Genetically modified crops: the ethical and social issues

Summary
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Introduction

The introduction of genetically modified (GM) crops into the environment and the food chain has become highly controversial in the United Kingdom (UK), parts of Europe and in other parts of the world. The possibility that GM crops will form a large proportion of the plants grown by farmers in the United States (US), and Europe within the next decade has aroused reactions ranging from outrage and unease to acceptance. By contrast, their introduction has been greeted with near-indifference by consumers in the US and Canada.

The genetic modification of plants involves transferring DNA (deoxyribonucleic acid), the genetic material, from a plant or bacterium, or even an animal, into a different plant species. Because we can increasingly identify which gene or genes determine particular characteristics, the appropriate genes can now be inserted directly into the plants we wish to modify. Although techniques required to create GM crops are recent and relatively sophisticated, genetic modification is in most respects an extension of what has been happening for ten thousand years. The primitive ancestors of almost all modern food crops are barely recognisable to the lay person; maize ears, for instance, were half an inch long rather than the eight or nine inches of their modern descendants.

In this report, the Working Party sets out to examine the ethical and social issues associated with the introduction of GM technology. It aims to inform the public debate in the UK and elsewhere around the world. It also hopes to assist the further development of public policies that will secure the benefits of GM crops and lead to the development of a regulatory system which protects human health and the environment and at the same time commands public confidence.

Ethical issues

There are three main types of principle that are relevant to the evaluation of policies or practices. The first principle is a principle of general welfare which enjoins governments (and other powerful institutions) to promote and protect the interests of citizens. The second is the maintenance of people’s rights, for example their rights to freedom of choice as consumers. The third is the principle of justice, and it requires the burdens and benefits of policies and practices to be fairly shared among those who are affected by them. When we consider the introduction of a new technology, such as that related to GM crops, we can ask a series of questions in the light of these general principles.

- Will the technology promote the general welfare by making for improved food safety or reducing the use of chemical pesticides in agriculture? Or does the technology pose unknown risks for consumers and the environment that we would be wise not to run if we are concerned about the general welfare?

- What implications does the technology have for the rights of consumers, for example the right to be informed about the food one is eating?

- What implications does it have for the rights of scientists to be free to conduct their research in ways that protect their intellectual integrity?

- Finally, we can ask questions derived from a concern with the principle of justice. Who will be the principal beneficiaries from the introduction of the new technologies and what obligations do they have to compensate the losers?
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GM crops also provoke a reaction that is difficult to place within arguments about welfare, rights and justice. Some perceive GM crops as 'unnatural' and those who disapprove of their development and use for this reason are among the strongest critics of GM crops. Others have argued that it is unethical to treat nature in an 'industrial' fashion, not simply because of the unfortunate consequences of so doing, but because they believe it is intrinsically wrong. Whereas the first of these concerns can be accommodated under the principle of the general welfare, the second makes 'the environment' an object of ethical concern, regardless of how the environment affects the interests of human and other animals.

After examining all the scientific evidence in the light of these ethical considerations, the Working Party takes the view that the genetic modification of crop plants, as so far developed, does not differ to such an extent from conventional plant breeding or other human interventions with the natural world as to make the process morally objectionable in itself. GM technology is a new tool which plant breeders are using to achieve their breeding goals more accurately and rapidly. The Working Party accepts that combinations of, for example, bacterial and plant genes in GM crops are very unlikely to be found or impossible to realise in nature. However, provided that potential side effects are thoroughly assessed, we do not consider that the generation of such new combinations should be prohibited.

Minimising risk: the role of regulation

In the UK, the release of GM plants into the environment and food chain is subject to regulatory regimes so that products and releases are carefully assessed before approval is given. The existing regulatory controls, which have concentrated on the impact of individual cases, have been quite appropriate for the early stages of GM development. Now that GM crops and food materials are reaching the marketplace, the Working Party considers that a broader view of the objectives of public policy needs to be taken. By using the case-by-case approach for approval of individual crop introductions, we may not assess the combined impact of several GM crops on the environment and the food chain properly. We therefore recommend consideration of a more integrated policy stance. We suggest that wider policy measures to address the broader consequences of the spread of the use of GM plants in the environment and of GM material in food should be considered. In particular, we recommend consideration of:

- a broadly-based environmental audit of the likely cumulative impact of GM crops on agricultural practices and the environment;
- measures to ensure appropriate labelling of GM and non-GM food and to encourage food producers to produce lines of non-GM food, and retailers to stock them.

