

A MAZE ABOUT MAIZE: A MESOAMERICAN DIVINITY AND ITS TRANSGENIC AVATARS.

Pat Badani

“Al Grano” project explores GM maize contamination and the risk to biodiversity and cultural diversity in Mexico. Decade-long debates have been re-kindled after the recent lifting of a moratorium forbidding multinationals to conduct GM maize experiments there. The convoluted stakes derive from history, ethnology, sociology, biopolitics, intellectual property, agronomy, ecology, science and technology of maize.



Maize specimens, 2011, Pat Badani, photographic document, © Pat Badani.

Introduction: “Al Grano” Project

“Al Grano” addresses the massive industrialization of corn in North America and transgenic contamination of native maize varieties discovered in 2001 in Mexico, the genetic home of that crop.

This is the first instance of contamination in a crop’s center of diversity and it has ignited a huge world controversy about maize’s genetic code (whether ‘pure’ or genetically manipulated) in the alimentary, political, economic, ethical and symbolic structures entangled in the debates. The “Al Grano” project gives visual and aural access to these structures via an installation that includes a 4-channel-synched-video-playback piece showcasing documentary footage with GM maize debate participants. The video footage is currently being filmed across national borders in the North American Free Trade corridor.

By investigating cross-sections in time and place, the project reveals the multiple viewpoints and discordant voices about issues that affect the environment as much as peoples’ lives – from basic subsistence for small Mexican farm holders, to food safety and physical health for the population-at-large. These issues pose serious questions about the nature of borders and about notions of identity, immunity and contamination.

A contested grain and its contested spaces: North America

Mexico is the center of origin and biological diversity of maize. Domesticated varieties can be traced back to the year 6000 B.C. in the valley of Tehuacan in Puebla, Mexico, where native peoples called it 'Zea mays.' These 'criollo' maize varieties have been maintained in 'milpas,' an advantageous polycultivation system that prevents the risk of crop loss in the event of natural adversity. To this day the 'milpa' provides an essential subsistence strategy for small farm holders because produce is used as food, as crop and as small commodity. Today, maize monocultivation is practiced in large farms in Northern Mexico.

The association between maize and Mexican identity is so central that a commonly used slogan claims: "Sin maíz no hay país!" (Without maize there is no country!) Maize is the cornerstone of ancient Aztec and Mayan cosmologies, and main protagonist in many myths that include the origin of woman and man. [1] Today, maize is considered Mexicans' 'Vitamin T' in a staple diet of Tortillas, Tacos, Tostadas, Totopos, Tlacoyos and Tamales consumed throughout all economic groups. Yet, paradoxically, Mexico is also a large importer of corn from the United States.

Maize was also a staple food for Native Indians in the United States and Canada who equally practiced polycultivation, although these native varieties have mostly disappeared today. European settlers adopted maize cultivation and practiced polycultivation in family farms as early as 1620. Much later, in search of greater profits promised by new technologies and genetic advances introduced in the mid 20th century, farmers were gradually absorbed by agribusiness with its increased specialization, standardization, and corporatization. Polycultivation gave way to monocultivation and this process has impacted the countryside and the family farm as a social body. Today, the United States is the world's largest producer and exporter of yellow corn (mostly transgenic) grown in the Corn Belt encompassing the states of Illinois, Indiana, Ohio, Iowa, Missouri, Kansas, Nebraska, South Dakota, Minnesota and Wisconsin. In Canada, corn is grown mostly in Ontario, Quebec and in Manitoba, yet Canada is a big importer of corn from the United States.

In 1994, with the intention of opening up and facilitating trade, the presidents of Mexico, the United States and Canada, signed the North American Free Trade Agreement that has created intense anti-free trade debates ever since. One argument is that business owners and elites in all three countries have benefited financially, to the detriment of small farmers. Mexicans claim that the most affected are 'campesinos' due to cheap imports supplied by agribusiness from heavily subsidized corn growers in the United States against which they cannot compete. Other important arguments include concerns over gene flow and contamination of native varieties by imported GM corn from the United States that would place the biodiversity of maize in Mexico at risk.

