The Politics of Transgenic Food:
An Ethnographically Informed Analysis of the Ban on Genetically Modified Crops in Bolivia

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Description of Research

This project seeks to ethnographically explore the ways in which farmers, agricultural researchers, agronomists, biologists and environmental advocates in three diverse communities in Bolivia experience and understand the recent national rejection of the agricultural technology of the genetic engineering of plants. Genetic engineering is the process in which scientists isolate an individual gene from an organism, remove it, and transfer the gene to another related or unrelated organism.[1] This creates the ability to enhance desirable traits or suppress undesirable traits of plants, such as creating resistance to pests, pesticides, and weather or improving shelf life. The key advantage of genetic engineering is a more efficient, more precise and faster way of plant breeding.[2] The crop varieties created through this process of genetic modification are generally known as genetically modified organisms (GMOs) or transgenic crops.

Controversy surrounding development and use of transgenic technology illustrates moral, political, social and economic conflicts, presents risks and creates complex societal decisions with the potential to impact ecological systems, diversity of life, health (both natural and human), poverty and wealth, global food security, economic gains, and the preservation of culture. The myriad of possible outcomes are complex and oftentimes contradictory, circumstantial and dependent on a variety of factors and can be both beneficial and problematic. Because arguments surrounding transgenic technology are mainly based on future predictions, there are no clear answers. Human society must weigh benefits and potential risks according to what we value most in order to come to a conclusion on if and how we develop and utilize this technology.

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[1] Glenn D. Stone, "The Anthropology of Genetically Modified Crops," *Annual Review of Anthropology*, 39 (2010): 382.

[2] Sakiko Fukuda-Parr, "Introduction: Genetically Modified Crops and National Development Priorities," in *The Gene Revolution: GM Crops and Unequal Development,* ed. Sakiko Fukuda-Parr (London: Earthscan, 2007), 5.

Both proponents and those opposing transgenic technology are prone to grandiose claims, ranging from solving world hunger to carcinogenic effects of eating transgenic foods. [3] Those in favor of transgenic plants argue that the technology enhances productivity, which can increase income and reduce hunger, increases food production and food security, and increases aggregate production and growth of a countries' gross domestic product. In addition, this technology allows countries to participate in the forefront of scientific and technological progress and the global economy rather than be marginalized from it. [4] Some also make the argument that genetically modified crops increase output stability and are generally less risky for both farmers and for global food security. Those who present arguments against transgenic technology base them on future concerns of ecological degradation, sustainability of land use, threats to the survival of traditional livelihood systems, undermining of biodiversity, dependence on commercial seed companies and the loss of self-sufficiency and control for farmers, human health concerns, and socio-economic and cultural risks. [5]

This project investigates a country that has recently committed itself to replacing all genetically modified crops with non-altered crops. Various factors, limitations and benefits associated with allowing or banning transgenic technology are examined through interviews with various stakeholders in Bolivia. This study hopes to illuminate the controversy of transgenic farming and to examine one country's path and the way it is experienced and understood by those residing in the country.

The *Law of the Rights of Mother Earth* (*Ley de Derechos de la Madre Tierra)* is a new and unique Bolivian law passed in December of 2010 and enacted in October of 2012 under

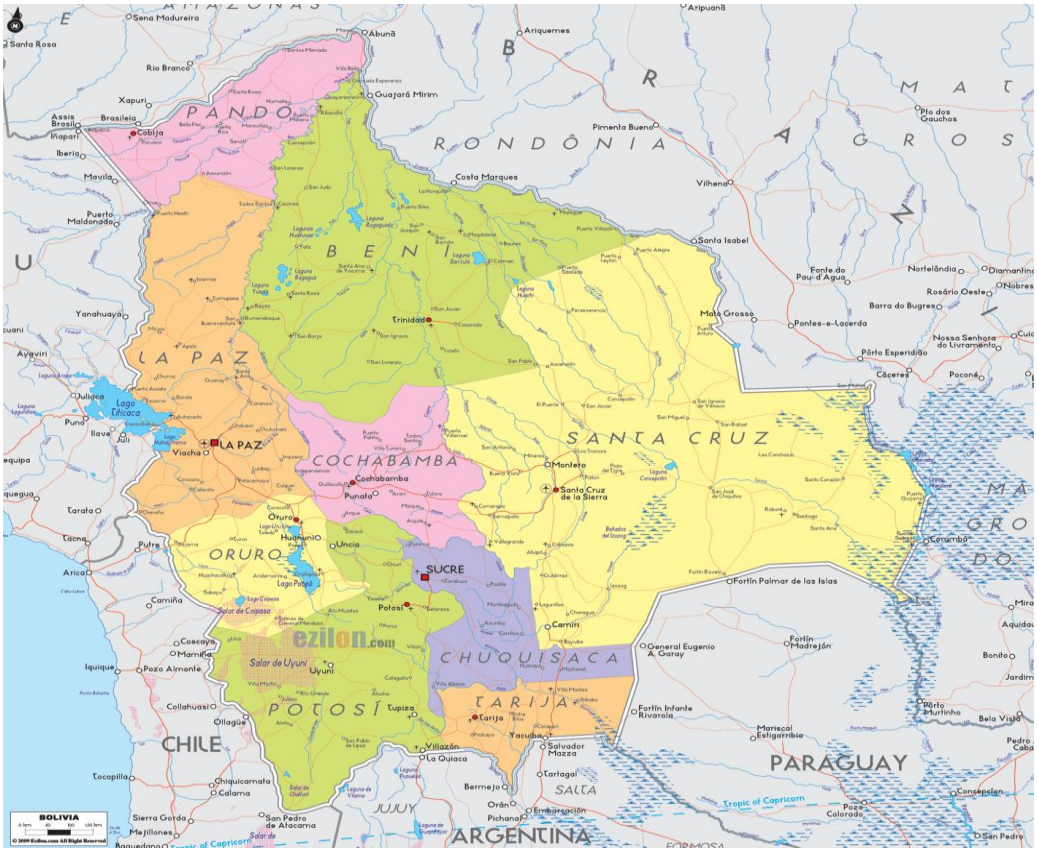
[3] Peter Pringle, *Food, inc.: Mendel to Monsanto—the promises and perils of biotech harvest* (New York: Simon & Schuester, 2003).
[4] Fukuda-Parr, "Introduction: Genetically Modified Crops and National Development Priorities," 3-14.
[5] Fukuda-Parr, "Introduction: Genetically Modified Crops and National Development Priorities," 3-14.

