The Food-Fuel Debate – A Non-sequitur?
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Abstract
The arguments typically presented against the use of food-crops to manufacture fuel in the so-called food-fuel debate are evaluated here and shown to be unsatisfactory. Whilst the price of food-crops could potentially be driven up by such usage, it is argued that this effect can readily be attenuated by imposing an environmental tax on fossil-fuels, which are currently substantially under-priced, primarily because their ecological and social costs are not reflected in the selling price of these fuels. It is further argued that in this menacing age of global warming, it is imperative that an environmental tax be imposed upon fossil-fuels, and that these environmental tax revenues be used to directly mitigate the ecologically deleterious effects of burning fossil-fuels. The energy implications of our burgeoning human population, and our exploding energy demands, as well as the pressing need to find effective and viable solutions are also examined, as are alternative energies. The potentially disastrous consequences of nuclear energy use by irresponsible governments like that of the former Soviet Union are also examined, particularly with regard to the issue of the wanton dumping of spent nuclear cores into the oceans.

Introduction
There is an energy crisis looming over us, which demands immediate address, and which we are not taking seriously enough at all. It has to do with how rapidly both the population of the planet, and our energy consumption is growing, as well as with the sources from which we obtain that energy.

Given the exploding human population on our planet, and even more so, given the fact that every year more and more of that growing population are choosing increasingly more energy-intensive life styles, it is imperative that we: a) control our population; b) change our life-styles to become less energy-consuming; and/or c) find energy alternatives. These are our only choices. There are actually some interim measures which if adopted quickly, could postpone the inevitable, but for a number of reasons, they are unfortunately, embroiled in a variety of red-herring issues. This paper will explore the energy crisis, the potential stop-gap solutions, and the politics of oil.

Keywords
Food fuel debate, fossil fuel pricing, environmental tax, environmental tax, energy crisis, population control, energy consumption, alternative energy, green energy, biofuel, bio energy, food prices, politics of oil, nuclear fuel dumping, nuclear waste dumping, reactor dumping, carbon dioxide emissions, greenhouse gasses, climate change, environmental cost of fossil fuel, food overproduction

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This graph shows energy use by source of energy since 1970, and includes predictions until 2030. The units on the left are terajoules (TJ: $1 \text{TJ} = 10^{12} \text{joules}$) Note that in 1975 the world’s population was about 4,000,000,000. (http://www.iiasa.ac.at/Admin/PUB/Documents/WP-77-007.pdf)\(^2\). Today, it is close to 7,000,000,000, this is a 75% increase. Our energy consumption though has just about doubled during this same period. This is disturbing, as it means that our per capita energy consumption is growing i.e. our energy consumption is growing faster than our population. As countries like China and India become wealthier, this energy consumption is likely to skyrocket. More and more people are using increasingly more and more energy, as is shown in the table below:

<table>
<thead>
<tr>
<th>Year</th>
<th>1990</th>
<th>2000</th>
<th>2005</th>
</tr>
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<tbody>
<tr>
<td>Global energy consumption in kg of oil equivalent per person per year:</td>
<td>1,668</td>
<td>1657</td>
<td>1778</td>
</tr>
</tbody>
</table>

Source: [http://earthtrends.wri.org/searchable_db/index.php?theme=6&variable_ID=351&action=select_countries\(^3\)]

The slight dip in 2000 comes mostly from a drop in per capita energy consumption in the developed countries (which are mostly in Europe) and in the middle income countries.
This graph shows the growth in per capita energy consumption from 1965 to 2005.

The predicted future demand picture is alarming, especially when we look at the sources of this energy. Note that most of it comes from non-renewable, greenhouse gas-producing fossil fuel sources.
Over 90% of carbon dioxide emissions come from fossil fuels, and this is not going to change as long as we continue to rely so heavily on these fuels to meet our energy needs.

