Section 7. Towards an adequate response to the converging crises

The current debate about climate change is dominated by responses which reflect dangerously reductionist thinking. Climate tends to be viewed in isolation from the rest of nature. The debate on climate change is reduced to a debate about numbers and about numerical 'targets'. 'Emission reduction scenarios' are being discussed in a 'pseudo-scientific' debate, which fails to take account of macro-interrelationships. This is heightened by our lack of knowledge of how earth systems will respond to even the current atmospheric and ecosystem changes, let alone those caused by geo-engineering interventions. This discourse reflects a widespread inability to think holistically, to see patterns and interconnectivity within the natural world. A reductionist discourse and understanding of the wider planetary crisis results in reductionist 'solutions' which exacerbate the very crisis they are meant to address.

Virtually all of the 'solutions' which are being forwarded in the mainstream debate involve merely ***reducing*** fossil fuel burning and/or the ***rate*** at which we destroy the biosphere, or moving to a 'fossil fuel free' ***growth*** economy. Some rely on patently dysfunctional market mechanisms, such as trading in 'ecosystem services'[178], or carbon trading. The fact that carbon trading has been a monumental failure, and in many cases resulted in a net increase in emissions appears not to dent the enthusiasm of those who promote it.

Other proposed 'solutions' include planetary geo-engineering, which generally involve sacrificing biodiversity and further disrupting poorly understood earth systems. These include changing the composition of the atmosphere, cloud cover or manipulating the biosphere in the hope that we can lower the planet's temperature. Such interventions, as we have seen, are dangerous and unproven. By threatening biodiversity and ecosystems – a primary, negative climate feedback – we increase the risk of not only triggering runaway warming but also destroying the planet's ability to recover from a mass extinction event. Such a runaway scenario could be described as 'beyond catastrophe'; without the powerful negative feedback provided by ecosystems (a situation which planet earth has never previously faced), oceans would warm releasing dissolved CO2 and eventually the ocean water itself would begin to vaporise. Water vapour, a powerful GHG represents a potent positive feedback which would raise temperatures inexorably. Because of the inhospitable nature of such a hot planet, and atmospheric similarities with Venus, this situation has been termed a 'Planet Venus' scenario and would result in a permanent end to life on earth.[179]

At this late stage, where the signs of earth systems failure are evident all around us, we need as a primary response to search for ways of living which cause no further harm to the planet. Alongside this we need to find ways of allowing ecosystems to heal and to increase in resilience.

The following three most urgent questions are central…and hardly ever raised in the mainstream climate discourse:

- How can humans actually live without further accelerating climate and ecological collapse?
- Insofar as is possible how can we undo some of the damage which humans have caused to give life on earth the greatest chance of survival?
- How can we bring about the necessary social and economic changes to make such a transition possible?

And underpinning all these questions; how can our understanding of earth systems inform both our thinking and responses?

In this final section, we will consider the first two of these crucial questions from a systemic viewpoint. Addressing the third question goes well beyond the scope of this report.

7.1 Sustainable energy?

80.5% of global energy consumption comes from fossil fuels. Much of the remainder (including industrial biomass and large-scale hydro power) is linked to ecosystem destruction and high greenhouse gas emissions, whilst 6.2% come from nuclear power, which is associated with destructive industrial mining and poses a serious threat to biodiversity. Ending fossil fuel burning as well as ecosystem destruction will thus require that we almost immediately dismantle most of our existing energy infrastructure and production.

Massive investment in renewable energy is widely promoted as being the key to addressing climate change. Yet much of the discourse about renewable energy reflects the reductionist thinking described above:

'Renewable energy' is used as a catch-all term which includes a wide range of energy sources, some of them highly environmentally destructive and/or linked to greater greenhouse gas emission than fossil fuels. Policies are being implemented to promote any type of non-fossil fuel/non-nuclear energy as 'renewable', in the name of 'climate change mitigation'. Even where a definition of 'sustainable renewable energy' is used, there tends to be little debate about the scale at which it could be 'sustainable'.

