CARTAGENA PROTOCOL, ARTICLE 26: SOCIO-ECONOMIC CONSIDERATIONS

(A focus on indigenous Mexican farmers)

Submitted by:
Gemma Aguilar
Zeinab Anvarian
Dénise Welch

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Title page art:
Sangre de los Mártires (Blood of the Revolutionary Martyrs Fertilizing the Earth), 1926 Fresco Universidad Autonoma de Chapingo, Chapel, east Wall.
http://www.diegorivera.com/index.php

DIEGO RIVERA (1886-1957):
Contemporary depictions of the essence of rural Mexico can be seen in the murals of Diego Rivera, who often used maize to depict the birth and soul of modern Mexico. In Rivera's *The Blood of the Rural Martyrs: Emiliano Zapata y Otilio Montaño*, the two martyrs are buried beneath a field of maize, whose roots become an umbilical cord connected to the two graves. Considered one of the greatest artists in the 20th century, Rivera's muralist paintings recovered the pre-columbian past catching the most significant moments in Mexican history: the earth, the farmer, the laborer, the costumes, and popular characters. His style is realistic and full of social content, creations of a revolutionary painter looking to take art into the public by using streets and buildings as his artistic medium. His murals often represent the continued reverence toward maize in popular Mexican culture.

INTRODUCTION

At the 1992 Earth Summit in Rio, a majority of UN member states signed the Convention for Biological Diversity (CBD). Among its objectives were: conserve biologically diverse species, conserve genetic resources, (maintain) natural habitats and ecosystems, ensure sustainable use of biological materials, and provide for fair and equitable sharing of benefits derived from the use of genetic resources. Perhaps the most important effect of the CBD was to assign sovereignty over natural resources to member states.[1] During the 1995 Conference of the Parties to the CBD an Open-ended, Ad Hoc working group on Biosafety[2] started developing a draft protocol on biosafety. This working group focused specifically on transboundary movement of any living modified organism (LMO)[3] resulting from modern biotechnology[4] that may have adverse effect on the conservation and sustainable use of biological diversity. Several years of negotiations culminated in the adoption of The Cartagena Protocol on Biosafety to the Convention on Biological Diversity, in Montreal in January 2000. The Cartagena Protocol (from now on referred to as CP) is therefore a product of this CBD working group and officially came into force on September 11, 2003.[5]

The CP is a sub-treaty of the CBD, meaning that only members of the CBD can become members of the CP. While the CBD offers an overall formula for protection and sustainable use of biological diversity, the CP deals with providing an international regulatory framework to reconcile the respective needs of trade and environmental protection with respect to a rapidly growing global industry, the biotechnology industry. The objective of the Cartagena Protocol on Biosafety is clearly stated in Article 1:

> "In accordance with the precautionary approach contained in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Protocol is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements."[6]

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[1] CBD Article 3: States have, in accordance with the Charter of the UN and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

[2] Biosafety refers to the need to protect human health and the environment from the possible adverse effects of the products of modern biotechnology. (Cartagena Protocol Introduction, page 1).

[3] Living Modified Organisms (LMOs) are defined in the Cartagena Protocol on Biosafety as any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology. In everyday usage LMOs are usually considered to be the same as GMOs but definitions and interpretations of the term GMO vary widely. Common LMOs include agricultural crops that have been genetically modified for greater productivity or for resistance to pests or diseases. Examples of modified crops include tomatoes, cassava, corn, cotton and soybeans. http://www.biodiv.org/biosafety/faqs2.aspx?area=biotechnology&faq=3

