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Contamination by Transgenic Crops in Costa Rica – Hidden Pollution in a 'Tropical Paradise' 1.2

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The debates around Genetically Modified (GM) crops in the South have focused, almost exclusively, on those countries where the area planted with transgenic crops is extensive, and production is destined for the export market. But before these crops can be commercially launched, they have to be field tested and multiplied. Therefore, years before the first authorization and commercial use of GMO seeds in the United States, the country that pioneered genetic engineering, it had already started experimental field testing and multiplication of seeds. Part of this multiplication was, and is performed in states that do not appear on the usual lists of countries growing GM crops. Very often these countries lack a legislative and regulatory framework to handle new challenges like genetic engineering. The lack of a culture of public debate also makes it difficult to address emerging challenges. One such country is Costa Rica, where seed multiplication of transgenic soya, corn and cotton was introduced in the early 1990s by North American, and European seed companies.

International industry and research institutions have used Costa Rica for many years, for GM seed production, and as an experimental testing ground. The agricultural biotechnology industry took advantage of its political dependency, weak state structure, vulnerability to corruption, and a lack of debate in the civil society.

Costa Rica is a small Mesoamerican country, which from outside appears to be an ecological paradise. It has the reputation of being democratic, compared to its neighbours. Also cooperating in the multiplication of transgenic seeds are Chile, Hawaii, Puerto Rico, Mexico and South Africa. In their formal presentations, Costa Rican officials are silent about its connections with the GM crop sector. Instead, we hear that 25 percent of the country is under some kind of environmental protection, or some statements about the country's natural wealth; which is considered to be 'mega-diverse' at the international level. But, in fact, the original vegetation has been destroyed to a large extent to make way for cattle ranches and monocultures of banana, pineapple or ornamental plants grown for export. It is not commonly known, that in this tropical paradise the propagation of transgenic crops started in the early 1990s. In the US, and parts of Europe critical voices began questioning GM technologies in the

mid-1980s. Since 1996, European consumers and environmentalists have protested the first arrivals of unidentified transgenic soybeans. In Costa Rica, the GM business did not have the fear of meeting a similar situation.

The Road to the Transgenic Era

Since 1991, transnational, agro-biotech corporations have used the country to multiply transgenic seeds for the world market. On the advice of international financial institutions, the agricultural sector in Costa Rica had already been transformed in the 1980s to cater to the export of agricultural products. Shortly thereafter, the era of genetic engineering was initiated in Costa Rica, mainly through foreign capital. The following table summarizes the major stages seen in this Central American state:

Stages of Planting and Reproduction of Genetically Modified Crops in Costa Rica

From 1991 to 1997-98	Onset of cultivation of transgenic soybean seeds and the supply of basic seeds by Monsanto (US) and Bayer (Germany) in the emerging markets in the U.S. and other countries (Argentina); also small-scale cultivation of transgenic cotton and corn seed.
From 1997-98 to 2003	Cotton seed giant Delta & Pine Land (US) started in Costa Rica with direct investment in a local company for the multiplication and processing of GM seeds. With this, the extensive cultivation of GM cotton seed begins. Area under GM soybean seed declined and GM corn seed was discontinued altogether. Mainly crops and hybrid lines of Monsanto, Delta & Pine Land, Bayer and Syngenta.
2003 to the present	Cultivation of GM cotton seed continues to increase; areas with GM soy are maintained. Cultivation of hybrid lines and varieties of Monsanto, Delta & Pine Land, Bayer, Syngenta and Dow AgroSciences (US). At this stage, civil society groups begin their investigation in the GM seed sector. The UNEP-GEF project: 'Development of a National Biosafety Strategy for Costa Rica,' funded by the United Nations and the World Bank, is initiated. This project culminated in 2005 with a proposal for a biosafety law, developed without any meaningful public participation[1] (UNEP-GEF initiated similar projects in other Latin American countries like Brazil and Mexico, as well as in African and Asian countries.)