Risk assessment methodology

Many of the GM crops under development will change the way crops are managed on the farm. There may be benefits to the environment and wildlife but there may also be risks. The Working Party considers that a full environmental assessment of the direct and indirect effects of such introductions should be undertaken so that the risks and benefits can be weighed against a baseline of present agricultural practices. We recommend accordingly that all applications for GM crops to be approved for commercial planting should be accompanied by a statement of the way in which the planting is expected to be managed in the field, and an analysis and assessment of the wider environmental impact that is anticipated. The advisory bodies should take this impact into account in formulating their recommendations. We further recommend that the regulators and the
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Government advisory committees should also explore the pros and cons of adopting a more explicit risk/benefit assessment in advising on individual cases.

Monitoring

It may not be possible to assess all risks of GM plantings adequately in advance. It is highly desirable to monitor the release of commercial GM crops for a number of years, together with the possibility of modifying or withdrawing consents if problems are revealed by the monitoring. We therefore welcome the modifications to EC Directive 90/220 to ‘verify the non-appearance of any harmful effects on human health and the environment’ and the proposals for post-release monitoring recently developed by the National Farmers’ Union and others. The Working Party strongly endorses these developments and recommends that the Government should plan to make regular post-commercialisation monitoring of the impact of GM releases a general condition for all releases, with inspection of the results by regulators, public access to the monitoring results and provision for modification or revocation of consents if the monitoring results show that this is necessary. This monitoring should include any impact on biodiversity.

Cumulative and indirect impacts

Although the scientific evidence suggests that the potential risks posed to the environment from individual GM crop varieties are very low, the introduction of these crops on a large-scale could have an impact on the environment through changes in agricultural practice or through gene flow into the wild or into other crops. The Working Party recommends that the comprehensive and ongoing research into the environmental impact of GM crops should continue to be carried forward, with the specific objectives of obtaining sufficient information from such trials to control the effects from possible interaction of the GM crops with both native plant species and other agricultural crops, including organic crops.

In the UK, there has been concern about the progressive intensification of agriculture, and the move towards cultivation of crops in larger fields. Although these trends have been established for over four decades, there have been fears that the introduction of GM plantings on a large scale may do more damage to existing habitats, and wildlife. Others believe that GM planting could improve land and farm management in ways which would be better for habitats and biodiversity. We consider that any introductions of commercial GM plantings should be handled in a way that contributes so far as possible both to improvements in agricultural practice and to wider national objectives for the countryside and biodiversity. The Working Party accordingly recommends that the Government should first undertake a broad environmental audit of the general implications of widespread use of GM crops and their impact on farming practices and the rural environment, using current agricultural practice as a base-line. The audit should also consider the desirability and feasibility of measures that might limit any adverse overall environmental impact of large-scale GM planting and optimise any potential benefits. The study might also consider whether it would be desirable or feasible to seek to exclude GM plantings from environmentally sensitive parts of the country.

Food and consumer choice

The Working Party has carefully examined all the evidence that we have been able to assemble about possible risks to food safety from GM food. We have not been able to find
any evidence of harm. We are satisfied that all products currently on the market have been rigorously screened by the regulatory authorities, that they continue to be monitored, and that no evidence of harm has been detected. We have concluded that all the GM food so far on the market in this country is safe for consumption.

There is nevertheless widespread public concern about GM food safety. The Working Party concludes that continuing vigilance is necessary for all GM food just as for other novel foods. **In particular we recommend consideration of:**

- the possible value of a more explicit risk/benefit analysis in assessing GM foods being applied by regulatory bodies;
- a more extensive monitoring programme over a longer time of any effects of the introduction of GM foods;
- the involvement of a broader base of stakeholders in the consideration of GM cases, and the monitoring of impact.

A genuine choice of non-GM foods should remain available with foods containing GM material being properly labelled so that choice can be exercised. More efforts should also be made to disseminate accurate and accessible information about GM food products and what is being done to test and monitor their safety. If effective choices are to be offered it will also be necessary for food producers to segregate food from GM and non-GM sources and to label it appropriately. We recognise that some people want to avoid GM foods because of how they are grown, not just because of what they contain. However, where products derived from GM sources are chemically indistinguishable from non-GM products we do not think it necessary nor practical to make universal labelling a statutory requirement. **We recommend that labelling of GM products should only be statutorily required for foods and products that contain identifiable GM material (DNA and proteins) above an agreed threshold.**