Amongst the most destructive types of energy which are promoted as 'renewable energy' forms are large hydro dams which can result in three and a half times more greenhouse gas emissions than gaining an equivalent amount of energy from burning oil,[180] and the burning of logged ancient rainforests from Tasmania as 'renewable energy' in Japan.[181]

In Germany, where legislation provides strong support for renewable energy, as much energy is sourced from burning palm oil as from solar power. Peat expert Professor Florian Siegert states

> *"We were able to prove that the making of these plantations and the burning of the rain forests and peat areas emits many thousands of times as much CO_2 as we then are able to prevent by using palm oil. And that is a disastrous balance for the climate."*[182]

Although palm oil burning accounts for only a small percentage of total non-fossil fuel and non-nuclear energy produced in Germany, the damage it causes is of such magnitude that it more than outweighs all the benefits from the country's sustainable renewables such as wind and solar power.

Replacement of fossil fuels by itself clearly cannot mitigate climate change unless fossil fuels are replaced with energy sources which protect ecosystems and species, soil, water and air. A new definition of "sustainable renewable energy" will thus be essential and must underlie all policies to phase out fossil fuel burning and nuclear power.

Such a definition would have to rule out any use of industrial agriculture and tree monocultures for energy in order to prevent further stress on biodiversity, ecosystems, soil, freshwater and climate from this source.

A definition of sustainable renewable energy would also ***rule out*** certain other forms and applications of so-called renewable energy, including all large hydro-dams.

Other forms of renewable energy, such as ***solar, wind or wave power, offer significant potential for sustainable energy but their impact will depend on how they are developed, on what scale and for whose benefit.***

Any type of large-scale renewable energy project has the potential to pose a threat to biodiversity, ecosystems and climate, as well as to communities, depending on the particular circumstances. Large-scale wind farms, for example, are being built at the expense of biodiverse peatlands in Galicia in Spain, with carbon dioxide emissions from peat degradation potentially outweighing any climate 'benefits' from using less fossil fuel. In Maharashtra in India, forests which were home to a rich variety of wildlife have been cut down and villagers displaced in order to establish wind farms.[183]

It is impossible to imagine that today's consumption of fossil fuels and the use of other destructive forms of energy could be rapidly replaced with sustainable renewable energy, given the speed at which fossil fuel burning and ecosystem destruction need to be ended if we are to prevent ecosystem collapse or crossing further climate tipping points, and given that the scale of 'renewable energy' required to replace fossil fuels would almost certainly automatically render it unsustainable and destructive.

One of the most ambitious proposals for phasing out fossil fuel and nuclear energy is the 'Zero Carbon Britain' report[184] which suggests that the UK (and thus other countries) could meet its energy needs from renewable energy within twenty years, provided that overall energy use was reduced by half. Whilst this report contains many positive ideas about phasing out fossil fuel use, there are also some serious problems with relying on its findings.

As we have seen, even a power down over twenty years, however ambitious, may not be fast enough given that we are already beyond safe levels of greenhouse gas concentrations in the atmosphere, although there are no reasons why the time-frame should not be reduced. But more importantly, the report advocates a high reliance on large-scale industrial biomass, with 4 million hectares of biomass plantations, including willow and miscanthus monocultures, whilst at the same time advocating a shift to non-fossil fuel organic agriculture. The report states: "Although organic bio-energy production is a novel idea, there is no reason why it should not work, since the energy crops act as 'break crops' to maintain the health of soils in an organic rotation". The problem, however, is that the authors assume that the high monoculture per hectare yields achieved with high agrichemical inputs can be maintained without them. High-yield monocultures, which, as we have seen, are inherently unsustainable, depend on high energy and agro-chemical inputs. Without such inputs, soils would be depleted much faster and yields would fall, possibly collapsing at some stage.