Source: Compiled by Ute Sprenger, 2007[2]

Initial production of transgenic seeds took place at a time when Costa Rica was exposed to strong political and economic turmoil. The welfare state was successively dismantled, starting from the late 1970s. Land reform and social reforms of the preceding thirty years were either frozen or withdrawn. There was a shift towards neo-liberal economic policy. Under these political and economic conditions, agri-business development for seed multiplication evolved through tissue culture and micro-propagation of coffee, bananas and ornamental plants on a massive scale, for export to Europe, Japan and North America. As part of this development, the foundation for a seed multiplication industry for GM seeds was established. This business is carried out as follows: The seeds are usually imported from the U.S., multiplied in Costa Rica, and then exported back to the U.S. The seed industry takes advantage of the Central American climate that allows for several harvests during the year. In comparison to the United States or Western Europe, where only a single harvest is possible in a year, Costa Rica's climate helps gather two or three harvest seasons annually. In effect, Costa Rica is a 'greenhouse' for transgenic seeds, for the agricultural bio-tech companies and research institutes of the North.

Establishment of Transgenic Seed Nurseries

In the sector of transgenic crop breeding, Costa Rica today is specialized in soybean and cotton seeds. There are cotton varieties developed for resistance or tolerance to insects (Bt cotton - *Bacillus thuringiensis*) and resistance to herbicides, as well as varieties of soybean with the brand names Roundup Ready (Monsanto) and Liberty Link (Bayer). The region most affected by these crops is the northern province of Guanacaste. In the domestic market, planting and marketing GM crops is officially not allowed, but Costa Rican law does permit experimental cultivation and breeding for re-export. Although GM interest groups, including national scientific projects and institutions in the U.S., assert that Costa Rica has good capacities for monitoring and control, several independent investigations have proved that the situation is quite different. Like most Latin American countries, Costa Rica currently has no special legislation for the management of modern biotechnology, nor an infrastructure with adequately trained staff to monitor what is happening in the sector.

Monsanto and Bayer were among the first influential companies to establish their breeding activities in Costa Rica. Already in 1991, the first transgenic soybean seeds were multiplied over 400 square meters of land. This was the controversial soybean, resistant to the broad spectrum herbicide Glyphosate, which Monsanto re-imported into the U.S. for experimental planting a little later, and, which shortly thereafter was marketed under the brand name *Roundup Ready*. The area under soybean seed production increased rapidly, as Costa Rica was becoming increasingly interesting to foreign seed companies. In 1999, the area for multiplication and experimental breeding had already reached 175 hectares, and besides GM soybeans, transgenic cotton and corn were also planted. By 2005, the total area for breeding GM crops had increased to more than 1,440 ha (about 90% for the multiplication of cotton seeds). It declined slightly to 1,230 ha in the growing period 2006-07.[3]

For reasons as yet unknown, the multiplication of corn seed came to a halt in 2001. Meanwhile, the experiments by national and foreign research groups with rice, banana and pineapple increased. The so-called 'tourism of GM-liberation' namely the transfer of risky transgenic work to Costa Rica, is still thriving. According to official data, between 1991 and 2005, more than 40 international companies and foreign universities cultivated transgenic plants - experimentally and commercially- for breeding purposes, with the most diverse properties in the country.[4] Thus, these cultures are sown at the command of agro-biotech companies and institutes, and the work is conducted without assessing the ecological or social risks involved. There is inadequate control of the trials by governmental inspectors. The companies and research institutions would never be able to conduct the same business in their home countries.

Public Opinion and Demands Taking Shape

The transnational companies, together with research groups, benefit from the fact that Costa Rica has inadequate regulatory and control mechanisms for the cultivation of transgenic crops. They have also taken advantage of the permissive political climate that exists in Costa Rica. With regard to the public, this is fortunately changing at last, because from 2003 onwards social groups and citizens began to intervene in the debate. From that year, a new political era came into effect in Costa Rica, in which social and civil rights groups now had some access to information related to the handling of GMOs. This new awareness had to do with the mobilization of civil society around negotiations for the Free Trade Agreement (FTA) between Central America, the Dominican Republic and the United States. In this way, urban and rural groups became increasingly involved in the debate about the country's economic course.

In the northern region, where transgenic cotton and soybean seeds are currently being sown, concerned groups from civil society, faced with a lack of response and information from the officials went into action. A Civic Committee, a citizens' initiative in the district of Cañas, the region where most GM crops are grown, has devoted itself since mid-2004 to the search for sites where transgenic crops are grown, touring the region and interviewing local inhabitants. Until then nothing was known beyond the fact that the seed production industry was active in the district's economy. It did not take them long to discover plantations of transgenic cotton spreading uncontrollably in the area. The residents complained about the massive application of herbicides and insecticides on these plantations.