President Evo Morales. [6] The law attempts to combat pressures on and create compatibility and responsibility with the Bolivian environment, recognize the inherent rights of both humans *and* nature, to protect indigenous culture and society in Bolivia, and to embrace a non-neoliberal economic model of development. The law outlines rights and obligations for management of natural resources necessary for current and future generations to live well with the natural world.[7] One important aspect of the *Law of the Rights of Mother Earth* is a ban on the import, production, study and use of transgenic technology in crops native to Bolivia or in crops which are centers of biodiversity in the country. The law states,

> To the Diversity of Life: It is the right to the preservation of the differentiation and variety of the beings that comprise Mother Earth, without being genetically altered, nor artificially modified in their structure, in such a manner that threatens their existence, functioning and future potential. [8]

This project examines perceptions of the use or absence of transgenic technology on agricultural systems, indigenous communities and traditions, self-sufficiency, economic stability, environmental impacts, and contributing to sustainable development. The main goal of this research is to examine how Bolivians understand the national rejection of this agricultural technology. To do so, this study focuses on four central questions in three very different communities within Bolivia. (1) How do Bolivian people understand the motivations behind the law banning transgenic technology? (2) Is the law viewed positively or negatively? (3) How are the already realized impacts of banning transgenic crops understood? (4) How do stakeholders perceive future impacts, costs or benefits to Bolivia in terms of economics, politics, society, culture and the environment?

[6] *Ley (Corta) de Derechos de Madre Tierra,* December 2010.
[7] *Ley (Corta) de Derechos de Madre Tierra,* article 2, December 2010, accessed August 20, 2013.
[8] *Ley (Corta) de Derechos de Madre Tierra,* article 7, December 2010, accessed August 20, 2013.



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Collection of Evidence

My research involved three weeks of ethnographic fieldwork in Bolivia, in which I conducted a set of 61 semi-structured interviews. Research was conducted in three areas of Bolivia; Santa Cruz, Cochabamba and La Paz. This was done to achieve a range of opinions on the subject in a diverse geography and to understand how geography impacts the ways in which the law is understood and framed. My main interviewees included agricultural researchers and agronomists, biologists, farmers, environmental activists, and social organizations, with the goal of understanding perceptions of the problems and benefits associated with transgenic policy in Bolivia. The interviews focused on social and economic impacts of the ban, environmental impacts, land use changes, the intersection between technology and native farming techniques,

[9] "Political Map of Bolivia," Ezilon.com, accessed August 10, 2013, http://www.ezilon.com/maps/south-america/bolivia-maps.html.

implications for indigenous culture, motivations for and political implications of the ban. A total of eight weeks, including preparation, fieldwork, and research and report preparation, was spent on the project.

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Meeting about improving farming techniques

Left: Rosario Llerena, plant pathologist and field assistant, Center: Farmer in the valley of Cochabamba, Right: Me

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Seed varieties at PROINPA

Interview with Julio Gabriel at PROINPA

[10] Photographs by K. Gjelsteen, July 11, 2013.
[11] Photographs by K. Gjelsteen, July 5, 2013.

Budget

With a bit of planning, the funds provided proved sufficient to carry out my research in Bolivia. Though some things in Bolivia, like food are quite cheap, other expenses, like hotels, flights and other fees, quickly added up. My flight to and from Cochabamba was just around $1400. The VISA entrance fee into Bolivia was $135. To prepare for interviews, I spent a week in an intensive Spanish language school, immensely helping the interview process by practicing vocabulary specific to my project, which amounted to $300. I also allowed budget to buy a quality tape recorder for interviews. Another instrumental aspect of my budget, was allowing money for a field assistant. I worked with Rosario Llerena, a plant agronomist who specializes in plant diseases, for three weeks. She had many connections in the field and helped me set up many of the interviews underpinning this study. All interviews were conducted in Spanish so she also helped translate and ask more fluently my questions. I would recommend finding a field assistant to other students if they have the connections. I paid Rosario $600 total for her three weeks of work. Flights to Santa Cruz and La Paz from Cochabamba for me and my field assistant were $400. I was fortunate enough to have family in Cochabamba I could stay with, so accommodation was not needed there. In Santa Cruz and La Paz, $350 was spent on accommodations for me and my field assistant. Fortunately, my field assistant was savvy in local transportation, so we were able to use the local *trufí* system (small buses) and communal taxis to find our way to various interviews. Because the locations of many of the arranged interviews were far from one another, an additional $200 was spent on local transportation. Food for the three weeks I worked on my project totaled $300. $220 was also spent on malaria pills and yellow fever shots, $20 on a fee to exit the country, and $100 for a hotel in La Paz on my return

