

Social mobilizations and relations of power surrounding the entry of genetic engineered organisms

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ABSTRACT

This paper aims to review three books that inform us about the diverse relations of power and power asymmetries in the entry of genetically engineered organisms (GEOs) in countries like Argentina, Brazil, Mexico, and Canada. From a political economy and an agrarian and peasant studies perspective, the authors show that not only the set of rules of national institutions, global corporations, and the global market establish the basis that favor the entry of GEOs. Instead, the conjugation of power asymmetries performed by different actors in power, historical processes, and gender and race inequalities are the ones that trace the path for a realignment of the agrarian system supported by science and based on the stigmatization of social movements.

Mobilizações sociais e relações de poder em torno da entrada de organismos de engenharia genética

RESUMO

Este ensaio tem como objetivo revisar três livros que nos permitem compreender as diversas relações de poder que se escondem por trás da introdução de organismos modificados por engenharia genética em países como Argentina Brasil. A partir de uma perspectiva da economia política e dos estudos agrários, as autoras analisadas mostram que as entradas desses organismos em certos países não são apenas propiciadas pelas regras do regime alimentar e da economia. Em vez disso, a conjugação de assimetrias de poder nas mãos de diferentes atores, processos históricos e desigualdades de gênero e raciais abrem caminho para um reajuste do sistema agrário apoiado na ciência e baseado na estigmatização dos movimentos sociais.

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RESUMEN

Este ensayo tiene como objetivo revisar tres libros que nos permiten comprender las diversas relaciones de poder que se esconden detrás de la introducción de organismos modificados

KEYWORDS

Bio-hegemony; social mobilization; food regimes; synergies of power

PALAVRAS-CHAVE

Bio-hegemonia; mobilizações sociais; regimes alimentares; sinergias de poder

PALABRAS CLAVE

Bio-hegemonia; movilizaciones sociales; regímenes de comida; sinergias de poder

por ingeniería genética en países como Argentina, Brasil, México y Canadá. A partir de una perspectiva de la economía política y los estudios agrarios, las autoras revisadas muestran cómo no son únicamente las reglas del régimen corporativo alimentario y las reglas de la economía las que permiten la entrada de estos organismos a ciertos países. En cambio, la conjugación de las asimetrías de poder a manos de diferentes actores, procesos históricos y desigualdades de género y raza son los que trazan el camino para un reajuste del sistema agrario apoyado en la ciencia y basado en la estigmatización de los movimientos sociales.

1. Introduction

Critical studies on genetically engineered organisms (GEOs) are increasingly gaining ground within the social sciences (Lapegna 2016; Motta 2016; Kinchy 2012; Leguizamón 2020). These studies scrutinize the adverse impacts that genetically engineered (GE) crops have on the ecosystem (Panario and Señoralé Pose 2001) and on human health. They explore the changes in knowledge of and control over seed production (Flachs 2019), and show how the business of science serves to alter and obscure vulnerabilities and risk perceptions (Druker 2015). They also inform how legal mechanisms are used to demobilize and delegitimize farmers' petitions and lawsuits against GEOs (Pechlaner 2012). In general, these studies inform about the political, economic, and cultural threats of the adoption of genetic innovations or nanotechnologies within the agrifood system (Scrinis and Lyons 2013). However, with some exceptions (Motta 2016; Kinchy 2012; Leguizamón 2020; Lapegna 2016) few studies focus on an in-depth look at the interplay between actors in power and peasants considering power asymmetries and systems of oppression such as gender relations, colonial legacies, and agency stigmatization.

