Genetically Modified Crops World Trade and Food Security

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Loaded
against the poor
World Trade Organisation

Oxfam

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Summary

There is a world food crisis. Currently 790 million people are undernourished and around one third of the world's children go to bed hungry. But their lack of food security is primarily caused by low incomes and unequal access to land, water, credit, and markets.[1] There is no crisis of world food *production* on the horizon, despite environmental problems and a growing world population. Hunger will only be eliminated if governments and international organisations such as the World Trade Organisation implement substantial policy changes in favour of resource redistribution, poverty reduction, and food security. Technological fixes alone, such as genetically modified (GM) crops, cannot solve this problem, despite the claims which have been made for them. [2]

The impact of GM crops for people in poverty, particularly in developing countries, could be negative. GM crops and related technologies are likely to consolidate control over agriculture by large producers and agro-industrial companies, to the detriment of smaller farmers.

Leaving aside risk factors, GM crops could be of some benefit to poor farmers in the longer term if applications are directed to their needs and if intellectual property rules do not channel all the gains to companies. These conditions do not apply at present and require government action.

There may be gains to low-income consumers flowing from reduced crop prices, if there are not effective monopolies in the supply chain. On the health and environmental side, we believe there is not yet sufficient scientific evidence to allow the commercial production of GM crops and that the 'precautionary principle' should be adopted.[3] Regulation and monitoring in developing countries must be considerably enhanced if consumers and the environment are to be properly protected.

World Trade Organisation (WTO) rules are relevant to GM crops since they limit countries' rights 1) to restrict production and trade of GM products, or to introduce mandatory labelling of foods, and 2) to design their own intellectual property legislation.

Negotiation and enforcement of other international agreements is needed, especially in order to safeguard farmers' seed saving rights, public health, and environmental resources. These agreements include the Convention on Biodiversity and the Biosafety Protocol, which a number of key countries, including the USA, have not ratified.

Oxfam's public policy recommendations:

- There should be an international moratorium on the commercial growing of GM crops to allow 1) further scientific assessment of socio-economic, health and environmental impacts, 2) public debate on biotechnology,[4] 3) establishment of national regulatory systems, and 4) adoption of legislation creating company liability for adverse effects.

- Donor support is needed for 1) public research into applications of GM technology of benefit to smaller farmers and low-income consumers in developing countries, and 2) regulatory and monitoring systems in developing countries.

- WTO rules should be amended to allow governments to restrict imports and/or allow mandatory labelling of GM seeds and foods.

- Regarding patents:

  - There should be an international review of patenting life forms, including the potential impact on small farmers.

  - WTO rules should be reformed to allow countries to decide their intellectual property regimes, including the option not to patent life forms.

  - Intellectual property laws and related international agreements should exclude 'privatisation' of traditional crop varieties and their genetic characteristics, and protect farmers' rights to save seeds.

  - Patents law should be revised to exclude products and processes that should properly be in the public domain.

- More countries should sign the Convention on Biodiversity (CBD). The Biosafety Protocol must be finalised, enshrine the precautionary principle in relation to transboundary movements of GM crops, and regulate liability and compensation in relation to possible GM technology-related damage.

- Multilateral Environmental Agreements that are legally binding to signatories, such as the CBD and its protocols, should take precedence over WTO agreements, when in conflict.

Genetically Modified Crops, World Trade and Food Security

1. Introduction

Trade in GM crops has expanded dramatically in the last three years and is expected to reach a value of US$2 billion by 2000. This trade is highly controversial, with the USA, Europe, and developing countries taking positions from 'let the harvest begin', to a total ban on imports and GM crop cultivation. This controversy is also reflected in academic circles, industry and civil society. It is expected that GM crops will be a hotly-contested issue at the Seattle Ministerial Meeting of the World Trade Organisation (WTO).