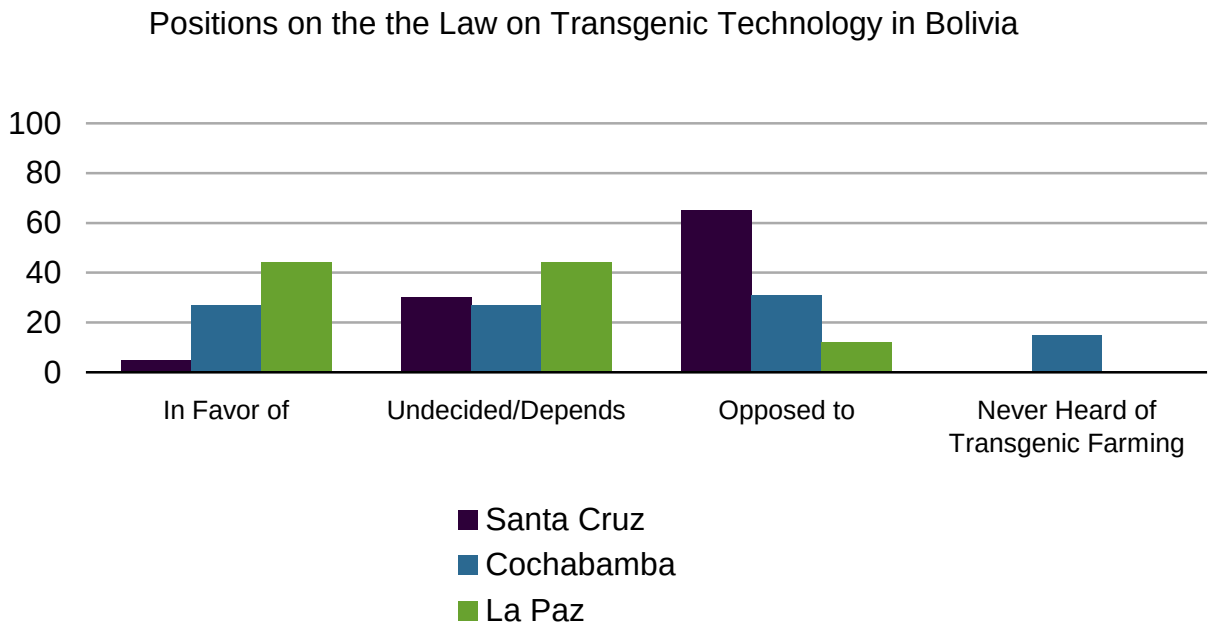
to the United States. All other research materials were borrowed from Collins Memorial Library or a public library. The total costs associated with this research project were $4,025.

Preliminary Findings

Perceptions of transgenic crops depended on one's profession, geographical location and outlook on the importance of technology, culture, economy and the environment in Bolivia. Perspectives and opinions were complex, diverse, and often partially contradictory. Interviewees understood the motivations for the rejection on this agricultural technology in a variety of ways. Many understood the decision to ban GMOs in terms of political influence. Political reasons for the ban included influence and misinformation of NGOs and environmental, social, and pro-indigenous organizations, political posturing of the Bolivian government and ignorance on the part of the government. Understanding and framing the decision through the motivation of conservation was another recurring pattern. Many noted the decision as an effort to protect Bolivia's biodiversity and local seed varieties, to protect a traditional way of life and Bolivia's ancestors and to achieve compatibility with *Pachamama* or Mother Earth. The final framing of the motivations behind the ban was a push against dependency. Interviewees expressed achieving food security, supporting small farmers and a fear of corporate control of seeds and food as major reasons for the ban. [12] These three themes can be summarized as political, conservationist, and protectionist motivations behind the law.

The following graph demonstrates the percentage of those interviewed in each region in favor of, opposed to, undecided or had never heard of the law concerning transgenic technology. The graph is arranged by 'position' on the 'X' scale and percentage of interviewees in each region who expressed this position on the 'Y' scale. Regions are displayed by color.

[12] Complied from a set of 61 unpublished interviews. See appendix 1.



[13]

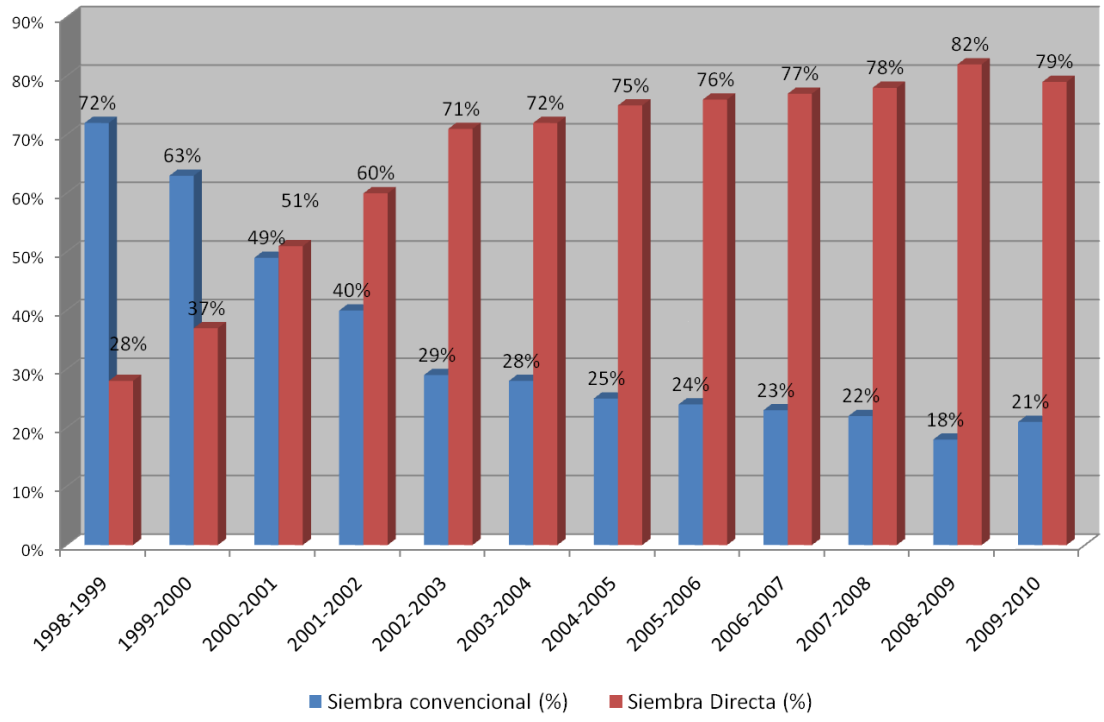
Most interviewed in Santa Cruz were opposed to or undecided about the law. A small minority were in favor of the law. In Cochabamba, interviewees were equally opposed to, in favor of and undecided about the law. Four farmers in Cochabamba had neither heard of transgenic technology nor the law banning them. The majority of those interviewed in La Paz were in favor of or undecided about the law, with a small minority opposed to the law. The next section explores the way that those interviewed in each region understand the law and its consequences and the ways in which this impacts their position on the law.

