DEFINING SYMBOLIC SPACES IN RESPONSE TO A GLOBALIZED WORLD:

INCORPORATING GMOS AND SEGREGATING MARKETS IN MEXICAN AGRICULTURE

by

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ABSTRACT

Developing countries are increasingly adopting agricultural biotechnologies to meet domestic objectives of food security, industrialization, increasing commodity exports, and international competitiveness. Yet, developing country policies lack coherence and are often conflicting and contradictory. Prevalent theories on the adoption of such technologies focus on trade relationships, regime membership, institutional capacity, consumer and producer acceptance, and environmental concerns. This thesis argues there is a need to move beyond static or uni-causal explanations. It proposes a framework that incorporates notions of symbolic politics as essential components. Incoherent national policies reflect national objectives and international constraints, as well as the concerns of society as expressed through resistance campaigns. The latter seek to influence national policies by framing GMOs in relation to broader societal concerns. By organizing resistance around a specific resource or symbol associated with conceptualizations of culture, identity, and autonomy, such movements are able to alter the meanings associated with GM crops. Thus, it is through the mobilization of symbolic politics that organized opposition is able to succeed in influencing national legislation in areas dominated by trade concerns, material interests, and power politics. This argument is explored though a narrative analysis of policy development in Mexico. Despite its history of promoting biotechnologies, it has not yet introduced GM maize due to effective resistance, as maize is a powerful symbol throughout the nation. This thesis also briefly considers the cases of Brazil and India as useful contrast cases that allow us to draw larger implications.

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LIST OF ABBREVIATIONS

AIA	Advance Informed Agreement
Bt	*Bacillus thuringiensis*
CBD	Convention on Biological Diversity
CIBIOGEM	Mexican Inter-Secretarial Commission on Biosafety of Genetically Modified Organisms
CEC	(North American) Commission on Environmental Cooperation (NAFTA based)
COP	Conference of the Parties
CPB	Cartagena Protocol on Biosafety
CSO	civil society organization
CTNBio	Brazilian National Technical Commission on Biosafety
ENGO	environmental non-governmental organization
GE	genetically engineered
GEO	genetically engineered organism
GM	genetically modified
GMO	genetically modified organism
IBAMA	Brazilian Institute for the Environment and Renewable Natural Resources
ILN	Mexican National Institute of Ecology
IPR	Intellectual Property Right
LMO	living modified organism
LMO-FFP	living modified organism for food, feed or processing
NAFTA	North American Free Trade Agreement
NGO	non-governmental organization
SAGARPA	Mexican Secretariat of Agriculture
SEMARNAT	Mexican Secretariat of Environment and Natural Resources
TRIPS	Trade Related Intellectual Property Rights (WTO agreement)
UPOV	International Convention for the Protection of New Varieties of Plants
WTO	World Trade Organization

1. Introduction:

Agricultural biotechnology poses particularly daunting challenges to developing countries. As they seek to authorize and regulate this new technology, developing countries must balance between trade and the environment, between the interests of producers and those of consumers, and between domestic and foreign forces. Yet, with continually growing populations, the need to maximize export commodities and increase food security, the question of utilizing genetically modified (GM[1]) crops is one of increasing significance in developing countries. Furthermore, they must face these difficult tasks with a regulatory capacity that is inferior to that of developed countries. Despite conflicting goals, it remains unclear why some mid-level agricultural producing countries readily adopt such crops (Argentina), as others take a more precautionary approach while pursuing their own research and development (China). Some are outright preventative of introduction (Kenya), while other governments struggle to promote such crops in the face of public resistance (Brazil and India).

Mexico, on the other hand, has allowed the testing of GM crops (though not GM maize) for over thirteen years and does not have any significant barriers to the trade of GMOs, yet signed the Cartagena Protocol on Biosafety (CPB) in 2000 and to date has not legalized commercial production. How can one explain these conflicting and inconsistent policies that demonstrate both promotion and precaution?

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[1] For the purposes of this paper, GMOs are also referred to as living modified organisms (LMOs), or genetically engineered organisms (GEOs), or transgenic crops, as a result of the terminology employed by the incorporated literature. While most authors use the terms GMO, GEO or transgenic, the Convention on Biological Diversity and the resulting Cartagena Protocol on Biosafety employ the term LMO (theoretically more precise in terms of environmental concerns, as it does not incorporate pharmaceutical products resulting from biotechnology), and is defined as "Any living organism that possess a novel combination of genetic material obtained through the use of modern biotechnology." (CPB Article 3, (g)).

In explaining policy choices, scholars look at multiple interactive variables, often focusing on one as a primary determining factor. An interest-group approach would focus on the strength and organization of local farmers' organizations, domestic research bodies, and the presence of foreign biotech companies as well as that of civil society, environmental and non-governmental organizations (NGOs) (Bernauer and Meins, 2003). An institutional approach would alternately emphasize institutional and policy-choice options as well as capacity and precedent. Also important is the concentration of authority in local regulatory bodies to actualize their vision, as well as the strength of democracy and the ability of the public to access decision-making arenas (Paarlberg, 2001). Global Institutionalists would expect the nation's policies to reflect those of their dominant trading partners, and/or their involvement in international regimes and institutions (Clapp, 2006; Gupta and Falkner, 2006).

While each factor has explanatory power, outlining the complex setting in which decisions are made, such theoretical insights are insufficient to explain why the national policies of developing countries lack coherence. Many policies are not directly in line with domestic trade interests or those of dominant trading partners, nor with the espoused concern of protecting local biodiversity. Neither do they reflect the organized interests of the government, industries, and regulatory agencies in promoting GM crops. Of particular significance, international and domestic NGOs have waged broad resistance campaigns, but have thus far only been successful in delaying commercialization.

In this thesis, I argue that CSO and NGO groups are able to leverage their campaigns against GMOs by framing the debate in relation to larger issues through the use of symbolic politics. Framing GMOs in symbolic correlation helps shape associated

meanings to reflect broader concerns held by the population, thus enabling the resistance movement to broaden its membership base and create transnational networks. This is especially successful in contexts where GM crops or foods can be framed as a threat to highly valued resources, crops, and lifestyles. Resistance is nonetheless tempered by the predominance of trade relationships, national objectives of attaining international competitiveness and industrialization, which tend to dominate policy-making arenas. This, however, highlights both the significance and limits of symbolic resources as political tools. In order to better understand how resistance movements have been able to mobilize symbolic politics to influence policy decisions and the limits therein, analysis of their objective, how the issue is framed and the movement structured, and what allows success in some areas and failures in others must be gleaned from overall policy development.

These questions will here be explored through analysis of Mexico's conflicting policies towards GM crops and products. Mexico has recently been labeled a GM "mega-country,"[2] where, as of 2007, over 70, 000 hectares of land were under GM crop cultivation.[3] Considered one of the six "founder biotech crop countries," as it was one of the first nations to experiment with GM crops, the nation currently grows several varieties of GM cotton and GM soy, and is testing many others.[4] Mexico is open to trade in GMOs; the only requisites are the minimum Cartagena Protocol on Biosafety (CPB) standard of documenting imports containing more than five percent GM materials, and the fact that the nation does not allow for the testing or planting of GM maize. While the

[2] C. James, ISAAA Brief 32, "Global Status of Commercialized Biotech/GM Crops: 2004" p. iv. www.isaaa.org
[3] C. James, ISAAA Brief 37, "Global Status of Commercialized Biotech/GM Crops: 2007" p. 80. www.isaaa.org
[4] Ibid, 80-81;

latter is ostensibly due to the potential threat of gene-transfer into local landraces, the nation does not require GM maize imports to be milled at the point-of entry, leaving ample room for trans-genes to spread from this self-reproducing, open-air pollinating plant. This indicates that Mexico is not segregating its markets as traditionally understood, by regulating some portions of the same product as GM and others GM-free, but is rather creating novel demarcations between different types of crops. In light of the generally promotional approach towards biotech crops, the reasons for this single crop to remain GM free, and the ambiguous reasoning for the ban, warrants exploration. What explains the lack of coherence and stability in Mexico's GMO policy? Why did Mexico adopt pockets of precautionary policy within a larger permissive framework?

Following a preliminary background to the debate surrounding GM agri-biotechnology and the unique stakes of developing countries and Mexico, I explore prevalent theoretical explanations and current literature. Third, I will outline symbolic politics prior to the core of my theory, which seeks to build on the former. Following a discussion of the unique socio-cultural and symbolic significance of maize in Mexico, in the fourth section I outline the policy history of Mexico in relation to GMOs. In the fifth I provide analytical narratives of two key policy developments in Mexico, with particular emphasis on trade relationships and international regime participation (primarily NAFTA and the CPB), environmental and biosafety concerns, domestic interest groups, national objectives, and the rise of civil society (CSO) and nongovernmental (NGO) organizations' retaliation. Following a brief exploration of alternate cases, the paper concludes with a discussion of the implications of symbolic spaces (and associated ideational and identity boundaries) in further political studies.

2. The Significance of GMOs: The Larger Debates in the Literature

2.1 The General Debates:

Decades after their inception, genetically modified foods remain at the center of debates encompassing potential environmental and health impacts, globalization, democratic deficits, corporate control of the global food supply, patent laws, and biological diversity. The introduction of GMOs into the environment through the global agricultural system, the salience of the issues that have coalesced around them, and the inability to agree on a global regulatory system has led one academic to address the overarching debate as a "battle for global governance."[5]

Advocates of agricultural biotechnology[6] point to potential benefits for increasing agricultural yields and reducing chemical inputs; particular emphasis is placed on the needs of the hungry and resource poor farmers in developing countries. Crops with added nutritional benefits, resistance to drought, salinity, debilitating pests and viral plights are attainable benefits. Critics question the priorities of multi-national corporations (MNCs) responsible to shareholders and seeking returns on multi-million dollar investments. Crops thus developed are marketable to comparatively wealthy industrial farmers able to buy more expensive seeds and the pesticides they are resistant to,[7] while humanitarian and environmental potentials remain largely unrealized and under-researched. Further, international patent laws deprive many countries from the

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[5] Yves Tiberghien, "The Battle for the Global Governance of Genetically Modified Organisms: the Roles of the EU, Japan, Korea, and China in Comparative Context," *Les Etudes du CERI* 124 (April 2006), Institut d'Etudes Politiques, Paris.

