Report Workshop "Sustainability of current genetically modified crop cultivation", Jaarbeurs Utrecht, 2 February 2012

Participating organisations:

Aidenvironment Consultancy (authors' report)
CREM (authors' report)
European Commission DG-SANCO (DG for Health and Consumers)
Dutch Food Industry Federation (FNLI)
Greenpeace
IGB (Information Platform Green Biotechnology)
Dutch Federation for Agriculture and Horticulture LTO Nederland
Friends of the Earth Netherlands
Ministry of Economic Affairs, Agriculture and Innovation
Ministry of Infrastructure and the Environment
Dutch Young Farmers Organisation (NAJK)
The Netherlands Biotech Industry Association (NIABA)
Netherlands Feed Industry Association (Nevedi)
Dutch Dairy Association (NZO)
Oxfam Novib
Plantum (not present)
Product Board for Margarine, Fats and Oils (MVO)
Solidaridad
Netherlands Foundation for Nature and Environment
Wageningen UR (authors' report)

Organisations that wished to be informed of the workshop's results:
Dutch Association of Food Trade Organisations (CBL),
Consumers' Association,
Vereniging Grootwinkelbedrijven Textiel (VGT),
Worldwide Fund for Nature

The workshop was led by Menno Bentveld (radio and TV presenter of programs such as *Vroege Vogels,* which often features sustainability issues).

Introduction: Background to study and workshop

The organiser of the workshop, Bart Crijns of the Ministry of Economic Affairs, Agriculture and Innovation, explained the background and indicated the goal of the study. The central issue was the following question: Does the cultivation of GM crops grown in another part of the world for our economic benefit fit in Dutch sustainability policy? The Ministry had commissioned a Wageningen UR consortium and the CREM and Aidenvironment consultancies to provide an answer on the basis of a literature study. The aim of the workshop was to allow participants to examine the study's contents and pose questions, and then to debate the question to enable them to form their own opinion.

Approach

Bert Lotz (Wageningen UR) explained the approach taken in the study *Sustainability of current GM crop cultivation, Review of people, planet, profit effects of agricultural production of GM crops, based on the cases of soybean, maize, and cotton* (Franke et al. 2011, Report 386 of Plant Research International, Wageningen UR; http://edepot.wur.nl/166665, summary on http://edepot.wur.nl/168762), hereinafter called 'the report'. The question referred to in the introduction was translated into the following research question: *Do GM maize, soy and cotton score differently from conventional crops assessed from a sustainability perspective*? To this end a framework of sustainability indicators was set up (taking account of the people, planet, profit

principles) partly based on sustainability indicators used in international agreements. This led to the following questions from the audience:

☐ *Was there a direct reason for organising a workshop?*

The Ministry commissioning the report and the authors (WUR, CREM, Aidenvironment) believe the report's findings are valuable and should be shared with the relevant groups in society so that they can reflect on the study's approach and outcome. The insights presented in the report give a comprehensive picture of the sustainability aspects of genetic modification. These aspects are relatively new to the debate (also in the EU context) which, until recently, had mainly been geared to aspects of safety. The report was published in May 2011 but the workshop was postponed to early 2012 for practical reasons. In the meantime the report has been read widely and has been received favourably in scientific circles. The question is here what the organisations present at the workshop consider as the next steps in the discussion on GM crops.

☐ The report makes use of the definition of genetic modification as set out in Directive 2001/18/EC. Here a genetically modified organism is defined as an organism in which the genetic material has been altered in a way that does not occur naturally. In genetic transformation of plants however, *Agrobacterium tumefaciens* is often used, which is a widespread soil bacterium with the natural ability to alter a plant's genetic makeup. The question is how this relates to the definition used by the EU. In nature *A. tumefaciens* brings genes into the plant to boost the growth of the bacteria itself, whereas in the case of GMOs, biotechnologists insert genes from other organisms not likely to appear naturally in *A. tumefaciens*.

☐ *Have similar studies been conducted in other European countries?*

In other European countries similar studies were conducted on the agronomic or economic aspects involved. This desk study was an attempt to present a broad overview of a range of indicators based on the people, planet, profit principles. Reactions from Europe indicate that this study was fairly unique.

Results

Wijnand Broer (CREM) summarised the results of the study. A policy on sustainability does not appear to rule out the use of current GM crops. GM crops can contribute to sustainability but the relative sustainability score depends on the characteristics and the crop concerned, on the region where it is grown, the institutional environment and the legal and socio-economic structure in place. The proper application of the technique, integrating various methods based on sound agro-ecological knowledge in the context of Good Agricultural Practice proves to be essential for the sustainability score.

This was followed by technical questions from the audience:

☐ *Was the information on all aspects discussed sufficiently for conclusions on sustainability?*

In most cases it was quite possible to draw conclusions on sustainability but not in every case, notably where 'people' aspects were concerned. Prior hypotheses could not always be rejected, as too little information could be gathered. In these cases it could not be concluded that there was no effect, either positive or negative.

