were then plenty of new oil and gas finds to bring on stream. This time there are virtually no new prolific basins to yield a crop of giant fields sufficient to have a global impact. The growing Middle East control of the market is likely to lead to a radical and permanent increase in the price of oil, before physical shortages begin to appear within the first decade of the 21st century. The world's economy has been driven by an abundant supply of cheap oil-based energy for the best part of this century. The coming oil crisis will accordingly be an economic and political discontinuity of historic proportions, as the world adjusts to a new energy environment" (9).

The three main purposes for which oil is used worldwide are food, transport and heating. In the near future the competition for oil for these three activities will be raw and real. An energy famine is likely to affect poorer countries first, when increases in the cost of paraffin, used for cooking, place it beyond their reach. Following the peak in production, food supplies all over the world will begin to be disrupted, not only because of price increases but because the oil will no longer be there.

Is Organic Any Different?

The Organic System Is More Energy Efficient to the Farm Gate...

One of the benefits of organic production is that energy consumption and, therefore, fossil fuel consumption and greenhouse gas emissions, are less than that in conventional systems.

The energy used in food production is separated into direct and indirect inputs. Indirect inputs include the

manufacture and supply of pesticides, feedstuffs and fertilisers while direct energy inputs are those on the farm, such as machinery. One measure of the energy efficiency of food production that allows a comparison between different farming practices is the energy consumed per unit output, often expressed as the energy consumed per tonne of food produced (MJ/tonne) or the energy consumed per kilogram of food (MJ/kg).

A study comparing organic and conventional livestock, dairy, vegetable and arable systems in the UK found that, with average yields, the energy saving with organic production ranged from 0.14 MJ/kg to 1.79 MJ/kg, with the average being 0.68 MJ/kg or 42 per cent (13). The improved energy efficiency in organic systems is largely due to lower (or zero) fertiliser and pesticide inputs, which account for half of the energy input in conventional potato and winter wheat production and up to 80 per cent of the energy consumed in some vegetable crops.

In conventional upland livestock production, the largest energy input is again indirect in the form of concentrated and cereal feeds. When reared organically, a greater proportion of the feed for dairy cattle, beef and hill sheep is derived from grass. In the case of milk production, it has been found that organic systems are almost five times more energy efficient on a per animal basis and three and a half times more energy efficient in terms of unit output (the energy required to produce a litre of milk) (13).

...But Not When It Goes Global.

So far so good - but once passed the farm-gate, things begin to go wrong. Britain imports over three-quarters of its organic produce, and despite consumer demand, only two per cent of its land is organically farmed (14). As the market has grown it has been met by imports.

A study looking at the energy consumption and carbon dioxide emissions when importing organic food products to the UK by plane (15) found that carbon dioxide emissions range from 1.6 kilograms to 10.7 kilograms. Air transport of food is the worst environmental option but road transport, especially unnecessary journeys, is also bad. For example 5kg of Sicilian potatoes travelling 2448 miles emits 771 grams of carbon dioxide.

The problem is that, overall, human beings have developed a tendency to deal with problems on an ad hoc basis - i.e., to deal with 'problems of the moment'. This does not foster an attitude of seeing a problem embedded in the context of another problem.

Globalisation makes it impossible for modern societies to collapse in isolation. Any society in turmoil today, no matter how remote, can cause problems for prosperous societies on other continents, and is also subject to their influence (whether helpful or destabilising).

For the first time in history, we face the risk of a global decline.

Shocks to the System

As already stated, the three main purposes for which oil is used worldwide are food, transport and heating. Agriculture is almost entirely dependent on reliable supplies of oil for cultivation and for pumping water, and on gas for its fertilisers; in addition, for every calorie of energy used by agriculture itself, five more are used for processing, storage and distribution.

Since farming and the food industry are not famous for spending money unnecessarily, there must be a presumption that there is very little short-term 'slack' which would allow its demand for energy to be reduced at short notice without disruptions in food prices. In the case of transport and heating fuel, there is more scope for saving energy at short notice; cutting leisure journeys, for instance, wearing extra pullovers and, in the slightly longer term, driving smaller cars have a role to play while, in the longer term, there is a totally different low-energy paradigm waiting to be developed. But it is the short term that has to be survived first and, in that short term, the competition for oil for food, transport and heating will be real and raw.