The first thing to note is that in fact, it is not only that we are consuming all this energy (which is a staggering quantity, and enough to change conditions on our planet), but even more so where the vast bulk of it is coming from. As you can see from the above bar graph, in 2005, only about 15% came from non-carbon dioxide producing, non-fossil sources. All fossil sources produce masses of the greenhouse gas carbon dioxide, and as we are all now aware, excessive carbon dioxide in the atmosphere is a real problem for the ecosystem, as it upsets a very delicate thermal balance which is necessary for life as we currently experience it to exist on the planet, and is a major cause of global warming via the greenhouse effect (for more on this, see: http://www.crystalinks.com/greenhouseeffect.html or http://hyperphysics.phy-astr.gsu.edu/hbase/thermo/grnhse.html).

Unfortunately for us, and for the planet, there are some very powerful forces aligned against sensible, scientifically-based thinking about our usage of fossil fuels. The link between fossil fuels and global warming has been clearly established for some time now. However, the fossil-fuel industry has been doing its best to confuse and muddy the waters on this issue, and has succeeded in so doing for quite a while now. The best recent source of evidence for this comes from an article in the New York Times, in which Andrew C. Revkin blew the whistle on the industry. He revealed that ‘for more than a decade the Global Climate Coalition (GCC), a group representing industries with profits tied to fossil fuels, led an aggressive lobbying and public relations campaign against the idea that emissions of heat-trapping gases could lead to global warming’ by claiming that “The role of greenhouse gases in climate change is not well understood,” in a scientific “backgrounder” which the GCC provided to lawmakers and journalists through the early 1990s, adding furthermore that “scientists differ” on the issue, when in fact scientists employed in the fossil-fuel industry itself were warning their paymasters that ‘the science backing the role of greenhouse gases in global warming could not be refuted.’

By saying things like this, the GCC was able to sow enough doubt and confusion in the minds of lawmakers and public opinion in order to delay action. In fact, ‘environmentalists have long maintained that industry knew early on that the scientific evidence supported a human influence on rising temperatures, but that the evidence was ignored for the sake of companies’ fight against curbs on greenhouse gas emissions. Some environmentalists have compared the tactic to that once used by tobacco companies, which for decades...
Thus, using the same cynical tactics which were harnessed by the tobacco industry to create doubt about what they in fact long knew to be true, the GCC was able to defer serious policy decisions for the sake of profits. (http://www.nytimes.com/2009/04/24/science/earth/24deny.html) & http://www.monbiot.com/archives/2007/04/10/the-real-climate-censorship/)

Let us now turn briefly to the difference between renewable and non-renewable energy sources: substances like coal, petroleum, and natural gas are non-renewable sources of energy. In a peculiar sense, one could of course advance the perversely slanted argument that coal is renewable, since it is produced by geological processes which converted hundreds of millions of years’ worth of plant growth into a kind of combustible rock, but this really is a spurious argument, advanced only by those with vested interests in this industry, whilst they grasp at straws in order to deny the sources and realities of global warming. Since the stakes in this game are really high though, even pathetic and spurious argument like this may be trotted out in order to create more confusion amongst the public.

As for petroleum and natural gas, it is not at all clear where these resources came from. One theory is that they came from the action of geological forces working on the bodies of the countless mass of microorganisms which teemed in the prehistoric seas and oceans of the planet, died, sank to the bottom, and eventually were transformed into petroleum, but this idea is not accepted by everybody, and in any case is irrelevant to the body of our discussion here. The key point is that these are not, by any reasonable, sensible definition, renewable resources (since it takes scores of millions of years to transform dead plants into coal). Worse than that, not only are they not renewable, they are also highly polluting sources of energy.

Energy produced from nuclear fission has also occasionally been advanced as a potential energy source for the future. Technically speaking, it is not a renewable form of energy. However nuclear processes produce so much energy per kilogram of fuel, that for the foreseeable lifetime of our species on the planet, we are not going to run out of this resource.