[4] The term `biotechnology' refers to any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for a specific use. Biotechnology, in the form of traditional fermentation techniques, has been used for decades to make bread, cheese or beer. It has also been the basis of traditional animal and plant breeding techniques, such as hybridization and the selection of plants and animals with specific characteristics to create, for example, crops which produce higher yields of grain. The difference with modern biotechnology is that researchers can now take a single gene from a plant or animal cell and insert it in another plant or animal cell to give it a desired characteristic, such as a plant that is resistant to a specific pest or disease. In the Biosafety Protocol, modern biotechnology means the application of: In vitro nucleic acid techniques, including recombinant deoxyribonucleic acid (DNA) and direct injection of nucleic acid into cells or organelles, or Fusion of cells beyond the taxonomic family, that overcome natural physiological reproductive or recombination barriers and that are not techniques used in traditional breeding and selection. http://www.biodiv.org/biosafety/faqs2.aspx?area=biotechnology&faq=1

[5] As of 30 April 2006, 132 instruments of ratification or accession have been deposited with the UN Sec-Gen.

[6] Cartagena Protocol Article 1, page 3.

GENERAL PROBLEM ADDRESSED BY THE CARTAGENA PROTOCOL

The Cartagena Protocol, the first international agreement to regulate the transboundary movements of genetically modified organisms (GMOs)[7], … "creates an enabling environment for the environmentally sound application of biotechnology, making it possible to derive maximum benefit from the potential that biotechnology has to offer, while minimizing the possible risks to the environment and to human health."[8]

The CP requires that Parties are well informed and agree in advance to GMO imports, which is called the Advance Informed Agreement (AIA) procedure. It obliges GMO exporters to provide detailed information on the organism in question and to get the importing country's explicit consent before any transboundary movement takes place. To this end, the CP also created a Biosafety Clearing House (BCH), which serves as the central portal for information[9] on national biosafety regulations, domestic GMO authorisations and genetically modified content in shipments. The BCH, as described in Article 20: 1(a) of the CP, exists to … "facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, LMOs." The BCH also helps parties to implement the protocol into their national law system, taking into account the special needs of developing countries, countries with economies in transition and countries that are centres of (crop) origin and centres of genetic diversity. Central to the CP is the reaffirmation of the Precautionary Approach (as stated in the Rio Declaration on Environment and Development, Principle 15): "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

To summarize, the general problem addressed by this treaty is that of biosafety: "the need to protect human health and the environment from the possible adverse effects of the products of modern biotechnology." Since GMOs are one of the major products of modern biotechnology, protection from potential risks or irreversible damages posed by the transboundary movement of GMOs is the main concern for all Parties to the Protocol. Currently, there is still very limited scientific understanding about the long-term effects of GMOs. Some scientists are unsure about the long-term implications of introducing GMOs into complex ecosystems and human diets; however, most scientists[10] support the CP because it seeks to create a safe and enabling environment in which the maximum benefits of biotechnology should be available for everyone.

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[7] Genetically Modified Organisms (GMOs) are organisms that have acquired novel genes from other organisms by laboratory "gene transfer" methods. Often the term "transgenic" is also used to mean the same thing. http://www.csrees.usda.gov/nea/biotech
The CP deals mainly with GMOs intentionally introduced into the environment like seeds, live animals and micro-organisms, but also contains provisions for genetically modified farm commodities like grain used for animal feed or processing. The CP treats GMOs and LMOs as more or less the same thing. www.newmediaexplorer.org/sepp/2003/06/16/treaty_on_trade_in_biotech_organisms.htm

[8] CP Introduction, page 1, par. 4.

[9] Scientific data can be collected from sites around the world as to how a GMO may behave and interact with other organisms when released into a particular environment. See: http://www.biodiv.org/chm/default.aspx

[10] The Royal Society, for instance, supports continuation of research on GM plants as the only way to assess their true potential. However, the Society also recognises the concerns expressed with regard to the technology and believes that these should continue to be addressed through collaboration and dialogue. They state the importance of public debate about GM food and taking into account wider issues than the science alone. (*Royal Society report: Genetically modified plants for food use and human health*, 4 Feb. 2002)