**External advice and advisory bodies**

There is clearly a continuing need for expert bodies to advise the regulatory authorities on individual applications for approval of plantings or novel foods. The crucial requirement for such bodies is that they are expert and independent and have the means and authority to obtain thorough analysis of any question which they think needs deeper investigation. It may be desirable to separate purely scientific assessment of issues about the safety and environmental impacts of GM planting and foods from some of the broader assessment suggested above. Such broader assessments are likely to involve judgements that are not purely scientific, and involve issues on which different people may legitimately take different views. **The Working Party therefore also recommends that a more broadly based group of advisers representing a wider range of stakeholder interests should form part of the regulatory structure giving advice on the balance to be struck before decisions are taken.**

The difficulty of policy making with regard to GM food is greatly exacerbated by the current climate of public distrust. We believe that it is particularly important that the government advisory committees continue to have consumers and advisers on ethics as full members, involved in the scrutiny and evaluation of all applications. Any change to this well-proven procedure would, in our judgement, be a retrograde step and would be perceived adversely by the public. **We therefore recommend as an over-arching body the creation of a biotechnology advisory committee that would report to the Cabinet Ministerial Group on Biotechnology and Genetic Modification, both upon request and on its own**
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initiative. We propose that this body would provide a locus for the discussion of scientific, ethical and general policy issues and would have as part of its remit the duty to consider the wide variety of moral concerns as well as the factual uncertainties surrounding the treatment of GM crops.

Disseminating information

Most people lack the opportunity to gain an understanding about the scientific differences between genetically modified and conventional crops or how they are regulated. Nor do they have the means of explaining any fears or concerns to those responsible for the development, production and sale of GM crops. We conclude that there is an urgent need to rebuild public confidence and that the recent credibility of government information on food safety has been so badly damaged that it may be more helpful for other organisations to take on some of the task. Although independent information from a trusted source will not allay all fears, such information will allow the public to make a more informed choice. We recommend that the proposed Food Standards Agency (FSA) should be the main source of independent information. We recommend that further research is undertaken to determine what information the public would like about GM food and how best to provide such information. We also recommend that the Cabinet Ministerial Group on Biotechnology and Genetic Modification initiates a wide-ranging review of the scope, co-ordination and effectiveness of the several current ‘public understanding of science’ initiatives with a view to achieving the best use of the available resources.

We urge the scientific community to continue to bear its share of responsibility for disseminating information. The Working Party recommends that the UK Research Councils, COPUS, the Royal Society, the Institute of Biology, the UK Life Sciences Committee, and industrial bodies such as the BioIndustry Association and others, examine how they can work together to continue their development of both new and ongoing mechanisms in which scientists would be able to engage better with the public. We further recommend that the Government takes an initiative to bring relevant experts and the consumer public together, possibly along the lines of the UK National Consensus Conference on Plant Biotechnology, to seek to understand the underlying concerns and to propose a way forward.

Commercialisation

The Working Party considers that in the developed world, the present mix of public sector research and commercial research and development is well structured to provide the motive power to develop the new GM technology appropriately as determined by the market. The arrival of GM products in the marketplace has sharpened the debate concerning the institutional reforms necessary to secure ‘best practice’. Wider consultation with stakeholders could make an important contribution towards the transparent, informed and responsible development and implementation of the technology. We recommend that the UK government departments, through their advisory committees, the agrochemical and seed industry and relevant trade associations, consult widely among consumers, farmers, environmental groups and the proposed stakeholder advisory group to ensure that the future goals for the technology take account of the wider issues.

The new GM technologies have tended to move the decisions about breeding even further away from farmer groups. The Working Party concludes that it is particularly important that farmers contribute to the debate concerning herbicide usage and the deployment of systems
to avoid the emergence of insect populations resistant to pest control measures. We recognise the role being played by farmers and their representatives (as well as others in the agricultural supply industry) in the Supply Chain Initiative on Modified Agricultural Crops (SCIMAC). We recommend that the SCIMAC approach to best practice for the introduction of herbicide-tolerant crops be extended to the broader issues of transitions in agronomic practice raised by GM plant varieties which have significant potential environmental impact.

Commercialisation and intellectual property rights

The commercialisation of plant biotechnology has advanced rapidly over the past five years. Intellectual property rights, mainly in the form of patents, have been fundamental to the commercial development of the technology. Several hundred patents on plant genes, techniques for genetic modification and transgenic plants have now been granted and many more have been filed. Although patenting in biotechnology generally is now widely practised by public and private sector researchers alike, excessively broad claims and restrictive licensing remain a potential threat to innovation.