[6] For discussion of arguments that agri-biotech can benefit biodiversity and food production, see: Jonathan Adler, "The Cartagena Protocol and Biological Diversity: Biosafe or Bio-Sorry?" *Georgetown International Environmental Law Review* (2000). Social Science Research Network Electronic Paper Collection: http://papers.ssrn.com/paper.taf?abstract_id=227644 . pp 5-10.

[7] The four main GM crops are soybeans, canola, corn, and cotton.

material benefits corporations gain from 'novel/ scientific discovery' resulting from the appropriation of genetic resources in developing countries, what critics call 'biopiracy.' Socioeconomic concerns add to overarching environmental concerns associated with commercial agriculture, monocultures, protecting biodiversity, gene flow, chemical tolerance and herbicide-resistant 'superweeds.'[8]

The fact of the matter is the benefits are contentious, the technologies are currently only selectively available, and no scientific consensus on the potential harms of agricultural GMOs has yet been reached.[9] In conjunction with the lack of a global regulatory consensus, the prevalence of academic literature focuses on limited aspects of such debates. Attention is given to the transatlantic divide in terms of regulation of GMOs (and reverberations within the international community), international trade and environmental regimes, and the potential for agri-biotechnology[10] to benefit the world's hungry and developing world farmers. There is great need, however, to incorporate analysis of developing country responses to the introduction of genetically modified crops, as these socio-political, trade, and decision-making environments are vastly different from those of the industrialized world.

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[8] Vandana Shiva, *Biopiracy:The Plunder of Nature and Knowledge* (1997) ; *Monocultures of the Mind:Perspectives on Biodiversity and Biotechnology* (1993); *Stolen Harvest: the Hijacking of the Global Food Supply* (2000).

[9] See, for example, Barbara Eggers and Ruth Mackenzie, "The Cartagena Protocol on Biosafety" *Journal of International Economic Law* (2000), 531; Adler (2000), pp 5-10.

[10] Biotechnology is implicated in a wide range of products, including agricultural products such as seeds, herbicides and pesticides, as well as health products such as pharmaceuticals, and other livestock and fish applications, the primary focus of biotechnology in this paper relates to agricultural biotechnology applications only. However, in relation to discussion of the 'biotech bloc' herein, the reader ought to bear in mind that the resources and sphere of influence of the biotech bloc is not limited to such products.

2.2 The Unique Stakes of Developing Countries

Developing countries have additional concerns and stakes with biotechnology. Mid-level agriculture producing developing nations depend on capital from commodity exports, and with more small-scale farms and less commercial agriculture, a greater proportion of the population rely on marginal profits. Increasing farm productivity and reducing losses from insect and viral plights are much needed benefits for many farmers, though the affordability of GM seeds, technology fees, and chemical inputs are not guaranteed. Further, as many nations in the global South are home to extensive biological diversity, there is much at stake in either adopting or avoiding biotechnologies. If a nation does not pursue its own GM sectors, it risks not being able to capitalize on the unique genetic resources found within its borders; if it does, due to the uncertainty of environmental impacts, it risks jeopardizing those very resources. In order to develop a domestic biotech sector or attract foreign companies, they must also have adequate intellectual property rights (IPRs) in place; this is expensive and time-consuming, and often requires making more stringent laws at the expense of domestic industries.

Furthermore, developing countries risk losing a competitive edge by not adopting GM crops, or at least preparing to do so, as development of "advanced science and technology infrastructure"[11] is a lengthy and expensive process. Ultimately, having the capacity to evaluate, regulate and process GMOs requires time to develop and refine, as does training scientists and bureaucrats to fill positions in the necessary agencies and institutions. If biotechnology is the technology of the future, many such countries may also want to not only have the capacity to regulate it, but also to have an internationally

[11] Sakiko Fukuda-Parr. "Preface," *The Gene Revolution: GM Crops and Unequal Development*, ed. Sakiko Fukuda-Parr. (Earthscan: London, 2007). p. xxix.

competitive biotech sector. However, many developing countries take a 'wait and see' approach as they are dependent on export markets and the policies of dominant trading partners necessarily influence autonomous decision making. The advent of the CPB has opened up the possibility of exercising precaution in terms of trading GMOs in cases of scientific uncertainty and negative environmental or socioeconomic repercussions. However, as long as commodity importers and wealthy OECD countries continue to view the WTO as the principle authority on trade regulations, and do not accede to the Protocol, room for autonomy remains questionable and limited.

To further complicate matters, many such countries have their own unique set of socioeconomic and historical circumstances that shape the needs and values of their local population, as well as different degrees of development of democratic institutions. This necessarily indicates different degrees of public involvement in decision-making, and while not always in line with the governments overall interests, ensuring the public is on board with policy choices, or at least involved in their development. For many, this is a necessary means of establishing public trust, and reducing the threat of social upheaval. Furthermore, most have indigenous and / or subsistence populations tied to the land, which are more susceptible to potential socio-economic disruptions with the introduction of more commercialized, input-reliant crops that do not allow traditional seed-saving practices to continue.

2.3 The Case of Mexico

In light of these unique challenges and the potential for benefits to reach such a large portion of developing country farmers, this paper explores the case of Mexico. A country gaining increasing attention within the academic community of late, Mexico is of

particular significance in analyzing GMO policy responses as the case lies directly in the midst of multiple debates. Mexico has both commercial and subsistence farmers, has strong trade and proximity ties with the US, the current hegemon and global leader in GM crops, and is an epicenter of great biodiversity.[12] Mexico also has a tumultuous history linked to democratization, land claims and industrialization, which are inherent aspects of its socio-cultural identity.

The advent of GMOs within Mexico provides a rich case study for analyzing the impacts of agri-biotechnology within the developing world, particularly insofar as it illuminates the tension between culture and development, and the conflicting interests of valuable trade relationships and the socio-economic wellbeing of a people whose history is tied to the land. The significance of these issues is here illustrated though analysis of maize in Mexico: how it come to pass that an area of rich biological diversity has pursued and adopted many agri-biotechnologies yet has refrained from introducing GM-maize, a staple crop in Mexico both for trade and consumption, which could arguably allow for the increased competitiveness of its commercial farmers and be of benefit to subsistence growers.[13]

2.4 Exploring Theoretical Explanations and Current Literature on Developing Countries:

Some scholars argue that when developing countries have GM crops unintentionally introduced into the environment, the policies of their dominant trading

[12] Mexico lays claim to more than 10% of the world's biological diversity in plant species, and is a center of origin for maize, tomatoes, beans, potatoes, chilies, cacao, agave, avocado, papaya, and amaranth. "Public Participation and the Cartagena Protocol on Biosafety: A Review for DFID and UNDP-GEF," p.64. www.ids.ac.uk/ ; Also see Engels et al. (2006).

[13] See for example, Adler (2000); Aerni and Bernauer (2006); Paarlberg (2002); Curtis et. Al (2004).

partner(s) largely shape the domestic response.[14] This, however, does not explain why Mexico has yet to legalize cultivation, much less the testing, of GM maize within its borders. As the number one recipient of American GM maize exports,[15] and with the unintentional introduction of such aforementioned trans-genes into the environment,[16] it is puzzling as to why the Mexican government has not officially adopted the technology for (or the ability to regulate) the one specific crop. While plausible that it is a question of protecting biodiversity, specifically its claim to being the genetic basin and origin of maize, this is far from likely given the continued production of other GM crops, particularly insect-resistant *Bt* cotton, of which Mexico also has domestic landraces.[17]

Others contend that the development of more precautionary legislation through the advent of the CPB *has* opened up more 'political space' to make independent decisions regarding the introduction of GM crops that could harm biodiversity (particularly without sufficient regulation).[18] While it is plausible that a refusal to incorporate GM maize into domestic agriculture is linked to Mexico's status as the genetic origin of maize, and as its current *in situ* guardian of maize's genetic diversity, this cannot explain why Mexico continues to import un-milled maize. Maize is an open-

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[14] Jennifer Clapp "Unplanned Exposure to Genetically modified Organisms: Divergent Responses in the Global South," *The Journal of Environment and Development* (2006) 15:3, p. 14.

[15] Mexico imports six different varieties of American GM maize for food, feed, or processing (Fitting (2006) p. 17).

[16] While the original study by Ignacio Chapela and David Quist (*Nature* 414, pp.541-543 (2001) that reported this was contested and the published study withdrawn from the journal, a recent study led by Elena Álvarez-Buylla of the National Autonomous University of Mexico (UNAM) in Mexico City has proven such gene transfer to have occurred. "Modified Genes Spread to Local Maize," *Nature* 456, 13 November 2008), p. 149.

[17] Aarti Gupta and Robert Falkner. "The Cartagena Protocol on Biosafety and Domestic Implementation: Comparing Mexico, China and South Africa," *Energy, Environment & Development Programme (EEDP BP 06/01), the Royal Institute for International Affairs*. March 2006. www.chathamhouse.org/eedp

[18] Gupta and Falkner (2006).

air, cross-pollinating plant with far-reaching seed, leaving ample room for gene flow.[19] Further, while Mexico was originally a staunch supporter of a restrictive, precautionary regime with strict labeling of any internationally traded GMOs during the CPB negotiations, the nation went on to sign a trilateral agreement with its NAFTA partners promising not to raise Advanced Informed (AIA) labeling thresholds above the initially agreed upon 5%.[20] This further weakens Mexico's claims of protecting biodiversity.