Santa Cruz

Due to its lowland geographical location, Santa Cruz has experienced an exponential growth in the agro-industrial farming of soybeans, a non-native cash crop. Soybeans were

[13] Compiled from all interviews. See appendix 1.

introduced in the 1990s with conventional seeds. However, transgenic soybean seeds grew in popularity and today are primarily used in soybean farming in this area. [14]



[15]

Total Exports: $US 11,793,672,569

This graph shows the growth of transgenic soy farming in Bolivia from 1998 to 2010, with blue representing conventional soybeans and red representing transgenic soybeans. Source: ANAPO.

Transgenic soybean farming is legal in Bolivia since it is non-native and soybeans are not considered a center of biodiversity in this region. However, the framework for the *Law of the Mother Earth* outlines a gradual reduction and elimination of all transgenic farming, including that of soybeans. ANAPO, the National Association of Producers of Oilseeds and Wheat, a farmers' association that works to support soybean farmers in Bolivia, estimates that in 1998,

[14] Association of Producers of Oilseeds and Wheat (*Asociacion de Productores de Oleginosas y Trigo*) (ANAPO), "Presentacion Institutional." Unpublished powerpoint.
[15] Association of Producers of Oilseeds and Wheat (ANAPO), "Presentacion Institutional." Unpublished powerpoint.

28% of soy grown in Santa Cruz was transgenic but by 2012, 98% was transgenic.[16] Farmers in Santa Cruz also grow maize, a native crop. Interviewees told me transgenic (Bt) maize is not "officially grown" but is occasionally grown illegally. [17]

Nineteen interviewees including farmers, agronomists and biologists at cooperatives, environmental organizations and a ministry of commerce in Santa Cruz presented various opinions on the article of the *Law of the Mother Earth* concerning transgenic technology. A large majority felt the law has had no impacts to date because enforcement has not been pursued. However, some noted that the ban has had a negative impact on farmers as they are not able to use a technology that will allow them to increase yields. Others considered negative impacts on food security, increased difficulty for farmers to compete in the international market, stagnation of production, and higher costs of production as side effects of the law.[18]

Similarly, many felt there would continue to be little to no impacts in the future due to a lack of enforcement. However, others felt the ban would slow economic growth, decrease production, negatively affect food security, impact the livestock industry due to less crop production and increase smuggling and illegal action in the future. Most predictions were negative expect one interviewee who suggested less environmental degradation as a result of eliminating genetically modified crops and another who hinted at a positive influence of the law as a result of the removal of large private corporations. [19]

The majority of those interviewed in Santa Cruz saw the law as problematic for Bolivia. Explanations included lowering productivity and the hindrance of economic development, especially in Santa Cruz. Interviewees also suggested that the development of Bolivia is

[16] Association of Producers of Oilseeds and Wheat (ANAPO), "Presentacion Institutional." Unpublished powerpoint.
[17] Dr. Vicente Gutiérrez (PROMASOR), in discussion with author, July 2, 2013.
[18] Compiled from interviews 1-23 in Santa Cruz. See appendix 1.
[19] Compiled from interviews 1-23 in Santa Cruz. See appendix 1.

impeded by banning a technology which is already on the market and is being used by other countries. Transgenic farming was understood by many as a tool for development and competition in international markets. Soybeans production, which largely takes place in Santa Cruz accounts for eight percent of Bolivia's total exports and was seen as indispensable to Bolivia's overall economic stability and growth.[20] This clearly shaped the ways in which interviewees in Santa Cruz experienced and framed the *Law of the Rights of the Mother Earth.*

Many of those who expressed negative sentiments towards the law in Santa Cruz felt the government was misinformed on the topic of transgenic technology. They felt they did not have all the correct information to make a qualified decision and had been swayed by powerful interest groups, such as conservationists groups, Greenpeace, groups lobbying for indigenous groups and other non-governmental organizations. Some also expressed the perception of the current Bolivian government as an "indigenous government" and strongly environmentalist and conservationist. Further, many expressed the sentiment that the government did not understand the needs of farmers in Santa Cruz and did not understand genetic engineering and its benefits. A representative from the "Fundación de Amigos de la Naturaleza" noted, "The *Law of the Mother Earth* prohibits and demonizes transgenic technology," representing the feeling that the government could only see one side of the argument.[21] Further, an interviewee at PROMASOR, a maize cooperative, stated "Laws are created only with the thinking and ideology of the ruling party." [22]

[20] Asociación de Productores de Oleginosas y Trigo (ANAPO), "Presentación Institucional." Unpublished powerpoint. See appendix 2, figure 1.
[21] Alfonso Llobet (Fundación de Amigos de la Naturaleza), in discussion with author, July 1, 2013.
[22] Dr. Vicente Gutiérrez (PROMASOR), in discussion with author, July 2, 2013.