This paper aims to review three books that inform about the diverse relations of power that allow for the settlement of *bio-hegemonies*, the stigmatization of social movements, and the perpetuation of gender inequalities and colonial legacies through the introduction of GEOs in countries like Argentina and Brazil. I draw on the book *Social Mobilization, Global Capitalism and Struggles over Food* by Motta (2016) to demonstrate how the market is not the only power that influences the establishment of pro-GEO policies, instead these policies are the result of a series of relations of power between different actors that establish the necessary conditions for their successful implementation. Added to this, I retrieve the book *Seeds, Science, and Struggle: The Global Politics of Transgenic Crops* by Abby Kinchy (2012) to exemplify how pro- and anti-GEO actors govern, silence, or intensify the conflicts that arise from the use and legalization of GEOs. Moreover, this book gives us the tools to understand agency beyond human terrains which problematizes the management of risks and vulnerabilities. Lastly, the book *Seeds of Power: Environmental Injustice and Genetically Modified Soybeans in Argentina* by Amalia Leguizamón (2020) is brought to the discussion to understand how the colonial legacies and nationalist ideologies based on Europeanization play strategic roles for the legitimization of GEOs.

2. Bio-hegemony: a game of power

GEOs are organisms that have modifications in their deoxyribonucleic acid. Although there are records of pre-Conquest populations of Latin America crossbreeding corn and

other food species, these crossbreeds are not considered GEOs since they are not modified through the use of biotechnology. The latter refers to the capacity of science to cross genome barriers. This allows for the introduction of genetic information from completely different organisms into the chromosomes of other organisms through biotechnological tools (Kinchy 2012). In the field of agribusiness, biotechnology has sought to carry out GEOs of various organisms. In Latin America, modifications to the genomes of soy, corn, and cotton have dominated. The intention of large corporations that lead the world in the production of GEOs is to obtain crops resistant to parasites, bacteria, fungi, or herbicides and to promote mass production of food without crop losses. Currently, the production of these organisms is in the hands of “three giant multinational agribusinesses (ChemChina-Syngenta, Corteva Agriscience, and Bayer-Monsanto) [that] control more than 60 percent of the global commercial seed market and 70 percent of the agrochemical industry” (Leguizamón 2020, 13).

The introduction of GEOs is a controversial practice within agribusiness due to the risks it entails to food sovereignty and genetic variations of wild organisms (Druker 2015). Although there is a discussion of the benefits that GEOs offer to farmers, such as improved risk management, pest prevention, and improvement in the quality of the harvest, there is also discussion about considering GEOs a threat to wild organisms and to the control over and negotiation of food sovereignty (Pechlaner 2012). The latter is visible through the purchase, sale, and planting of GE seeds, where farmers are prevented from being their own seed producer and are distanced from controlling and protecting the field autonomously (Flachs 2019). This is because purchase contracts of GE seeds allow the producer to make direct observations in the field to detect the correct use of these seeds by the farmer. In other words, the use of GE seeds is based on the control and evaluation of the practices that farmers carry out in their fields. By purchasing GE seeds, control of seed production is granted to transnational corporations and, in doing so, control over food production and the governance of the agricultural system is granted to those who seize power within the business of GE seeds.

The control of the agrifood system through the introduction of GEOs can occur through various power relations that Newell (2009) has named *bio-hegemony*. This concept refers to the order and symbolic domination that specific institutions and actors articulate to benefit from existing power asymmetries (Newell 2009; Motta 2016). In practice, *bio-hegemony* “involves the construction of many social relations that secure its material, institutional and discursive power” (Motta 2016, 19) and is made up of the coalitions that are established among diverse actors ranging from scientists, politicians, universities, public officials, and corporations. These actors seek to create alliances that allow them to sustain dominant narratives (Newell 2009) in which the media such as radio and television play an unprecedented role in spreading these narratives among the most impoverished sectors of agribusiness (Motta 2016). It is through these means that *bio-hegemony* “defines the symbolic domination that is in place when the actors that most benefit from GE crops can portray GEOs as representing the general public interest” (Motta 2016, 8). In this sense, it is not only through the production, purchase, and sale of GEOs or the evaluation of the use of GE seeds in the field what grants power to corporations producing GE seeds, but also the strategies, imbalances of power, and negotiations that these corporations employ to twist national normative frameworks and decision-making processes for their benefit.