In Mexico the importance of maize is quite different from the importance that the crop has for the other two NAFTA partners, specifically regarding the debates on food sovereignty, land use, biodiversity and biotechnology of maize.

What follows is a discussion about maize primarily focusing on Mexico, because the debates there center on politics that go hand-in-hand with the introduction of new technologies informing the way in which maize is defended today as diverse crop, as food, as commodity, and as cultural symbol.

Maize technologies in Mexico

Maize cultivation and domestication systems and technologies in Mexico have been dynamic, evolving and changing, even to this day, through a type of expansion and innovation that, since the Spanish conquest, has engaged a process of transferring technologies from the global north to the global south with the promise of economic growth. [2] This process is marked by five periods of intense political, social and technological change with the most current one being the Biotechnological Revolution under the neo-liberal regime.

In pre-Hispanic times, the valley of Mexico had a complex system of floating gardens called 'chinampas' maintained by means of an efficient technique of recycling of nutrients, connected by a network of channels of drainage, irrigation and navigation that provided for the livelihood of about one million people. There is evidence that these floating gardens produced many plants and herbs including four to five tons of maize per hectare. Today, the United States averages the same amount per hectare with current technologies. [3]

With the Spanish conquest of Mexico, a long process began where the traditional use of land for 'milpa' cultivation gave way to other methods of cultivation. New agricultural technologies were introduced and the native polycultivation using simple instruments and small-scale farming was gradually replaced by methods and technologies used in Europe, including monocultivation over large expanses of land.

Maize's transgenic avatars: Multiple viewpoints

The convoluted stakes related to GM corn are huge but unevenly distributed. The debates are different in Mexico than what they are in the United States and Canada, because maize has added nutritional, historical and cultural importance there. However, some issues are of concern to the three nations, such as:

Conflicting interests that inhibit collaboration in an interdependent economy; food regulation under food safety laws that jeopardize the survival of small farmers; the remaking of the countryside and the disappearance of the family farm; the increased domination by agribusiness of agricultural land to plant limited crop varieties that gradually destroy biodiversity and erode the environment; the increasing expansion of GM cornfields not to feed people, but to supply a lucrative industry of animal-feed, corn fructose syrup, and bioproducts such as corn ethanol and corn plastics (PLA). [4]

In Mexico, in addition to the above issues, debates also encompass the risk of gene flow and GM contamination of 'criollo' corn varieties. Other arguments include:

Food sovereignty; labor and human rights debates concerning the livelihood of indigenous populations; debates about the importance of traditional maize cultivation for the world at large; debates about the need of government support for sustainable production technologies that include the preservation of traditional methods of agriculture; and debates about the need to protect Mexican genetic maize patrimony. [5]

Embroiled in numerous controversies, corn has become biotech's godsend and curse because of the current inability to identify and anticipate all the hazards involved. What is certain is that agricultural biotechnologies are here to stay. Some experts claim that the biggest risk is not from science and

biotechnology but rather from the control of this knowledge by agribusiness that create monopolies with copyrights and patenting of seeds for profit regardless of the human and environmental consequences (e.g. by Monsanto, Pioneer, Syngenta, DuPont, etc.) In self-defense, industry representatives argue that indigenous Mexican farmers have manipulated corn for centuries to fulfill individual demands, and that today biotech super-giants manipulate corn genetics to do likewise, but with different tools. Yet, this is reductive because although both techniques are aimed at crop improvement, there are many differences between domesticated and genetically engineered crops.

