Can large-scale biofuels be sustainable? February 2008

Almuth Ernsting assesses the current social and environmental impacts of large-scale biofuel production and questions whether 'sustainability standards' will be enough to prevent serious problems.

Few people now doubt that some of the biofuels used in Europe are produced at the expense of rainforests and other biodiverse ecosystems and that those should not be promoted as 'green energy'. Nobody would choose to buy biodiesel made from Colombian palm oil grown on illegal plantations owned by companies linked to paramilitaries which have killed, evicted and tortured local people to grab their land. Governments and international organisations are therefore keen to develop 'sustainability standards'. In Europe, various countries including the UK are planning 'reporting requirements' on environmental and social sustainability. The European Commission has proposed environmental standards, though they do not include human rights and food security. Can sustainability guarantees work and ensure that biofuels will contribute to climate change mitigation and socially just development?

Scepticism has come from many grassroots organisations, non-governmental organisations (NGOs) and even a report published by the Organisation for Economic Co-operation and Development (OECD). Sustainability guarantees have to overcome three major hurdles if are to truly protect the environment and communities. Firstly, policies need to be shaped by the people whose livelihoods will be directly affected by biofuel production. Secondly, a policy instrument needs to be found which can stop deforestation, biodiversity losses, evictions of local communities, human rights abuses, malnutrition and starvation due to biofuels. And finally, the scale and type of biofuel production chosen must be sustainable in view of the planet's finite resources.

How high are the stakes?

This year's Amazon fires have been amongst the worst on record – 54% up from 2006. The dramatic increase in fires has been restricted to three soya-producing states[1]. A study by NASA scientists published last year showed a clear correlation between the price of soya and the rate of Amazon destruction[2]. Soya prices have risen steeply this year and there is strong evidence that the price rise is driven by the booming demand for biofuels. Dr Nepstad, headof the Woods Hole Research Institute's Amazon programme, has warned that droughts, coupled with high deforestation could within two decades lead to a 'nightmare scenario' where the rainfall cycle on which the forest depends collapses[3]. This would trigger widespread vegetation die-back. Evapo-transpiration from the Amazon forest plays an essential role in maintaining rainfall patterns across the Amazon basin and probably over a much wider region, from Argentina to the US Midwest. Once tree cover has been reduced beyond a critical threshold, rainfall might no longer be sufficient to sustain the Amazon forest and much of Latin American and US agriculture. The Amazon forest alone stores up to 120 billion tonnes of carbon in vegetation and soil – enough to push global temperatures well above 2ºC warming, regardless of any possible cuts to fossil fuel emissions. Changed rainfall patterns caused by a possible Amazon die-back could push the world into instant food shortages. By expanding biofuels without true 'sustainability guarantees', we are literally playing with fire.

Other possible 'negative impacts' include starvation and tens of millions of refugees: Jean Ziegler, Special Rapporteur to the UN on the Right to Food, has warned that "here is a great danger for the right to food by the development of biofuels… it (the price) will be paid perhaps by hundreds of thousands of people who will die from hunger."[4] The Chair of the UN Permanent Forum on Indigenous Issues, Victoria Tauli-Corpuz, meantime, warned that 60 million indigenous people worldwide could become biofuel refugees[5].

Those are some of the reasons why over 150 organisations from North and South have signed a "Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures"[6]. A moratorium means nothing other than applying the precautionary principle, to which the EU has committed itself. During the most recent meeting of the Convention on Biological Diversity, several governments demanded that the precautionary principle should be applied to biofuels, and most recently, Jean Ziegler has called for a five-year moratorium in front of the UN General Assembly.

Who decides what is sustainable?

Communities in the global South are most directly affected by biofuel production, because the highest-yield biofuel feedstocks grow in the tropics and most of the future biofuel expansion is therefore planned for Asia, Latin America and Africa. Any policy regarding 'sustainable biofuel production' will have little legitimacy unless it is shaped by the people whose livelihoods will be directly affected. European member states, the EU and international agencies have been developing their own proposals with scant regard for the views of communities in the global South. Hundreds of southern NGOs have signed declarations demanding an end to EU biofuel targets and objecting to us trying to solve our own energy problems at the expense food production, land rights and environment in the South[7]. Those voices have been consistently ignored by policy makers.

Certification – a wish-list or a meaningful policy instrument?

Earlier this year, the United Nations published their report, *Sustainable Bioenergy: A Framework for Decision Makers*[8]. The report warns: "Unless new policies are enacted to protect threatened lands, secure socially acceptable land use, and steer bioenergy development in a sustainable direction overall, the environmental and social damage could in some cases outweigh the benefits" and calls for "internationally agreed standards and other certification models". The report list the negative impacts which much be avoided, but makes no concrete policy recommendations. Most reports on 'sustainability standards' amount to similar wish-lists but offer no blueprint for avoiding negative and even catastrophic impacts.