The sentiment that the law has had both positive and negative elements depending on location, crops and use of the technology was also expressed. An interviewee from an environmental organization, Fundación de Amigos de la Naturaleza, described,

> There are different points of view. The ban has certain benefits for native crops because transgenics can affect biodiversity. But for more extensive crops, they should not be banned because this affects the competition of Bolivia and can impact the economy. [23]

Some felt the law could be beneficial for other parts of Bolivia, like the West, or for the protection of native crops but not for Santa Cruz or soybean production. Only one interviewee felt the ban is positive for Bolivia for the reason of the protection of native crops. [24]

Cochabamba

Farmers in Cochabamba, a city and region located in the center of the country, primarily grow native crops, such as potatoes, maize and European tree fruit in the Andean valleys. Positions on the law were more varied, in contrast to mostly negative positions in Santa Cruz, largely due to the fact that Cochabamba does not produce soybeans, the most abundant genetically modified crop grown in Bolivia. Following the pattern in Santa Cruz, many felt there have been no impacts of the law to date due to a lack of regulation. However, others suggested a negative impact on the Bolivian economy and development of technology while some suggested that the law has helped preserve plant life and biodiversity, lessened dependency on foreign seed corporations, has had a positive impact on the environment and has been beneficial for the indigenous community.[25]

Those who felt the ban is problematic for Bolivia, expressed that transgenic technology is more efficient and exact, that it will help Bolivia develop a capacity to

[23] Alfonso Llobet (Fundación de Amigos de la Naturaleza), in discussion with author, July 1, 2013.
[24] All information compiled from interviews 1-23 in Santa Cruz. See appendix 1.
[25] Complied from interviews 23-48 in Cochabamba. See appendix 1.

grow, that there is negative misinformation on this topic, and that transgenic crops do not affect health. Many felt the law will hinder Bolivia's ability to compete in the future. Those who viewed the ban as beneficial for Bolivia said that relying on large corporations for seeds would be harmful to Bolivia's national food security, that transgenic crops directly affect the health of those who consume them, that banning transgenic crops is beneficial to small farmers and the environment, and that it will lessen the risk of "gene contamination" and other risks to consumers, producers and society associated with transgenic farming. Those that were undecided felt that the ban could be positive or negative depending on the particular region in which the modified crops are grown. They also noted that there are both benefits (like boosting competition) and potential harms (like environmental degradation) that come with using transgenic technology. [26]

Some interviewees expressed a number of these sentiments. For example, Cecilia Gonzales, who worked in the Biodiversity Department at the Ministry of Water and Environment, said that the ban has negatively affected Bolivia's economic status but has had a positive impact on the environment due to less expansion of the agricultural frontier.[27] Similarly, Luis Aguirre, a Biology Professor at *Universidad Mayor de San Simón* in Cochabamba, said, "It is a type of policy that goes against the neoliberal capitalist system, but it causes an isolation of our capacity to produce."[28] José Antonio Castillo, an agronomist at PROINPA research center argued that when other countries use technology it is necessary for Bolivia to adapt and also use this technology. In reference to royalties to seed companies, Castillo explained, "Sooner or later

[26] Complied from interviews 23-48 in Cochabamba. See appendix 1.
[27] Cecilia Gonzales (Biodiversity Department at the Ministry of Water and Environment), in discussion with author, July 12, 2013.
[28] Luis Aguirre (Biology Professor at Universidad Mayor de San Simón), in discussion with author, July 12, 2013.

you are going to have to use technology and pay for it."[29] In another light, Dr. Jorge Rojas, a Professor of Biotechnology at *Universidad Mayor de San Simón* spoke of ignorance playing a role in our perceptions of transgenic technology. He stated,

> People don't perceive quality; they are afraid of the unknown. In Europe, they asked people the question: Have you ever eaten a gene? The people replied: Never in my life. But we are always eating genes. All emerges from ignorance. We are impacted by fear of the unknown and bad perceptions. The origin of bad perceptions came from transnational companies. But if GMOs were born in the national state, perceptions would have been different. This is more about dependence on their herbicides and specific fertilizers. This is a strategy of independence for the West but it can have a negative effect. The Andean farmer is doomed to continue production eternally. [30]

For him, the ban came from ignorance about the impacts of using transgenic technology and that this will in turn have an effect on the future of Andean farmers.

La Paz

The region of La Paz and the surrounding *Altiplano* is both dry and high in elevation, about 12,000 feet or above. In this region, native crops, such as quinoa, potatoes, and maize, grow surprisingly well and have been growing in these conditions by Andean farmers for thousands of years. La Paz is the center for the government which approved *The Law of the Mother Earth* and the article concerning transgenic crops. It is also the center for many non-government organizations and social and environmental institutions.