Maize is a self-pollinating plant with male and female parts, and reproduction happens when the plant's male gametes release pollen and fertilize female gametes located in the cobs. Crossbreeding selected plants by transferring pollen of the desired types by hand from plant to plant has been practiced for millennia. Indigenous peoples in Mexico have developed an extraordinary level of expertise throughout generations, obtaining and conserving diverse populations of 'criollo' maize, interchanging seeds with other 'campesinos' as part of ancestral social practices denoting ritual kinship and civil-religious systems that are in place to this day, albeit dwindling; practices that have been an intrinsic part of indigenous Mexican identity. [6]

Agricultural biotechnology uses genetic engineering, tissue culture and other techniques, and transgenic plants are the product of such tools. [7] These maize avatars are not the result of natural crossbreeding or recombination. Transgenic maize is genetically modified in laboratories to develop agronomically desirable traits whereby specific genes are introduced into the maize genome resulting in modifications such as resistance to herbicides and insect pests; mutations that have proven to be problematical at many levels. Moreover, because of the increasing control of agriculture and related biotech research by corporations who not only fund research efforts (Monsanto, Syngenta, etc.) but who also own these GM avatars through copyright laws and patents, farmers cannot save their GM seeds for replanting – contrary to traditional farm practice – forcing them to buy new seed from GM companies each year and to pay these firms a technology fee. This phenomenon places farmers in a pervasive money-spinning loop of government subsidies and corporate control.

Genetically modified maize was grown for the first time in the United States and Canada in 1997. Today, the United States is the world's biggest supplier of transgenic corn. Mexico no longer produces enough corn for local human consumption due to disappearing 'milpas' resulting from obstructive government policies. Yet, paradoxically, it is the large transnational GMO corporations in the United States who value the Mexican 'campesino' technologies most. Unfortunately, transnational corporations appropriate native maize varieties extracting what they find useful to create transgenic avatars for profit, establishing an elaborate system of patenting that ultimately harm 'campesinos.' This has generated great controversy surrounding regulatory frameworks governing the approval, production, use, and trade of crops.

For Mexico, the initial promise that agro-biotechnology would feed the increasing population and prevent starvation has actually resulted in greater social exclusion, greater inequality and a divide between two types of agriculture: the agro-industrial one based in new technological packages with official support; and the small holder, traditional maize production, increasingly cornered in zones of indigenous cultural resistance with little access to government subsidies. NAFTA practically condemned maize to disappear from Mexican commercial production. It is claimed that trade policies have contributed to the devastation of the countryside and of peasant production; to the increasing substitution of polycultivation by monocultivation and the associated risk of biodiversity loss; to water depletion, and to an impoverished soil that now offers diminished yields. All of these factors deeply

affect the livelihood of 'campesinos'. [8] Indigenous populations argue that the current neoliberal regime considers them backwards and inefficient, and that their policies are forcing them to migrate from the countryside in order to seek employment in local industries or in 'maquiladoras' (such as jean factories) and across the border in the United States. This situation further condemns the 'milpas' by deskilling a new generation of younger farmers who do not inherit knowledge and expertise about classical plant-breeding developed and transferred from generation to generation for centuries by their elders.

This state of affairs increases Mexican dependency on GM corn imported from the United States, and further aggravates the risk of gene-flow contamination of 'criollo' maize. GM seed infiltration through imports and cross-pollination contamination by dominant GM genes are seen as a real danger to biodiversity by some experts, and contested by others. Yet, this type of disagreement points to the real need for caution and regulatory measures.

Sustainable agriculture/sustainable culture

In the United States and Canada the need to feed people at lower costs was the economic and social logic behind the increased industrialization, specialization and marketing of agriculture that began in the mid 20th century. Now, the claim that corporate agriculture and its technologies are the solution for the world's starving poor is dubious because millions of hectares of land are being used, not to grow staple foods for human consumption, but to grow GM corn for the bioproducts, processed-food, and animal-feed markets. A devastating combination of factors – climate change, depleting natural resources, a global scramble for land and water, the rush to turn food into bioproducts and excessive corporate concentration in the food sector – is creating an era of permanent food crisis that will require radical reform of the international food system.