The problem with fission energy is not that it is going to run out in the near future, nor that it has a massive carbon footprint; the problem with it is that it produces horribly hazardous, and highly toxic by-products in the process of making energy, and that both the handling and disposal of these by-products, despite claims to the contrary by the nuclear energy industry, is highly problematic. There are serious concerns for example that the Russians, as a way of cheaply unburdening themselves of nuclear wastes, dumped masses of these substances, possibly including entire spent nuclear cores into the sea, an action perhaps prompted by the weakening Russian economy which preceded the collapse of the Soviet Empire.

In fact, 'rumours of Soviet nuclear waste dumping have circulated for years, but the leadership of the former USSR long denied any such activity. Official recognition of the disposal came in March with the release of a report by a special commission headed by Alexey V. Yablokov, environmental adviser to Boris Yeltsin, president of the Russian Federation.

'The 46-member commission announced that, starting in 1965, the Soviets dumped 18 nuclear reactors – seven of which were loaded with nuclear fuel – into shallow water in the Kara Sea, which lies off the eastern coast of Nova Zemlya. The Soviet Navy also sank another two empty reactors in the Sea of Japan, off the Eastern Russian Coast.

'The commission also reported that the Soviet Union discharged major quantities of less radioactive forms of solid and liquid waste in the Barents and Kara seas and into the Pacific Ocean. That practice continues at low levels to this day, in violation of Russian law and international agreements, Vitali N. Lystsov revealed. Lystsov was a member of the Yablokov commission and is an expert on radiological safety at the Russian Environment Ministry in Moscow.

"We have to stop this process," Lystsov acknowledged. Yet the Russian Navy currently lacks the capacity to store and dispose of the nuclear waste generated by ships. "As I see the situation now, the production is going on and liquid radioactive waste is overfilling the tanks. It could be more dangerous [to store the waste] than to go to the sea and release low-activity waste," he said.'
‘Furthermore, real concern has been raised, since ‘Russian scientists described facilities inside Russia that have far greater quantities of nuclear waste stored in insecure reservoirs and a lake that could leak into rivers flowing into the Arctic.’

(http://www.thefreelibrary.com/Hazard+from+Soviet+nuclear+dumps+assessed-a013785312) (for more on this see also http://www.nti.org/db/nisprofs/russia/ naval/waste/wasteovr.htm).  

Aside from this rather horrifying set of revelations, the environmental threat posed by accidents at nuclear fission facilities is also very serious indeed. Aside from Chernobyl and Three-Mile Island, there has been a variety of other near nuclear-misses. For a partial list of nuclear accidents which have happened thus far, click on this link: http://problems.ollhoff.com/Case%20Studies/chernoybl.htm.  

Source: http://www.worldprocessor.com/53.htm

The radiation cloud from the Chernobyl explosion as at end April 1986.  
(For an account of the Chernobyl disaster, go to: http://problems.ollhoff.com/Case%20Studies/chernoybl.htm)
Given the foregoing discussion, it is now quite simple to state what the parameters ought to be for us to continue to meet our energy needs without destroying the planet: We have to find sources of energy which do not damage the environment, or produce difficult to deal with and dangerous by-products and which do not upset the robust yet delicate balance of the ecosystem as it currently exists. If in addition, these energy sources could also actually repair the damage we have already caused so far, particularly in terms of reabsorbing the millions of tonnes of carbon dioxide we have been releasing into the atmosphere, then so much the better.

To put this in perspective, since the industrial revolution began, we have dumped roughly a million, million tonnes of carbon dioxide into the atmosphere, and we are currently releasing close to 30 thousand million tonnes of it per year. A million, million tonnes, by way of reference, is about the mass of a moderately large mountain, or more or less the volume of Lake Ontario (the 10th largest freshwater lake in the world) but remember that a mountain is made of dense rock, and a lake of relatively dense water, whilst we are talking about a gas here.