Thus, theories need to move beyond arguments that rely on single causal variables, and that do not fully take into account the unique circumstances developing countries face. Sakiko Fukuda-Parr, in her compilation *The Gene Revolution: GM Crops and Unequal Development*, seeks to provide analyses upon which such theories can build. Providing background, individual case studies, and comparative analysis, this work attempts, through exploring national capacities and constraints, institutions and policies, what has enabled developing countries to utilize biotechnologies, and how to be better able to promote development through such use. While the case studies shed light upon institutional and policy strengths and weaknesses, it is ultimately an empirical layout of policy choices and options. It explores which policy areas have been able to promote the use of GMOs and those that have not, but does not adequately explain *how* such institutions and policies came to reflect promotion or precaution.

Similarly, Paarlberg proposes a method of assessing the available choices for developing countries in terms of policy alternatives, then reviews the actual choices made by four developing countries. His policy choice spectrum identifies each as either

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[19] Clapp (2006), p. 9.

[20] Peter Andree, *Genetically Modified Diplomacy: the Global Politics of Agricultural Biotechnology and the Environment* (Vancouver: UBC Press, 2007), p. 260-61.

promotional, permissive, precautionary or preventative, and moves on to assess four countries' position towards GM technologies in five critical policy areas: intellectual property rights (IPR), biosafety, trade, food safety and consumer choice, and public research investment. While this demonstrates that there are indeed multiple factors at play in determining the overarching national stance towards biotechnology, there is again insufficient explanation of why some policy domains have been able to promote biotechnology while others have not. What is needed in both studies is a deeper exploration of how resistance to promotional policies succeeded in altering national policies despite the organized interests opposing them.

Thus, a critical factor missing from these more complex, multi-variable analyses is exploration of *how* key actors come to define their interests, and how policies come to reflect not only a culmination of actors' interests, but can actually oppose stated national or interest group objectives. In some cases, material interests, trade interests, or environmental goals are readily apparent in defining group interests; this is not always the case, however. For example, it cannot explain why so many rural farmers in Mexico joined the opposition movement; they are, according to biotech proponents, those the GM technologies are supposed to benefit by increasing yields while reducing inputs.

3. Delving Deeper: Symbolic Politics and GMOs

3.1 Current Approaches

Due to the complexity of policy-making contexts, scholars are increasingly turning towards more nuanced, interpretive means of identifying the ways in which decisions are made, as well as the range of possible choices from which decisions must be selected. In her recent work *Designs on Nature: Science and Democracy in Europe and the United States*, Shiela Jasanoff dispels arguments that different national policy frameworks arise simply from trade concerns, interest group activism, or institutional precedent.[21] Demonstrating the inapplicability of arguments of convergence, she explains the "persistent differences in national ways of meeting common economic and social challenges" through a deeper examination and understanding of political culture, or the "systematic means by which a political community makes binding collective choices."[22]

Peter Andree, in his 2007 analysis of the CPB in *Genetically Modified Diplomacy: the Global Politics of Agricultural Biotechnology and the Environment*, explores the discursive aspect of policy creation.[23] He argues that a discourse of precaution enabled and further entrenched by the CPB has altered the policy options before countries, as well as supplanted the discourse of risk that had previously dominated debates around agricultural biotechnology. This opened up political space to reassess and reiterate national and group interests both individually and internationally. Both of these analyses demonstrate the organic nature of both interests and policies, a key aspect of this study.

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[21] Sheila Jasanoff. *Designs on Nature: Science and Democracy in Europe and the United States*. (Princeton University Press: New Jersey, 2005) p.15.
[22] Ibid., p. 8, 21.

Kyoko Sato takes it one step further in her 2007 doctoral dissertation, *Meanings of Genetically Modified Food and Policy Change and Persistence: The Cases of France, Japan and the United States*.[24] Sato explores the development of shared discursive meanings found in specific policies through analysis of the changing frameworks surrounding GM foods in three key industrialized countries. She argues the shared definitions are found in public and private discourse, whereby institutionalized policies mutually reinforce, yet are constitutive of and contingent upon the evolution of the symbolic meanings of GM foods. While Sato responds to prevalent explanations for divergent policy frameworks, she incorporates greater sociological nuance to demonstrate the inter-subjective understandings that help shape individual perceptions of identity, risks and interests, which in turn are both reflected in and impacted by institutionalized policies.

Sato rejects "static and deterministic" explanations focusing on one predominant causal factor, and proposes that "examining meanings- *in addition to* other factors known to shape policy developments, such as material interests, institutions, national culture and contingent events- uniquely illuminates the ways in which policy unfolded … across cases and over time."[25] Neither the symbolic meaning that defines or is associated with GM foods determines national policy, nor does policy determine such collective understandings. Sato thus proposes a dynamic approach that highlights these two spheres as mutually constitutive and co-evolutionary, without one necessarily preceding or predetermining another. Meanings and politics are inseparable and by nature interactive,

[24] Kyoko Sato "Meanings of Genetically Modified Food and Policy Change and Persistence: The Cases of France, Japan, and the United States." Doctoral Dissertation for a Doctor of Philosophy Degree at Princeton University, presented in September 2007.
[25] Sato (2007), p. 2; emphasis added.

as "distinct, formal definitions of GM food in policy frameworks and various connotative meanings implied in policy, public discourses and social practices" develop and both explicitly and implicitly interact with political frames.[26]

3.2 Thesis Focus: Mobilizing Symbolic Politics to Counter Dominant Economic Interests in Developing Countries

Building from Sato's theoretical framework, I argue that national regulatory frameworks can be better understood as a culmination of responses by state and non-state actors to increasingly globalized localities. While governmental and institutional stances on such issues can largely be explained in relation to power politics, trade and environmental concerns, resistance movements operate across less organized sectors of society with fewer financial resources, yet come to have their world views reflect in national policies. Issue-framing itself represents a power struggle as actors are engaged in contestation over which associated meanings become dominant.[27] It is argued that successful issue-framing creates commonly-held meanings of GM crops that correlate with larger concerns held by the populace, enabling common resources (such as crops, foods or social structures) to take on symbolic significance and represent local understandings of autonomy, identity and traditions that are tied to the environment, diversity, and subsistence. Perceptions and meanings that carry such weight are difficult for institutionalized actors to ignore.

From this perspective, culture cannot be conceptualized as either uniform within a nation, or static. Rather, culture is viewed from a more anthropological perspective,

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[26] Sato (2007), p. 4.

[27] One interesting alternative way to address issues of symbolic politics and issue-framing, the creation and contestation of shared-meanings, would be through Michel Foucault's discussion on the interplay between power and knowledge in the formation of authoritative bodies of knowledge. See M. Foucault "Power/Knowledge," ed. C. Gordon, 1980. This, however, is beyond the scope of the present analysis.

aligned with peoples beliefs, ideas, feelings and meanings,[28] or as "the entire way of life of a society: its values, practices, symbols, institutions, and human relationships."[29] Beginning with this denser or 'thicker' notion of culture, it follows that one often cannot speak of a unified national culture, as there are often multiple contesting sectors that split society: "apparently homogenous communities are riven by conflicts of interest and linked into national and international networks of commerce and power. The 'global' is in the 'local'."[30] Where the local and global are inherently linked, then, one cannot, and indeed should not, look only to theories of globalization, modernization, or local grassroots development discourses in attempting to understand how culture and development interact.[31]

To accurately understand the realities of living in any locality, it ought to be recognized that the local is inherently tied to the global through commodity chains, labor markets, politics, and environmental circumstances themselves. It is then apparent that the world view of various sectors of society is linked to perceptions of how the global influences the local while local concerns are often articulated through global mediums (such as the internet and transnational networks). By recognizing these relationships non-governmental actors are able to identify and mobilize local values and symbols, linking the meaning of a specific occurrence to broader concerns, thereby helping to

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[28] Vincent Tucker, "Introduction: A Cultural Perspective on Development," *European Journal of Development Research: Special Edition: Cultural Perspectives on Development*. 1996 (8:2) p. 4.
[29] Samuel P. Huntington, "Foreword: Cultures Count," in *Culture Matters: How Values Shape Human Progress*. Lawrence E. Harrison and Samuel P. Huntington, Editors. New York: Basic Books. p.xv
[30] Tucker (1996), p. 11-12. Citing Jane L. Collins, "Development Theory and the Politics of Location: An Example from North Eastern Brazil," *European Journal of Development Research: Special Edition: Cultural Perspectives on Development*. 1996 (8:2). Esp. p. 63.
[31] See Tucker (1996), especially pgs. 1-3.

shape associated meanings and interests. This is why issue-framing plays such a central and pivotal role in the mobilization of resistance campaigns.

While the articulation of such localized concerns occurs through and within globalized contexts, where trade and development agendas tend to dominate policy frameworks, this paper demonstrates the unique means of influencing government decisions through the creation of symbolic spaces. This occurs when socio-historical factors are utilized in framing the issues surrounding the introduction of GM agricultural goods to broaden and strengthen local resistance movements, and to promote the use of transnational networks to vocalize and attain local demands.

3.3 Mexican Maize: A Resource of Symbolic and Political Significance

The case of Mexico highlights both the limits of local indigenous and environmental groups and the upper limits of power politics and trade relationships in shaping policy decisions. The latter is particularly apparent, given persistent US pressures, Mexico's shifting stance during CPB negotiations, and its national objective of industrialization. My argument is that neither biodiversity concerns nor trade relationships can independently explain the internally conflicting policies regarding GM maize in Mexico. Rather, in the midst of such trade-influenced arenas, framing the discourse of dissent around a symbol of national significance, maize, has enabled a coalition to mobilize around threats to biodiversity and socioeconomic wellbeing. Thus, successful opposition, in this case the ban on planting GM maize in Mexico, has allowed for the demarcation of symbolic spaces by drawing on the meanings and significance associated with maize: autonomy, culture, history and identity.