The Exposure by Civil Investigations

It became evident from the checks by civil society and on-site investigations that there was a management deficiency on the part of the authorities responsible for monitoring operations with transgenic crops. One clear sign of serious structural weakness in the monitoring process of the authorities is the widespread contamination of the

environment of the region through dispersed GM seeds. Re-growth of transgenic seed has been recorded in the growing regions in north Costa Rica.

Due to the lack of precaution by seed production companies, the situation has reached a point where GM cotton plants appear at several sites. They have been recorded growing in fields lying fallow, in between subsequent crops, on roadsides and riverbanks as well as in home gardens in the region. The resistant crops of the transnational companies have already become weeds, and the only way to combat them is by using conventional, specific herbicides. In areas where most of the transgenic soybeans, resistant to the herbicide Roundup, are located, the Civic Committee found out that people in the neighbourhood and workers have been consuming GM soy as part of their daily food. This particular soybean is used in other countries for animal feed and not for human consumption- a fact that the inhabitants of this region are unaware of.

Generally, inhabitants of the growing areas, owners of lands or agricultural workers are rarely informed about the characteristics of GM seeds. Questions raised by civil society representatives about cultivation of transgenics, or complaints from residents of the area facing problems i.e. of pesticide pollution, are met with a lethargic response from the authorities. Given the great appreciation for nature and the biodiversity of Costa Rica, this reaction from the authorities is difficult to understand. One cannot rule out an unintentional cross-pollination of transgenics with wild plants. The government should be alert to this danger. In this case however it goes far beyond unintentional contamination and the entire state of affairs is one characterized by gross negligence.[5]

Critical Voices Demanding Democratic Processes

In Costa Rica, as in other countries of the Global South, the pro-GM technology lobby tries to influence the political decision-making process. It is also engaged in shaping public opinion and the biosafety policies in the respective countries. After all, huge markets are at stake for the biotech seed industry. For example, the U.S. cotton sector is growing rapidly. Possibly speculating on increased exports to China in the future, the USA has dramatically increased the area under production of transgenic cotton seeds in Costa Rica since the growing season of 2003-2004. And since then the influence of industrial lobbying for pro-GM technologies has definitely become significant in this country. This ranges from direct interventions in the decisions of the administration, to the conspicuous presence of U.S. experts, who create a favourable atmosphere for GM technology among local politicians, in the sciences, and the media.

Nevertheless, the worldwide controversy over the risks and precautions needed in the use of GM crops and over the precautions needed has not escaped Costa Rica. In September 2004, the demand for a moratorium on GM crops resounded for the first time from civil society. Increasingly local organizations are seeking information on

the implications of the presence of GM crops on fields with conventional and organic crops. The US lobby for gene technology has expressed alarm. Staff members from the USDA (US Department of Agriculture), which works closely with the transnational seed cotton company Delta & Pine Land on cotton seed, refers to citizen questioning in Costa Rica as an 'extreme environmentalist coalition'[6].

In spite of all the efforts of concerned costarrican citizens, public awareness of genetic engineering is still low in Costa Rica. This has changed only a little, despite all the complaints about the seed companies, about their careless handling, growth, harvesting and transport of GM crops. In Costa Rica, an earnest, transparent and informed discussion on the consequences of GM crops is still a long way.

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[1] May Montero, A. (2005). Desarrollo de un Marco Nacional de Bioseguridad para Costa Rica. Informe Final. Proyecto PNUMA-GEF http://www.unep.org/Biosafety/files/CRNBFrepSP.pdf
[2] Sprenger, U. (2007): Fallstudie: Auswirkungen des Einsatzes transgenen Saatguts auf die wirtschaftlichen, gesellschaftlichen und politischen Strukturen in Costa Rica. Gutachten im Auftrag des Deutschen Bundestages, Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag (TAB), p. 42 ff (previously undisclosed)
[3] Portal Central del Centro de Intercambio de Información sobre Seguridad de la Biotecnología http://cr.biosafetyclearinghouse.net/estadisticas.shtml
[4] A small group of national researchers is working with public funds, and in cooperation with foreign institutions.
[5] Sprenger, U. (2008): La contaminación oculta. Semilla transgénica, bioseguridad e intervenciones de la sociedad civil en Costa Rica. Berlín, Alemania/San José, Costa Rica.
[6] USDA/FAS GAIN Report Nr: CS5013 (08/2005) Costa Rica Biotechnology Annual Report 2005 www.fas.usda.gov/gainfiles/200508/146130453.