Similar to Cochabamba and Santa Cruz, some interviewees in La Paz understood there to be no impacts of the law to date due to a lack of regulation. In Cochabamba and Santa Cruz, the lack of regulation was not necessarily seen as negative. However, in La Paz the lack of regulation was talked about in a negative light by interviewees. Interviewees in La Paz also

[29] José Antonio Castillo (PROINPA research center), in discussion with author, July 11, 2013.
[30] Dr. Jorge Rojas (Professor of Biotechnology at Universidad Mayor de San Simón), in discussion with author, July 11, 2013.

talked about the generation of illegal flows of seeds, negative impact on Bolivia's economy and its ability to compete and produce enough food for the future, but not in such a significant light. These negative consequences were considered but did not ultimately outweigh the benefits of the law. [31]

Ultimately, interviewees in La Paz found the most importance in protecting biodiversity, handling natural resources in a responsible manner, self-sufficiency, protecting Andean culture and living well not only economically but also spiritually, politically and socially. [32] One particular interview in La Paz seems to resonate with a general pattern of thought among those interviewed in La Paz. Jorge Mariaca, a Biologist, spoke of transgenic technology as a collective risk to society. He argued that the "plague of sameness" presents risks and that society should aim to create as much diversity as possible.[33] Unlike those in Santa Cruz who viewed genetic engineering as less risky due to the precision of the technology and more efficient farming it creates, the uniformity of farming through genetic engineering seemed more risky for Jorge Mariaca and many of those interviewed in La Paz.

Interviews in Santa Cruz, Cochabamba, and La Paz present various outlooks on the *Law of the Mother Earth* and the article banning transgenic technology. Their outlooks on the importance of economic development, social and spiritual development, efficiency, environmental protection, protection of biodiversity, seed varieties and traditional culture, and self-sufficiency were important factors framing their positions.

[31] Complied from interviews 48-57 in La Paz. See appendix 1.
[32] Complied from interviews 48-57 in La Paz. See appendix 1.
[33] Jorge Mariaca, in discussion with author, July 12, 2013.

Discussion

My research shows that the way Bolivians understand the various potential benefits and drawbacks of genetically modified crops depends on patent laws, protection of genetic diversity, regard for local agriculture systems and culture, environmental practices and concern for the "plague of sameness" and societal risks are understood and framed in a multitude of ways in Bolivian society. On the one hand, transgenic crops can be framed as a technological component of modernization. If viewed in this way, one can assess the implications and trade-offs of rejecting modernization and technology. However, transgenic crops can also be seen as more than technology or as pushing the boundaries of what comprises technology. The partial ban on transgenic crops in Bolivia is perhaps more than simply a rejection of technology, but a resistance to global capitalism, a "global hierarchy of value" and empowering global scientific knowledge over local knowledge systems. A new wave of political ecology has identified this resistance and attempts to diversify both nature and economies as valuable. [34] Peutz has explored the idea of a "global hierarchy of value" in which certain peoples, cultures or communities are considered worthy or worldly or not. [35] Futher, political ecologists have illuminated that "technology is based on unequal exchange in the world system, which increasingly generates a global polarization of wealth and impoverishment." [36]

This research may allow us to better understand how Bolivian people navigate the neoliberal global context. It shows how Bolivian people understand and form opinions on a

[34] J.K. Gibson-Graham, "Post-Development Possibilities for Local and Regional Development" in *Handbook of Local and Regional Development,* ed. Andy Pike, Andres Rodriguez-Pose, John Tomaney, (London: Routledge, 2011).
[35] Nathalie Peutz, "Bedouin "abjection": World Heritage, Worldliness, and Worthiness at the Margins of Arabia," *Journal of the American Ethnological Society,* 38 (2011).
[36] Alf Hornborg, "Undermining Modernity: Protecting Landscapes and Meanings among the Mi'kmaq of Nova Scotia," in *Political Ecology across Spaces, Scales, and Social Groups,* ed. Susan Paulson, Lisa Gezon, (New Brunswick: Rutgers University Press, 2005), 197.

national resistance to global polarization of resource allocation and a modern hierarchy of knowledge systems and values. One example of this was given by an interviewee who illustrated his belief in the idea of a right to live without poverty, not just economically but also socially and spiritually. This interviewee spoke of spirituality in terms of being in connection with the natural world. This exemplifies looking beyond value in only terms of commodification. Bolivia may not simply be rejecting and denying this scientific technological knowledge to its citizens, but instead may be trying to protect their societal values, economy and environment.

One element of modernism is the belief in the perfectibility of nature and social order by the state. Scott argues that the problem with modernity is that scientific knowledge is considered the only authority or truth to improve the human condition and all other sources of judgment are considered inept. Further, Hornborg explains that modernity is a process that "abstracts, encompasses and disempowers the local" and that the modern model of reducing risk through technology also generates other risks like environmental degradation. [37] To some, transgenic technology reduces risks to society because it is a "precise science," but to others, it creates risks due to concern for unforeseen consequences.

Transgenic farming can also be thought of as the restructuring of nature as infrastructure, which inevitably creates new relationships. Furthermore, Scott explores the simplification, control and uniformity of nature by the modern state.[38] This parallels the idea of genetically modified crops as an attempt to simplify and unify nature through technology to produce higher yields for consumption. Our perception of plants has been re-imagined into crops, a more "legible" conception. As Scott exemplifies with the practice of forestry, the goal became the

[37] Alf Hornborg, "Undermining Modernity," 197.
[38] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

delivery of maximum constant volume/yield and minimum diversity.[39] The Bolivian state is perhaps attempting to preserve local knowledge systems other than scientific knowledge and to protect the diversity of life by partially banning the use of genetically modified crops.

Each country and region has its own particular circumstances so it is impossible to create a "one-size fits all" policy on genetically modified crops. This research attempts to understand how Bolivians think about and experience the scenario produced by the entry of transgenic crops into the global agricultural system. The vast and spanning implications of the rejection of this agricultural technology should be examined in many different contexts to make informed decisions about how this technology is handled by society.

Reflections

Likely the largest problem I ran into while conducting research was the language barrier. Though I had two years of Spanish language at the University of Puget Sound and spent a week familiarizing myself with the language specific to this topic at a language school in Bolivia, it was difficult to always completely understand what interviewees were trying to convey. Luckily, my research assistant was also taking notes, so I had the chance to translate these in my own time. One of the questions I was left wondering about and was unable to find answers to due to the language barrier, was the impact of transgenic farming on both pesticide and water usage. It would be interesting to find out how switching to transgenic farming affected the use of both of these resources on soybeans in Santa Cruz.