Some argue that the refusal to adopt technologies that could be of benefit to the local population demonstrates 'economically irrational behavior.' For example, some development theorists are critical of inefficient and maladaptive cultural practices based on arguments such that "folk populations typically adopt strategies that assure a life-sustaining but less than maximum yield of food, and they resist changes that entail what they perceive to be risks, even though these new food-providing practices would produce more food."[32] While some may view this as a 'maladaptive,' 'development-resistant,' or 'risk-adverse' facet of the local culture, there is arguably a deeper explanation for such behavior- primarily that there is more than economic or productive maximization at the heart of why subsistence farmers choose such agricultural practices. This may be found through cultural, environmental or socially reproductive analyses.

Thus, in the case of Mexico, despite the fact that concerns over GM maize and the conservation of maize diversity is inherently linked to the viability of Mexico's agricultural communities, it is also much more than a socio-economic concern, and has ultimately enabled diverse groups to unite under the banner of maize. Maize is a symbol of great significance in Mexico: over 80% of the area devoted to maize cultivation is of local varieties, and that it represents much more than a staple of crops and diets is seen in the fact that specific varieties are also grown for aesthetic purposes and ceremonial rituals. Families value farming maize for a greater sense of autonomy and security, and value how such a lifestyle maintains "*usos and custumbres*, traditions of reciprocity and local governance that date back to pre-conquest times and still guide decisions about land, forest, and water use, labor exchange, and other questions in many indigenous

[32] Edgerton, Robert B. (2000). "Traditional Beliefs and Practices - Are Some Better Than Others?" in *Culture Matters: How Values Shape Human Progress*. Lawrence E. Harrison and Samuel P. Huntington, Editors. New York: Basic Books. p. 137.

areas."[33] As such, even the trade-related North American Commission on Environmental Cooperation (CEC) acknowledges that, "Maize has significant cultural, symbolic, and spiritual values for most Mexicans." The CEC further notes that locals perceive the presence of GM material in local varieties as a "direct threat to political autonomy, culture, identity, personal safety and biodiversity."[34] It is of little surprise that maize is referred to as a "powerful symbol of the Mexican nation."[35]

This is the basis of the argument of this paper: within trade-dominated decision-making arenas, successful resistance of GM maize has been a question of creating and maintaining symbolically significant boundaries. The latter exist in accordance with commonly held perceptions and meanings linked to maize in Mexico, which are framed in association with culture, history, and identity, and the refusal to cede autonomy over such symbolically significant resources. According to Sato's analysis, culture may be thought of in dynamic terms as "a collection of diverse, fragmented and inconsistent elements, such as schemas, scripts, symbols or world views, that could be put to strategic use … that could shape and bias cognition and thought."[36] Thus, specific objects come to represent different perceptions of function, identity, benefit or risk, and can then be used as a tool for political mobilization. In the case of the opposition in Mexico, native maize came to represent culture, history, livelihoods, and autonomy, while GM maize was associated with NAFTA, the powerful influence of the US, neo-liberalism, and a loss of identity, dignity, and security.

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[33] Kathleen McAfee " Beyond Techno-Science: Transgenic Maize in the Fight Over Mexico's Future," *Geoforum* 39 (2008), p. 150.
[34] CEC Report 2004, referenced in McAfee (2008), p.153.
[35] Fitting (2006), p. 19.
[36] Sato (2007), p. 21.

4. The History of Policy and Regulatory Trajectories in Mexico: Conflicting Priorities

Beginning in the 1980s, and continuing throughout the 1990s under President Vicente Fox, Mexico's dominant strategy to rectify the debt/peso crisis was to pursue a neo-liberal economic model of development. One new component of this national mandate was to incorporate genetic engineering into local agriculture and industry; in 1988 the first GM crop was approved (insect-resistant *Bt* cotton), and many more have been granted testing-rights since.[37] Until recently, the only framework for biosafety regulation existed under the jurisdiction of the Ministry of Agriculture (SAGARPA), which developed a set of standards to govern GM crops that came into effect in 1995: the Mexican Official Standard NOM-056-FITO-1995 (known as NOM-056 for short). This legal mechanism

> established procedures for field-testing of transgenic crops but was silent about large-scale planting and commercialization. This gap in the regulatory framework was addressed by creatively interpreting NOM-056 to portray large areas (even extending to 10, 000 hectares) as experimental fields (and hence still requiring biosafety measures).[38]

In 1998 the Ministry if the Environment took an increased interest in the implications of GM crops and products at the same time as negotiations were underway for the Cartagena Protocol on Biosafety (CPB). The CPB is a piece of international legislation developed under the auspices of the United Nations' Convention on Biological Diversity (CBD) that regulates the transboundary movement of living modified organisms (LMOs). Also in 1998, the Mexican government declared a ban on

[37] Gupta and Falkner (2006).
[38] Ibid.

experimental cultivation of transgenic maize that was not lifted until mid-2004,[39] as there were concerns about potential gene flow into the closest wild relative, *teosinte*, and modified traits were of no perceived benefit to local farmers.[40] This ban was arguably the primary reason the Mexican government declined to join those resistant to regulation, the Miami Group, comprised of its NAFTA partners, Canada and the US, as well as other countries with vested biotech interests who opposed stringent regulation (Argentina and Australia). [41] Nor did Mexico join the Like-Minded Group, a coalition of 100+ developing countries and China, which advocated for strong regulation and labeling requirements in line with a precautionary stance.[42]

Rather, the Mexican government aligned with the Compromise Group, or those OECD countries that wanted adequate international regulation without unnecessarily restricting the trade of LMOs,[43] along with Switzerland, Japan, and Norway. Trade interests can arguably explain this maneuver, as Mexico was not only in a free trade agreement with two significant GM advocates (the US and Canada), but was also incorporating biotechnology into its domestic economy. An additional result of Mexico joining NAFTA was the introduction of more stringent IPRs; while Mexico is now in compliance with the WTOs Trade Related Intellectual Property Rights (TRIPS), the new 1996 legislation is still less restrictive than that of the US and still allows for seed-

[39] Clapp (2006), p. 8; Gupta and Falkner (2006).
[40] Elizabeth Fitting, "Importing Corn, Exporting Labor: The Neoliberal Corn Regime, GMOs, and the Erosion of Mexican Biodiversity," *Agriculture and Human Values* 23 (2006), p. 17.
[41] Andree (2007), p. 162.
[42] The precautionary principle states that in situations where lack of harm cannot be scientifically proven, one should take precautionary action.
[43] Clapp (2006), p. 6.

saving.[44] Mexico's IPRs in this area are largely based on the Union for the Protection of New Varieties of Plants Convention (UPOV), which the nation signed in 1979 and ratified in 1995 to meet pressures from the US and Section IV, Chapter 17 of NAFTA.[45]

In response to the tumultuous negotiations in Cartagena and rising public skepticism, an inter-agency institution (CIBIOGEM) was created to aid in the development and coordination of a national biotechnology policy in 1999. Following the ratification of the CPB, the Mexican Academy of Science proposed a national Biosafety Law designed by the Mexican Academy of Science, which was promotional to the further introduction of GMOs. Soon after, in 2004, a law was passed that allowed for the planting of GM maize in Mexico (though inter-ministry conflicts have continually inhibited the implementation of this specific law).[46] The Biosafety Law was adopted in 2005 and includes a proposed plan to introduce GM maize into Mexico. CSOs, NGOs, the Ministry of Environment and some scientists within the Ministry of Agriculture opposed the official introduction of transgenic maize, though governmental agencies (specifically SAGARPA) "have pressed for deregulation of GMOs as part of their effort to promote liberalization of agricultural trade."[47] Most recently, a few days in advance of the executive decree from the current President Felipe Calderon that the nation's ban on experimental crops of GM maize will be officially lifted, the mayor of Mexico City (Marcelo Ebrard) announced that his state will remain free of GM maize to protect local

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[44] Manuel Piotras, "Unnatural Growth: The Political Economy of Biotechnology in Mexico," in *Food For The Few: Neoliberal Globalization and Biotechnology in Latin America*, ed. Gerardo Otero, University of (Texas Press: Texas, 2008). p, 116-118.

[45] White, William and David Walden "Chapter 17: Intellectual Property Rights: Briefing Note for the Regional Integration of the Americas- Group 5, February 2, 1999. Accessed October 2009 from: http://wehner.tamu.edu/mgmt.www/NAFTA/spring99/Groups99/5/group5_1.htm.

[46] McAfee (2008), p. 155.

[47] Ibid., p.155

breeds.[48] It is in light of this conflicting and disjointed approach to promoting and regulating agri-biotechnology within Mexico that academics often look to external pressures and trade relationships to account for the disjunctions within national policies.

Table 4.1 Policies Toward GM Crops in Mexico

Policy	Promotional	Permissive	Precautionary	Preventative
Intellectual Property Rights		Compatible w/ TRIPS, based on UPOV, allows farmers to save seeds.		
Biosafety		Extensive field testing, adoption, maize excluded but imports not milled.		
Trade	No significant barriers to trade. (5% AIA labeling standards)			
Food Safety and Consumer Choice	No distinction between GMOs for feed or human consumption.			
Public Research Investment	Big domestic R&D sector			

Source: Adapted from Paarlberg (2001)

[48] Arturo Barba, "Mexico City Vows to Protect Historic Maize Varieties." 3 April 2009, www.scidev.net/

5. Analytical Narratives: Analysis of Two Key Policy Cases

5.1 Case One: The Cartagena Protocol on Biosafety

During the negotiations for the CPB, Mexico held a middle ground, compromising position, advocating for the right to exercise a precautionary stance without unnecessarily restricting the trade of GMOs. This stance reflects the final text of the CPB, which Mexico signed in 2002. While this mirrors Mexico's trade priorities, the reason for the precautionary divergence is related to the unique status of maize in Mexico. While the potential environmental threat GM maize could pose was the official cause of concern, this was largely a scientifically acceptable means of responding to the broader societal concerns of protecting the integrity of local maize and the autonomy of its production. This section discusses Mexico's involvement in the CPB, but also provides the context of NAFTA, as it is necessary to demonstrate Mexico's conflicting priorities regarding trade and the environment, and to frame the resistance campaigns.

