Interview

The current and future status of GM technology: Interview with Dr Sandy Thomas, Director of the Nuffield Council on Bioethics

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Dr Thomas, thank you very much for inviting me to your office today. Can you please give a brief description of the current status of GM crop technology?

Genetic modification (GM) is a technology used very widely now as a tool in plant breeding. Crops which have been developed, particularly for markets in which GM is approved, are very much based on using this kind of approach. It is difficult to get a feeling for how much GM technology in crops might be used in Europe in the future – at the moment we are not currently growing any crops for harvesting. Of course there are a number of experimental outdoor trials going on. Very recently for example, there was the conclusion of the farm-scale trials sponsored by a number of organisations to evaluate the environmental impact of three GM crops. In general GM technology should be seen very much as a tool and another way of moving genes around. It has been applied in several countries, such as the USA, and there are a number of leading research institutes around the world which use GM technology to try and solve agronomic problems in developing countries. Twenty-seven per cent of the global GM crops area is in the developing world of which a main part represents Bt cotton[1] in China. What our report[2] suggests is that there is a great deal of caution in those countries about adopting the technology because there is worry that it may affect future export markets.

Can we discuss this caution in more depth?

It is very difficult to be clear about the influences on developing countries that have led some of them to be so cautious in adopting GM technology and applying it to improve their agriculture. The ramifications of the GM debate in Europe have really been very considerable and we have seen this very well illustrated in the case of the food aid controversy in some parts of Africa, eg Zambia. So, there is little doubt – as our report has concluded – that the GM debate in Europe and the rejection of GM technology by European consumers has influenced policy making in Asia and Africa. They can see that these products are not wanted by EU consumers as the EU authorities have placed very strict regulations for imports from other countries that may contain GM.

Do you think that this strict regulatory system could possibly make Europe a highly protectionist environment with a closed market?
It would be very difficult for developing countries in general to be able to meet the standards for traceability and the labelling regimes that are demanded for importing GM crops into the EU. Having said that, we should also acknowledge that some policy makers in developing countries may be concerned, I think with good reason, that they do not have the regulatory capacity to be able to introduce GM technology on a wide scale. GM technology does require significant crop management with a wide range of practices. Enforcing these regulations requires considerable technical capacity.

This could translate to a significant lack of investment. It also seems that it is very difficult to set up this regulatory capacity in the Third World so there is a clear danger that if GM crops are ever approved in Europe they might be exported from the developed to the Third World with a higher price. Would you agree?
We argue that we are already in the situation where GM crops are widely produced in North and South America (USA and Argentina), and China. So there are all these areas of quite intensive cultivation and we also may see others following like South Africa and India. However, there is no doubt that the R&D investment for GM technology is largely concentrated in the developed world. We argue in our report that if GM is to be useful in the developing world, funds must be made available to develop R&D activities and meet the great challenges relating to food security and population growth.

So the issue here is that the price of GM crops produced in the developed world would be unaffordable for most developing countries with very low GDP per head?
Developing countries might be better served by having access to the right tools to develop their own GM crops.

True, but is there a danger here that the private Western companies will invest heavily to protect the most precious pieces of their tools' intellectual property?
We have to be cautious here on what can be protected and what cannot. On one hand there are some new initiatives where large companies like Syngenta are donating some of their technology licence-free. It is early days and we do not know how successful this will be, but one hopes that this is the first sign of a growing approach whereby companies and other institutes are able to open up their intellectual property. Certainly there are a few isolated examples and there is quite a lot of willingness to cooperate. Having said that of course, companies do not really want to be put in the position where their proprietary technologies are used for export and products come back to their own markets. But my own feeling is that there are many opportunities where GM technology could be used effectively in domestic markets of developing countries.

What are these new opportunities?
Our report presents eight case studies in which we consider a number of different crops, including bananas, where we review potential developments of GM technology. Of course, appropriate regulations will be needed – no one is pretending to ignore this aspect – but if you just take bananas, which are a major crop in parts of the developing world, they suffer from a number of serious viral diseases. Being able to introduce viral resistance, which has been difficult using conventional technology, could have a great economic impact.

This is surely good for the domestic producer. In general then, it seems that there are two trajectories, one that affects the producer and another that could also affect the consumer.

I think the first generation of GM crops has primarily benefited producers, who may not have to use as much pesticide or they may have easier management procedures, and this seems to be one of the reasons why the technology has been so unpopular among EU consumers. Then there has been a lot of argument about whether it benefits the environment or not. It is really important not to generalise. It is early days, but a recent UK governmental report on farm-scale trials has shown that one GM crop has benefited the environment and two have not. Many members of the public are concerned about environmental impact but are perhaps less aware of the serious harm that conventional farming can cause to the environment. Overall, what is good for the environment is not necessarily correlated with the use of GM.