What are the sources of all the carbon dioxide in the atmosphere? The consumption of terrestrial vegetation by animals and by microbes [respiration and rotting, in other words] emits about 220 gigatonnes [thousand million tonnes] of CO$_2$ every year, while respiration by vegetation emits another 220 Gt. These huge amounts are balanced by the 440 Gt of carbon dioxide absorbed from the atmosphere each year as land plants photosynthesise. Similarly, parts of the oceans release about 330 Gt of CO$_2$ per year, depending on temperature and rates of photosynthesis by phytoplankton, but other parts usually soak up just as much – and because of our fossil-fuel burning, are now soaking up slightly more. [Incidentally, if you are surprised at how these figures balance, you ought not to be. Remember that the life on the planet, until we started burning fossil-fuels, was essentially in a carbon dioxide balance, absorbing just as much as it emitted].

‘Human emissions of CO$_2$ are now estimated to be 26.4 Gt per year, up from 23.5 Gt in the 1990s. Disturbances to the land – through deforestation and agriculture, for instance – also contribute roughly 5.9 Gt per year. About 40% of the extra CO$_2$ entering the atmosphere due to human activity is being absorbed by natural carbon sinks, mostly by the oceans.
The rest is boosting levels of CO₂ in the atmosphere' (http://www.newscientist.com/article/dn11638-climate-myths-human-co2-emissions-are-too-tiny-to-matter.html[17]).

There are some spurious claims that volcanic activity emits more carbon dioxide than human activity, but this again is a claim advanced by vested interests, and is quite simply not true: we can trace the source of carbon dioxide in the atmosphere to some extent because the ratio of carbon isotopes in volcanic emissions is different from that of fossil fuels. Calculations indicate that volcanoes at present add about 0.3 Gt of carbon dioxide per year, around 1% of the contribution made by humans. (http://www.newscientist.com/article/dn11638-climate-myths-human-co2-emissions-are-too-tiny-to-matter.html[18] & http://hvo.wr.usgs.gov/volcanowatch/2007/07_02_15.html[19]). So, clearly, fossil fuels are not the answer, but we really and desperately do need to find one.

To a large extent it all boils down to a matter of choice: If we as a species make the kinds of choices which we are making, if we insist on reproducing our species at the current alarming rate, and we also continue to insist on consuming as we now do, then – setting aside the ill thought-through protestations of misguided ecologists who want it all to come to a screeching halt, but have no viable alternatives to propose – there is no choice but to look for real options. Of course, in so doing, some part of the ecology will have to suffer. The globe is a closed eco-system, with a finite surface area. There is no getting away from this: every choice we as a species make has consequences attendant upon it and short of advocating the total eradication of our species, we have imperatively to find viable solutions to the crises confronting us.

This point having been made, there actually are a number of possible new energy sources: some of them (like zero-point energy and cold fusion for example) are, at least for the moment, more in the realm of science fiction than reality; some of them (like wave energy, tidal turbines, and air-borne wind turbines for example) are well on their way to being realised, but still need substantial development; and some (like bio-fuels and hydrogen cells for example) are relatively mature, albeit that these still need cautious further development, since they still have many significant environmental consequences, which have to be dealt with properly.

Of all of these potential future energy sources, the ones which are most promising, at least for the moment, are probably bio-fuels, fuels which are derived from biological sources. In fact, there is a range of bio-fuels currently available:

- some come directly from oil-bearing plants like oil palms, soy and rape-seed plants, or jatropha bushes and the like, or even from animal fat, and produce oils which can be converted into bio-diesel (for more on bio-diesel see: http://auto.howstuffworks.com/fuel-efficiency/alternative-fuels/biodiesel.htm[20]);
- some come indirectly from sugars and starches and produce bio-ethanol (for more on bio-ethanol see: http://www.esru.strath.ac.uk/EndE/eb_sites/02-03/biofuels/what_bioethanol.htm[21]);
- some come from a process called biogas digestion, in which biological matter (often dung and other wastes) are fermented to produce methane (for more on biogas digestion see: http://www.wisegeek.com/what-is-a-biogas-digester.htm[22]); and
- some come from converting a portion of the entire plant into combustible substances, the so called second-generation fuels (Plants are mostly composed of cellulose and lignin. In the second generation process, they are separated, and the cellulose is converted into alcohol. For more on second-generation fuels see: http://www.enerkem.com/index.php?module=CMS&id=9[23]).