Through its dependence on oil, contemporary farming is exposed to the whole question of the sustainability of our use of fossil fuels. It took 500 million years to produce these hydrocarbon deposits and we are using them at a rate in excess of 1 million times their natural rate of production. On the time scale of centuries, we certainly cannot expect to continue using oil as freely and ubiquitously as we do today. Something is going to have to change.

The same applies more widely to every natural resource on which industrial civilisation relies. Furthermore, one

might think that there is a compounded problem. Not only are there more people consuming these resources, but their per capita consumption also increases in line with the elaboration of technology. We seem to be facing a problem of diminishing returns, indeed of running out of the vital raw materials needed to support our economic growth.

Almost every current human endeavour from transportation, to manufacturing, to electricity to plastics, and especially food production is inextricably intertwined with oil and natural gas supplies.

Commercial food production is oil powered. Most pesticides are petroleum- (oil) based, and all commercial fertilisers are ammonia-based. Ammonia is produced from natural gas Oil based agriculture is primarily responsible for the world's population exploding from 1 billion at the middle of the 19th century to 6.3 billion at the turn of the 21st Oil allowed for farming implements such as tractors, food storage systems such as refrigerators, and food transport systems such as trucks As oil production went up, so did food production. As food production went up, so did the population. As the population went up, the demand for food went up, which increased the demand for oil. Here we go round the Mulberry bush Oil is also largely responsible for the advances in medicine that have been made in the last 150 years. Oil allowed for the mass production of pharmaceutical drugs, and the development of health care infrastructure such as hospitals, ambulances, roads, etc.

We are now at a point where the demand for food/oil continues to rise, while our ability to produce it in an affordable fashion is about to drop.

Within a few years of Peak Oil occurring, the price of food will skyrocket because the cost of fertiliser will soar. The cost of storing (electricity) and transporting (gasoline) the food that is produced will also soar.

Oil is required for a lot more than just food, medicine, and transportation. It is also required for nearly every consumer item, water supply pumping, sewage disposal, garbage disposal, street/park maintenance, hospitals and health systems, police, fire services and national defence.

Additionally, as you are probably already aware, wars are often fought over oil.

Bottom Line?

If we think we are food secure here in the UK and other industrialised countries simply because we have gas in the car, frankly, we are delusional. Despite the appearance of an endless bounty of food, it is a fragile bounty, dependent upon the integrity of the global oil production, refining and delivery system. That system is entirely dependent on the thread of technology. Modern, technology-based agriculture produces both food, and seeds for next year's food, on a just-in-time basis. There are precious little reserves of either food or seeds to sustain any protracted interruption.

Technology and the incredibly rich tapestry it has made possible has created a false sense of security for so many of us. The thread is flawed; the tapestry is now fragile; famines are possible. We must take that seriously...

Our food supply, and our economic survival as a whole, depends on the steady availability of reasonably priced oil. Is oil our Achilles heel?

This Means Our Food Supply Is:

Vulnerable:

The oil supplies that fuel the food system could be exhausted by 2040 (19). In many regions oil production has peaked and most reserves lie in the Middle East. Food security is also threatened: for example, even if all UK fruit production was consumed in the UK, of every 100 fruit products purchased, only 5 will now have been grown in the UK.

Inefficient:

For every calorie of carrot, flown in from South Africa, we use 66 calories of fuel. The huge fuel use in the food system means more carbon dioxide emissions, which means climate change, which means more damage to food supplies, as well as other major health and social problems.

Unsustainable:

Even organic supplies are becoming hugely damaging as imports fill our shelves (17). One shopping basket of 26 imported organic products could have travelled 241,000 kilometres and released as much CO2 into the atmosphere as an average four bedroom household does through cooking meals over eight months (18).