There is no precedent for mandatory certification, and experience with voluntary certification schemes gives no grounds for optimism. For example, the Forest Stewardship Council (FSC) certification has been in operation since 1993 yet the International Tropical Timber Association reported in 2006 that less than 5% of tropical forests were sustainably managed, a definition in which they included the timber industry in Malaysia, a country where the rate of deforestation increased by 85% between 2000 and 2005. A recent report[9] from the OECD and the UN Food and Agriculture Organisation warns: "Sustainability criteria are meaningless unless an adequate policy instrument is developed… Though theoretically possible, reliance on certification schemes to ensure the sustainable production of biofuels is not a realistic safeguard". Accountability and verification of the entire production chain have caused serious problems for the FSC.

And there are two even greater hurdles. Firstly, certification would need to be compatible with World Trade Organisation (WTO) rules. The WTO is biased against government 'interference' in international trade and there is no sign that the EU wants to risk WTO adjudication over biofuels. Secondly, certification would need to address the indirect impacts of biofuel production. In the Amazon, for example, soya is the main driver for deforestation. Soya prices are rising to a large part because US farmers have switched from soya to corn for ethanol. Rainforest is being burnt and cleared for soya plantation, but even more is destroyed as a result of soya displacing other types of agricultural activities, including cattle ranching, elsewhere in Brazil and forcing those into the Amazon basin. Sugar ethanol expansion is having a similar effect. Some sugar cane is being grown inside the legal Amazon, but far more important is the displacement of agriculture from northern

Brazil into the rainforest[10]. Micro life-cycle studies for corn ethanol will not reveal the impact on Amazon deforestation, nor will greenhouse-gas standards show whether sugar cane grown in Sao Paulo drives cattle-ranchers into the Amazon. Methodologies to assess the 'greenhouse gas balance' of different biofuels will be highly unreliable unless they take into account those indirect impacts.

Are some biofuel crops or technologies inherently sustainable?

Some biofuels made from waste are undoubtedly sustainable, although they can only meet a small part of our energy demand. Using waste vegetable oil for transport fuel and sewage and manure for biogas will reduce methane emissions and should be promoted.

There is little evidence that any biofuel crops are inherently sustainable. Rainforest destruction and displacement of communities and food production are due to monoculture expansion, not to the wrong choice of crops. Sugar cane, as mentioned above, has the highest energy yields of all ethanol feedstocks, but is one of the drivers of deforestation in Brazil. It is also linked to extremely poor working conditions, severe health problems amongst plantation workers, thousands of documented deaths from over-working, and instances of slavery.

Jatropha is widely promoted as a crop which will grow on marginal lands and will not compete with food. The Indian government seek to convert 13.5 million hectares of 'wasteland' to jatropha by 2012. Local NGOs have warned that this definition includes common lands and forests on which farmers, pastoralists and indigenous peoples depend for their livelihoods. Already there are reports of companies pressurising farmers into signing over their land[11].

Second generation solid biomass-to-liquid biofuels, such as cellulosic ethanol, are not yet commercially available but are widely claimed to be more sustainable. So far, it takes more energy to turn solid biomass into biodiesel or ethanol than is gained from it. Companies are heavily investing in genetic engineering and synthetic biology to try and overcome plant self-defence mechanisms which have been developed for probably one billion years. Possible safety hazards of GM microbes, fungi and GE trees being developed for cellulosic ethanol have not been assessed. If a technological breakthrough turned cellulosic ethanol into an energy source, this would almost certainly lead to a massive expansion in monoculture tree plantations, such as eucalyptus. Already, tree plantations are a major cause for ecosystem destruction, biodiversity losses, falling water tables, displacement of local people and soil erosion in many countries, particularly in the global South. We certainly cannot assume that cellulosic ethanol will be inherently sustainable.

How much biofuel is sustainable?

One question rarely asked by governments is how much biofuel could in theory be produced sustainably. Already, human use of freshwater, soil erosion rates, climate and biodiversity impacts of nitrate fertilisers, and land-use for agricultural monocultures are by all standards unsustainable. 'Optimistic' bioenergy forecasts are based on the presumption that agricultural production will continue to increase and that we can produce more crops without using more land. This optimism is not based on facts. 2007 will be the third consecutive year with world grain production below 2004 peak levels. Climate change, groundwater depletion and soil depletion are already reducing yields and harvests in many parts of the world. One recent study finds that humans already use 23.8% of the net primary productivity of the terrestrial biosphere, causing severe ecosystem degradation and bio-geochemical changes, and that large-scale biomass expansion would greatly increase those pressures[12]. There is little question that local communities in low-energy societies can benefit from growing crops for biofuels sustainably as part of mixed farming systems and on a small scale. It really is extremely doubtful, though, that biofuels can be sustainably ramped up to replace a substantial portion of today's fossil fuel use on a warming planet which is rapidly losing cropland to

desertification, and which is already seeing its ecosystems destroyed by agriculture at an unprecedented rate.

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