The assumptions made by the authors of 'Zero Carbon Britain' contradict the results of a study by the Elm Farm Research Centre which suggests that a UK-wide transition to completely organic farming would reduce cereal, oilseed rape and sugar beet yields fall by 30-60%. They are also contrary to predictions by the Soil Association that suggest such a transition would reduce yields by 30% - findings which cannot be extrapolated to other biomes and climate zones.[185] Such yield reductions would by themselves, be incompatible with food self-sufficiency in the UK. Indeed, a transition to mixed, biodiverse organic farming is essential for maintaining the long-term fertility of our soil and thus for making longer-term food self-sufficiency possible. However, yield reductions would indeed be incompatible food self-sufficiency if large areas of farmland were diverted to bioenergy production.

Nor do the authors appear to have considered the seriousness of the current biodiversity crisis. Furthermore, no account has been taken of farmland losses due to

the now unavoidable warming and associated freshwater constraints. The report therefore does not represent evidence that even 50% energy reductions in a high-energy society, together with massive investment in sustainable renewable energy over twenty years will be sufficient to end fossil fuel burning as well as ecosystem and biodiversity destruction. Even deeper cuts in energy use and more significant economic and social change will be required.

Any reduction in energy use can be expected to end economic growth, since there is overwhelming evidence that economic growth is directly linked to growth in energy use. Studies by Robert Ayres and by Reiner Kummel show that growth in energy efficiency, labour and capital are important factors in economic growth, and that the biggest factor by far is ongoing growth in energy use.[186] Growth in GDP and growth in energy use have been consistently coupled. There are no reasons to believe that increased energy efficiency could break this link. Energy efficiency has been increasing not at the same rate as economic growth, but it has nonetheless consistently accompanied it. Efficiency rates have been improving at a rate of around 1% a year since the 19th century, whilst fossil fuel burning has increased dramatically. On the whole, greater energy efficiency is correlated with greater overall energy use, as discussed by George Monbiot in his 2006 book 'Heat – How we can stop the planet burning'. For example, central heating has greatly improved energy efficiency but it has led to more people heating more rooms to a higher temperature. There are no indications that, in future, policies aimed at improving energy efficiency will by themselves curb overall energy use.

Given the coupling between completely unsustainable growth in energy use and economic growth and the limitations of relying on energy efficiency, it seems clear that economic growth is incompatible with our survival. ***Drastic reductions in global energy and resource use are needed and this will demand major social and economic change and a reversal of the current high-energy industrial growth model.***

7.2 Energy and climate justice

Fast growing and excessive energy use has been coupled with a highly unequal distribution of energy use, with around 2 billion people having little or no access to energy other than biomass, which is often burnt in stoves within dwellings, endangering health and lives. Many people are also forced to rely on unsustainable biomass burning with additional impacts on environment and climate. Communities in some parts of the world have found ways of sustainably using biomass and integrating this low-level use into biodiverse food-production in order to meet their own energy needs. Local community knowledge of truly low-carbon living without harming biodiversity and ecosystems will be essential for our survival, but biomass use in this context is invariably small-scale.

Meeting the basic human need for energy (in both North and South) whilst drastically curbing overall energy use is clearly essential if we want to have any hope of stopping fossil fuel burning as well as ecosystem destruction. However, relying on high energy prices as a means of curbing energy growth will result in ever more extreme fuel poverty amongst poorer people. This has already been happening since 2005 due to high oil and gas prices. The results are deepening poverty as well as a rush to burn more biomass. In the US, high fuel prices are leading to a major increase in wood burning, both in domestic households and at a far greater scale by energy companies, at a time when the US consumption of wood, particularly for paper, is already highly unsustainable and reliant on imports, on industrial tree plantations and on the destruction and degradation of US natural forests. In Lebanon, logging for fuel wood is reported to have risen sharply in line with fuel price rises as people see no other

option for keeping their homes warm during cold winters.[187] Clearly, simply trying to substitute current energy and infrastructure with new forms of energy will do nothing to address the underlying resource exploitation, overconsumption and inequality.