The settlement of *bio-hegemonies* is not a smooth process, quite the contrary. The dynamics by which GEOs shape the agrifood system are contentious processes disputed by diverse actors. Motta tackles the case of Argentina to show how the entry of GEOs occurred in two stages, the first one that laid the foundations for the establishment of a *bio-hegemony* in the country, and the second for negotiations and resistances. In this first phase, which began in 1990, Argentina was under a neoliberal regime in which the already existing institutions and normative frameworks strengthened the implementation of GEOs policies (Lapegna 2016). Although there were movements such as La Via Campesina and local rural movements, they did not manage to successfully enter the game of decision-making since stakeholders and institutions aligned in favor of their interests in GEOs (Motta 2016). Thus, coalitions between diverse actors from corporations such as Monsanto (currently Bayer) and a group of scientists gained prestige through narratives based on agriculture development and improvement of field conditions. The argument was that GEOs eliminate the vulnerability and loss of crops by pests or pesticides.

A decade later, the second stage of the introduction of GEOs in Argentina began, for which Motta coined the concept of *bio-hegemony with mobilization*. This concept is used by the author to demonstrate that power asymmetries between actors and institutions are not the only power relations that favor the introduction of GEOs. *Bio-hegemonies* are nurtured by the perpetuation of narratives that claim to represent the general public interest and the historical role of GEOs in the regional soybean commodity chain. Almost a decade after the first introduction of GEOs in Argentina, the anti-GEO movements managed to regain strength in the country due to the new structuring of the institutions that obeyed a center-left logic (Lapegna and Perelmutter 2020), during Néstor Kirchner's government in 2003. However, back then not only were the institutions and legal framework in favor of GEOs well established, but also the soy-based export market. This meant that a center-left government that positioned itself as anti-GEO had to continue with the policies of introducing these organisms. Thus, building a *bio-hegemony with mobilization* that opened the dialogue to social movements but in turn favored the institutions and actors that defended the introduction of GEOs, was employed by actors in power.

Drawing on a comparison between the Argentinian and Brazilian cases, Motta argues that being under a neoliberal regime is not a guarantee per se to achieve a *bio-hegemony*. The author explains that in 1990, although the right-wing government at the time and institutions promoted and welcomed GEOs, a strong mobilization of peasants and rural grassroots organizations formed alliances at the national level to make it impossible to establish an agrarian policy based on GEOs. The first process was a failed attempt of *bio-hegemony* by the corporations that sponsored GEOs and neoliberal institutions in the country. However, at the same time, the precarious and abandoned conditions of the Brazilian countryside fostered the illegal transit of GE soybeans from Argentina, which was seen by impoverished Brazilian farmers as an opportunity to continue their cultivation. This and the contamination of soybean crops due to the pollination of GEO crops to organic crops from Argentina became the vehicle that would drive a GEO policy in the future. By 1998, when illegal seed trafficking in the south became more and more a recurrent behavior, the current right-wing government promoted a moratorium that allowed the cultivation of GEO crops.

By 2005, under the presidency of Lula Da Silva, Brazil witnessed for the first time changes in government that were planned from a center-left perspective. For the

peasant and social movements this meant an entry into decision-making with an anti-GEOs bench supported by the government. However, Motta mentions that, even with a government holding an anti-GEO narrative, the possibility of negotiating at a legislative level the entry of GEOs in the country was clashing with the opposite reality in the country. The moratorium in 1998, the trafficking of seeds and the contamination of wild seeds by GE seeds coming from Argentina laid the foundations for a *bio-hegemony with mobilization* in the country. Once the government adopted the entry of GE seeds, Brazil slowly became one of the main exporters of GE soybeans worldwide. By 2008, the government approved the entry of other GE crops such as corn and cotton opening the door to a corporate-based agro-industrial system. This allowed the traffic of illegal seeds to decrease and promoted a restrictive policy to punish those who misused and sold GE seeds.