Of all of these various fuel types, the most immediately useable are bio-diesel, bio-ethanol, and bio-gas. Both of the former are liquids which, with very minimal engine modification, can be poured directly into the fuel tanks of existing internal combustion engines, and used to power them.

The big advantage of these bio-fuels is that they contribute far less additional carbon dioxide to the atmosphere than do fossil-fuels (it all depends on how they are produced in fact). It is all a terribly dirty business though, and there is a significant amount of realpolitik involved in all this. There is for example some evidence that bio-fuels made from soy actually
increase the total carbon dioxide emitted into the atmosphere, but that the European Union suppressed this report. (See: http://www.globalwarming.org/2010/04/23/hidd en-eu-analysis-biofuels-can-produce-more- co2-emissions-than-fossil-fuels/ [25]). The fossil-fuel industry is no stranger to realpolitik either, as I pointed out earlier in this paper.

Never-the-less, bio-fuels, especially those produced from big trees like oil palms, do hold some promise for reducing carbon dioxide in the atmosphere. Since oil palms are large plants, they capture a lot of carbon dioxide from the atmosphere and convert it, through photosynthesis, into oil-bearing fruits, or other plant parts. Burning fuels from such sources thus involves releasing carbon dioxide, most of which was captured from the atmosphere in the first place. In fact, depending on what is done with the rest of the plant once the commercially valuable part of it is harvested, there can actually be some significant portion of carbon dioxide which is taken out of the system for good: for example, if oil palms, and all their ancillary wastes (dead leaves, the left over parts from the harvest, and the old trees themselves once they are cut down in the process of replanting) are converted to biochar and buried, rather than burnt, a significant portion of the carbon dioxide removed from the atmosphere will stay in the ground and enrich it, rather than being put back into the atmosphere (Biochar is charcoal created by the pyrolysis of biomass. It differs from conventional charcoal only in that its primary use is for carbon sequestration and soil enrichment rather than for fuel. For more on biochar see http://www.biochar.info/ [25]). This process of removing carbon dioxide from the atmosphere, and entrapping it somehow, is called carbon capture and sequestration. The plants capture the carbon dioxide from the atmosphere, and depending on how the waste parts are treated, the carbon contained therein could also be sequestered (stored long-term).

In this regard, oil palms are very good indeed. They capture almost as much carbon dioxide as does a tropical rainforest. One hectare of oil palms absorbs about 64.5 tonnes of carbon dioxide per hectare per year, whilst a rainforest absorbs about 42.4 tonnes of carbon dioxide per hectare per year. This figure of 64.5 tonnes however does not take into account the carbon dioxide released if the oil produced is burnt, nor does it take into account how much carbon dioxide is released in the harvesting planting etc. processes involved in cultivating these plants. Furthermore, and importantly it also does not take into account how much carbon dioxide is released by the cutting and replanting of old trees, so the actual figure is somewhat lower. However, it does show some promising trends, provided all these factors are managed properly.

The biggest objection to the use of biogenic oils as fuels though is that aside from jatropha – which is toxic, and thus inedible – all the other oil-bearing crops are also sources of food, producing both edible oils (like palm oil or rape-seed oil), and proteins (like soy). Thus, there is some fear that the diversion of the edible oils derived from these crops into the manufacture of fuel will drive food prices up as demand for these oils for fuel use increases. This is a legitimate concern, but not one which is insurmountable.

The way to approach this problem is first of all to look at it the right way round. The main reasons why fossil fuels are currently actually so cheap is because hardly any portion of the full environmental, social, and health costs of using them have not been taken into account in their pricing. These costs thus far have been passed on (although not in fact for free) to the environment in the form of untaxed pollution, green-house gas emissions and the like, and onto society in the form of additional health care bills.