Many civil society organisations, particularly in the global South, advocate ***energy sovereignty*** as an alternative to the highly unequal distribution of energy use as well as to climate change. Friends of the Earth International defines energy sovereignty as

> *"the right for all peoples to have access to sufficient energy within ecological limits from appropriate sustainable sources for a dignified life. Energy sovereignty is the right of peoples to decide over their sustainable consumption patterns that will lead them towards sustainable societies".*[188]

This definition is particularly helpful because all experiences of sustainable, low energy and low carbon living are specific to people's local environment, ecosystems, soil, climate and to their culture since, as we have seen in Section 6, cultural diversity is linked to maintaining biodiversity. Plans for large-scale bioenergy in the South, to meet primarily the needs of the North, sit in diametric opposition to this. They leave us with the tragic irony that those most at risk from the impacts of climate change are already losing their livelihoods and natural environments as a result of false energy and climate change 'solutions'.

As we have discussed, ecological limits are becoming ever tighter as a result of climate change, ecosystem destruction and biodiversity collapse. The fundamental question is whether living within such limits is compatible not just with economic growth (which it clearly is not) but also within any industrial society. Historically and at present, all sustainable, low-carbon and low-energy societies have been non-industrial societies or communities, although, on the other hand, it must be stressed that not all non-industrial societies have lived in sustainable ways.

It is difficult to see how any social change that does not include ***rapid de-industrialisation*** could allow for the rapid phasing out of destructive practices including fossil fuel burning, industrial agriculture, mining, over-abstraction of water. We are too close to global ecological collapse to suggest that any further industrial exploitation of resources and of the biosphere could possibly be considered 'safe'.

7.3 Ecosystem protection and demand reduction

It is not just the global demand for energy that is highly unsustainable and destructive of ecosystems, but also many other forms of resource use, including the global use of wood products, agricultural products and in particular meat and dairy, as well as mining. Just as with energy, consumption levels are growing fast and are also highly unequally distributed. Paper and pulp production, for example, has increased six-fold since the 1960s, resulting in large-scale deforestation and vast areas of destructive tree plantations, whilst 10% of the world's population consumes over 50% of the world's paper. Unsustainable levels of meat and dairy consumption are likewise concentrated amongst a global elite whilst per capita food consumption in large parts of the South is declining.[189] ***Overconsumption, resource exploitation and inequality go hand in hand and must be addressed simultaneously*** in any adequate response to the converging crises. It is difficult to see how this can happen fast enough without rapid de-industrialisation.

7.4 Agriculture and food sovereignty

As Via Campesina state:

> *"Industrialized countries and the industrialization of agriculture are the biggest sources of global warming gases, but it is farmers and rural*

> *communities - and especially small farmers and rural communities in developing countries - that are among the first to suffer from climate change... Moreover, plants, animal species and marine life are threatened or disappearing at an unprecedented pace due to the combined effects of warming and industrial exploitation. Life at large is endangered by the decreasing availability of fresh water resources."*[190]

Historically and today, sustainable agriculture has been represented by ***small-scale biodiverse peasant agriculture*** with low-energy and high labour inputs, adapted to local circumstances. Via Campesina and many other organisations have developed the concept of ***food sovereignty*** based on sustainable peasant farming, which they define as: "the right of peoples to healthy and culturally-appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems."

This will require not simply different farming methods but major social and economic changes, including land-reform, allowing for land currently used for monocultures, much of it in the South for export to the North to be used to food production instead, the dismantling of agribusiness, and an end of overconsumption of energy, wood and agricultural products by a global elite, which requires large areas of land to be used for plantations and not for food.

7.5 Increasing Resilience: alternatives to Geoengineering

So far we have discussed the need for rapid demand reductions, de-industrialisation, food sovereignty and energy sovereignty based on truly sustainable renewable energy. However, as we have seen, current levels of greenhouse concentrations in the atmosphere and the level of ecosystem destruction and degradation which humans have already caused are anything but safe and carry a high risk of a mass extinction which, in the worst case, could end in the loss of all life. Yet, as discussed above, geo-engineering carries a high risk of speeding up rather than preventing ecological collapse and thus climate collapse. What then are the hopes for preventing the worst possible outcome and allowing conditions for life to persist?

