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'Biofuel controversies in a globalising world'

>> *See also his powerpoint presentation!*

(SLIDE 1)

Today, the world indeed faces huge, complex problems that threaten sustainable development. If scientists are to make contributions to a more sustainable world, they need to understand the complexity of contemporary social and natural systems. It is the combination of natural science and social science knowledge that is essential for gaining a better understanding of today's challenges.

In searching for sustainable solutions for current energy-, environmental- and developmental problems biofuels are hotly debated. The rapid increase in biofuels production and consumption is turning into a global controversy, especially – but not only – where it interferes with food and the environment. Can biofuels make a contribution to sustainable development? I would like to guide you through the complexities of biofuels, and of biofuels governance, in order to answer this question.

1. Biofuels: trends and controversies

(SLIDE 2) Biofuels are fuels that are directly derived from biomass, either as liquid or as gas. Within liquid biofuels, we distinguish two types: bioethanol and biodiesel. Bioethanol is the most widely used liquid biofuel, accounting for some 94% of global biofuel production in 2006. Bioethanol production is concentrated in the US, Brazil and China. Around 60% of bioethanol comes from sugarcane and 40% from other crops, mostly maize. It is less produced in Europe. In our continent, Germany, France and Italy dominate biodiesel production from rape seed and sunflower. (SLIDE 3) Currently, research focuses on developing a second generation of technologies, producing biofuels from non-crop organic material such as wood, organic waste and algae. Organic solar cells are envisioned as a desirable third generation of biofuels. Wageningen research into the bio-based economy focuses on these and other uses of organic compounds formed by plant photosynthesis.

One might consider biofuels a very timely topic. (SLIDE 4) But also during the early decades of the former century, at the dawn of the automobile revolution, biofuels were under rapid development. I quote the Scientific American of 1918: "The fuel problem is rapidly getting more serious. (...) It has been found that a mixture of 25 per cent each of gasoline and benzole with 50 per cent of alcohol (that is: bio-ethanol) works very satisfactorily in our present motors (...) (T)his may prove to be the solution for the fuel

problem". Farmers and their organizations were strong advocates of biofuels then, and also Henry Ford and Rudolph Diesel. But by the end of the 1930s biofuels from crops were almost completely replaced by leaded gasoline.

(SLIDE 5) There are five main reasons behind the current remarkable boost in first generation biofuels. First, the idea exists that we are at the peak of fossil fuel use. Besides environmentalists also major oil companies now warn that decreasing fossil fuel reserves and growing energy consumption urge for new energy sources. Second, the continuing attention for the role of fossil fuels in climate change creates a favourable condition for increased attention to and stimulation of all kind of alternative energy systems, including biofuels. Third, the dependencies of major fossil fuel importing countries (most notably the US and the EU member states) on unstable fossil fuel producing and exporting regions (Russia, the Middle East, Venezuela) trigger increased pressure to lower fossil fuel dependencies. Fourth, and partly related to the former point, the recent oil price increases have given a further boost to interests in and production of biofuel. This comes together with the fact that biofuels can largely use the existing fossil fuel infrastructure (such as distribution and retailing systems, cars, and combustion systems), making biofuels more competitive than other alternative energy sources. And finally, the crisis in rural areas of many OECD countries following over-production of agricultural commodities, low crop prices (at least until recently), land set asides and low income levels for farmers, provided fertile ground for a new market for agricultural commodities.

(SLIDE 6) Governments throughout the world have stimulated the biofuel market development strongly, among others by means of market creation via setting mandatory targets for biofuel use; by subsidizing farmers, ethanol and biodiesel processing companies, and biofuel users; by protecting domestic markets via trade barriers; by installing large subsidized R&D programmes; and by experiments with various transport technologies and programmes. By the way: also in the 1930s there was a plan in the United States for a law requiring all motor fuel to contain 10 percent of ethanol made out of corn. And also then, governments were joining farmers in stimulating biofuels. Currently the biofuel support is wider: agribusiness, oil and energy companies, car companies, investment funds, farmer organizations and various international organizations have joined governments in the promotion of this new market. (SLIDE 7) It is only recently that the initially local biofuel systems in a few countries are developing into a truly global biofuel market, involving almost all countries. But the increasing investments in biofuels come along with sharp controversies on two issues: environmental sustainability and effects on the poor in developing countries. Let us look at both controversies.

(SLIDE 8) Biofuels are often celebrated as an alternative to fossil fuels for their contribution to combating climate change. They are part of the renewable energy family, which are generally believed to have a better environmental profile than fossil fuels and nuclear energy. (SLIDE 9) But more recently critics started to question the environmental profile of biofuels. First, there is considerable diversity in energy efficiencies and greenhouse gas savings from biofuel use, depending on the type of feedstock, cultivation methods, conversion technologies, energy efficiency assumptions and even calculation

methods. Second, biofuel expansion comes with biodiversity destruction, for instance when tropical rain forests are converted into arable land. Third, large scale biofuel production endangers soil and water conservation. (SLIDE 10) Especially the first generation biofuels derived from large scale monocultures, such as US maize based bioethanol, Malaysian oil palm based biodiesel, and Brazilian soy based biodiesel are increasingly seen as unsustainable. Small-scale production of crop-based biofuels (such as *Jatropha* in Tanzania; (SLIDE 11) or sunflower in Uganda) are more environmentally sustainable. But in those cases energy balances and cost structures show remarkable inefficiencies, making this only attractive in peripheral localities not well served by the conventional fossil fuel infrastructure.