Many claims have been made for GM crops in terms of eradicating hunger and 'feeding the world'. This paper applies Oxfam's own experience and lessons from working in over sixty countries with poor people, many of whom live permanently with undernourishment and the threat of severe hunger. Work with poor farmers and communities without a secure supply of food makes up around one third of Oxfam's spending. Oxfam provides large quantities of food assistance in humanitarian emergencies, and we trade in around 60 food products through the Oxfam Fair Trade Company.

This paper briefly describes why people go hungry around the world, and what we see as the potential risks and opportunities of GM crops. It goes on to state what we see as the policies which are driving the development of GM crops in a way which presents real dangers to the livelihoods of poor farmers, and potential environmental and health risks. It ends with a set of recommendations to the WTO and national governments to transform their approach to one that supports poor people's food security, and poor farmers' livelihoods.

2. GM Crops, Food Security and World Trade

2.1 Food Insecurity in the developing world

The world produces more than sufficient grain and other foodstuffs for all people to enjoy a healthy diet.[5] Yet almost 800 million people, the majority of whom live in rural areas, are undernourished because they lack money to buy the food that is available, or land and other productive resources to grow it themselves.[6] This shows that increased availability of food at the global level does not necessarily translate into increased food security at the national or household level.

Since the 1970s, the percentage of food-insecure people has decreased in all parts of the developing world except sub-Saharan Africa, since the 1970s. Recent projections of world population predict that it will stabilise at just below 9 billion around 2050. Estimates of agricultural production potential vary, but most commentators agree that we are not facing a looming catastrophe where global population growth outstrips world food production, despite widespread poverty, hunger, and environmental problems.[7] The UN Food and Agriculture Organisation (FAO) predicts that per capita food supplies will continue to increase in developing countries as a whole to the year 2010. There is, therefore, no imperative to rush ahead with GM crop production in order to offset a pending crisis in world food supply.

This is not to deny that GM technology offers potential to contribute to higher yields and crop productivity of interest to poor farmers, and that these opportunities should be researched.

However, the potential benefits for small farmers and poor consumers in developing countries will only be realised under two conditions:

a) There is substantial *public* investment in research. The development of drought- and pest-resistant varieties of peasants' staple crops, for example, currently offer little or no financial incentive for research and development by private companies. Mechanisms are needed to promote public and private investment into GM research that benefits poor farmers and consumers in developing countries.
b) GM technology and products remain accessible for applications of benefit to poor farmers and consumers, and for use in the public interest. This has implications for systems to protect intellectual property (see below).

It is important to note that there are many agricultural technologies and reforms, not GM-based, that offer greater opportunities to improve agricultural productivity and food security in developing countries. These can be grouped under the heading of 'sustainable agriculture' and comprise a range of techniques and approaches that usually aim to address broader development objectives (e.g. security of land tenure, gender equity) alongside increased productivity. Key traits of these approaches are farmer participation in technology development, a reduced need for external inputs such as agro-chemicals, and that the farmer has control over the resources and inputs used. The economic constraints on pro-poor agricultural development must also be addressed if any kind of technological change is to bring benefits and help ensure the viability of small-scale production. These constraints include unequal distribution of assets and inputs (land, water, credit, technical assistance), government trade and price policies, monopolies in marketing chains, and so on.

Oxfam has long supported projects that promote these approaches to agricultural development and food security. For example, an Oxfam-supported project in Albania has successfully developed 'permaculture' techniques for application under difficult agroecological and economic conditions. In Kenya, Oxfam has supported nine national NGOs in the promotion of 'conservation farming', which has succeeded in improving vegetable production, household and women's incomes, and reduced environmental risks. Oxfam Fair Trade Company works with a number of local partners on the production of organic food stuffs for sale in the UK.[8] Oxfam supports many organisations working on the structural obstacles to food security, such as the Landless Farmers Movement and indigenous organisations in Brazil that are campaigning for land rights. Farmers' unions supported throughout Latin America lobby for credit for smaller producers and form co-operatives to achieve the scale needed to compete in markets.