One of the biggest surprises was how willing interviewees were to take time out of their work day to talk with me. Some seemed slightly hesitant to talk at first, but when I explained my research was for a *student project* they seemed to be more willing to give their opinion. Some

[39] Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed.*

interviewees even met us long after the work day had ended. Interviewees also seemed very open to discussion at the end of our interview and wanted to hear my opinion on the subject.

One of the biggest realizations I had while in Bolivia, not completely related to this topic but still very relevant, was how complex every situation is. While in Bolivia, I came across cases of extreme poverty. At the same time, I was also immersed in a culture so abundant and diverse. I found myself realizing how difficult it is to prescribe any sort of solution. After listening to the variety of vastly different opinions and outlooks on this single topic of transgenic farming, I understood that there will never be a singular answer and that there will always be numerous implications and consequences of any action, no matter the intention.

This research project and my time traveling in Bolivia sparked my interests in the conflicts and contradictions between development and environmental sustainability. I would like to build on this interest in my International Political Economy senior thesis.

Appendix 1

Interviews in Santa Cruz:

1. Ricardo Rodríguez, Gobierno Autónomo Departamental de Santa Cruz
2. Juan José, Gobierno Autónomo Departamental de Santa Cruz
3. Dr. Illescas, Centro de Investigación Agrícola Tropical (CIAT)
4. Rice farmer
5. Mario Porcel, Fundación de Desarollo Agrícola Santa Cruz (FUNDACRUZ)
6. Farmer, Fundación de Desarollo Agrícola Santa Cruz (FUNDACRUZ)
7. Dr. Juárez, Fundación de Desarollo Agrícola Santa Cruz (FUNDACRUZ)
8. Alfonso Llobet, Fundación de Amigos de la Naturaleza (FAN)
9. Ana Isabel Ortiz, Federación Nacional de Cooperativas Arroceras
10. Salome Tupa, farmer
11. Dr. Zabala, Association of Producers of Oilseeds and Wheat (ANAPO)
12. Dr. Osinaga, CAO
13. Dalcy Montenegro, CIAT
14. Jorge Limpias, SENASAG
15. Jorge Rivas, CADEX
16. Vicente Gutiérrez, PROMASOR
17. Maize farmer, PROMASOR
18. Antonio Sanjinés, PROBIOMA
19. Fernando Copa, VALLECITO
20. Ortube, DECANO FACULTAD DE CIENCIAS AGRICOLAS; UGRM, VALLECITO
21. Isabel Cazón, Fitopatologa, VALLECITO
22. Lucy Rivero, INIAF Santa Cruz
23. Mario Mendoza, INIAF

Interviews in Cochabamba:

24. Técnicos campo, PROINPA
25. Fernando, Biodiversidad de PROINPA
26. Julio Espinoza, economista PROINPA
27. José Antonio Castillo, Investigador PROINPA
28. Pablo Mamani, PROINPA
29. Julio Gabriel, Investigador, PROINPA
30. Fanor Alvarez President de Asociación de Papa, Totora SEPA
31. T. Avila, Investigadora
32. Dr. Moisés, AGRUCO
33. Dr René Andrew, Investigador
34. Cecilia Gonzales, Biodiversidad
35. Ing. Quispe, Desarrollo Productivo del MDRyT

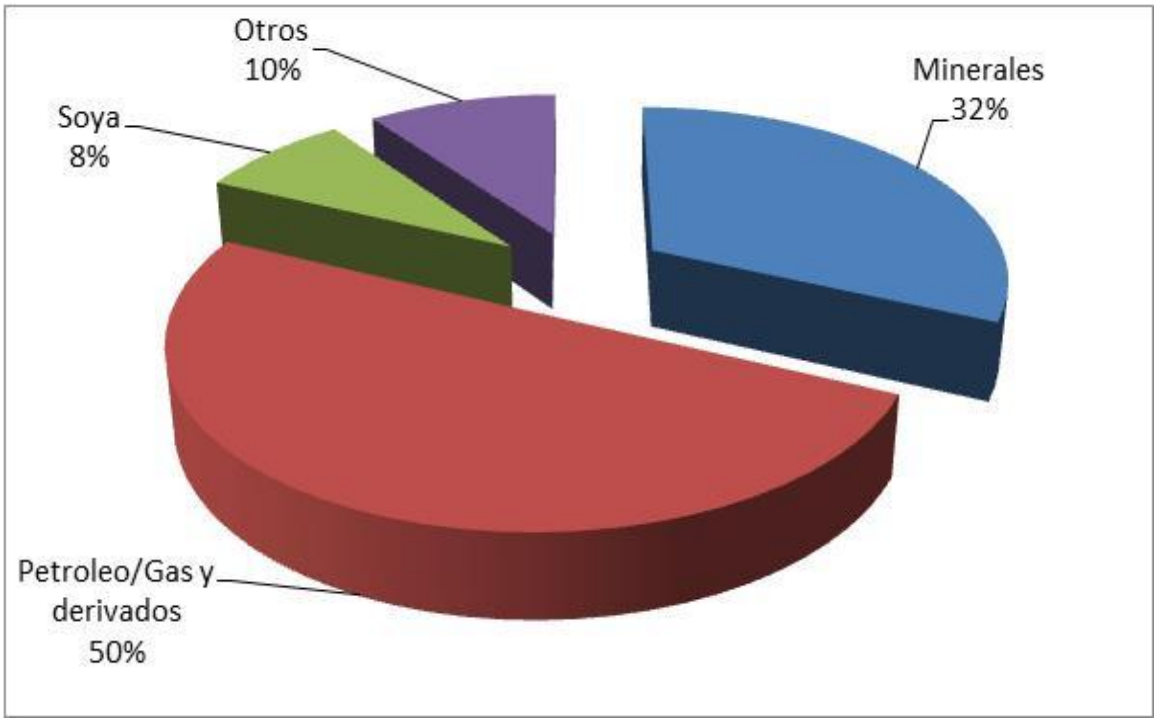
36. Carlos Salinas, Unidad de Cambio Climático y Medio Ambiente
37. Esther Rojas, biotecnóloga UMSS, Agronomía
38. Zulma Salazar, Agricultora Cliza
39. Benita Cruz, farmer
40. David Gutiérrez; Agricultor Punata
41. Eufronio Vizcarra, Cliza
42. Juan Ardaya, Punata
43. Bernardo Guzmán, Agricultor de Comarapa, Valles mesotérmicos de Santa Cruz
44. Asbel Prado
45. Antonieta Rivero, Ingeniera especialista en frutales San Benito
46. Ing. Gino Catacora, Coordinador de Plataformas de Competitividad
47. Omar Mérida, SEDAG
48. Dr. Jorge Rojas, Biotecnólogo, UMSS
49. Carlos Aquino, SENASAG Cochabamba
50. Luis Aguirre, Biology Professor UMSS
51. Severo Villarroel, CENDA (Centro de Comunicación y Desarrollo Andino)
52. Lidia Paz, Centro de Investigación y Promoción del Campesinado CIPCA