The Working Party has noted the concern about the extent to which patents on partial gene sequences may ‘reach through’ to patent claims on full length DNA sequences. We therefore recommend that national patent offices, the European Patent Office and the World Intellectual Property Organisation (WIPO), limit patent claims for ESTs strictly to their specified uses to avoid dependency on subsequent patents which have overlapping DNA sequences. We further recommend that WIPO and the EC closely monitor the development of EST patents worldwide.

The Working Party is also concerned that some of the current practices of the major firms concerning patenting and licensing in this area may restrict competition and in particular make it difficult for developing countries to gain access to the new technologies on fair terms. To mitigate the potentially negative effects of monopolies on key plant technologies we recommend that public sector institutions which hold such patents serve the wider public interest by retaining their intellectual property and licensing it in a fair and equitable manner so that key technologies are not tied up in exclusive and inaccessible licence deals.

The Working Party also takes the view that the situation where a single commercial organization has broadly based intellectual property rights for one crop technology under its sole control is highly undesirable. We therefore recommend that national patent offices, the European Patent Office and WIPO discourage patent applications which allow extensive control over a single crop species. Rather, these offices should seek to restrict any such applications to the particular type of technology or products in the crop concerned.

Commercialisation and developing country issues

The majority of developing countries are likely to be disadvantaged in negotiating licence terms. It seems unlikely, therefore, that much consideration will be given to making the proprietary technology accessible to developing countries or to supporting an infrastructure which will allow resource-poor agriculturists in developing countries to pursue local goals for the technology. In terms of economic transactions, these are issues about fairness and justice between parties. It is vital that international agencies vigorously address the challenge of providing access to the technology, both by supporting the development of appropriate derivatives of the technology for local application and by promotion of a climate
for unrestrictive licensing. We therefore recommend a sustained programme supported by increased inputs from donors to support the International Agricultural Research Centres (IARC) system, bilateral programmes and organisations such as International Service for the Acquisition of Agri-biotech Applications (ISAAA) and CAMBIA (Centre for the Application of Molecular Biology in International Agriculture) to develop and distribute enabling technologies in a form which is appropriate to the agricultural needs of the developing countries. This can be achieved more effectively in partnership with industry.

The Working Party concludes that the possibility of new plant varieties being presented for registration with the benefit of both plant variety rights and patent protection could limit the mechanism by which germplasm (and therefore, genetic diversity) is shared among breeders. This potential locking up of genetic variation would be contrary to the spirit and intent of plant variety rights. We must wait and see the extent to which the growing influence of patents in the exploitation of plant varieties will restrict access to proven germplasm. We recommend, however, that WIPO, the EC, Union for the Protection of New Varieties of Plants (UPOV), the Consultative Group on International Agricultural Research (CGIAR) and International Plant Genetic Resources Institute (IPGRI) together closely monitor the impact of patents on the availability of germplasm to plant breeders.

We conclude that there is an urgent need for a realistic assessment of the likely availability of licensed, patented technologies for developing countries. We recommend that those leading companies (and others) holding such patents work in collective partnership with a consortium of appropriate international organisations (such as the CGIAR, ISAAA and the Rockefeller Foundation) to identify and implement practical strategies for broad licensing terms for developing countries. While these should not restrict either the developing world for application to local crops and food security, or to the smaller breeders in the developed world, they would, however, need to provide protection to the large corporations in their own competitive markets.

Where international monopolies based on exclusive ownership of enabling technologies restrict further innovation, fair access and trade, compulsory licensing, could under some circumstances, be considered as an appropriate response. However, we do not recommend the wholesale imposition of compulsory licensing, since in this sector the outcome could be a decline in willingness to invest in research and development and to share knowledge with scientists in the public domain.

**Broad claims**

Excessively broad claims clearly act counter to the intent of the patent system. The Working Party concludes that on balance broad claims within a patent are only justified where the invention is truly supported by correspondingly broad examples and deserves the reward of broad claims. We recommend that national patent offices, the European Patent Office and the WIPO draw up new guidelines for patent offices to discourage the over-generous granting of patents with broad claims that have become a feature of both plant and other areas of biotechnology.

**Impact on developing countries: implications for UK policy**

The most serious of the dangers for the developing world may arise from not developing the capacity to screen, breed and safety-test GM crops, and to manage their release and use. If no such capacities are developed, the best scientists in the developing countries and the CGIAR system will be tempted to migrate to commercial organisations in industrialised
countries. The danger is then that yield increases and employment income from food staples will remain sluggish.