☐ *Does the report not ignore the toxicity of glyphosate too easily?*

The report is very clear about the toxicity of glyphosate. The use of glyphosate has an advantage when compared to other, more toxic, herbicides also used in conventional cultivation. A recent report from Greenpeace does not give a representative reflection of the many studies on the health and environmental aspects of working with glyphosate.

☐ *Why wasn't a comparision made with organic farming?*

Given the research question of whether the cultivation of GM crops in third countries benefitting our economy fits in with our policy on sustainability, the view was expressed that organic agriculture should be part of the debate. It should also be noted that most of the seed for the GM crops comes from one single company, Monsanto. The report makes a comparison with the sustainability of conventional (non-GM) cultivation without stating that conventional cultivation is sustainable as such. There were not enough research data available for a direct comparison between organic farming and GM cultivation for this aspect to be included in the report.

☐ *Why is so little attention being paid to monopolisation?*
In monopolisation two aspects are at play and it is difficult to separate them. There is consolidation to accommodate the increasing costs of innovation, and also the cost of patent applications, to ensure the innovation costs are recovered.
Recently a Wageningen UR report on patents has been published (Louwaars *et al*. 2010) and COGEM published a report on consolidation (Schenkelaars *et al.* 2011).
Monopolisation is not confined to genetic modification; it is also an issue in conventional plant breeding. The vegetable seed sector, where GM crops do not play a role, is a case in point. In addition, rules on competition also apply in the plant breeding sector. These points sparked the debate described below.

Debate

The report concludes that a sustainability policy need not rule out the cultivation of GM crops provided that there is a sound institutional framework in place. This should guarantee for instance that the measures in place to address the potential negative side effects of GM cultivation, such as the development of resistance in pests, are implemented or that higher yields benefit society as a whole. Again, this is not unique to GM crops. It applies to all innovations in agriculture. Some applications of GM cultivation could lead to less sustainable uses, like the tendency of some farmers growing herbicide tolerant soy to convert to monoculture. *How likely is it then that the desired conditions are met?*

Could certification help to enforce these measures? The question is whether certification can be enforced on import. On the one hand it would seem that the EU as a major importer of soy could set requirements for its production conditions. On the other hand, putting pressure on the soy producing country would not help a great deal. Soy producing countries now have sufficient alternative markets in Asia. For the EU the cultivation of protein crops to replace imported soy would not be a viable alternative. What we have learnt from the Round Table on Responsible Soy is that buyers do have a limited influence but that the road toward sustainability is long and hard. It should be noted that GM soy is not sustainable but neither is non-GM soy. The question was rather what requirements need to be put in place for agriculture to be sustainable and how they could be achieved. The report concludes that genetic modification need not be excluded from a sustainability policy per se. The matter is, which techniques produce the best results for this policy to work.

In the Netherlands the institutional framework is in place to ensure that the cultivation of GM crops can contribute to greater sustainability. Someone in the audience expressed the view that Dutch farmers were sufficiently informed to deal with genetic modification in a responsible way and that there was a willingness to grow GM crops to make farming more sustainable. What they needed however were modified varieties suitable to conditions in the Netherlands. Compared to the Americas Dutch farmers grow crops on a modest scale, which makes herbicide tolerant crops rather useless. Maize in the Netherlands is not affected by the insects that current transgenic Bt constructs are aimed at, but this could change given the incidental reporting of the occurrence of the Western corn rootworm. Dutch farmers could benefit from GM starch potatoes or from *Phytophthora* resistant potatoes or perhaps from local GM protein crops, as costs and the environmental burden would decrease. But unfortunately the EU climate for GM crops is becoming less favourable.

Another member of the audience however argued that it was not always necessary to make use of genetic modification as there were other fast breeding techniques like that of marker-assisted selection. Genetic modification was not a cure-all, but a wholesale ban of the technique was perhaps disproportionate. It could well have a place in the agriculture of the future if GM cultivation meant saving the use of natural resources. An example was drought-tolerant crops.

GM cultivation using a limited number of homogeneous plant varieties could also be an obstacle to the development of more economic and robust farming systems with greater biodiversity. But this was not always the case: while encouraging the incorporation of several types of transgenic Bt-constructs in a wide range of cotton varieties for different growing conditions the Indian authorities also put conditions in place to guarantee biodiversity (also with regard to the number of varieties).