We have warned of the dangers of trying to speed up the carbon cycle, through large bioenergy plantations and/or through trying to impose global industrial models for soil conservation. This, however, does not mean that that soil cannot be regenerated and that a lot of the soil carbon losses caused by industrial and over-intensive farming cannot be reversed.

7.6 Reversing climate damage from industrial agriculture and soil depletion:

Small farmers, indigenous peoples and other rural communities have developed many different strategies for soil conservation and for improving soil fertility which could well help to reduce carbon dioxide in the atmosphere to some extent if locally adapted sustainable farming methods were to replace industrial monocultures. For example in the Deccan Plateau in India, farmers, have long grown a great variety of crops through rain-fed agriculture in a semi-arid climate, relying largely on women's knowledge of different soil types and crop varieties. Government policies however have promoted irrigated intensive rice production in other parts of the region and the distribution of cheap excess rice, which has caused water-logging and salination on irrigated lands and desertification as dry-land agriculture was increasingly abandoned. There are encouraging examples of farmers being able to revert back to traditional farming methods and reversing the process of desertification as a result.[191]

The US campaign group Food First describes soil and water conservation strategies as well as community-led reforestation in Tlaxcala, Mexico: "In the 1970s, the hillsides around Vicente Guerrero looked like a moonscape because they were so badly eroded. Chemical inputs had wasted the soil." Intercropping, hedgerows, reforestation and careful soil management based on local knowledge has returned soil fertility (and presumably soil carbon linked to humus content) and allows for highly diverse agricultural production for the benefit of farming communities today, whilst native vegetation and biodiversity have recovered at the same time.[192]

These examples are not climate change mitigation strategies which can be quantified in terms of 'greenhouse gas reduction' or 'carbon sequestration' targets, or which can be standardised as global 'solutions'. They are adapted to specific local conditions and cultures and led by communities, yet they clearly increase the resilience of ecosystems. High biodiversity, healthy soils and their ability to regulate local climate and contribute to the global climate, including by sequestering carbon are important indicators. Poignantly they strengthen the resilience of communities to climate change at the same time.

7.7 Resilient Ecosystems for Stabilising the Climate

Throughout the planet's history, ecosystems have played a vital role in stabilising the climate and the planet's life support systems even at times of severe climate change. This is no guarantee that they will be able to stabilise the climate in future, given that the rate of warming may be unprecedented in the planet's history and given the damage from ecosystem destruction, pollution and species losses at present. However, it is clear that ecosystem resilience will be key to the survival of all life. The most recent severe warming episode took place 55 million years ago (though far more slowly than the present). The precise events that led to the high levels of warming and subsequently to climate stabilisation at higher temperature levels are not known. The release of methane from clathrate stores (see Section 1) and/or widespread peat and coal-seam fires have been proposed as potential causes. Long-term chemical processes including rock weathering can explain the eventual cooling of the planet, but not the fact that climate change did not turn into runaway global warming. Nobody knows how the climate stabilised itself without the warming spiralling out of control, but there are good reasons to think that ecosystems, and in particular the spread of fern swamps into the Arctic provided an important 'negative feedback'.

Deciphering the soil and fossil data associated with this extinction event, it is known that large forest cover across the northern hemisphere survived and that species migrated polewards and ultimately vast fern swamps colonised the Arctic.

Geological evidence suggests that floating Azolla fern swamps drew down very large amounts of carbon dioxide 5-6 million years after the extreme warming event, possibly triggering large-scale global cooling.[193]

However, it is very possible that, during the global warming episode, fern swamps, as well as forests and other ecosystems sequestered enough carbon dioxide to prevent even more intense, and possibly runaway warming.