Through the historical analysis of the cases of Brazil and Argentina, Motta identifies the diverse actors that compose the *bio-hegemonies* and the routes they follow to build them. Inequality and abuses of power, as well as the silencing of opposition, were essential in the consolidation of a *bio-hegemony with mobilization* in both countries. One of Motta's contributions is to show that

the trajectories behind the dissemination of GE crops in these countries were stories of political struggles over agrarian development in which social movements and the rural poor, while contesting the advancement of a biotech agrarian model, were silenced, ignored or demobilized by a network of actors in favor of GEOs. (Motta 2016, 148)

Motta's contribution in this regard is to prove that the entry of GEOs in both countries was not only due to economic factors, but the use of an international legal instrument that constructs a policy culture based on processes of organizational building, network formation, identity construction, meaning-making, and mobilization (Motta 2016, 21). The study of demobilization allows the author to show the conditions under which social and peasant movements challenge public policies and counteract market interests and business as usual. In both countries, the entry of GEOs was involved in "conflicts over distribution of wealth, over distribution of socio-environmental damage, as well as over access and control of natural resources" (Motta 2016, 7).

3. GEOs and science

Science has played a major role in introducing GEOs into agribusiness, not only through the production of new biotechnologies but also in the formation of pro-GEO narratives (Flachs 2019) that allow the construction of *bio-hegemonies* (Motta 2016; Lapegna 2016). These narratives ensure that GEOs are not harmful to health and do not increase society's vulnerability and risks (Kinchy 2012). In countries such as Brazil, Argentina (Motta 2016; Leguizamón 2020), Mexico, and Canada (Kinchy 2012), as well as in the countries of the Andean Community, science has had a unidirectional dialogue with society and has supported legal frameworks that legalize and allow the introduction of GEOs. This has left social and peasant movements with other knowledge(s) which are not based on the scrutiny of the scientific method out of the game of power (Kinchy 2012). In the case of Brazil, for example, "the counter-reaction of the pro-GEO coalition was to frame the movements of GEO-Free Brazil as anti-science, again by relying on a

technocratic ideology in which science provides legitimacy to politics and competitiveness for the economy” (Motta 2016, 106). Thus, science as a political subject and as an instrument of power manages to position itself as a relevant actor for decision-making where science legitimates power and supports narratives built around the use of GEOs.

However, science has also played a supporting role in social movements that identify as anti-GEOs. Kinchy (2012) has named this phenomenon the *epistemic boomerang*, which refers to the action “through which local groups and NGOs, frustrated by exclusion from policy-making debates, go outside normal political channels to appeal to scientists, hoping to mobilize scientific research in support of their social goals” (51). The *epistemic boomerang* refers, then, to the relationship between science and society that develops in a multidimensional way. This is the case of a movement in Oaxaca, Mexico, that started a strong media campaign to regulate and stop the introduction of GEOs in the region due to crops contamination. In this case, an *epistemic boomerang* took place and the scientific community managed to show by PCR tests that organic maize fields were contaminated by GEO crops. Through these means, social movements and anti-GEO groups gained access to decision-making and prevented the development of a *bio-hegemony* and an agribusiness based on GEOs in the region. Before this successful demand, peasants’ voices were constantly silenced and demobilized.

Both one-way dialogue and multidimensional dialogue between society and science can generate alliances and coalitions that define the future of GEOs in certain territories. In the case of Brazil, the introduction of a legal framework to legitimize the entry of GEOs was largely due to the creation of a “policy culture in which science and risk are harmonized as criteria for decision-making” (Motta 2016, 2). In the case of Mexico, it was the support of the scientific community that allowed their voice to be raised against the entry of GEOs. In these examples, we see the two sides of the problem in which “science and scientists are frequently considered to be the best possible arbiters of technological controversies, because they are assumed to produce objective, value-neutral assessments that do not favor one social group over another” (Kinchy 2012, 2), but we also see the contrary. On this spectrum, the negative aspects of GEOs have “a wide range of cultural, economic, and ethical implications that are not easily reduced to scientific calculations of risk” (Kinchy 2012, 2). Positioning science as the arbiter of the conflict of GEOs implies reducing social conflicts to technical problems that involve a regulatory rather than a social solution. Furthermore, it implies taking science as the only way to determine the benefit or adverse effects of GEOs, discarding other knowledge(s).