ARTICLE 26: SOCIO-ECONOMIC CONSIDERATIONS

Although a good step in the right direction (i.e. working towards cooperation among nations in pursuit of the safe transfer, handling, and use of LMOs resulting from modern biotechnology) there are numerous challenges facing this Protocol, and therefore its overall long-term effectiveness. One of the challenges is that of socio-economic considerations, especially in regard to indigenous communities and those local communities within the centres of crop origin. Recalling the CP Preamble, it is clearly stated (among other things) that the Parties reaffirm the precautionary approach, recognize the crucial importance to humankind of centres of (crop) origin and centres of genetic diversity, and take into account the limited capabilities of developing countries to cope with the nature and scale of known and potential risks associated with LMOs. Parties have not only considered the possible ecological and health risks of the transboundary movement of LMOs, but also the often difficult-to-quantify social risks related to these products of modern biotechnology.

On page 19 of the Cartagena Protocol, under Article 26: Socio-economic considerations, it is stated,

1. ***" The Parties, in reaching a decision on import under this Protocol or under its domestic measures implementing the Protocol, may take into account, consistent with their international obligations, socio-economic considerations arising from the impact of living modified organisms on the conservation and sustainable use of biological diversity, especially with regard to the value of biological diversity to indigenous and local communities."***

2. ***"The Parties are encouraged to cooperate on research and information exchange on any socio-economic impacts of living modified organisms, especially on indigenous and local communities."***

The implications of this article are astounding. First of all, the mere mention of the value of biodiversity to indigenous communities in an article is quite profound. Secondly, the mention of cooperation and information exchange is very positive. What is missing however, are the "teeth" to this article. While parties "may take into account," and "are encouraged" there is no wording which holds a party responsible for failing to recognize indigenous communities and their importance to protecting human health and the environment from the possible adverse effects of LMOs. In essence, this article is a nice gesture, but very basic, and will therefore only achieve very basic results.

The Precautionary approach (which is central to the CP), is based on the assumption that people have the right to know as much as they can about risks they may be accepting, in exchange for some benefits, and thereby make the proper choices. Thus, those who will be affected by a decision should help make the decision. Most indigenous communities however, are not part of the decision-making process when it comes to the socio-economic concerns of LMOs. The precautionary principle –by giving uncertainty its due weight –examines the broadest possible range of harmful effects (socio-cultural values) instead of just single, linear risks. At a Biosafety Symposium in Kuala Lumpur (Feb 2004) attended by biosafety experts, Dr. Traavik[11] shared results of ongoing research done among peers on the impact of GMOs on the planet. They conclude that since most GMOs originate in developed countries, their movement to the ecosystems of developing countries must proceed only with the consent of the fully informed citizenry of these nations. Furthermore, since most GMOs are

[11] ***A Response to criticism about our work on GE biosafety: The Carthagena protocol, the Precautionary principle, "sound science" and "early warnings***", Terje Traavik, Dr. philos. Scientific Director, GENØK-Norwegian Institute of Gene Ecology, Professor of Gene Ecology, Univ. of Tromso.

imported along with first-world co-technologies (pesticides, herbicides, agricultural practices), their transboundary movement could possibly threaten various cultures. According to Dr. Traavik, limitations of biosafety infrastructure are not limited to developing countries, but are a result of a global under-investment in science-for-safety. In his opinion, the fact that biosafety is a priority for many developing countries is an interesting testimony to the fact that priority investment in science-for-sale does not suit all cultures and is exposing significant gaps even among wealthy nations.

Different scientists concur that there are indeed socio-economic[12] considerations related to releasing GMOs into the environment, however they do not discourage their careful use. According to the Royal Society of Canada, "The current science-based health and environmental regulatory regimes do not address a number of broader social and ethical concerns raised by Genetically Modified (GM) crops and foods. These concerns range from fundamental opposition to the artificial manipulation of plants and animals (playing God with nature) to the belief that global justice and beneficence (that is, doing or producing good) is not being served by current applications of biotechnology. There are also consumers' rights issues regarding sufficient information to allow informed choices to be made about food consumption."[13] The Netherlands Commission on Genetic Modification (COGEM) even has a subcommittee devoted to ethics and social aspects related to genetic modification, which critically monitors the developments concerning genetic modification in biotechnology and puts them into a broader social perspective.