Attention was drawn to the paradoxical situation that almost no GM crops were grown in the EU or the Netherlands, but both import huge amounts of these crops for animal feed. *What were the most important reasons to be so fearful and obstructive towards genetic modification?* It was suggested that many consumers rejected genetic modification, but even that could not be taken as fact because there were inherent limits to the questionnaires used. It seemed people still had doubts about safety. However, the safety of GM products has been secured by an extensive European assessment of the risks to humans, animals and the environment, including their long-term effects. There is no scientific evidence pointing to safety risks. It was remarked that the existence of an independent risk policy for GM products itself would give rise to suspicion. Outside the realm of agriculture applications of genetic modification were often better accepted, for instance in pharmacy where there is comprehensive safety regulation. Unfamiliarity and negative image forming about genetic modification could influence the consumer's view. It could help if the facts about genetic modification were freely available and regulation was in place, but the question remains as to whether it would prove helpful to the consumer to have more information about genetic modification on top of all other aspects important for sustainability. Ethical convictions would not seem to play such a large role among the public in forming an opinion about genetic modification. Monopolisation and the power of multinationals could well play a role, although this was mainly among plant breeders and growers. A complicating factor is that some parties see a market advantage in capitalising on the negative image of GM products. It was also remarked that the current generation of GM crops provided no direct added value to the consumer.

With regards to the tenability of genetic modification it was suggested that this was a prime example of the application of the precautionary principle. However, it should be noted that applying the precautionary principle in European legislation on GM products could limit farmers' and consumers' freedom of choice. This view sees freedom of choice being limited by selectively not implementing certain innovations. On the other hand it was argued that the precautionary principle actually guaranteed freedom of choice, because freedom of choice was now being restricted by a change that is irreversible. Like it could no longer be guaranteed that non-GM seeds are 100 per cent free from GMOs. The question was whether the consumer would ultimately be prepared to pay the cost of excluding GM products in the retail and food industry. The report shows that freedom of choice is possible by separating the chains, but that economic feasibility may limit this possibility. For example, the regional separation of GM and non-GM products in Brazil to guarantee freedom of choice for customers came at the expense of freedom of choice for the local farmer. The situation in Argentina shows that because of the economic attraction of GM crops (ease of use for the grower) they can become so all-encompassing that it is no longer an attractive investment to develop and produce seed of non-GM crops. This means that ultimately certain non-GM cultivation will only remain possible by government investment in non-GM plant breeding.

A recurring question was whether there were concrete sustainability aspects which applied specifically to genetic modification. If so, then this would need to be addressed in the debate and in policy. The sustainability aspects that applied to all innovative technology would not have to be dealt with in the genetic modification dossier. It did not mean that these aspects would be ignored, but that the best place for the discussion would be in the debate and policy about sustainability in agriculture as a whole. It was remarked that almost all sustainability aspects studied in the report were not unique to genetic modification, but applied to all innovations. It was suggested that probably only the patenting of construction/genes was unique to genetic modification. However, products of marker assisted plant breeding could also be patented and even native traits, which occur naturally in plants. Market power has traditionally been associated with genetic modification but it was noted that consolidation and market power now also occur in vegetable breeding, where for instance only three companies worldwide breed spinach. “Intervention in DNA” was referred to but that concept is difficult to define. Other breeding techniques regarded as conventional also intervene in DNA.

The report provides tools to enable closer analysis of some problems, and forms an approach to improving the situation. There is also a role here for the private sector. The report can also teach us the mistakes from the past and help us to avoid them when working with the new generation of GMOs. Differences in perception among the participants about what they consider to be the most perfect form of farming (for example, large-scale versus small-scale) were reflected in the debate, and people were not always aware of this. Would it help if farmers were allowed to introduce GM crops locally on a small-scale in order to solve a specific problem and then demonstrate the results in their immediate surroundings?

Closing and take-home messages

☐ The discussion between those in favour and those against benefitted from the framework provided by the report for sustainability aspects and the manner in which sustainability indicators were evaluated on the basis of published knowledge. The report provided tools for government and the private sector to better safeguard sustainability.

☐ It was proposed that the report’s insights and approach be referred to the EU programme aimed at identifying the socio-economic aspects of genetic modification.

☐ The representative of the Ministry of Economic Affairs, Agriculture and Innovation will report the results of the discussion to the Ministry. The report and the workshop demonstrated that it was useful to consider the debate on genetic modification in the context of sustainability, whereas until now it had concentrated mainly on safety. This workshop can be seen as a starting point for further dialogue on the issue. For future discussions it is important to make the distinction between the aspects of sustainability that are specific to genetic modification and those that are specific to the agricultural system used. That distinction is important to determine where which discussion should take place.

☐ Although most aspects are not unique to genetic modification the question is whether more concrete substance can be given to reducing specific damaging effects which could be dealt with in the institutional environment but nevertheless could become more common given the evident appeal of these crops to the farmer (for instance, the charm of glyphosate and its ease of use as crop protection).

Finally, many of the participants were keen to look into the way sustainable agriculture should develop in the future. This would have to involve a broader analysis of the contribution of GM crops and crops bred conventionally and their relationship to integrated and organic agricultural systems.

Clemens van de Wiel, René Smulders, Bert Lotz, Wageningen, March 2012