In earlier decades the ecological question and the complex connections between agricultural technologies, rural and urban life, maize production and the environment, worried very few people. Many now agree that corporate farming causes the decline of family farms and rural communities, threatens the environment and the natural resource base, and compromises the future of society. For some there is now a high/low tech divide. Others see a more hopeful 'post-industrial' future, a new paradigm of agriculture informed by ancient agro-ecological technologies combined with supportive state policies. Despite the maze of impediments that make policy amendments difficult due to agribusiness' influence in government, numerous lobbying groups are making headway in effecting change. For example: NGOs and advocacy groups such as WWF, ETC, ActionAid and Oxfam, lobby for fair shares for the poor in a world of resource scarcity and environmental limits. [9]

In Mexico there are several civil groups and national organizations such as the Coalition in Defense of Maize, and an increased group of academics wishing to maintain traditional native agriculture. Some have been documenting knowledge of seeds and practices that constitute a true patrimony for the country and for the world, and there is now a live seed bank in place (CIMMYT). These actions validate native practices and recognize their scientific expertise.

At present, there is a growing tendency to develop new types of dialogue where tradition and innovation can meet and share a place, thereby extending alternatives and potential for change. Growing consumer worries about how we feed ourselves fuels a paradigm change in agriculture and marketing, and many are developing different models of food production and distribution where valued

goods and services are created by ecologically sound and socially responsible means, customized for specific markets. [10] Some farmers are already venturing into a new era of sustainable agriculture defined as a way of raising food that is economically viable, healthy for consumers, does not harm the environment, supports biodiversity and animal welfare, is socially just, and enhances rural communities. These initiatives proliferating in the 1990's (diversified farming, organic farming, biodynamic farming, urban farming, community supported agriculture, local food chains, etc.) look to combine traditional and contemporary technologies and systems not with the intention of returning to an idealized past, but with the intention of building a different future.

Transdisciplinary research and practice

Informed by the issues discussed above, "Al Grano" delves into new structures for life in the 21st century, seeking to re-define 'growth' for a sustainable future by evaluating knowledge about arcane and contemporary agro-technologies. Throughout the process of collection and interpretation of exploratory documentation, I maintain an inter-subjective role with a broad spectrum of individuals who share their expertise and wisdom: farmers, grocery store owners, agronomists, policy makers, researchers, personalities and the public at-large. The intention is to set in motion receptivity by intertwining research methodologies used in ethnography into my new media artist's tool-kit. These strategies allow me to craft a variety of narrative grounds about issues that are central to my body of work: border-crossings, migration, and foreign status.

References and Notes:

1. Luis Cardosa y Aragon, "Corazon de Maíz," in *Mitos del Maíz* (Mexico, D.F., Artes de Mexico: La Enciclopedia de las Culturas de Mexico), no. 79 (2006): 11–14.
2. Elisabeth Fitting, *The Struggle for Maize. Campesinos, Workers, and Transgenic Corn in the Mexican Countryside* (North Carolina: Duke University Press, 2011), 5.
3. J. Aguilar, C. Illsley and C. Marielle, "Los Sistemas Agrícolas de Maíz y Sus Procesos Técnicos," in *Sin maíz no hay país* (Mexico, D.F., Culturas Populares de Mexico, 2003), 95.
4. Manuel Perez Rocha, trans, "Sin Maíz No Hay País" in *Alliance for Responsible Trade*, June 23, 2008, <http://www.art-us.org/content/relaunching-national-campaign-sin-ma%C3%ADz-no-hay-pa%C3%ADs-without-corn-there-no-country> (accessed May 2, 2011).
5. Rocha, trans, "Sin Maíz No Hay País."
6. J. Aguilar, C. Illsley and C. Marielle, *Sin maíz no hay país*, 128.
7. Fitting, *The Struggle for Maize. Campesinos*, 39.
8. Aguilar, Illsley, Marielle, *Sin maíz no hay país*, 105–115.
9. Alex Evans, "Biofuels boom in Africa," in *The Guardian*, May 31, 2011, <http://www.guardian.co.uk/environment/biofuels> (accessed June 2, 2011).
10. John E. Ikerd, *Crisis & Opportunity. Sustainability in American Agriculture* (Lincon and London, University of Nebraska Press, 2008), 40.