Science performs “as a powerful ideology to legitimize politics” (Motta 2016, 113). Even when an *epistemic boomerang* takes place supporting anti-GEO groups, science is still in a position of power from which it can validate resistances, groups, and movements. Science obscures other knowledges and restricts the participation of other groups within the sphere of conflict and negotiation just by having the title of scientific knowledge (Druker 2015). Hence, the *epistemic boomerang* is conditioned to the willingness of the scientific community to support struggles. *Bio-hegemonies*, in this terrain, rely on science to secure their material, institutional, and discursive power to build policy-making relations and regulatory frameworks to support their actions and narratives (Newell 2009). Science is used as an agent that mobilizes the legality and legitimacy of GEOs by resolving, dissolving, and silencing anti-GEO groups and movements. This

way, *bio-hegemonies* determine the benefits of GEOs, their risk, and the vulnerabilities surrounding their use. Science is used to manipulate movements and people's perceptions on the use and consumption of GEOs, uncovering the fragility of democratic decision-making processes threatened by corrupted institutions and colluded stakeholders to the benefit of corporations that produce GEOs (Druker 2015).

4. Social movements resisting the entry of GEOs

In the first stage of resistance to the introduction of GEOs into Brazilian territory, it was “a critical mass among the rural poor that provided a background for interpreting the introduction of GE seeds as part of an agrarian model that would further jeopardize their fight for land rights” (Motta 2016, 132). However, due to the correlation of forces that emerged from the groups in power, the peasant and social movements were silenced, ignored, or demobilized by actors with greater representation in power and greater economic stability. These actors that made up the *bio-hegemony* in favor of GE crops entering Brazilian territory had the necessary means and opportunities to promote the politics of *fait accompli*¹ (Motta 2016). Meaning that GEO policies were taken without prior discussion or lobbying and approved without a representative and deliberative democratic process. The contentious politics over GEOs in Brazil used to take place among a cabinet of experts and policy-makers from international corporations and national institutions against disadvantaged social movements and the rural poor. What happened in Brazil informs us that even when social movements are heterogeneous and unite to fight for similar causes, they do not succeed due to power asymmetries.

As in Brazil, the peasant movement in Argentina has experienced relationships of domination and conflict by groups in power (Motta 2016); and especially in the Argentine pampas, the peasant movement “is thin in strength and numbers [as] the consequence of a history of invisibility and dispossession” (Leguizamón 2020, 113). While Motta mentions that the entry of GEOs into Argentina was due to the silencing of social movements and the construction of a *bio-hegemony* among groups in power, Leguizamón presents a broader vision of this process. Leguizamón (2020) argues that the entry of GEOs in Argentina is due to a colonial legacy that continues to be experienced in the country. The author mentions that “during the late nineteenth and early twentieth centuries, European migrants settled in the Pampas and established a type of capitalist agriculture based on large-scale production for export” (Leguizamón 2020, 17). By this means, “the nation-building project of the liberal elite of the nineteenth century created a racialized political economy built on an assimilationist ideology” (Leguizamón 2020, 18). This created a notable difference between indigenous peasants and peasants of European descent that generated inequalities and impoverished working conditions in the countryside.

Leguizamón presents in her book the concept *synergies of power* to frame the peasant struggle and the fight against GEOs within temporary coloniality reinforced in the nineteenth century in Argentina. This concept refers to “the intersecting structural and symbolic dimensions of domination that operate simultaneously and across time to create,

¹Motta (2016) refers to policies of *fait accompli* as those that were taken without prior discussion or lobbying and that were taken for granted and approved without a representative and deliberative democratic process.

compound, and legitimate environmental injustices” (Leguizamón 2020, 15). It highlights, as the concept of *bio-hegemony*, how a powerful synergy of influential actors manages to lay the foundations to create power hierarchies in the decision-making process. *Bio-hegemony* and *synergies of power* are nothing but the seizure of power by subjects with greater privileges and influences, both symbolic and operational, over subjects they can dominate and exploit. The first concept looks at ideologies and symbolic domination in power asymmetries that build hegemonies, the second looks at patterns of dominations, exploitation, and conflict that derive from internal colonial processes.