In Mexico, research[14] done on attitudes towards agricultural biotechnology has yielded some interesting results, the least of which stresses that resource-poor farmers are often badly organized and under-represented in national public debates. This same research revealed that Mexican farmers were concerned about corporate control of agricultural biotechnology, about the potential of GM maize to outcross with local indigenous maize, and about their country's rich biological diversity. They were also doubtful that their national biosafety guidelines could be implemented effectively since GM maize was a product of imported Western technology and not a product of Mexican academic institutions. Overall the research showed that the political, cultural, and historical background of Mexico significantly influences public perception towards agricultural biotechnology and therefore the issues chosen for discussion at the national level, meaning that a global system of biotechnology governance has to take into account these socio-economic concerns in order to work properly.

Professor Julian Kinderlerer, a leading expert on biotechnology with extensive insight into the indigenous campesino situation in Mexico states that, "GMOs in general are not dangerous, however specific GMOs in specific habitats with specific applications may be very dangerous, therefore a case-by-case approach is always necessary."[15] He claims that, although scientifically, there has been no harm from transgenic maize to the environment or human health of Mexican campesinos, there has indeed been socio-economic harm. This harm stems from the fact that the campesinos have not been informed about what they have been given (i.e. transgenic seed)[16] and have not been asked if they would like to have it, and have therefore not been participating in information exchange (which is a key element of Article 26: Socio-economic considerations).

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[12] Relating to or concerned with the interaction of social and economic factors (Oxford dictionary).
[13] http://strategis.ic.gc.ca/epic/internet/incbac-cccb.nsf/en/ah00186e.html#sec4c
[14] Aerni, P., 2001. *Assessing stakeholder attitudes to agricultural biotechnology in developing countries*. Biotechnology and Development Monitor, No. 47, p. 2-7.
[15] Kinderlerer, J., 7 April, 2006. Lecture on the Cartagena Protocol; Leiden University.
[16] Transgenic seed is not separated from non-transgenic seed in shipments of maize coming from the U.S. Since the U.S. is not a party to the CP, they are not required to separate GM and non-GM shipments, which is a major reason why the campesinos in Mexico (a party to the CP) are not aware of what they are receiving, but should be. The failure of the Mexican government to inform them, and to appropriately implement biosafety guidelines (possibly due to lack of funding) is also part of the problem.

GENETICALLY MODIFIED MAIZE AS A SOCIO-ECONOMIC/CULTURAL THREAT TO INDIGENOUS MEXICAN FARMERS

Many countries that are poor economically are paradoxically rich in terms of genetic diversity. Unfortunately economic resources for the conservation and sustainable use of agricultural genetic resources in these developing countries are well-below adequate levels, especially when it comes to the *in situ*[17] conservation of traditional farmers' varieties and wild relatives of cultivated plants. This is the case with Mexico, a developing country that also happens to be the centre of origin for maize, a crop that is of crucial importance to humankind. According to leading anthropologists[18], prehistoric Mesoamerican subsistence agriculture incorporated a large variety of plants, including maize, which is considered outstanding because of the tremendous impact its cultivation and domestication has had upon human society (at present maize is the third most important food crop in terms of supplying calories to the human race)[19]. In fact, the genetic diversity that saved maize in the United States in the 20th century came from Mexico, where its existence was not accidental. Maize was the result of the work of generations of traditional small-holder and peasant farmers who (in a world where they are often ignored or seen as a burden) are the true guardians of most of the world's remaining maize biodiversity in the field.[20]