Looking at the environmental cost, it can essentially be broken down into 2 parts:

1. the extraction cost to the environment of getting these fuels out of the ground and eventually into our fuel-tanks, which involves an immense amount of environmental destruction and pollution, partly from spills, and partly from total environmental degradation, and the attendant social & health costs of all this; and

2. the usage cost of these fossil fuels in terms of how much damage is done to the environment, and hence to society & to the health of the people by the greenhouse and other noxious gasses emitted when these fuels are burnt.

Looking at the aforesaid costs, were these factors to be taken into account, fossil fuels would no longer be so cheap to use at all. At the moment, as pointed out earlier, it is not the consumers who are paying for this, but the planet, and individuals in the society. This is because we currently continue with these activities as if the planet has an infinite absorptive capacity for handling this abuse,
and as if these social costs are irrelevant to the issue. However this is not true. The result of this reckless, selfish and irresponsible consumption is the total ecological crisis which now confronts us. (for a more in depth discussion of the topic, look at the following articles:


http://www.cleanairnet.org/cai/1403/article-34285.html


The hidden cost of fossil fuels used in the US alone in 2005 is estimated to be around USD 120 to 200, 000,000,000. Given that fossil fuel bill for the US in that year was around 800,000,000,000, this implies an additional 25% at least ought to be imposed as environmental and health taxes on our fossil fuel usage. Of course, the revenues from these taxes must imperatively be channelled into the right corrective activities and not into the coffers of governments to dispose of as they please.

In addition to this, the cost of developing and putting into place the technology to capture and sequester all the additional carbon dioxide released by the burning of fossil fuels ought to be added to the cost of fossil fuels paid by the consumers. At the moment, at the very least, what this would mean is a calculation of the acreage of plants which need to be planted or sustained for each tonne of fossil fuels consumed, in order to reabsorb all the carbon dioxide emitted by the act of burning it.

Additionally, the environmental cost of land degradation from the extraction and the clean-up costs for the spills and other disasters attendant upon fossil fuel use ought also to be figured into the final price of fossil-fuels. Were all this done, the full price of fossil-fuels would likely be more than double what it is now. At the moment, needless-to-say, the oil, gas and coal producers, and by extension the consumers are not paying any of these costs, which is why they can sell, and we can buy and use these substances so cheaply.

Were we to start paying the actual full cost of using these fuels, there would be one enormous, and immediate effect: a lot more people would start walking & riding bicycles more, and driving & flying less. Also, a lot more money would be spent on research to increase fuel efficiency, and in finding eco-friendly alternatives to fossil fuels.

Returning to the question posed earlier, would diverting edible oils into fuel use necessarily raise food prices? The answer is not so straightforward as might seem prima facie. The fact is that between 1974 and 2000 for example, real (inflation-adjusted) food prices dropped by 75%

http://wapedia.mobi/en/Food_vs_fuel


Also, there is another factor confounding the issue: overproduction of certain foods, and the subvention of productive capacity in certain agricultural sectors. In some, mostly First World countries, farmers, who constitute a powerful political force, are actually either paid not to produce, or their production is purchased by the state and simply destroyed. (For more on this see for example: http://www.flex-news.food.com/console/PageViewer.aspx?page=4098

which outlines how Poland overproduced almost 300,000 tonnes of milk in 2005/2006, and had to pay a massive fine of €89 million for this. See also:

http://findarticles.com/p/articles/mi_m0HXI/is_2004_March_31/ai_n25086252 which reports on how Danish farmers are faced with the same issue of milk overproduction. Finally, see http://www.eubusiness.com/news-eu/farm-milk-price-meet.ifu which details the crisis in the European Union due to milk overproduction. Milk production by the way also involves carbon dioxide and methane production from the cows' digestive systems, and so is not such a trivial issue at all.)

What all this implies in summary is that a more rational redistribution of agricultural productive capacity could substantially attenuate the inflationary effects on food prices of diverting edible oils to fuel use.

Never-the-less, it is possible to argue that in a free market, such a diversion of comestible oils might tend to push prices up, since these oils are ultimately a commodity which is in limited supply. The problem with this argument is that the global economy, prevailing capitalist mythologies notwithstanding, no longer function as an unregulated economic system.
So, the effects of such diversions could easily be countered by imposing a tax on bio-fuels, and using this to subsidise and off-set the rise in the cost of food.