Other problems highlighted include loss of nutrients in food, increased incidence and spread of diseases such as Foot & Mouth and other major animal welfare problems. Poor countries producing food for distant markets are not necessarily seeing benefits through increased and often intensive production for export. The report reveals how such trends could be reversed through industry, government and public action.

In other words, we won't have to run completely out of oil to be rudely awakened. The panic starts once the world needs more oil than it gets.

To understand why, you've got to fathom how totally addicted to oil we have become. We know that petroleum is drawn from deep wells and distilled into gasoline, jet fuel, and countless other products that form the lifeblood of industry and the adrenaline of military might. It's less well known that the world's food is now nourished by oil; petroleum and natural gas are crucial at every step of modern agriculture, from forming fertiliser to shipping crops. The implications are grim. For millions, the difference between an energy famine and a biblical famine could well be academic.

Independent policy analyst David Fleming writes in the British magazine Prospect (Nov. 2000), "With a global oil crisis looming like the Doomsday Rock, why do so few political leaders seem to care? Many experts refuse to take the problem seriously because it "falls outside the mind-set of market economics." Thanks to the triumph of global capitalism, the free-market model now reigns almost everywhere. The trouble is, its principles "tend to break down when applied to natural resources like oil." The result is both potentially catastrophic and all too human. Our high priests-the market economists-are blind to a reality that in their cosmology cannot exist."

Fleming offers several examples of this broken logic at work. Many cling to a belief that higher oil prices will spur more oil discoveries, but they ignore what earth scientists have been saying for years: there aren't any more big discoveries to make. Most of the oil reserves we tap today were actually identified by the mid-1960s. There's a lot of oil left in the ground - perhaps more than half of the total recoverable supply. Fleming says that that is not the issue. The real concern is the point beyond which demand cannot be met. And with demand destined to grow by as much as 3 percent a year, the missing barrels will add up quickly. Once the pain becomes real, the Darwinian impulse kicks in and the orderly market gives way to chaos.

Some insist that industrial societies are growing less dependent on oil. Fleming says they're kidding themselves. They're talking about oil use as a percentage of total energy use, not the actual amount of oil burned. Measured by the barrel, we're burning more and more. In Britain, for instance, transportation needs have doubled in volume since 1973 and still rely almost entirely on oil. Transportation is the weak link in any modern economy; choke off the oil and a country quickly seizes.

This wouldn't matter much, Fleming laments, "If the world had spent the last 25 years urgently preparing alternative energies, conservation technologies, and patterns of land use with a much lower dependence on transport." (He figures 25 years to be the time it will take a country like Britain to break its habit.) Instead, "the long-expected shock finds us unprepared."

Some UK Food Statistics

UK Food Supply Chain
UK food retailing market was worth £103,800 million in 2001.
Food manufacturing is the single-largest manufacturing industry in the UK.
Food supply chain employs 12.5% of the entire workforce in the UK.
Food supply chain contributes 8% to the UK economy.
Food and drink accounts for 21% of weekly household expenditure.
Food supply chain and unsustainability.
Food supply chain is the largest energy user in the UK.
Food production and distribution contributes up to 22% of the UK's total greenhouse emissions.
Food travels further than any other product - 129 km compared to the average product travel of 94 km.
Wages in the food industry are notoriously low compared to other sectors.
Nearly 30% of household waste is food waste.

Conclusions

Proximity and localization of food system would be beneficial.

The contemporary food system is inherently unsustainable.

Indicators of social, environmental and economic performance, such as food security, greenhouse gas emissions, food miles, farm income and biodiversity highlight this fact. This process could be reversed by re-establishing local and regional food supply systems and substituting 'near for far' in production and distribution systems. This would reduce both the demand for, and the environmental burdens associated with, transportation.

The proximity principle is a straightforward concept in Eating Oil, where production processes are located as near to the consumer as possible. When applied to food supply, local food systems in the form of home-delivery box schemes, farmers' markets and shops selling local produce would replace imported and centrally distributed foodstuffs.