The Mexican government signed a free trade agreement with Canada and the United States on January 1st, 1994. Whereas prior to the debt crisis of 1982 it was a national objective to remain self-sufficient in maize production, with emphasis placed on supporting small and medium farms,[49] under NAFTA this was to come to an end. Import tariffs and quotas were to be phased out, and "federal programs in support of Mexican food prices and rural producers had already been cut under policies to make the country "NAFTA-ready"."[50] Despite the fact that Mexico is the genetic basin for maize diversity and that it is the staple crop in the local diet, it was determined that American farmers had a comparative advantage in producing maize on commercial farms. Mexico, with its

[49] Fitting (2006), p. 16.

[50] McAfee (2008), p. 150. Some price supports had been in place for over 40 years (Fitting (2006), p.16.

comparative advantage in surplus labor and low production costs, was to "gradually open its doors to corn imports in exchange for guaranteed access to horticultural and other labor-intensive crops in Canada and the United States."[51] At the inception of NAFTA, American corn was roughly half the price of local corn in Mexico, not only because of the industrial production used up north, but also because American farm subsidies are three times that allowed to Mexican producers. By 2002, the "prices paid to Mexican producers had plunged to less than half of their pre-NAFTA levels."[52] Demonstration of the now entrenched trade relationship, and the impact it has had on local farmers, can be seen in current trade statistics:

> It estimated that U.S. farm and food exports to Mexico exceeded $11.5 billion in 2007 -- the highest level ever under NAFTA. From 2001 to 2006, U.S. farm and food exports to Mexico climbed by $3.6 billion to $10.8 billion. … The United States supplied more than 72 percent of Mexico's total agricultural imports in 2007, due in part to the price advantage and preferential access that U.S. products now enjoy.[53]

While it has been argued that Mexico "has developed a broad national consensus, symbolized by NAFTA, that its interests are best served by economic intimacy with the United States and Canada"[54] this is decidedly untrue. Despite the negative impacts upon the local population, the Mexican government was sure that trade liberalization under NAFTA would enable the industrialization and development the country sought over the previous decade. It is arguable, however, that such a relationship has been of mixed benefit. Most commercial agriculture occurs in Northern Mexico, while the small-scale

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[51] Fitting (2006), p. 16.
[52] McAfee (2008), p.150.
[53] GAIN Report MX8048 (2008) "Mexico Biotech Annual Report 2008" USDA Foreign Agricultural Services: http://www.fas.usda.gov/info/factsheets/reports.asp p. 8.
[54] David Landes, "Culture Makes Almost All the Difference," in *Culture Matters: How Values Shape Human Progress*, eds. Lawrence E. Harrison and Samuel P. Huntington, (Basic Books: New York, 2000) p. 6.

and subsistence farms exist in the more environmentally diverse and indigenous areas to the South: "According to SAGARPA, there are nearly two million corn producers in Mexico, and more than 85 percent of those growers have landholdings smaller than five hectares."[55] These small-scale and subsistence farmers have not stopped producing their own corn, despite drastically reduced prices paid to them. Some argue that this is because of a taste preference (locals prefer white corn for tortilla making, not the yellow corn produced by the US[56]) while others point to the cultural and dietary significance of the crop: "white corn varieties, which are mainly used for human consumption, continue to dominate domestic production. Corn is the most important staple crop in Mexico, with consumption of corn and tortillas accounting for about 47 percent of average caloric intake."[57] Either way, these farmers are "subsidizing their own corn production with the proceeds from other crops, or more often, from family off-farm labor."[58]

It has been noted by many that such rural farmers are protecting the diversity of not only local maize breeds but also multiple others of importance for human consumption.[59] Yet the government is decidedly ambivalent of their economic plight and the threat GM corn poses to such diversity (particularly with insufficient local knowledge of what GM is and how to prevent gene flow[60]). It is also now widely documented and accepted that such gene flow has already occurred. At the time the first controversial study was published in *Nature* in 2001 (see note 16 above), the Mexican National

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[55] GAIN Report MX8048 (2008), p. 9.
[56] Fitting, (2006), p. 17.
[57] GAIN Report MX9007 (2009) "Mexico Grain and Feed Annual Report 2009" USDA Foreign Agricultural Services: http://www.fas.usda.gov/info/factsheets/reports.asp p. 10.
[58] McAfee (2008), p.150. For a thorough discussion of this and associated implications, see Fitting (2006).
[59] Engels et al (2006).
[60] See, for example IFPRI Discussion Paper 00726 "Farmer Preferences for *Milpa* Diversity and Genetically Modified Maize in Mexico (Oct. 2007). www.ifpri.org

Institute of Ecology (INE) immediately conducted a study reporting similar findings. This led the Mexican government itself to complete an inquiry in 2002: while the report released to the public demonstrates transgenic presence in local varieties, the government has not taken any drastic or extensive measures to put an end to it.[61] Despite the fact that the government still has not approved transgenic maize trials or commercialization, this nonetheless demonstrates that the government is relatively ambivalent about protecting its vast maize biodiversity.

Based on these perceived threats to indigenous varieties, and the obvious tensions between industrialized development and rural agricultural and indigenous cultures, the Ministry of Environment in particular, and some specialists from the Ministry of Agriculture (which overtly pursues biotechnology as an integral part of liberalized trade in agricultural goods), actively fought against the legalization of GM maize.[62] Thus, while Mexico was simultaneously negotiating and signing onto NAFTA, the nation also had delegates participating in the United Nations Environmental Program (UNEP) Rio Summit in 1992. While there was controversy over whether the resulting Convention on Biological Diversity (CBD) should aim to include biotechnology as a factor in questions of biodiversity, this was eventually agreed upon. In the end, the CBD (which Mexico is a party to) that resulted from the Summit contained "two provisions that provided the legal basis for a biosafety protocol"[63] :

> Article 8 (g) requires Parties, at the national level, "to establish or maintain means to regulate, manage, or control the risks associated with the use and release of

[61] Clapp (2006), pp. 8-9.
[62] McAfee (2008), p. 154-155.
[63] Antonio G. M. La Vina, "Genetically Modified Organisms and the Cartagena Protocol on Biosafety: What is at Stake for Communities?" Working Paper No. 4: Globalization, Environment and Communities. World Resources Institute, February 2003, 13
http://governance.wri.org/project_description2.cfm?ProjectID=148

> living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health.
>
> Article 19 (3) calls on governments, at the international level to consider the need for and modalities of a protocol setting out appropriate procedures, including, in particular, advance informed agreement, in the field of the safe transfer, handling and use of any living modified organisms resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity.[64]

Pre-negotiations to actualize this protocol took place between 1992 and 1994, although the issue regarding the need for a protocol on biosafety was deliberated again during the first Conference of the Parties (COP-1) in 1994; the decision to begin actual negotiations did not occur until COP-2, held in Jakarta in November of1995.[65] COP-2 resulted in the "Open-Ended Ad Hoc Working Group composed of representatives, including scientific and legal experts, nominated by Governments and regional economic integration organizations."[66] The negotiations themselves took place between 1996 and 2000, with the end result being the Cartagena Protocol on Biosafety (CPB), the final text of which was agreed upon on January 29, 2000, in Montreal, Canada, only one year after the intended 1999 deadline. While much was left to be further specified at subsequent Meetings of the Parties (MOP), the Biosafety Protocol came into effect on September 11, 2003, ninety days after the 50th signatory had ratified.[67]

While one of Mexico's NAFTA partners, the United States, was not party to the CBD, and was therefore not a recognized party to the CPB, the States was still able to be a part of the pre-CPB negotiations, and actually led the Miami Group, which included

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[64] Reference to Article 19 (3) of the CBD and its contextual significance in leading to the CBP can also be found in Peter Andree *Genetically Modified Diplomacy* (2007) pp. 3, 113.
[65] B. Arts and S. Mack, "Environmental NGOs and the Biosafety Negotiations," in *European Environment* 13 (2003), p. 24.
[66] La Vina (2003), p. 13.
[67] Cartagena Protocol Signatories list, CBD website: http://www.cbd.int/biosafety/signinglist.shtml

Canada, Argentina, and Australia. Mexico was invited to join this negotiating bloc, which was comprised of those nations, which like Mexico, had strong commitments to biotechnology, but declined to do so. The primary reasoning for this was that "Mexico had recently put a moratorium in place on GE corn, because of worries that it could affect indigenous varieties of teosinite, so it wanted a protocol that would support this action, which it saw as vulnerable to a trade dispute under the North American Free Trade Agreement (NAFTA) or the WTO."[68] However, Mexico also declined to join the precautionary Like-Minded Group, opting instead to be a member of the Compromise Group, seeking comprehensive regulation but no serious impediments to the trade in or development of biotechnologies and their products. This makes sense in terms of domestic interests as "Mexico has a considerable biotech infrastructure, including a developing regulatory framework, world renowned biotech researchers and research institutions, a government commission dedicated to coordinating biotech policy, and active private sector organizations that promote the positive use of biotech."[69] This stance was also arguably acceptable to the general population of Mexico:

> In general, Mexican consumers, producers, importers, and retailers continue to be disengaged from the biotechnology debate; with the latter opting to let industry trade associations do any significant lobbying which may be necessary. Moreover, Mexican consumers are more concerned with price and quality than the source of their food … However, Mexicans do draw a distinction between biotechnology and genetically modified corn. Many, across the socio-economic spectrum, are concerned about the integrity of Mexico's native corn species. [70]

While a recent study on Mexican stakeholders' attitudes towards GM crops in general demonstrates that many actors 'pragmatically' perceive some benefits from

[68] Andree (2007), p. 162.
[69] GAIN Report MX8048 (2008) p. 3.
[70] Ibid., p. 8

adopting such technologies, it must be noted that the stakeholders surveyed did not include rural, subsistence farmers or local indigenous groups.[71] While it is argued that those included are significant as they are involved in the national debate and in shaping public perceptions regarding GMOs, and while some NGOs and church groups were included, the study is nonetheless restricted to government, academics, businesses, legislatures, and producer and consumer organizations. The primary backlash, however, has come from local and international CSOs, environmental NGOs and indigenous organizations.