2.2 GM technology – developments, potential opportunities and risks

The commercial market for GM seeds expanded dramatically in scale and geographic scope in 1998, with the land area planted to GM crops more than double the previous year. An estimated 98 per cent of this is in the USA, Argentina and Canada.[9] The International Seed Trade Federation has estimated that the world market for GM seeds will reach US$2 billion by the year 2000 and will triple to US$6 billion by 2005. The biotechnology and related agro-chemical industries are controlled by a very small number of companies. For example, Monsanto controls 88 per cent of the GM seed market in the USA, based on area planted in 1998.

Biotechnology companies, and the US government, have been pushing to expand the production of GM crops, arguing that they offer huge potential opportunities for increased yields, reduced production costs and environmental protection. Varying degrees of resistance to the speed with which biotechnology companies would like to introduce applications of GM technology have come from groups that propose a more precautionary approach to the application of GM technology, and some groups that oppose the technology outright on ethical grounds.

Discussion on the advantages and disadvantages is complex, which emphasises the need for good information for the general public, North and South. One positive example is the Gene Campaign, an Oxfam partner in India, which makes programmes for regional and national radio broadcasts, and has developed a training course on biotechnological issues for NGO staff and government officials. They have also run a public campaign on the need for accurate information on Monsanto's activities.

A number of influential actors have recently questioned the benefits of GM technology. For example, Dan Glickman, US Agriculture Secretary, has highlighted the danger of small farmers becoming dependent on privately-owned technologies, including GM, noting that profit-driven choices in technology development are at best irrelevant to poor farmers and, at worst, reduces them to 'serfs on the land'.[10] Initial figures released by the US government show that, although there was a massive increase in acreage of some GM crops since their release in the mid-1990s, the benefits to farmers in terms of reduced costs and increased profits are limited, and in a minority of cases there are no benefits at all.[11] A recent report for Deutsche Bank suggests that, following consumer pressure (in particular in Europe), the shares in biotechnology companies have become a liability to fundholders and GM crops a liability to farmers.[12] In addition, a leading US maize processor, Archer Daniels Midland (ADM), which buys a substantial proportion of the world's maize crop, has demanded that its suppliers separate GM and non-GM produce.[13] This demonstrates that consumer demand is forcing differentiation in the market, a trend that food and biotechnology companies initially resisted.

Differentiation between GM and non-GM crops at source, and labelling of products on the basis of their GM content, is necessary to secure the right of consumers to make purchasing decisions according to their own preferences. This applies equally to farmers and consumers in the South as well as the North. A number of Southern consumer groups are calling for labelling of GM products in their own countries, including IDEC in Brazil.[14]

The potential opportunities and risks of GM crops in developing countries

Potential opportunities	Risks
Socio-economic	
• Higher agricultural yields and labour productivity • Increased farm income, given appropriate market conditions • Reduced costs for producers e.g. from reduced dependency on external inputs such as fertilisers and pesticides, and increased effectiveness of herbicides • Cheaper products for consumers, e.g. jeans made from self-dying blue cotton • Enhanced assets of poor people, where they have security of tenure, e.g. by enabling cultivation on land that was previously considered useless for farming, such as saline soils • Cheaper staple foods for net food-importing developing countries	• Corporate control is increased over seed and agro-chemical markets (through patenting, monopoly production), at the expense of poor farmers. • GM varieties extend the range of crops that can be produced in Northern temperate zones and these substitute for developing-country export products • GM crops are introduced faster than the development of the regulatory capacity in developing countries • Potential opportunities by-pass smaller farmers, due to lack of investment in research on relevant crops/applications • Biotech companies bear little liability for any damage to the environment or public health resulting from use of the technology. • Large-scale GM crop farming makes GM-free and organic farming *de facto* impossible • GM crops and related technology packages considerably reduce production costs but are only adopted by larger farmers. Which increases problems of uncompetitiveness for small-scale farmers