Taking UK food supply and trade at present, there is great potential to apply the proximity principle, in the form of import substitution. Apart from products such as bananas, coffee and tea, many of the foodstuffs that are imported at present could be produced in Britain. Many meat products, cereals, dairy products and cooking oils are - or could be - available here throughout the year. So could fruit and vegetables, perhaps the most seasonal of food groups, through a combination of cultivating different varieties and traditional and modern storage and preservation techniques.

The land currently used to produce food that is exported could be used to increase our self-sufficiency.

There is growing evidence of environmental benefits of local sourcing of food in terms of reduced transport-related environmental impact. In the case of organic produce, a survey of retailers compared local and global sourcing of produce marketed in different outlets between June and August 2001. Products were chosen that were available in the UK during these months but are at present imported by the multiple retailers. These included spring onions imported by plane from Mexico, potatoes imported by road from Sicily, onions imported by ship from New Zealand. It was found that local sourcing through a farmers market, for example, would therefore reduce the greenhouse gas emissions associated with distribution by a factor of 650 in the case of a farmers' market and more for box schemes and farm shop sales (16).

The value of UK food, feed and drink imports in 1999 was over £17 billion. It is clear that a reduction in food imports through import substitution would not only be of benefit to the UK economy as a whole but could also be a major driver in rural regeneration as farm incomes would increase substantially. Local food systems also have great potential to reduce the damaging environmental effects of the current food supply system.

A sustainable food system cannot rely, almost completely, on one finite energy source; an energy source which causes enormous levels of pollution during its production, distribution and use. Although food supplies in wealthy countries such as the UK appear to be secure and choice, in terms of thousands of food products being available at supermarkets, seems limitless, this is an illusion.

The vulnerability of our food system to sudden changes was demonstrated during the fuel crisis in 2001. A sharp increase in the price of oil or a reduction in oil supplies could present a far more serious threat to food security and is likely to as oil enters its depletion phase. Food production and distribution, as they are organised today, would not be able to function. Moreover, the alternatives, in the form of sustainable agriculture and local food supplies, which minimise the use of crude oil, are currently unable to respond to increased demand due to low investment and capacity.

The food system is now a significant contributor to climate change. Reducing the carbon dioxide emissions from food production, processing and distribution by minimising the distance between producer and consumer should be a critical part of any strategy to mitigate global warming.

There are many benefits to organic farming, including reduced fossil fuel energy consumption and greenhouse gas emissions. However, these are often overshadowed by the environmental damage of long distance transport. Organic products that are transported long distances, particularly when distribution is by plane, are almost as damaging as their conventional air freighted counterparts. Highly processed and packaged organic foodstuffs have an added adverse environmental impact.

The priority must be the development of local and regional food systems, preferably organically based, in which a large percentage of demand is met within the locality or region. This approach, combined with fair trade, will ensure secure food supplies, minimise fossil fuel consumption and reduce the vulnerability associated with a dependency on food exports (as well as imports). Localising the food system will require significant diversification, research, investment and support that have, so far, not been forthcoming. But it is achievable and we have little choice.

Postscript

Saturday 02 April 2005

The biggest problem I feel is not the actual demise of fossil fuels, like Peak Oil, but that all that all our systems, finance, communications and power (electric) depend on, and interrelate and depend either directly or indirectly to each other. Obviously from this point oil is a major supplier of not only power but many other products. It is this, an obviously food as a main concern, that must be understood. I also think that in understanding this then people may be more able to understand what is being said about Peak Oil.

I wonder if those that seem to accept the Peak Oil problems, or more so the fossil fuel problem, see the effects that it will have and that it may well even now be too late to do anything much to mitigate its coming effect on society.

I am starting work on another similar article that expands on my earlier article 'Domino Effect and Interdependencies' which can be found at http://www.powerswitch.org.uk/portal/index.php?option=content&task=view&id=452&Itemid=2.

I feel that it will be this that will ultimately bring us all down, as the amount of oil decreases and the price increases.

It is this systems dependence which is not clearly understood or appreciated. This also includes the relationship between Peak Oil and global earth change situations like global warming, soil erosion, higher sea levels, water depletion and deforestation to name a few. They are all interrelated.

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