Similarly the repeated oscillation between glacial and interglacial periods spanning at least the last 1.8 million years may well have depended on key ecosystems – including South East Asia's tropical peat forests – to draw down the excess atmospheric CO_2 and prevent a runaway warming scenario. At the end of the last ice age for example, following the onset of warming, climate stabilized with just 90 ppm more atmospheric CO_2. ***Evidence suggests that SE Asia's peat forests may have functioned like a 'thermostat', sequestering the excess carbon in the form of peat, thus contributing to climate stabilisation***.[194] Ironically these are the very

peatlands which are currently being rapidly destroyed for oil palm and acacia plantations, removing one of the planet's key negative climate feedbacks.

Ecosystem protection combined with widespread restoration thus offers our best hope for climate stabilisation in the absence of further fossil fuel burning. Both protection and restoration depend on addressing the root causes of destruction, including overconsumption and inequitable resource transfer from South to North. There is very clear evidence that ***legally establishing the territorial and customary rights of indigenous peoples and other forest communities is a critical ingredient in protecting forests.*** Estebancio Castro Diaz writes in a Global Forest Coalition discussion paper:

> *"Most of these rainforests are the traditional land and territories of Indigenous Peoples, which they either reside in or have previously used or occupied. Indigenous Peoples have nurtured and maintained their lands and territories which has in turn protected large areas in which these resources are located."*[195]

Detailed discussions about effective policies for ending deforestation can be found elsewhere and would go beyond the scope of this report.[196] Similar principles apply to the protection of other ecosystems such as grasslands and wetlands.

There are a large number of successful or promising examples of ecosystem restoration, including true reforestation with diverse native species and forest regrowth, peatland and wetland restoration, or grassland restoration.

7.8 Examples of ecosystem restoration

1) Peatland restoration - Scotland

In Scotland, the RSPB is involved is purchasing conifer monocultures planted on peat bogs. The tree plantations are being cut down and drainage channels blocked to prevent further peat oxidation, thereby locking up the remaining carbon. In time, the return of native and often endangered birds, insects and plants leads to the re-establishment of the peatland ecosystem potentially with a renewed capacity to sequester carbon. There is enormous potential for similar peatland restoration in the UK and across the globe – essential if carbon dioxide emissions are to be stopped.

Blanket peat bog in northern Scotland, similar to peat bogs now being restored by the RSPB.[197]

2) Removal of River Dams

According to a report by the International Rivers Network and Friends of the Earth Japan,[198] 60% of the world's rivers have been fragmented by dams and diversions and one per cent of the world's land surface has been submerged by dams. "Cumulatively the world's large dams have replumbed rivers in a massive experiment that has left the planet's freshwaters in far worse shape than any other major ecosystem type, including tropical rainforests."[199] Dams and diversions are the main cause in the extinction or threatened extinction of one third of freshwater fish species, as well as driving shellfish, amphibians, plants and birds towards extinction. Dams accelerate global warming due to methane emitted from flooded vegetation and the displacement of up to 80 million people worldwide. However, the true climate impact is far greater than that from methane emissions alone: Rivers play a major role in the global carbon cycle, moving carbon which has been taken up by forests and other ecosystems to the ocean, where some of it is sequestered long-term. They also carry nutrients which fertilise plankton in the oceans which in turn absorb large quantities of CO_2.[200]

Experience with dam removal, mostly in North America, shows that dam removal is a highly effective form of ecosystem restoration. So far, around 500 out of at least 17,500 dams in the US have been removed. For example, the Sandy River in Oregon was dammed for nearly a century until the removal of the Marmot Dam in 2007. According to media reports; "Some predicted the river would need two to five years to carry off half the sediment pile. It did it in months. Federally protected Coho salmon were swimming upriver to spawn the day after the dam crumbled".[201] In Alabama, the Cahaba River, one of the North America's most biodiverse rivers, had been dammed by a coal company in 1960, leading to the loss of almost all mussels and snails upstream of the dam and blocking migratory fish. Original species have significantly recovered since the dam was removed in 2004.[202]