The current situation of maize farmers in Mexico is a good example of a socio-economic challenge for the CP. At the beginning of 2001 the price of maize that farmers received for their harvest was one peso a kilo. Since Mexico signed the North American Free Trade Agreement (NAFTA) the price of maize has been declining, due to the elimination of government subsidies and competition from imported maize from the U.S.[21] Furthermore, a rural crisis has emerged in Mexico due to poverty and urbanization, and to meet the demands for maize Mexico now imports large quantities from the U.S., of which 20 to 30% is transgenic[22]. Since the U.S. is not a party to the CP there is no need to separate transgenic maize from non-transgenic maize for trade purposes (as the CP calls for). This ultimately translates into indigenous Mexican farmers (campesinos) unknowingly receiving transgenic maize and continuing with traditional plant breeding (as they have for millennia), unaware that they are experimenting with and spreading transgenic seeds. Since the Mexican government is a party to the Protocol, it has agreed (per Article 26) that in reaching a decision on importing GMOs it should take into account socio-economic considerations on the conservation and sustainable use of biological diversity, especially with regard to the value of that biodiversity to indigenous and local communities. The Mexican government, per the same Article, has also been encouraged to cooperate on research and information exchange on any socio-economic impacts of GMOs on indigenous and local communities. So far, the government has failed to undertake effective action. Some special interest groups, such as Greenpeace[23], however, have been very vocal about possible harmful impacts of transgenic maize and its threat to traditional agriculture and food sovereignty, prompting a growing awareness among scientists and concerned citizens alike.

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[17] *In situ* conservation involves the protection of the areas, ecosystems and habitats in which plants of interest have developed their distinctive characteristics, and is achieved through legislative measures and the use of incentives.

[18] Cowan, C.W., and Watson, P.J., 1992. *The Origins of Agriculture: An International Perspective*. Smithsonian Institution Press, Washington and London.

[19] Fresco, L.O., 13 Jan 2006. Lecture for the course: A Double Green Revolution; Leiden University.

[20] Esquinas-Alcazar, J., 2005. *Protecting crop genetic diversity for food security: political, ethical and technical challenges*. Science and Society reviews. Nature Publishing Group. Vol 6, 946-953.

[21] Eastmond, A. and Faust, B., 2006. *Farmers, fires, and forests: a green alternative to shifting cultivation for conservation of the Maya forest?* Landscape and Urban Planning. Vol 74, 267-284.

[22] An example of transgenic maize is Bt maize, which has been genetically altered to express the insecticidal toxin of Bt bacteria.

[23] See: "Maize under threat, GE maize contamination in Mexico", August 2003. http://www.greenpeace.org/raw/content/international/press/reports/maize-under-threat-ge-maize.pdf

In order to address the impact of imported transgenic maize on indigenous Mexican farmers, among other things, a special working group was created from the Commission for Environmental Cooperation (CEC) of North America to deal with it. This working group produced a 2004 report entitled *Maize and Biodiversity: The Effects of Transgenic Maize in Mexico: Key Findings and Recommendations.* According to the Issues Summary[24] of this report, "In Mexico, maize is the most important cultivar in terms of land area devoted to it (7.9 million hectares in 2001) and the second in terms of gross production volume (18.6 million tons in 2001). The pattern of consumption in Mexico is distinct from those of the United States and other industrial countries, since 68% of all maize is used directly as human food (and not for animal consumption or industrial input)." Maize is open-pollinated, meaning that gene flow occurs easily among these plants that are grown close together. According to the authors of this summary, campesinos have taken advantage of this characteristic for centuries, hybridising cultivated maize and weedy or wild relatives, directing an evolution of new races that fit their needs, preferences and local environments. Traditional agricultural practices of ethnic groups have maintained these selection processes with domesticated maize, thus making this an important form of *in situ* maize conservation. The concern now is that if campesinos have access to transgenic varieties that are perceived as valuable they will crossbreed these varieties with traditional varieties. This spreads the transgene and its trait among the land race fields, possibly affecting the wild relatives of maize, and therefore affecting biodiversity. While scientists have been busy producing studies and arguing about whether or not transgenic maize has been found growing in Mexico and has crossbred with land races and wild species, other scientists[25] claim that the ecological and health impacts of transgenic maize are negligible and have focused on the social and cultural impacts.