Beginning in the late 1990s, while CPB negotiations were underway, local and international environmental groups mounted a campaign objecting to both field-testing and importing GM corn. Peasants, indigenous rights groups, and international NGOs later joined the campaign, though the issue was framed in conjunction with a rejection of NAFTA and the neoliberal policies of the government. The creation of CIBIOGEM to monitor biosafety issues in 1999 was reportedly a partial response to this increasing opposition.[72] If this institutional response was a result of the increased number of individuals and constituencies that joined the campaign, in addition to the broadened scope of their complaints, it is arguable that that the threat of GM corn became a more salient public and political issue that demanded government response once it was framed in relation to other concerns considered problematic by the Mexican population.

Further support of for the notion that issue-framing is critical to effective resistance campaigns lies in the fact that the internationally renowned Zapatista

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[71] Philipp Aerni and Thomas Bernauer, "Stakeholder Attitudes toward GMOs in the Phillipines, Mexico, and South Africa: the Issue of Public Trust," *World Development* (2006), 34:3, pp. 557-575.
[72] Fitting (2006), p. 18.

movement (EZLN) itself linked its resistance movement to NAFTA. They chose the day that Mexico signed NAFTA to launch their campaign for autonomy in the southern state of Chiapas. In the GM resistance campaign, linking autonomy, indigenous land rights, and socioeconomic concerns with the environmental threat broadened the base of the opposition. Indeed, it is arguable that the issues of NAFTA, biotechnology, maize culture, and subsistence, land-oriented lifestyles are inherently linked:

> the biotechnology debate in Mexico has centered almost exclusively on corn and the issue of biodiversity. Corn has a special place in Mexican culture and is considered part of the national patrimony. This stems from various factors including Mexico being the center-of origin for corn and a reservoir of its genetic diversity and it remains the most important crop in Mexico with about half the arable land dedicated to its production. Much of this corn production is associated with small-scale subsistence-type production that, in turn, is associated with a traditional way of life – a way of life that, before NAFTA, was highly regulated and protected. Because of these factors, biotechnology in Mexico has been focused on protection not only of the national patrimony but also of a traditional farming lifestyle that has come under threat as NAFTA has brought more competition and a gradual lifting of government protection.[73]

Nevertheless, in 2003, after signing on to the CPB (which required creating a comprehensive biosafety framework),[74] the Mexican government signed a trilateral agreement with its NAFTA partners, Canada and the US, stating that transports of LMOs must be accompanied by documentation that they may contain LMOs, or the those FFPs only require labeling if they contain goods over 5% GM composition.[75] This is a rather high threshold (compare to the EU's 0.9%), particularly if the government is trying to limit the contamination of local maize. In addition, Mexico does not distinguish between GMOs for food and feed but rather approves both for human consumption,[76] indicating

[73] GAIN Report MX8048 (2008) p. 7.
[74] Gupta and Falkner (2006).
[75] Andree (2007), p. 260-61; Clapp (2006), p. 9.
[76] GAIN Report MX8048 (2008) p. 4.

concerns over human health impacts are not the primary concern in relation to GMOs. Yet, as the nation still does not allow for the domestic testing or commercialization of GM maize, explaining the resistance to incorporate this one specific crop is arguably dependent on the cultural significance of maize.

If the primary concern was related to biodiversity, as a member of the CPB Mexico could arguably refuse to import GM maize (especially un-milled) based on the threat it may pose to local maize diversity. The CPB clearly enshrines the right to take a precautionary approach in Article 1 of the protocol, which states its objective is:

> To contribute to ensuring that 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.[77]

The form that this 'protection' may take is laid out in two Articles of the Protocol:

> Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism […] shall not prevent that Party from taking a decision, as appropriate, with regard to the import of the living modified organism […] in order to avoid or minimize such potential adverse effects.[78]

Analysis of the broader negotiations demonstrates that a good part of this success in achieving a precautionary piece of legislation to counter-balance the WTO is due to the large number of negotiating parties and the overall comprehensive nature of the participants. While the pre-negotiations were much more inclusive than the formal text-drafting meetings, there were not only states involved, but also industry representatives and a large number of CSOs that included many NGOs. Empirical analysis has demonstrated that environmental NGOs (ENGOs) were significantly influential as they

[77] CPB, Article 1.
[78] CPB, Article 10 (6), 11 (8).

acted, for many Southern delegates, as "biosafety experts who could articulate their interests and concerns within the accepted language of risk."[79] Furthermore, ENGOs were not only active participants in the preliminary stages, but also influenced the negotiations through "lobbying, advocating, promoting and mobilizing public pressure."[80]

Nonetheless, given that transgenic maize not only can, but also has, spread into local maize crops (with potentially irreversible effects on the maize diversity of the region[81]), and despite the lack of scientific evidence as to *all* the potential implications for local biodiversity, Mexico continues to import six varieties of American GM maize, un-milled. In fact, GM corn makes up over 30% of the approximately six million metric tons of corn imported from the US each year.[82] If the nation were only trying to ease trade relationships or yield to US pressure, it must be noted that it is in the interest of the American-backed biotech industry for Mexico to allow for testing and commercial planting, as well as for the nation to have another staunch pro-GM ally internationally. Arguably, it is also in the interest of American farmers, who would then be guaranteed a more accessible and welcoming market. Not only would Mexico be a veritable ally in the global battle over GM foods by incorporating all such possible crops and making it official that environmental concerns are of little significance, but it would also provide a more extensive market, as maize is the staple crop of Mexico.

With little inquiry or public debate, the Mexican Penal Code was changed in 2002 to make it illegal to store or introduce transgenic seed into the environment without authorization, causing agri-biotech supporters to seek legislative clarification as to what

[79] Peter Andree, (2007), p. 134-5.
[80] Arts and Mack (2003), p, 23.
[81] Clapp (2006), p. 8.
[82] Fitting (2006), p. 17.

was allowed and what was not. This led to the initial negotiations for a national Biosafety Law in 2005 designed by the Mexican Academy of Science, which was promotional towards introducing GM maize into Mexico and "points to the influence on regulation of those with specialized knowledge who are also themselves producers of the regulated technology."[83]

In response to such developments, in 2002 a group of 21 indigenous communities from the southern state of Oaxaca and three NGOs (Green Peace Mexico, the Mexican Center for Environmental Law, and the Union of Mexican Environmental Groups) made a formal request to investigate the effects of transgenic maize in Mexico. Backed by organizations within the three NAFTA nations, the request was put to the NAFTA derived North American Commission on Environmental Cooperation (CEC), which was created to act as an advisory group, investigating and providing recommendations to the three environmental ministries on topics of transboundary environmental concern. The CEC report was finalized in 2004, and "argues that GM corn in Mexico is unacceptable largely because of social and cultural factors rather than for known risk factors for gene flow or human health."[84]

Furthermore, despite the lack of scientific consensus that gene flow was affecting biodiversity, the report "recommended that Mexico maintain its ban on planting of GM maize, that more studies on effect of gene flows be conducted, and that GM corn shipped to Mexico be milled at the port of entry."[85] While the study was not well received by either the Mexican or American governments (who claimed the report did not assess the

[83] Gupta and Falkner (2006). It should also be noted that the Mexican Academy of Science eventually insisted upon the regulation of GMOs "once their presence was a *fait accompli*." McAfee (2008), p. 155.
[84] Fitting (2006), p. 19.
[85] CEC, 2004. Summarized by Clapp (2006), p. 10,

positive potential of GM maize, and was not presented in a sufficiently scientific discourse), this was a large victory for the environmental and indigenous coalition. [86] Thus, while "Mexican federal agencies have worked to weaken the regulation of international trade in GMOs"[87] by acting (as the only NAFTA member that is party to the CPB) to lower labeling requirements and pass promotional domestic legislation, they still have not been able to introduce GM maize, despite frequent attempts. NGOs and CSOs have meanwhile gained much needed leverage to ensure GM maize is not adopted, although the ensuing actions of the government, after ratifying the CPB in 2002, demonstrates the continued attempt to do so.

Framing resistance to GMOs as a part of greater issues, such as NAFTA, indigenous and land claims issues, environmentalism, culture, public participation, and governmental legitimacy, has enabled a more successful movement to take shape, indeed one that has taken on transnational dimensions. The anti-GM maize movement now represents a coalition of organizations that claim membership of over 25 million Mexican agriculturalists, which have joined under the slogan "*El Campo no Agunata Mas*" ("The Countryside Can't Bear Anymore"), and have begun networking internationally:

> Civil society opposition to agricultural liberalization and GMO deregulation are the outcomes of decades of rural organizing and farmer-scientist exchanges. Campesino [rural farmer] and indigenous organizations, academics, and activists have held Forums in Defense of Maize where these ideas have been debated and elaborated. They have participated in international conferences and protests along with networks of other farmers and activists, including Via Campesina, Brazil's Movimiento Sem Terra, and peasant organizations from other Latin America countries, India, Bangladesh, Thailand, the Philippines, Indonesia, East, West, and Southern Africa, the United States and Europe.[88]

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[86] Clapp (2006), p. 10.
[87] McAfee (2008), p. 155.
[88] McAfee (2008), p. 157.