Environmental	
• Reduced pressure on the environment, principally from reducing use of pesticides and herbicides • GM plants can be developed for removing toxic chemicals from soils • Production of biodegradable plastics	• Further losses of biodiversity from monocultures • Alien genes (including 'terminator genes') transfer from GM crops to other varieties of the same crop and to other species, with unknown effects • Increased resistance of weeds and pests to agrochemicals, resulting in increased use • Decreased natural soil fertility (through reducing the activity of nitrogen-fixing bacteria)
Health	
• Elimination of allergens and toxic substances in crops • Production of vaccines	• Increased allergens, antibiotics rendered ineffective and viruses spread across species (e.g. from plants to human gut bacteria)
Consumer Choice	
• Improved quality and shelf-life of fruit and vegetables • Improved flavour, texture, and nutritional content of food crops • Lower prices for products	• Threat to choice to make informed purchasing decisions based on social, ethical, religious, dietary, and environmental preferences

Note: some issues arise in both opportunities and risks because the impact of GM crops depends greatly on how the technology is applied, who controls it, and their objectives.

2.3 The WTO and the precautionary principle

International trade rules, negotiated at the WTO, influence the development, use and transfer of GM technology. Some rules relate to intellectual property laws, and to the ability of governments to take action to restrict or label imports on health and environmental grounds by invoking the 'precautionary principle'.[15]

Recent WTO rulings suggest that import restrictions on products, on the basis of the method by which they were processed or produced, contravene the WTO principle of 'non-discrimination' between 'like products'. Whether GM and non-GM varieties of the same agricultural crop, such as maize or soybean, are considered equivalent or 'like products' under WTO rules remains a disputed area (with the USA and EU on opposite sides).

The WTO Sanitary and Phytosanitary (SPS) Agreement is intended to prevent national laws regulating food safety, food quality, and the spread of plant and animal diseases from unduly restricting international trade. SPS rules specify that regulations must be based on the available scientific evidence and applied only to the extent necessary to protect human, animal, or plant life or health.

Other relevant rules are contained in the WTO Agreement on Technical Barriers to Trade (TBT), which aims to ensure that WTO members do not use domestic regulations, standards, testing, and certification procedures to create unnecessary obstacles to trade. TBT rules encourage countries to use international standards as a basis for national laws where appropriate, and cover a range of technical regulations and standards, including labelling.

It is not clear whether or not the WTO SPS or TBT rules support precautionary action taken by governments to restrict or label GM food imports and, to date, different governments have acted on the basis of different interpretations. The EU has responded to consumer concerns over GM technology by adopting directives that make labelling mandatory for all products containing GMOs. Japan is also seeking to introduce mandatory labelling. The US government (in support of biotechnology companies) has threatened to bring a WTO dispute against the EU's compulsory GMO labelling laws. The UK government has stated that it has no legal power to impose a national moratorium on commercial planting of GM crops because

of WTO rules, but a legal opinion commissioned by environmental NGOs disputes this interpretation. A US-EU WTO dispute over GMOs is likely to clarify the grey areas in WTO rules one way or the other.

Many developing-country governments are reluctant to accept the *broadening* of WTO rules to more clearly enshrine the 'precautionary principle', and the ability of governments to restrict or label imports on health or environmental grounds. This is because it may further restrict developing countries' access to export markets where they are already struggling to meet international health and environmental standards. Developing country governments see this issue as a potential Trojan horse for northern protectionism. However, many developing-country governments wish to restrict GM crop imports themselves.

2.4 Patents and GM crops

The possibility of patenting GM crops is driving many of the developments in biotechnology in the field of agriculture. This is because patents grant companies a period of monopoly production, and can represent an incentive to invest in research and development of new product lines.