(SLIDE 12) The second biofuel controversy relates to interactions with the food system and the poor in developing countries. The assessment of this food–fuel relation, and the consequences for the poor in developing countries, varies among scholars. Proponents of free trade, advocates of large scale biofuel programmes, and some development institutes often celebrate the potentials of biofuels for developing countries. Biofuels enable developing countries to enter new export markets; they can provide local farmers a better income; and they may boost national economies via a model of both import substitution (of fossil fuels) and export growth (of biomass/biofuels). Especially the favourable natural conditions, wide land availability, low labour costs and the fact that sugarcane and oil palm (the most cost-efficient and least climate change causing crops) grow best under tropical conditions provide tropical regions a comparative advantage in growing biofuel feedstock. (SLIDE 13) But there are three major worries. Large scale energy crop production may impact strongly on food supply, food prices and food scarcity. The European Environmental Agency estimated that 10-30% of arable land in the EU is needed for replacing just 10% of gasoline by biofuel (which is the EU target for 2020). US large scale biofuel production has been one of the causes of increased food prices (for instance of maize, meat and eggs), of food availability for the poor and of growing food protests. This is also the reason why the Chinese government tries to restrict the growth of energy crops, with ambivalent success. Secondly, there is also the danger that the poorest developing countries become biomass-, rather than biofuel-exporting regions. Or that foreign investors rather than domestic citizens in these countries gain the economic benefits. African countries and firms do not have a well-developed technological, knowledge and management infrastructure necessary for large-scale biofuel processing and exports. And last but not least, large energy plantations in developing countries often affect land availability and thus income sources for small farmers and indigenous people. Mozambique announced to convert an area of the size of the Netherlands (4 million hectare) to biofuel crops. What does that mean, professor Giller? (VIDEO PROF. KEN GILLER)

2. Biofuel governance: fair fuels

(SLIDE 14)

To summarize: current global biofuel developments are heavily debated, as they are often not sustainable. But does this mean that biofuels have no contribution to make to energy security, to climate change mitigation, to development in poorer regions: in short do they have no future? Of course they have. Biofuels can be beneficial for the poor and the

environment. For instance, when organic waste from agriculture, households or industry is converted into fuels; when biofuel production triggers sustainable development in poor regions, such as Mozambique; or when the promise of synthetic biology for organic solar cells becomes reality. The challenge is to transform the current global biofuel system – that is so unsustainable – in the direction of what we will label ‘fair fuels’. Fair fuels are fuels that fulfill social and environmental conditionalities.

How to direct and govern unsustainable biofuels towards ‘fair fuels’? (SLIDE 15) This is far from simple, for two interdependent reasons. First, the biofuel system is highly complex. It interferes with and combines energy-, food- and transport systems. And, as we saw, it is increasingly organized globally. Second, current governance is complex. Policy-makers within the setting of one nation-state and through laws and regulations have for a long time been the dominant actors, containers and instruments of sustainability policies. But, following globalization, this nation-state government model is less and less effective in reaching sustainability. Contemporary governance has three characteristics:

- First, successful governance for sustainability can only be based on arrangements with multiple actors, crossing various scales;
- Second, the sources of authority, on which governance power is based, have become divers: from only state regulation towards also markets, science, morals and legitimacy;
- And third, the abundance of information comes together with a lack of agreement on what is reliable information, which complicates governance.

These characteristics make successful sustainability governance complex. Hence, some believe that social scientists can only try to understand governance. But social scientists can do more than only interpret how complex governance develops. With our Wageningen research programme in Ecological Modernization we also contribute to new governance arrangements that work. (SLIDE 16) I will illustrate some of the questions and challenges – at different scales – which need to be worked upon to move to ‘fair fuel governance’.