What are some of the benefits or concerns you have about the effects on our health or on product quality?
The small farmer in the developing countries may be both the producer and the consumer. A lot of the arguments we make in our report are about the potential benefits of GM technology to the small-scale farmer. In addition there are data which suggest that growing GM crops is linked to the reduction in the use of pesticides and this has a potential benefit for biodiversity. The main economic benefits in the USA seem to have been associated with increasing cost savings in farming and less with consumer satisfaction.

Seeds for GM crops tend to be more expensive and there has been a good deal of criticism about this recently. I personally have received e-mails and letters where people make accusations that GM products are being used by multinationals to dominate seed markets in poor countries. For example Monsanto has acquired a significant percentage of the Brazilian seed market. We have raised concerns in our reports about monopoly control and we think it is very important that the small-scale farmer should have a choice. This is particularly important in the developing world.

What are the current and future global regulation trends?
At the moment we have very different policies prevailing in the USA and Europe. The USA has a decade of experience and most Americans now eat GM food every day and there has been no adverse reaction from its consumption. The attitude of regulators has been that food should not be regulated according to how it is made, but according to the nature of the actual product. So they therefore do not label their GM products and they do not segregate between GM and non-GM foodstuffs. When you look at GM polls in the USA, the awareness of what is GM or non-GM is low and interest is also relatively low. They are generally surprised by the Europeans' negative attitude towards the use of GM food. This situation has stopped a significant amount of potential US GM exports into the EU and the USA is reluctant to segregate GM from non-GM foods as it is very expensive. However, this situation has now precipitated a challenge under the WTO rules, because a country can only reject imports if there is a definite and specific risk to health or to the environment.

Yes, but why aren't we using the US data to permit the use of GM crops?
I think it is in part a historical problem. Initially concern about GM became very intense especially in countries like Britain. For example part of the public seems to have lost confidence in the regulatory process following the BSE crisis and subsequently adopted a very negative attitude towards the use of GM crops. They became very sensitive to GM crop imports. In addition, in Europe we have a very active environmental movement which has been historically very sceptical towards the use of GM crops. The structure of the US and European environments are very different, and I

think there is a feeling that what applies in the US is not applicable here.

Would we ever see the use of GM technology in olive oil (SE Europe), wine (France, Italy) or wheat production?
Only if the consumers have confidence in the technology, but there is a very long way to go. It may well be difficult for GM crops to obtain much of a foothold in Europe during the next ten years.

And where is the rest of the world going in the next ten years?
There is little doubt that the rest of the world, led by the USA and in particular countries such as India, China, Malaysia and Philippines, will continue to invest in GM crops like cotton. It is early days though to say whether food will take off in the same way. I think developing country policy makers are in a very difficult position because they may feel concerned by the very stringent EU regulations. But some people may argue that when GM technology for maize or soya is introduced in the developing world, farmers will find it very hard to keep them separate from domestic crops.

What are the trends of US investment compared to Asian countries such as China?
In rapidly developing countries such as India and China, multinational firms may invest in these territories with an eye on long-term profit. They recognise regulatory uncertainties and the difficulties of enforcing IPRs [intellectual property rights]. But there may be some surprises. For example China, using its positive experience with Bt cotton, may feel encouraged to invest in GM food and this, you can imagine, could have a significant economic impact and help the sector grow faster.

What is the future of the use of GM tools for drug or pharmaceutical product production in plants?
Ironically, in the USA the use of plants for drug development has actually alerted the public opinion to possible adverse effects. And this has created some anxiety about possible contamination between GM crops that are used for drugs and food. The use of GM tools to improve the quality of crops with vitamins, for example, sounds promising but it will need a great deal of research to establish that the right bio-availability levels are superior to the conventional vitamin providers. But progress in this field is quite slow, due to the amount of information that is needed to be collected and analysed.

What are your suggestions and message to the government or the private sector?
Well, we are particularly focused on the development of GM technology for the developing world because we feel this is the region where conventional technology cannot provide the right solutions for some serious problems. GM technology could be one of the tools that can be used to provide some of these solutions. What we argue for is a more careful, case-by-case assessment where GM technology is compared not only to other technologies but also to the idea of doing nothing.

We are beginning to see development in countries such as Argentina, China, India and South Africa. If their experiences prove to be successful, this may encourage governments to increase investment in GM food. But this should follow a carefully crafted regulatory system.

The message I would like to get across is that GM is not the type of technology that will feed the developing world but can be a useful tool. It has a role to play and, together with other approaches in agriculture, could help the developing world to solve some of its serious problems.

References and notes

1. Modified to express proteins from the soil bacterium *Bacillus thuringiensis*.
2. Nuffield Council on Bioethics (2003), 'The use of genetically modified crops in developing countries' (URL: www.nuffieldbioethics.org).