Key issues relating to patenting of GM crops concern:

- The extent to which it is appropriate for private companies to be granted monopoly intellectual property rights over (genes of) traditional crop varieties that have been used and developed by farmers over centuries,[16] and to 'own' new varieties that are developed from them through adding or removing just a few amongst thousands of genes.[17]
- The importance of maintaining public access to GM techniques and products that could be used to develop products of possible benefit to poor farmers and consumers.
- The potential impact on poor people's food security of granting monopoly production rights to private companies.
- The potential for companies to control several aspects of production through 'input-packages', for example, varieties engineered to tolerate particular brands of agrochemicals.

It is important to note that companies' intellectual property rights are not matched by obligations. Although biotechnology companies argue that the potential benefits of GM crops clearly outweigh the risks, they are unwilling to accept liability for any damage arising from their use, and are not obliged to do so by national or international law.

In some cases, the extent of patent protection granted to private companies is excessive when compared to the benefits that it has been shown to bring. Clear evidence that the patent system has stimulated the development of useful products and technologies that would otherwise not have been developed is only available for a few sectors (such as pharmaceuticals). There is little empirical evidence about the positive impact of patents and plant variety protection on agricultural investment, the rate of technology transfer to developing countries or the stimulation of local research and development.[18]

US legislation allows for the patenting of crop varieties and also of a broad range of technological production processes. The European Patent Convention (EPC) explicitly excludes patents on discoveries, plants, animals, genes, and cells. However, EU Directive 98/444/EC allows patenting of transgenic materials and certain human genes. This Directive is currently facing a legal challenge from the Dutch government, with support from the Italian and Norwegian governments.[19] Developing country governments are generally opposed to the patenting of life forms, including processes to engineer life forms.

The WTO Trade-Related Aspects of Intellectual Property Rights (TRIPs) Agreement, in Article 27.3b, allows members to exclude plants, animals, and 'essentially biological processes' from patenting, but not micro-organisms and microbiological processes. The same article requires all countries to provide for the protection of commercial plant varieties, either by patents or by an effective *sui generis* (of its own kind) system, without specifying exactly what is expected from WTO members in this regard. This potentially allows for considerable flexibility in the systems that developing countries must implement to regulate intellectual property rights on life forms, although the requirements may be clarified in a review of this Article, due to take place in 1999.

One possible *sui generis* system likely to be recognised as effective is the International Union for the Protection of New Varieties of Plants (UPOV) system of Plant Breeders Rights. This was initially developed in Europe and has now been adopted by the industrialised countries and a large number of developing countries. The UPOV system produces a strong intellectual property rights regime for *plant varieties* produced by companies or institutions, but not over the *process* or *techniques* to create new varieties. However, UPOV does not protect farmers' rights over traditional crop varieties that have been developed over centuries.[20]

The Convention on Biological Diversity – CBD

The WTO TRIPs Agreement contradicts the Convention on Biodiversity (CBD) which was signed at the UN Conference on Environment and Development in 1992. It is currently unclear whether the CBD or the TRIPs Agreement takes precedence.

The CBD's aims are 'the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies.' The CBD:

- Recognises the sovereign rights of states over their biological and genetic resources
- Requires transfer to be on terms which recognise and are consistent with the adequate and effective protection of intellectual property rights
- Aims to enable developing countries, which provide genetic resources, to have access to technology which makes use of those resources, on mutually agreed terms, including technology protected by patents and other intellectual property rights
- Requires the equitable sharing of benefits arising from the commercial use of communities' biological resources and local knowledge
- Asserts that intellectual property rights must be supportive of and not run counter to the CBD objectives.

Source: Tansey (1999)

The parties to the Convention on Biodiversity (CBD) established an Ad Hoc Working Group on Biosafety to negotiate a BioSafety Protocol aiming at the 'safe transfer, handling and use of living modified organisms, […] specifically focusing on transboundary movement.[21] Such a protocol could potentially cover issues of liability and compensation for damage to the environment or human health resulting from the release of GM crops, as well as notification of transboundary movements of GM crops and the role of risk assessments. However, negotiations to establish the Protocol stalled in early 1999, mainly because of objections by the 'Miami group' of agro-exporting countries (Argentina, Australia, Canada, Chile, Uruguay and the USA). The impasse was closely related to US-EU disagreement over GM crop regulation and labelling, and the status of the proposed Protocol vis-à-vis current and future trade agreements.