If this seems like additional taxes, that is correct, but given the situation of the ecology, it is clear that we have to pay appropriate prices for our consumption, if we are to remedy the current situation. In order to do all these things though, governments would really have to have the foresight and the political will to do all that is necessary to deal with this planet-threatening problem.

Part of this agricultural solution is the need to cultivate the most efficient crop in terms of oil yield per hectare, particularly given that arable land is in limited supply, and cannot all be diverted into agricultural production without provoking fresh ecological crises:

According to the FAO, the global land area without major soil fertility constraints is about 31.8 million square kilometres, and total potential arable land is about 41.4 million square kilometres. This is about 13% of the total land surface area of the planet. Of this arable land, about 40% is currently under the plough. This however does not mean that the remaining 60% can also be converted to agriculture and cultivated with impunity. A lot of it needs to remain untouched if we are not to accelerate the ecological crises we have already provoked. (http://ftp.fao.org/agl/agll/docs/wsr.pdf 35 & Staff (2008-07-24). "World" The World Factbook. Central Intelligence Agency. Retrieved 2008-08-05 36)

Thus, the amount of arable land available on the planet is limited. What this fact implies, particularly given the burgeoning human population is that we are rapidly being constrained in our choice of crops, and are being forced to cultivate the most high yielding ones (in terms of their yield per hectare). There is no choice in this matter. Thus, pseudo-moral concerns with using a food crop to provide fuel are quite simply nonsensical. As a result of the population choices we have made, we no longer have the luxury of a choice in this matter. We absolutely must use the land which is available to us wisely.

This is where oil palms come into their own. They have by far the highest oil yield per hectare of any oil-bearing crop bar none. One hectare of oil palms currently produces about 4 to 5 tonnes of oil per hectare per year. One hectare of jatropha yields a bit less than half this amount, and one hectare of soy, rape-seed, or maize yields about one eighth to one tenth of this output. (Oil World, 2008 37).

Put in practical terms, this means that one could drive a VW Polo 109,000 km on the oil yield of one hectare of oil palms, 45,500 km on the oil yield from one hectare of jatropha, and 8,000 km on the oil yield from one hectare of soy. These figures speak eloquently to the entire situation. Given the constraints already discussed supra, there is no choice but for us to cultivate the most yield efficient crop possible, which happens to be oil palms.

Needless to say, there are all sorts of environmental objections to this proposal, and there is a strong anti-oil palm lobby actively opposed to this idea, but until there are viable solutions, and until we control our population and energy consumption drastically, There is no other choice, and environmentalists who oppose the foregoing would in fact be well advised to focus their energies on the essential, underlying issues in fact, rather than engaging in 'scapegoatism'.
If there are any lingering doubts about the rate at which we are consuming resources, and the predicament into which we have placed our planet, and indeed our continued survival on the planet, the above two maps ought to take care of them. They represent the shift in our annual resource consumption between 1961, when we used 61% of the planet's resource capacity for the year, and 2006, when we used 144% of it. Perhaps we have become too used to budgetary deficit spending, and have decided to do this in ecological terms too. The ecology however is a far harsher mistress than the central bank, and it would behoove us to not forget this.

Milton Friedman, echoing Robert Heinlein (The moon is a harsh mistress, New York: Tom Doherty, 1966 39), once said ‘there is no such thing as a free lunch’. Well, for far too long now, we have been putting off paying the full fare for our fuel consumption. If we continue to shirk paying our dues, then the ecosystem will, and sooner rather than later, extract a payment from us, and this payment is unlikely to be on friendly terms. It is all quite simple really: we have made certain choices, and sooner or later, we must pay the full price for the choices we have made. The longer we put this debt repayment off, the bigger the final bill is going to be, with the ultimate price being the extinction of much of life on the planet; not really much of a choice if you think about it.

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