The questions of social, cultural, and economic impacts of technological changes in agriculture are subjects of dynamic debate. The CEC recognizes that this topic has special significance for Mexico, being an evolutionary centre of origin of maize, so chapter six[26] of the CEC report deals specifically with social and cultural effects associated with transgenic maize production. Chapter six states that because of its contribution to the social and cultural identity of Mexico, maize agriculture is relevant beyond its economic importance. In many regions, maize is grown with beans and squash creating a system that produces calories from the basic grain, a vegetable protein and a condiment, all of which are central to Mexican cuisine. In general, there are more than 600 different food preparations involving maize, and any tampering with this central food source, whether real or perceived, might be considered a threat to an ancient culture. It's interesting to note that the native inhabitants of Mesoamerica placed themselves in a cosmological food chain by offering sacrifices of human flesh to maize gods in return for vegetable crops to feed people. In addition, the *Popol Vuh*, the sacred book of the Maya, describes maize as the elemental substance used by the grandmother and creator of humans, to fashion the first Mayas. Although we are living in the 21st century, it is important to remember that maize continues to occupy a unique place in contemporary Mesoamerican civilization and is the foundation of the region's cuisine, the object of public policy, and a central element in iconography, ritual expression, folklore, and art. Abundant ethnographic evidence from rural Mexico shows that maize plays a profound role as sacrament, ritual divination, and as evidence that a farmer is committed to the rural community, its past and its values. These cultural values, as well as missing markets for seed, information, and other inputs probably explains the relative conservatism of indigenous farmers to variety selection and a preference for local seed.

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[24] Carpentier, C.L. and Herrmann, H. *Maize and Biodiversity: The Effects of Transgenic Maize in Mexico: Issues summary.* Prepared for the Secretariat of the CEC as part of the Article 13 initiative on Maize and Biodiversity, Montreal, 8/11/2004.

[25] Professor Kinderlerer, for instance, claims that ecological and health issues are not the problem with transgenic maize, but rather socio-economic.

[26] Brush, S. and Chauvet, M. *Maize and Biodiversity: The Effects of Transgenic Maize in Mexico. Chapter Six: Assessment of Social and Cultural Effects Associated with Transgenic Maize Production.* Prepared for the CEC Secretariat as a draft chapter for input to the public symposium, 11 March 2004, Oaxaca. (The lead advisory group reviewer was Professor Julian Kinderlerer).

According to the Chapter six report, transgenic maize, developed outside Mexico, is the technological product of centralized scientific programs and not a technology that farmers have developed, which causes scepticism. Even though gene insertion has not produced maize that is substantively different from conventional breeding methods, these facts are not widely recognized or understood, and indigenous farmers prefer local material versus material from distant and unrelated gene pools (not to mention the intellectual property rights associated with transgenic maize). Historically, public breeding programs were the norm in Mexico, but now privatised breeding creates the fear of more social inequality due to the prevalence of private firms, patents, and licensing (none of which will most likely benefit indigenous farmers). It is very important then, that transgenic maize technology be introduced with adequate biosafety measures including public sector research and training that will benefit the non-commercial and semi-commercial indigenous producers and not just commercial producers. In essence, unlike farm commodities in the U.S. and Canada, to most Mexicans, and especially to indigenous groups, maize is not seen as merely something to be bought and sold. According to our group, overlooking or underestimating the concerns of indigenous Mexican farmers when dealing with an international treaty regulating the safe transfer, handling, and use of any LMO (in this case, maize), is a sure way for treaty implementation and biosafety monitoring programs to fail. Social and cultural views about transgenic maize among campesinos have to be taken more seriously or the success of the Cartagena Protocol will be in jeopardy.