The International Undertaking on plant genetic resources (IU) is being negotiated under the auspices of the FAO Commission on Genetic Resources for Food and Agriculture. This will establish a multilateral framework to facilitate access to genetic resources of the main crops, for which countries are highly interdependent and which are important for food security. The

negotiations concern the scope of the Undertaking, the rules governing access, benefit sharing, and the realisation of Farmers Rights (particularly arising from their contributions to conserving, improving and making available plant genetic resources). Many NGOs have called for the IU to be accepted as a protocol to the CBD, which would make it legally binding and potentially give it primacy over the WTO TRIPs Agreement.

3. Oxfam's Position on GM Crops, the WTO and Food Security

Oxfam believes that public policy on trade and technology development should promote greater opportunities for developing countries and poor farmers to achieve and maintain food security and rural livelihoods, guarantees for human health and safety, sustainable environments and fairness between developing and developed countries.

Underlying the recommendations below are the following principles:

- The need to apply the 'precautionary principle', such that technological innovation and commercial application is regulated and, where necessary, slowed, with the aim of avoiding harm to farmers, consumers and the environment. The potential risks of GM crops to poor peoples' livelihoods, environment and health are too large to make acceptable a hands-off approach to the development of biotechnology. This principle must be translated into national and multinational regulation that minimises those risks and maximises potential opportunities of the technology and its products to them.
- The need to explore the potential opportunities for poor farmers and low-income consumers to derive benefits from GM crops through research and innovation. This requires public investment, and incentives to promote private investment.

<u>Recommendation 1</u>:

Oxfam supports an international moratorium on the commercial growing of GM crops.

This is in order to allow for:

- independent assessment of the social and economic impacts, and research into the environmental and health risks of GM technology
- public debate on the direction of biotechnology development
- the establishment and strengthening of regulatory systems for applications of GM technology in developing and developed countries
- the adoption of legislation that creates company liability for adverse effects on people or the environment caused by the release and marketing of GM crops.

The adoption of the precautionary principle through an international freeze on commercial growing will not delay benefits of GM technology to poor farmers in developing countries because only very few GM crops that offer such benefits have been developed to date, and even those require further risk assessment. The freeze will allow time for laboratory tests and field trials to assess the health and environmental risks identified by scientists and for adequate regulatory systems to be developed. Field tests must be conducted with the utmost care for potential environmental impacts, and only after consultation with and the consent of local farmers and residents.

WTO rules must be extended to secure the right of governments to apply a freeze on the commercial growing of GM crops.

Recommendation 2:

Donor governments and agencies should commit resources for investment in research into the potential opportunities of GM technology to deliver economic, environmental, and health benefits to poor farmers in adverse agro-ecological zones. This should be in support of sustainable agriculture, and not divert resources away from current research and development of sustainable farming technology.

GM applications of particular interest include nitrogen-fixing crops, crops with enhanced vitamin and mineral levels, and drought and salt-resistant crops. Public investment should both support public research in national and international agricultural research organisations (especially the CGIAR institutes), and create incentives for private research into applications of GM technologies most likely to benefit poor producers and consumers in developing countries.

Recommendation 3:

Donor governments should support the development and implementation of systems to regulate GM technology in developing countries.

Such systems are crucial to ensure that environmental, health and consumer risks of applying GM technology are minimised, and that potential opportunities to enhance food security and farmers' livelihood opportunities are maximised. This will include support for the development of legislation in developing countries on corporate liability for adverse effects on people or the environment arising from the release and marketing of GM crops. Most costly will be the monitoring systems, including laboratory facilities, to uphold the standards created by legislation. There is a danger that if regulation is tightened in developed countries and not in developing countries, more risky trials of GM crops will be diverted to developing countries.