Interviews in La Paz:

53. Juan Rici, IICA
54. Beatriz Zapata, Biocultura
55. Jorge Choquehuanca, Parques Nacionales y Biocultura
56. Roxana Olivares, ONUDI
57. Luis Acosta, INIAF
58. Carlos Román y Fredy Caballero, Semillas INIAF
59. Rodolfo Machaca, Secretario General de la CSUTCB
60. Agricultor de Puerto Acosta, Calangachi, La Paz
61. Jorge Mariaca, Biologist

Appendix 2

Figure 1

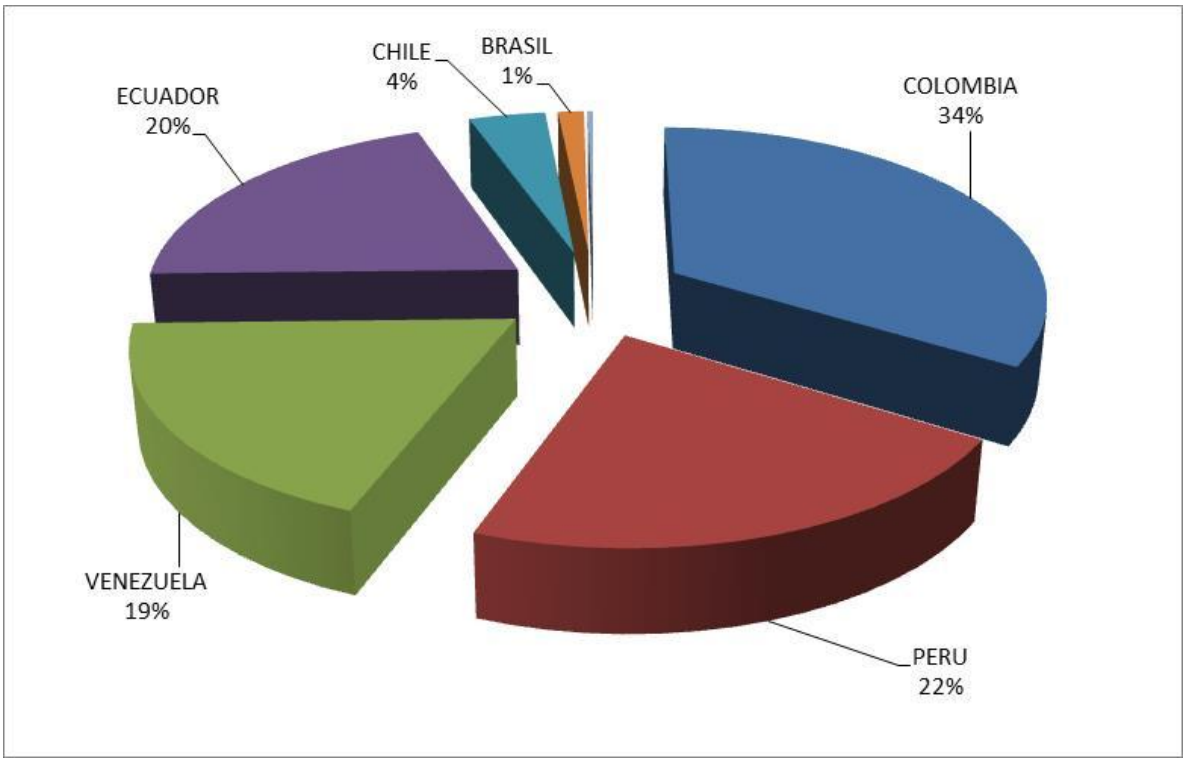


This graph represents the total percentage of GDP for exports in each industry in Bolivia.
Source: ANAPO

[40]

[40] Association of Producers of Oilseeds and Wheat (ANAPO), "Presentacion Institutional." Unpublished powerpoint.

Figure 2:



Total Soy Exports: $US 954,167,716

[41]

This graph shows the countries to which Bolivia exports soybeans. Source: ANAPO

[41] Association of Producers of Oilseeds and Wheat (ANAPO), "Presentacion Institutional." Unpublished powerpoint.

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