According to Scott Vaughan[27], from the Carnegie Endowment for International Peace, "there is a consensus that economic valuation is useful in measuring human preferences, however, it does not attempt to measure in any way what some might describe as the 'intrinsic value' of the environment." In Mexico there is a high importance placed on non-market values (such as colour[28] and taste) associated with land races. These non-market values often reflect public, rather than private goods and like other public goods remain under-priced. If it was possible to assign market prices that reflected values such as colour, taste and tortilla-texture capabilities versus current market values of larger yield or resistance to pests (remember that most maize grown in developed countries is grown in monocultures and used for animal feed or food processing, so colour and taste are not considered important) then indigenous farmers could possibly make decent money off of their maize harvests. However, as was indicated before, indigenous farming is small-scale and often directed at sustaining the local community.[29] Indeed, when it comes to maize and indigenous farmers in Mexico, it is not about the money, rather about the tradition. So, in the context of trade liberalization, the planting of transgenic maize represents an element of competitiveness in which some producers (the uncompetitive indigenous campesinos) could be displaced by others. In a traditional production system, then, agricultural biotechnology may be viewed more sceptically or differently by different groups, and should thus be approached in an interdisciplinary way. According to Chapter six of the CEC report, it is impossible to predict whether transgenic maize will accelerate change in indigenous Mexican communities or provoke undesirable consequences in the country's maize. Because of the different types of maize producers (commercial, vs. semi and indigenous), there is the possibility for much economic vulnerability with the use of transgenic maize, but also for possibilities such as producing pharmaceutical and industrial products. In either case, it is our group's strong opinion that in a country like Mexico (the ancestral home of maize and of the ancient agricultural traditions which still prevail) it is imperative that broad public input, especially from indigenous and local communities, be solicited before promoting any widespread use of transgenic maize.

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[27] Vaughan, S., 2004. *Economic Valuation and Trade-Related Issues*. Prepared for the CEC Secretariat as part of the Article 13 initiative on Maize and Biodiversity: the Effects of Transgenic Maize in Mexico.

[28] According to the CEC, white maize is used for tortillas, red for special dishes, and yellow for chicken feed.

[29] Communal lands in Mexico are registered as "ejidos" and since 1992 a change in Art. 27 of the Mexican Constitution has made it legal to divide, rent or sell these lands.

CONCLUSION

The Cartagena Protocol is an historic achievement. It pioneers an international regulatory framework for ensuring an adequate level of protection in the field of the safe transfer, handling and use of any LMO resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements.

The precautionary approach is based on the assumption that people have the right to know as much as they can about risks they may be accepting, in exchange for some benefits, and that those who will be affected by a decision should help make the decision. That stated, maize has significant cultural, symbolic, and spiritual values for most Mexicans, making the risk assessment of transgenic maize in Mexico inextricably linked to these values. At present, many campesinos and the community organizers who are most vocal and concerned with transgenic gene flow perceive GM maize as a direct threat to political autonomy, cultural identity, personal safety and biodiversity. Furthermore, many campesinos do not perceive any direct benefit to them from the current (insecticidal) transgenic maize. What this boils down to is that even if indigenous and local communities are fully aware of the benefits of transgenic maize, they may still refuse it, which is fully their right to do so. The situation of indigenous farmers in Mexico and their view on the socio-economic impacts of transgenic maize on their communities is a clear example of areas in which the CP, and Article 26 in particular, desperately needs to be strengthened.

In light of the afore-mentioned studies and current facts on the ground, it is the position of our group that in order for the CP to achieve its aim and become truly effective, indigenous farmers cannot be ignored. Without their input and traditional knowledge, and concerted efforts by governments to conserve it, implementation and therefore the entire validity of the CP will fail. Protecting centres of crop origin and those threats, whether real or perceived, which affect the traditional knowledge of indigenous and local communities within these centres is of universal importance to food security and biodiversity conservation. The strength of the Cartagena Protocol and its useful implementation is key to a sustainable future for all humankind, whether they reside in developed or developing countries, whether they belong to majority or indigenous communities, and most importantly whether these communities themselves feel socially, economically, or culturally threatened by products of modern biotechnology.