Recommendation 4:

WTO rules should be revised to extend the 'precautionary principle' and secure the right of governments to restrict and/or require mandatory labelling of GM food and seed imports in the face of inadequate scientific evidence on potential environmental and health risks.

Governments must retain the right to take precautionary action to block GM food and seed imports completely when scientific evidence that they are risk-free to human health and the environment is unsatisfactory. WTO SPS and TBT rules must be clarified to allow governments to require mandatory labelling of GM foods by producers and traders.

Recommendation 5:

There should be an international review of the impact of patenting life forms. Patent rights in the EU and USA should be altered so as to recognise the contribution of historic and public development of genetic crop materials. This should be reflected now in a more limited right to protect intellectual property in genetic crop materials and in strong rules to support technology transfer. The Dutch government's challenge to the EU Directive 98/444/EC that allows patenting of transgenic materials and certain human genes deserves support.

An international review on the impact of patenting life forms must cover, among other things, its impact on poor farmers' livelihoods and the extent to which benefits arising from the commercial use of genetic resources, such as traditional crop varieties, are shared with the farmers and communities that have used and developed these crops over many years.

Existing EU and US patent legislation relating to life forms should be amended to tilt the balance between corporate property rights and farmers' rights in favour of the latter. This is in order to recognise that the contribution of historic and public development of genetic crop material is far greater than any genetic alteration for single or multiple traits that modern laboratories can claim.

Recommendation 6:

The WTO TRIPs Agreement must remain sufficiently flexible to allow governments to determine national intellectual property regimes for crop varieties, including the option not to patent life. The TRIPs Agreement and the Union for the Protection of Plant Varieties (UPOV) should be amended and the International Undertaking on plant genetic resources negotiated so as to recognise farmers' rights over traditional crop varieties and to secure farmers' rights to save seeds.

The 1999 review of Article 27.3b of the TRIPs Agreement must not force governments to adopt patents as the only allowable system for protection of intellectual property rights for crop varieties. The TRIPs Agreement and UPOV should be amended to recognise the rights of farmers to save seeds from their harvests for replanting, independent of patents obtained by companies in other countries. UPOV should acknowledge the historic selection and breeding efforts of farmers, and recognise farmers' and national rights over traditional crop varieties. Negotiations on the International Undertaking on plant genetic resources should be concluded and the agreement accepted as a protocol under the CBD so as to secure farmers' rights to save seeds and national sovereignty over the 'common heritage' of seeds and plants.

Recommendation 7:

More countries should sign the Convention on Biodiversity (CBD), and the international community should proceed on the agreement of a Biosafety Protocol under the CBD.

The Biosafety Protocol must be finalised so as to enshrine the precautionary principle in relation to transboundary movements of GM crops. A Biosafety Protocol should regulate liability and compensation in relation to any possible GM technology-related damage to the environment or public health. The Protocol must also allow member countries to ban GM crops or food unless importers can prove that they do not have potential to threaten national biodiversity and genetic wealth, even if this is disputed by countries that have not signed the CBD, such as the USA.

Recommendation 8:

Multilateral Environmental Agreements (MEAs) that are legally binding to signatories, such as the Convention on Biodiversity and its protocols, take precedence over WTO agreements, when in conflict.

The WTO is not the appropriate forum to negotiate regulations on the transboundary movement of GM crops.