3) Community forestry – Gambia

Community management and control of forests has been shown to be the key factor in forest protection and restoration. There have been positive reports about the Gambian government's Community Forestry policy which seeks to encourage and assist rural communities in the control and sustainable management of forests. Bee-keeping has helped to raise rural income and to prevent forest fires, since farmers are given a stake in protecting forests.[203] 70% of Gambia's forests were destroyed and 78% of the remaining forest is severely degraded, yet since the new policy was introduced there have been reports of natural tropical forest beginning to expand again.[204] There are a large number of examples of successful community forest management and restoration.[205]

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178 See "Life as Commerce", Global Forest Coalition, October 2008, http://vh-gfc.dpi.nl/img/userpics/File/publications/LIFE-AS-COMMERCE2008.pdf

179 (Bundy, Wayne M. Out of Chaos: Evolution from the Big Bang to Human Intellect).

180 "Hydroelectric power's dirty secret revealed", Duncan Graham Rove, New Scientist, 24th February 2005, http://www.newscientist.com/article.ns?id=dn7046

181 "Gunns to export wood for Japanese furnaces", Business Spectator,2nd September 2008, http://forests.org/shared/reader/welcome.aspx?linkid=105751&keybold=wood%20burning%20energy

182 http://de.indymedia.org/2007/03/170912.shtml

183 Pictures from the Carbon "Offset" Market: Part 2, Larry Lohmann, Corner House, www.thecornerhouse.org.uk/pdf/document/OffsetsMarket2.pdf

184 www.zerocarbonbritain.com/content/view/27/48/

185 "10 reasons why organic can feed the world", Ed Hamer and Mark Anslow, The Ecologist, 5th June 2008, www.ukwatch.net/article/10_reasons_why_organic_can_feed_the_world

186 "The last oil shock", David Strahan, 2007

187 http://cgi.wn.com/?action=display&article=77549459&template=worldnews/paidnews.txt&index=recent.

188 www.foei.org/en/campaigns/climate/energy.

189 see: "The food emergency and food myths", Vandana Shiva, Seedling, July 2008, Grain, http://www.grain.org/seedling/?id=552.

190 http://viacampesina.org/main_en/index.php?option=com_content&task=view&id=457&Itemid=37

191 "Food security for Dryland Communities", P.V. Sateesh, Deccan Development Society, www.ddsindia.com/www/default.asp

192 "Along the Immigrant Trail III: Mexico City and Tlaxcala", Food First, www.foodfirst.org/node/1752

193 www.nac9.nl/abstract_list.php?subject_area=IODP%2FMarine+Geosciences&print

194 "A record of Late Pleistocene and Holocene carbon accumulation and climate change form an equatorial peat bog (Kalimantan, Indonesia): implications for past, present and future carbon dynamics", Susan Page et al, Journal of Quarternary Science, Vol 19, Issue 2, 27th September 2004

195 www.globalforestcoalition.org/img/userpics/File/publications/IndigenousPeoplesandClimateChange.pdf

196 eg http://www.globalforestcoalition.org/img/userpics/File/publications/PotentialPolicyApproachesandPositiveIncentivestoReduceemissions.pdf and www.wrm.org.uy/publications/briefings/underlying.html

197 http://www.wildcaithness.org/peatands.jpg.

198 Dammed Rivers, Damned Lies, 2003, http://internationalrivers.org/files/wwf3.briefingkit_0.pdf

199 http://internationalrivers.org/en/node/287

200 see for example http://internationalrivers.org/en/latin-america/amazon-basin/amazon-powers-major-carbon-sink

201 http://seattlepi.nwsource.com/local/373350_sandyriver04.html?source=mypi

202 www.al.com/news/birminghamnews/index.ssf?/base/news/1214295332270520.xml&coll=2

203 "Gambia: Where the rural population is at the centre of forest management", World Rainforest Movement Bulletin December 2006, www.wrm.org.uy.

204 http://news.mongabay.com/2008/0612-hance_chazdon.html.

205 E.g. "Community based forest governance", Friends of the Earth, www.foei.org/en/publications/pdfs/community-based-forest-governance