It is apparent, in exploring the conflicting interests involved both directly and behind the scenes of the CPB negotiations that it has been the specific issues surrounding maize that has resulted in the lack of a fully promotional stance towards GMOs. With farmers vying for international and domestic competitiveness, national policies aimed at incorporating biotechnologies, and a largely uninvolved and ambivalent consumer faction, the most effective, if not the only means of resisting GMOs has been due to the cultural importance associated with maize. As a result, it is only maize that has remained unsanctioned, though no GM crops have yet been legalized for commercialization. In short, within the environmental medium of the CPB, and in opposition to the trade-dominated concerns of the Mexican government, successful opposition has been the result of mobilizing the population around a symbolically significant resource, maize, framed in conjunction with over-arching socio-economic concerns.

5.2 Case Two: The Biosafety Law

The Biosafety Law of 2005 was introduced to coordinate national biotech laws with international regulations. As the law was promotional towards GMOs, it received organized backlash from local actors, though this did not prevent its inception. However, due to the sensitivity of the GM maize issue, approval for testing of the commodity, while intended under the law, has not yet occurred. Continued resistance by CSOs and NGOs has been complimented with local government rejection, delaying the necessary legislative stipulations. This case demonstrates the limits of both local resistance and the pursuance of unsupported institutionalized economic objectives.

Further evidence that the Mexican government used its membership in the CPB and the creation of CIBIOGEM to advance plans of introducing GMOs is that the

Senate's ratification of the CPB "helped to insure final congressional approval of the Bio-safety law in February 2005, as Mexico was obligated under the CPB to pass domestic legislation in order to harmonize its domestic laws with its international obligations."[89] Thus, the government fulfilled its obligation by passing the *Ley de Bioseguridad de Organisimos Genicamente Modificos* (or GMO Biosafety Law) in 2005, which essentially

> permits commercial planting of transgenic maize and other crops but makes importing, testing, and planting of transgenic maize subject to permission on a case-by-case basis and forbids GMO planting inside to-be-defined 'restricted zones' of crop genetic diversity. It creates a national Commission on Biosafety, calls for new biosafety standards and food labeling rules, and mandates funds for collecting data on indigenous and genetic resources, monitoring GMOs and implementing the international Biosafety Protocol … It enumerates fines for violation of the law but without clear enforcement mechanisms and provides for involvement of at least five state agencies in biotechnology regulation. *In its content and complexity, the Biosafety law echoes a continuing ambivalence about GMOs*."[90]

It is arguable that the ambiguity of the law is designed to satisfy multiple interests without ruling out any future options.

Nevertheless, the Biosafety Law met with protests by both environmental groups and farmers' organizations, largely by calling out the government for acting against the commitments made by signing on to the CPB:

> A statement by 17 Mexican non-governmental organizations denounced Mexico's biosafety law – dubbed the "Monsanto law" by these critics – for neglecting the principles of precaution and prior informed consent, for failing to consult those likely to be affected by GMOs … and for failing to take a holistic approach to biosafety [which] requires safeguarding farmers' rights to continuing producing and exchanging seeds freely and without fear of transgenic 'contamination'…[91]

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[89] GAIN Report (2008) p. 8

[90] McAfee (2008) p.155, emphasis added; Also see Clapp (2006), p. 10.

[91] McAfee (2008) p.155

Furthermore, with the inception of the Biosafety law the resistance movement has continued to broaden its membership and mandate by incorporating a discourse of food sovereignty and attacking neoliberal economic interests:

> a coalition of eight civil-society organizations led by Mexico's National Association of Rural Commercial Producers (ANEC) denounced the law as an outcome of power relations in the North American agro-economy. The new law, they stated, favors only the few beneficiaries of traffic in cheap corn: transnational agri-business firms and Mexican companies producing maize flour and animal feed.[92]

While this resistance has also relied on both a domestic and transnational member-base, concerns over a Mexico-specific piece of legislation has made the impact felt by the government arguably different. The CPB was an international affair with specific reverberations for the Mexican populace; it is decidedly more difficult to engage the same degree of pressure from outside sources (as the CEC report did, for example) when it is a question of domestic regulation. Not only was the government *required* to create a Biosafety law to meet its CPB obligations, it was better able to do so without the involvement of CSOs, NGOs, or other form of public involvement. As biotech proponents created the law in a more closed venue, it seems inevitable that the result would reflect the interests of industry and those in government.

In July of 2008, the Secretariat of Environment and Natural Resources (SEMARNAT) published in Mexico's Federal Register the report 'Implementing Regulations of the Bio-safety law' ("Reglamento"), which is amongst the last steps needed to implement the 2005 law. One report notes that industry sources claim the objective is to "harmonize and consolidate Mexico's biotech policies while allowing greater certainty in regards to the requirements and terms for the execution of the law. *At*

[92] McAfee (2008), p. 157.

the same time, it constitutes a clear incentive to use innovative biotechnology in the agricultural sector."[93] The report also has a specific section dedicated to outlining a new 'Special Regime' enabling the introduction of GM maize into Mexico, to comply with the provision of the 2005 Biosafety law requiring the development of regulations to protect native landraces. This specific publication has been greatly anticipated as "with this Special Régime for the Protection of Corn in place, it is expected that SAGARPA would then begin to authorize the permits for the experimental field trials of up to18 biotechnology corn varieties."[94] While this was to have been produced sixty days after the original report was to be released, more than one year later, this Special Regime has not yet been published.

Most recently, in April of 2009 and only a few days in advance of the executive decree from the current President Felipe Calderon that the nation's ban on experimental crops of GM maize will be officially lifted, the mayor of Mexico City (Marcelo Ebrard) announced that his state will remain free of GM maize to protect local breeds.[95] While the lack of a published 'Special Regime' on GM maize introduction is promising, along with the continued support of local governments to remain GM free, this does not bode well for the GM resistance movement in Mexico. Primarily, it demonstrates that despite many achievements, the campaign has ultimately only been successful in delaying the introduction of GM maize. Ultimately, this discussion highlights both the limits of local indigenous and environmental groups and the constraints on power politics and trade relationships in shaping policy decisions.

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[93] GAIN Report MX8048 (2008), p. 3, emphasis mine.
[94] Ibid., p. 3.
[95] Arturo Barba, "Mexico City Vows to Protect Historic Maize Varieties." 3 April 2009, www.scidev.net/

6. Bringing in Other Developing Countries: Brazil and India

Two other mid-level agricultural producing developing countries, Brazil and India, have tumultuous histories tied to the introduction of agricultural biotechnology. Extensive transnational campaigns have been waged in opposition to GMOs, whereby attempts by the national government to promote GMOs have been far less than successful and long delayed. How the meanings associated with GMOs were developed, the resistance campaigns framed, and national policies impacted offers extended support of the core theoretical arguments of this thesis. Ultimately, each case demonstrates that CSO and NGO groups were able to leverage their proposed rejection of GMOs by framing the debate in relation to broader social concerns, though these campaigns have nonetheless been tempered by the predominance of each nation's objectives of attaining international competitiveness and industrialization.

6.1 India

India has a long relationship with traditional biotechnology dating back to the middle of the twentieth century, the advent of the Green Revolution, and has over the years developed strong domestic institutions capable of regulation as well as research and development (R&D). In large part this is due to the need to raise farm productivity to combat poverty in general, particularly in extreme drought, pest and disease-ridden areas, as well as promote food security.[96] The government created the Department of Biotechnology (DBT) in 1986, which funds education, research, and training, and is involved in most public research within the nation. The DBT considers biotechnology to be a market in which India could be globally competitive. While this bodes well for

[96] Bharat Ramaswami and Carl E. Pray, "India: Confronting the Challenge- The Potential of Genetically Modified Crops for the Poor," in *The Gene Revolution: GM Crops and Unequal Development*, ed. Sakiko Fukuda-Parr. (Earthscan: London, 2007). p. 157-8.

R&D in crops grown and used by local farmers, not one from the public research sector has undergone sufficient field trials or is close to commercialization.[97]

The private sector is also involved in India. Monsanto and Mahyco (an Indian seed company) have a joint venture in *Bt* cotton, and have since sub-licensed the gene to at least 20 other firms in the country.[98] While merging the technology and seed company demonstrates the government's desire to maintain involvement, Monsanto purchased 26% of Mahyco's shares in 1998 with the publicized intention of using the company as a vehicle to "penetrate the Indian agriculture sector in a big way."[99] This, along with Monsanto's patent on the 'terminator gene' (gene use restriction technology, or GURT) resulted in organized backlash from local and international NGOs as well as opposition parties. This movement built on a strong tradition of anti-GM resistance dating back to mid 1990's, when India's Research Foundation for Science, Technology and Ecology joined an international campaign arguing that patent laws would disadvantage the 80% of India's farmers that relied on seed-saving practices.[100] The issues surrounding GM technologies were then after framed in relation to negative views of globalization, loss of autonomy, and a threat to traditional farmers (and seed-saving) in general.[101]

The resistance movement has been successful in articulating environmental concerns and the potential for more stringent intellectual property rights (IPRs) to reduce the viability of both seed-saving practices and control over domestic genetic resources. With the inability to stop farmers from illegally planting GM seeds, the multiple

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[97] Ramaswami and Pray (2007) p. 159-60.
[98] Ibid., p. 161.
[99] Quoted in Parrlberg (2001), p. 99.
[100] Andree (2007) p, 83.
[101] Paarlberg (2001), p. 100; Ramaswami and Pray (2007) p.163.

controversies surrounding GM foods, and three competing regulatory sectors (agriculture, biotechnology, and environment) approval for testing is extremely slow.[102] As a result of the many pressures faced by the government, official support of biotechnology is mainly in R&D, leaving other policy areas restrictive. In 2004 the government adopted a strategy that first restricts GM research in export crops and disables commercialization in 'agro-biodiversity zones' and 'organic farming zones. It secondly ranks priorities favoring non-GM biotechnologies and ranking crops and traits that deserve GM research, which generally reflect the needs of poor farmers.[103]

India has a much more precautionary policy framework than that of Mexico, yet Mexico has had more success in terms of delaying the introduction of GM crops. The Indian public has greater institutional access to government decision-making arenas and a strong Supreme Court, meaning the public is better able to influence national policies through traditional democratic avenues than their counterparts in Mexico. Yet, despite the promotional policies the Mexican government introduced through less democratic means, opponents to GMOs have created a successful means of influencing the ability of the government to utilize this promotional policy framework. The strength of the resistance movement that has coalesced around the crop, due to the salience of the symbolic significance of maize, has resulted in a government hesitant to act on its own policies.