While national governments can no longer dictate biofuel developments, they remain important governing agents for fair fuels. To push fair fuels, governments have to switch from general support, subsidies and market creation for all biofuel use, towards conditional support for the use of specific biofuels. Within their territory governments have a fair amount of power and instruments to push for the production of fair fuels, for instance by setting strict production standards for energy crops and biofuels; (SLIDE 17) by discouraging first generation and stimulating second and third generation biofuels; or by giving preference to other renewable energy sources if fair biofuels are not available. But this is of course not only a technical issue of good governance. Not all governments have the capacity, willingness and interest to implement preferential fair fuel policies. The political and business stakes are high to continue with current first generation biofuels. Moreover, increasingly biofuels (or biomass for producing biofuels) come from

the global rather than the national market, making national regulation difficult. (SLIDE 18)

The globalization of biofuels – with global trade and investment, global standardization of products, and global players – reduces the possibilities of national governments to remain in biofuel control. (SLIDE 19) The dominant framework in which biomass and biofuels are globally exchanged is that of the World Trade Organization, the WTO. It is not yet clear how biofuels fit into this existing trade regime. Are national subsidies on fair biofuels allowed; and can biofuel or biomass importing countries (such as the Netherlands) set criteria for fair production methods of these imported commodities? Our first analyses conclude that ‘fair fuels’ require a change of WTO rules. This puts the following questions on the agenda. How might such new rules look like; what collateral damage follows from a global trade system more strongly based on sustainability and less on free trade; and in pushing for sustainable trade, should a “coalition-of-the-willing” aim for a – difficult and lengthy process of – revision of WTO rules, or for the establishment of a new institution: a World Sustainability Organization? Any of such major system changes will not materialize in a fortnight. So we are in need of feasible short term governance strategies. I will mention two.

(SLIDE 20) First, the European Union can act proactively as an experimental garden for ‘fair biofuels’. We have more examples where the EU sets sustainability restrictions on trade and investment, against a WTO logic. With respect to biofuels, the EU could set the current standard of mandatory biofuel use in EU gasoline (10% in 2020) at a more realistic level. And this standard could be complemented with strict, mandatory conditions regarding the fairness of biofuels. The recent draft EU energy directive falls short in setting stringent fairness conditions for biofuels. But non-governmental organizations, scientists and the European Parliament are increasing the pressure for developing and implementing stricter environmental and social conditions on biofuels.

(SLIDE 21) A second short term governance step towards fair fuels is labeling. Labels and certificates distinguish fair biofuels from those that are not fair. As long as these labels and certificates do not limit free trade, they are allowed within the current WTO system. The Dutch Cramer commission was one of the first to develop criteria for sustainable biofuels in 2006; and many governments, companies, non-governmental organizations and scientists have followed since then. (SLIDE 22) There are four challenges for developing a fair fuel labeling system:

- First, how to operationalise criteria for fair fuels?
- Second, which public and private actors should be in charge of implementing and verifying the label?
- Third, how to harmonize and merge the dozens and dozens biofuel certification initiatives into a few or even one globally accepted system?
- Finally, how to ensure that major markets – such as the US and EU, but also India and China – are receptive and responsive to such fair fuel labels?

With these challenges it seems easy to denounce fair fuel labeling initiatives. Such labels would be impossible to develop, and would have marginal relevance. Although labels are no panacea, research into other eco- and fair trade labels does show that they work: by changing markets, by setting standards, and by de-legitimizing unfair fuels. But do consumers want and react upon labels, professor Spaargaren? (VIDEO PROF. GERT SPAARGAREN).

(SLIDE 23) So, instead of denouncing biofuel labeling initiatives, we might better call for extending fair fuel labeling. We also need fair fuel labels for fossil fuels. Then, as my colleague mentioned in the video, consumers can become co-governors of fair fuels via their wallet. Besides using their wallet, there are two other governing roles for citizen-consumers. First, in the absence of powerful governments, producer- and citizen-consumer organizations can together organize fair product chains globally, and market them locally. Second, citizen-consumers are important in legitimizing (or not) new developments. Thomas' law of sociology says: "If men define situations as real, they are real in their consequences". How citizen-consumers define biofuels will have large consequences for the future of biofuels. Consequently, all players in the biofuels system – advocates and critics, governments and transnational corporations – are trying to influence the framing of biofuels. (SLIDE 24) This is an example of how the Dutch non-governmental organisation Natuur en Milieu frames biofuels. This framing by all stakeholders is only partly a matter of scientific facts, and also a matter of economic interests, political power and morals. Hence, the current discussions and debates on biofuels should not be seen as just disagreements, but as important acts of governance. And scientists – whether they want it or not – cannot but play a role in such governance arrangements by using their scientific authority.

3. Conclusion

(SLIDE 25) What do we learn from this? Biofuels are highly controversial, as they can endanger the environment and the poor. Hence, we are in need of 'fair fuels', biofuels as much as other fuels. Only then can biofuels be part of a solution, and not of a problem. But fair biofuel regulation does no longer have one center. It moves far beyond the public authorities in The Hague, towards the supranational frameworks of the EU and the WTO, as well as towards the moral, market and scientific authorities of private and academic actors.

Such complex multi-actor and multi-centric biofuel governance is illustrative for many other fields of governance for sustainability. In a globalizing world, with a proliferation of governance capacity among many actors and a diversification of sources of authority, sustainability governance is highly complex; and solutions are thus never simple. Wageningen social scientists reflect on contemporary governance complexities, trying to make sense what is happening and why this is happening. But, together with natural scientists, we also evaluate successes and failures. And we help design new governance arrangements that do further sustainability. Then we have science for understanding, and for impact.

Wageningen, 7 March 2008