At present the balance of agricultural research between the developed and developing world could well limit the use of increasing numbers of desirable plant types. **The UK should use its position in the World Bank, EU, CGIAR, WTO and other bodies to reverse this trend through improving the infrastructures and remedying the underfunding and biases of public-sector research in developing countries.**

Multinational companies are likely to operate increasingly in developing countries, particularly in Asia and South America. These companies will probably wish to deploy intellectual property measures which have been successful in developed countries. While farmers may well benefit from these new technologies, it is most important that they retain the choice to grow either the new improved seed from the companies or the new improved seed from national breeding programmes or the CGIAR Centres. We consider that it is vital, therefore, that these centres maintain proficiency in the latest technologies and continue to deploy the best technology available in the public sector. **We strongly recommend that the UK continue to support the CGIAR system to this end. At the same time we recommend that the CGIAR seeks to protect proactively its own technology through patenting and use it to access other protected technology on behalf of their clients, the developing world.**

The TRIPS agreement has ‘no requirement on patent applicants to involve or consult with local communities or governments about patenting a compound based on a natural product from that country, or sharing the benefits or including the prior contributions of indigenous peoples’. The Convention on Biological Diversity (CBD), on the other hand, requires host government consent and ‘approval and involvement’ of traditional communities. There have been attempts to amend patent law so that the CBD objectives would be better supported by taking into account the access legislation. The UK, occupying an intermediate position on GM crops between the liberal regulatory position of the US Government and the hostile view of some European governments and non-governmental organisations, is well placed to broker progress on this matter via the WTO and the CGIAR. **The Working Party recommends that the UK, in consultation with like-minded developing countries and other member states of the EU, propose that the WTO explore and report on the extent to which the international and national legal framework currently frustrates the objectives of the CBD on providing fair and equitable access to genetic resources and how this conflict might be addressed.** There is an overriding need to respect the property rights of developing country researchers, public agencies and indigenous communities regarding plant materials developed by them.

The Working Party recommends that the UK Government and EC, preferably working through the CGIAR, invite those developing countries willing and able to commit genuinely additional resources, to enter a joint initiative. In view of the proven high returns to and impact on poverty of appropriate agricultural research, and the new salience of fundamental and applied GM research, there should be a funded major expansion of research:

(i) **into higher, more stable and sustainable production of tropical and sub-tropical food staples;**

(ii) **seeking gains for poor farmworkers, food consumers and smallholders;**
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(iii) by mainly CGIAR institutes and developing-country national agricultural research systems (NARS), working with private sector researchers in the developing and developed world where desirable;

devising alongside locally appropriate:

(i) research planning;

(ii) regulatory/implementation mechanisms for environmental review of GM crop experiments;

(iii) food-safety clearance of GM releases to farmers.

The Working Party further recommends that the Department For International Development (DFID) and the Ministry of Agriculture, Fisheries and Food (MAFF) should jointly help UK researchers to contribute to developing this initiative. We endorse the recommendation by the House of Commons Environmental Audit Committee that a Minister from DFID be appointed to the Cabinet Ministerial Group on Biotechnology and Genetic Modification.

The Working Party welcomes the aim of the March 1998 White Paper on overseas aid to underpin the agreed Organisation for Economic Co-operation and Development (OECD) effort to construct ‘aid partnerships’ with developing countries to halve world poverty by 2015. To help to achieve this we recommend that alongside consultations with the developing countries concerned about their own agricultural research priorities, the UK Government should pre-commit a substantial amount of the rise in UK aid announced in July 1998 to additional spending on the research and development of GM food staples grown in developing countries. A part of this sum should be for consultative work with those countries on the design of appropriate regulatory regimes. We further recommend that this contribution should be used to leverage extra funds from other donors (including the EU) for developing country NARS and for the CGIAR institutes. The funds should be focused on those developing countries eager to support the initiative with extra domestic financing for public-sector agricultural research.

Of the various traits under consideration in GM crops, it should be noted that herbicide-tolerance may be associated with special socio-economic effects when utilised in varieties for use in developing country agricultures. For example, the use of herbicides replaces hand weeding. Notwithstanding the fact that some of the most striking applications of herbicide-tolerance are in developing countries, the same use of herbicide-tolerant varieties may work against poverty reduction programmes which requires raising, not lowering, the demand for labour. We recommend that the CGIAR should carefully assess both socioeconomic and agricultural needs before introducing crop varieties with novel traits into developing country agricultures and should co-ordinate careful assessment of the potential risks of hybridisation of GM crop plants with weed relatives.