[102] Ramaswami and Pray (2007) p. 163.
[103] Ibid., p. 159.

Table 6.2 Policies Towards GM Crops in India

Policy	Promotional	Permissive	Precautionary	Preventative
Intellectual Property Rights			Compliance with TRIPS but no patents granted	
Biosafety			Some GM crops introduced, but clear GM free zones	
Trade				Preference for GM-free imports and exports.
Food Safety and Consumer Choice		Separate testing for GM, but by same standards. No labeling req's.		
Public Research Investment	High capacity but low investment $3m/y 2002-7			

Source: Adapted from Paarlberg; info from Parrlberg (2001) & Raswami and Pray (2007)

6.2 Brazil

Brazil, similar to India, has a strong tradition of a high degree of public involvement and access to political decision-making. Agricultural biotechnology was part of a larger national objective of commercialized agriculture and increased commodity exports that, by 1995, led to the creation of CTNBio, the nations regulatory authority on GM crops, which comprised actors and specialists from sectors of society, government and industry.[104] With the introduction of internationally acceptable patent

[104] Hochstetler, Kathryn (2007) "The Multilevel Governance of GM Food in Mercosur," in *The International Politics of Genetically Modified Food: Diplomacy, Trade and Law*. Robert Falkner, Ed. Palgrave MacMillian: New York. p. 167.

laws in 1996, CTNBio went ahead authorizing field trials, with commercialization of Monsanto's RR soy in 1998. Public backlash, however, was not restricted to public protests and campaigns, but rather went through the courts of Brazil.

Led by the consumer group IDEC (a former member of CTNBio that resigned on principle), local social movements, Greenpeace and the Ministry of Environment (and its subset IBAMA) joined the cause, arguing that CTNBio had no constitutional right to act without equal authority being held the Ministries of Health and Environment. When the courts ruled in their favor, the result was a judicial moratorium (pending an adequate environmental impact survey) on GM crops that lasted from 1998 until 2005. With the election of a sympathetic Worker's Party president in 2002, anti-GMO activists expected their cause to be benefited, and although the Lula administration did change the 1995 legislation, it was to allow for the sale of GM soy by farmers growing it illegally in the south. More than 500 environmental groups wrote the government of their disapproval, and the Landless Workers Movement (MST) increased its direct actions.[105] Resistance was primarily framed as a question of socio-economic impacts (soy is primarily a larger-scale commercial crop), as well as a threat to environmental and biodiversity preservation, and as requiring greater public involvement. This issue-framing was particularly salient as there are still-unrealized land reforms, which additionally affects the environmental resources of the Amazon as poor farmers slash and burn to lay claim to land (unproductive land is legally claimed by occupation).

Following the increased campaigning against GMOs, the Lula administration introduced a proposed Biosafety Law in 2003 to the senate, granting activists the

[105] Hochstetler (2007), p. 168-9.

Ministry of Environment much greater authority, but then went on to amend it behind closed doors until it became the Biosafety Law No. 11.105.[106] This law was largely based on the temporary provisions introduced by the government to accommodate illegally planted GM soy, and was thus much more promotional than the original draft.[107] Furthermore, it placed CTNBio back in the seat of power as environmental impact assessments were to be completed upon their request.[108] Currently, Brazil is the world's third largest exporter of GM crops with over 15 million hectares under GM cultivation in 2007.[109] Thus, while the resistance movement was initially successful and demonstrated widespread social, institutional and legal influence, it was ultimately only able to delay the introduction of GM crops.

The case of Brazil demonstrates that there are indeed limits to issue-framing in achieving the long-term policy goals of the resistance campaign. The legalization of GM soy may in large part be due to the fact that it was being grown extensively during the judicial moratorium, but nonetheless, the government acted in direct opposition to the broad resistance movement. This may also be because soy is not as culturally significant as maize is in Mexico, though as the Biosafety Law in Mexico demonstrates, the government is continuing to pursue a promotional GM maize agenda. Mexican opponents would be wise to petition for maize imports to be milled at point of entry to ensure gene-transfer does not escalate and justify legal adoption of the GM crop.

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[106] Hochstetler (2007), p. 169

[107] Jose Maria F. J. da Silveira and Izaias de Carvalho Borges (2007), "Brazil: Confronting Challenges of Global Competition and Protecting Biodiversity," in *The Gene Revolution: GM Crops and Unequal Development*. Sakiko Fukuda-Parr, Ed. Earthscan: London. p. 112.

[108] Ibid., p. 114.

[109] James (2007), p. 23.

Table 6.2 Policies Towards GM Crops in Brazil

Policy	Promotional	Permissive	Precautionary	Preventative
Intellectual Property Rights		PVP Law based on UPOV; allows for seed-saving		
Biosafety		**Post-2005:** Brazil is now within the top 4 GM nations in the world, and approvals move more quickly	**Pre-2005:** 7 year moratorium due to public resistance; GM soy grown illegally in the south	
Trade			CPB signatory, wants higher labeling, some areas distinctly GM free for export markets	
Food Safety and Consumer Choice			Not full market segregation, but some product labeling	
Public Research Investment	Significant R&D capacity and expenditures $300m/y since 1994			

Source: Adapted from Paarlberg (2001)

7. Conclusions and Implications for Future Analysis

In attempting to explain the largely incoherent national policy framework pertaining to GMOs, specifically GM maize in Mexico, Sato is correct that "examining meanings- in addition to other factors known to shape policy developments, such as material interests, institutions, national culture and contingent events – uniquely illuminates the ways in which policy unfold[s]".[110] In all three cases illustrated above, opposition movements were successful in organizing a coalition that raised extensive awareness and pressured the government to take their concerns into consideration, thereby influencing national policies. While there is need for greater analysis of the cases of Brazil and India, the brief overviews demonstrate that the meanings associated with GMOs were indeed organic and developed in relation to successful issue-framing, whereby public perceptions and national policies were mutually constitutive (sometimes positively, sometimes negatively). Identifying such relationships helps explain the convoluted and contradictory policy frameworks adopted by developing countries.

While all three cases are similar, Mexico has had more success in restricting the introduction of GM maize as it has the strongest symbolic framework. Successful opposition resulted from the symbolic basis of maize in issue-framing by resistance actors- the specific meanings, risks, identities and other issues, that were associated with the specific act of GM maize infiltrating Mexico.[111] By framing GM maize as not only an environmental but also a socio-economic NAFTA-related issue, the movement gained a diverse set of members that crossed class-based, cultural, and even national boundaries, with concerns about the loss of autonomy and threats to cultural and historical identities.

[110] Sato (2007), p.2.
[111] Sato (2007).

Thus, symbolic politics help explain the somewhat contradictory policies of the national government in Mexico. While the government aggressively pursued a mandate of neo-liberal development and agricultural liberalization, the nation nonetheless has not fully adopted GM technologies; thus, the Mexican government has not acted in line with its trade interests or those of its dominant trading partner, the US. While the government obviously views such relationships and technologies in a beneficial way, it is argued here that the symbolic significance of maize has led to the above-analyzed contradictions within the national policy framework, not concerns about local biodiversity or genetic conservation. The high labeling thresholds outlined by the tri-lateral agreement and the rejection of the CEC report are evidence of this, as is the fact that the guardians of such genetic diversity, the rural farmers and indigenous populations, continue to be marginalized. GM maize has been neither adopted nor promoted within the country due to the salience of the symbol of maize itself; the backlash from the people has demonstrated that the symbolic space associated with maize will not be given up easily, as it would be intrusion into contentious areas of culture, history, and identity.

Thus, the argument here is that GM maize remains unsanctioned due to the salience of the symbol of maize itself. Resistance has demonstrated that some things are more important than promises of increased economic growth or industrialized development and modernization. This does not mean, however, that such local cultures are development-resistant or under-achieving; nor was there an interest in reverting to traditionalism. In a nation readily adopting many biotechnologies and importing still more, with no distinction between GMOs for human consumption or for animal feed, GM maize has been singled out as unacceptable due to its symbolic, cultural significance.

Global means of resistance were embraced in order to reject a form of imported development technology that was deemed culturally unacceptable in terms of local perceptions and meanings of identity, community and family relationships, and ties to spiritualism and the land.

The unique status of maize enabled its use as a symbolic resource in articulating local concerns, needs, and aspirations. The intersection of the global with the local is no longer an option that can be rejected; it is a reality that alters local, social, and literal landscapes. At times this may be an imposition (NAFTA and the infiltration of GM maize) and at others a choice (networking internationally and addressing issues associated with global processes). Yet, embracing this truth will enable those within the immediate locality to articulate their unique version of development- how they want to achieve their version of reality. While resistance is not always successful in all areas, it would be interesting to study whether the successes attained empowered local populations, leading to further organizing to articulate other needs, concerns and goals.

It remains to be seen whether the Mexican government will continue to promote GMOs by allowing transgenic maize trials (hopefully with more effective regulatory oversight to maintain biodiversity), or if the nation will maintain its planting ban, thereby solidifying the symbolic space around native maize. Given the recent contradictory statements made by the federal government and that of Mexico City, it will undoubtedly be a controversial decision and provide a rich area for analysis. In such future analyses it is recommended that the symbolic significance of maize, and the associated strength of the movement to protect its origins, be paid close attention, as this is undoubtedly a battle over symbolic spaces and the ideas and identities they represent.

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