Endnotes

[1] Food security: 'is where everyone has access to sufficient quantities of good quality food at all times'.
[2] Genetically modified (GM) crops: The genetic make-up of genetically modified organisms is altered in order to 'make them capable of producing new substances or performing new functions'. This happens usually by introducing genes from other organisms, thus creating 'transgenetic' crops.
[3] Precautionary principle: When scientific evidence is not very clear or is contradictory, governments should err on the side of caution when formulating standards or regulations, in order to protect public health or the environment. This is especially important when the consequences of making an error are grave, e.g. in the case of greenhouse gas effects, and the impact of certain kinds of genetic modification. Thus technological innovation should be put on a hold until proven safe; however, what 'safe' is needs to be agreed, and is obviously debatable.
[4] Biotechnology: 'remarkable advances in laboratory techniques which are enabling scientists to probe and experiment with the processes that are fundamental to life, increasing our understanding and, at the same time, making it possible for us to manipulate these processes to our advantage'.
[5] Frances Moore-Lappé, Joseph Collins and Peter Rosset with Luis Esparza (1998) *World Hunger – 12 Myths*, (Second revised and updated version), London: Earthscan.
[6] FAO (1999) *The State of Food Insecurity in the World 1999*, shows that the number of malnourished people gradually decreased to 790 million from over 950 million in 1970. It is estimated that at least half the world's population, about 3 billion people, are heavily dependent on agriculture for their livelihoods.
[7] See e.g. G. Conway (1997) *The Doubly Green Revolution - Food for all in the twenty-first century*, London/New York/etc., Penguin Books; Moore-Lappé et al (1998). Lestor Brown at the US WorldWatch Institute is a notable exception who predicts a substantial shortfall in food supply compared to demand.
[8] The Soil Association, Oxfam Fair Trade's certifying body for organic produce, prohibits the use of GMO material in food labeled as 'organic'.
[9] This section draws on RAFI (1999) *The Gene Giants: Masters of the Universe?*, RAFI Communiqué, March/April.
[10] The Guardian, 25 August 1999.
[11] From reports published on the website of the US Department of Agriculture, http://www.usda.gov/usda.htm, including: *Impacts of adopting genetically engineered crops in the US – preliminary results* (posted 20 July 1999); *Comparison of means and econometric models* (posted 20 July 1999); *Genetically engineered crops for pest management* (posted 25 June 1999); *Caveats about using comparisons of means* (posted 24 June 1999).
[12] The Guardian (25.8.99), *GM investors told to sell their shares*; see also a report by the Institute for Agriculture and Trade Policy: http://www.iatp.org/
[13] *BRIDGES Weekly Trade News Digest* Vol. 3, Number 35, 6 September 1999.
[14] Instituto Brasileiro de Defesa do Consumidor. http://www.idec.org.br
[15] This section draws heavily on Matthew Stilwell and Brennan Van Dyke (1999), *An Activist's Handbook on Genetically Modified Organisms and the WTO, Second Edition,* Washington: Consumer's Choice Council.
[16] In 1994, for example, researchers from the University of Colorado were granted a US patent on male sterile plants of the traditional Bolivian 'Apelawa' variety of quinoa, a common staple food in Bolivia. The US patent claim covers any quinoa hybrid that is derived from 'Apelawa' sterile male cytoplasm including, but not limited to, some 36 traditional varieties cited in the patent application.
[17] Genes, DNA, chromosomes and genomes: A chromosome is a 'rod-like part' in the cell nucleus; every organism has several chromosomes, which carry hereditary characteristics. Each chromosome is made up of DNA, which consists of a sequence of thousands of genes. A genome is the totality of all the genetic material in an organism.
[18] Geoff Tansey (1999), *Trade, Intellectual Property, Food and Biodiversity,* London: Quaker Peace and Service. Available on http://www.quaker.org/quno.
[19] The latter is not a member of the EU but is a signatory to the EPC. It has been asserted that EU Directive 98/444/EC is ambiguous in excluding plant and animal variety patenting in article 4.1b, yet accepting it in article 4.3 as an outcome of 'microbiological and other technical processes'.
[20] This is often because traditional crop varieties are genetically diverse, rather than uniform, as required for eligibility to protection under UPOV.
[21] UNEP/CBD/COP/2/CW/L.22.