It is important to ask how risks to environmental and human health can be minimised, given the limited regulatory capacity of many developing countries. We conclude that transfer of experience and know-how from advisory and regulatory bodies in developed countries to the developing world, with suitable adaptation to its socio-political as well as physical environments, is urgently needed. The Working Party recommends that part of new UK aid funds recommended to be earmarked for GM research and development in and for developing countries should be used to help such countries in devising appropriate incentive and regulatory regimes against possible environmental and biosafety hazards. While consultation with regulatory bodies in the US, EU and elsewhere is
essential, developing countries have different (and varied) farming systems, food chains, and environments, and so need different biosafety and environmental procedures. We therefore recommend that this part of the new GM funding be guided by leading researchers via appropriate international bodies with strong developing-country representation such as the Food and Agriculture Organisation, the International Food Policy Research Institute, and/or the Institute for the Support of National Agricultural Research.

We are unable to recommend a single ethically based solution to the broad and complex issue of substitution crops. This issue is often cited by those who oppose GM technology, but the problems are by no means restricted to genetic modification or to agriculture. Nevertheless, given the need for increased reliance on renewable raw materials, we conclude that international aid funds need to be allocated for valid projects aimed at diversification of cash crops and for the building of the technical capacity to achieve this.

The Working Party notes that the centres of diversity of the wild populations of some of our modern day agricultural crops are in developing countries. We recommend that the IPGRI and others entrusted with stewardship of plant genetic resources consider the risk implications of introgression of genetically modified traits into the centres of diversity for the main temperate and tropical crop species and decide whether additional measures are needed to protect these genetic resources through ex situ and/or in situ conservation.

The need of developing countries for increased yields from crops that can be grown in inhospitable or deteriorating environments may contrast with their desire to care for their particularly rich natural biodiversity. To date, developing countries have less well-developed regulatory structures and expertise to manage the introduction of GM crops appropriately. The biosafety Protocol being considered by the parties to the CBD is intended to provide a first line of reference in this area, particularly for developing countries. However the negotiation of the Protocol has been blocked by countries which have already started extensive commercial planting of GM crops. The Working Party considers the Protocol to be an essential safeguard to enable the desirable development of appropriate GM crops for developing countries to take place safely, and recommends the UK Government and its European partners redouble efforts to reopen the stalled negotiations on this subject and to bring them to a successful conclusion.

**Conclusion**

In conclusion, we reaffirm our view that GM crops represent an important new technology which ought to have the potential to do much good in the world provided that proper safeguards are maintained or introduced. All those who are involved in developing the new technology, whether they are researchers in the public sector, in agrochemical or agricultural businesses or farmers, or food manufacturers and retailers need to recognise and accept a very broad responsibility to the public. They need to ensure that ethical concerns are taken account of, that their new technologies and products are safe for human consumption and avoid further harm to the environment, that the potential of GM technology is harnessed to meet the most urgent food needs of the world as well as commercial benefit, that impartial information is made widely available to the public and that consumer choice is fully respected.
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Many groups and sectors of society are concerned with the implications of GM crops and have a legitimate interest in the outcome of decisions about them. We do not advocate a moratorium on either research, field trials, or limited release into the environment, irrespective of the likelihood that such a moratorium could be legally challenged. We do not see any grounds for it that cannot be better dealt with in other ways. Nor, if these trials proceed successfully, should there be a longer-term blanket moratorium on commercial growing. We do, however, believe that energetic action by the Government is needed before any commercial plantings are undertaken in the UK in order to protect the wider environment, to ensure that choice is available for those who do not wish to consume GM foods, and to allay public concern. The Working Party recommends that the next step should be to allow some commercial planting of the most promising GM crops, on a limited and closely monitored basis, designed to identify and contain any adverse environmental and safety effects. At the same time we recommend that steps are taken to ensure that appropriate amounts of non-GM planting continue with a segregated production chain to support the availability of non-GM foods in the shops to satisfy that demand.

The scope of improvements offered by genetic modification in the future is much wider and consumer benefits much more evident. However, concentrating exclusively on the safety and environmental impact of GM crops in the UK and Europe may distract both the public and governments from giving proper attention to the benefits they could bring to developing and developed countries. Industry must play its part in making the technology available to developing countries. The research investment in plant genetic modification by the private sector has already greatly accelerated the development of the technology. The need for concerted action to assist in the safe application of plant genetic modification by industry in partnership with governments, charitable foundations and international research organisations to food staples of the developing world is urgent.