With the entry of GEOs in Argentina, indigenous peasants mobilized against “health and environmental risks of toxic agrochemical exposure, and the forced evictions and habitat devastation that came as a consequence of the northern expansion of the agrarian frontier” (Leguizamón 2020). However, this movement was silenced and ignored because its ideologies were not compatible with those of an Argentine identity and nationalism based on a European ideal. In both Brazilian and Argentinian movements, the denunciation of organic crop pollution by GEOs has been a constant struggle that does not find regulation through normative frameworks or governmental decisions. To understand this struggle, Kinchy (2012) coined the concept *genes out of place*, to emphasize that “notions about contamination and purity are socially constructed, [further] institutionalized [to then become] points of conflict, and change” (20). This means that bio-pollution or *genes out of place* are “political struggles over the social order” (Kinchy 2012, 20) that are expressed about the different dynamics of the agricultural order.

Seeds have their own agency. The concept *genes out of place* informs how GEOs are to be understood from a plane of mobility since they “behave like any other living plant, growing, reproducing, and spreading their genetic material to offspring” (Kinchy 2012, 9). Once GEOs are released into the environment it is almost impossible to contain their agency. Although other vehicular agents such as wind flows and other aerobic factors as well as various insects in charge of cross-pollination are involved in their spread and mobility, once the GE seeds find the ideal conditions for their reproduction, the containment and creation of human barriers are obsolete. Naming GEOs as agents implies denouncing that they are organisms whose capacity for development and spreading cannot be regulated. This suggests that there is a threat of bio-pollution that occurs de facto every time these GEOs are released into the environment. Thus, regulating the damage and risk, as well as containing it, implies bringing into the discussion the need to have a risk management strategy for the release of GEOs into the environment, and including issues of social and environmental justice as well as the distribution and compensation of damages (Epstein 2002).

Peasant and anti-GEO movements are the largest antagonistic organizations to GEO policies and markets. They are composed by diverse knowledgeable actors that build strategies to negotiate and denounce the risks of introducing GEO seeds in their territories. As local, regional, and international movements denounce, the entry of GEOs not only favors the growth of global agrarian capitalism but also the asymmetries of power and corruption that censure food sovereignty and peasants’ rights. The entry of GEOs not only damages soils, crops, and the diversity of endemic species, but also puts at risk the existence of traditional food systems and cultural food relations (Kinchy 2012; Leguizamón 2020). The mobilization of peasant and anti-GEO movements informs how channels of democratic participation, as well as the spaces for political

deliberation and decision-making, are threatened by and under the control of groups in power that accomplish *bio-hegemonies* to satisfy their objectives (Motta 2016). Containment of crops contamination, risk and vulnerability management, and food sovereignty are just some of the multiple demands that peasant and social movements have as a political agenda against GEOs.

5. Gender inequalities in the introduction of GEOs

Gender, race, and ethnic relations within agrarian studies have been obscured by orthodox approaches that give preference to the study of class and power relations with the state (Razavi 2009). Within studies of GEOs, the same line has been followed and few are the studies that conduct in-depth analyses of how the agrarian system or agribusinesses are grounded on gender relations (Leguizamón 2020; Moerbeek and Casimir 2005; Motta 2016). Shiva (2009) argues that global agribusiness markets are nothing more than hierarchies built on the exploitation of women, peasants, and land. This opens the door for studies on materialities and corporeal domains (Allen and Sachs 2007) that demonstrate that day-to-day politics also shape the organization of agribusinesses. Motta and Leguizamón's books demonstrate how women's collective action against GEOs can be an antagonistic power to state GEO policies, but also a direct antagonistic power to GEO narratives based on health conditions and management of risk. Women's struggle makes clear that the fight against GEOs is also a fight against the "conception and perception of risk that is simultaneously cognitive, embodied, and emotional" (Leguizamón 2020, 107). Thus, the introduction of gender as a unit of analysis is useful to show how the relations of affection and care are key elements to understand the different edges of the movements against the introduction of GEOs.

Both Motta's and Leguizamón's books make it clear that local conflicts against the introduction of GEOs have mobilized gendered identity politics by restricting or facilitating women's participation in the defense of life. Thus, the entry of GEOs highlighted the inequalities that both peasants and subjects in general experience daily regarding patterns of power such as gender, race, class, and ethnicity (Motta 2016; Kinchy 2012; Leguizamón 2020). Within the GEO struggle in Argentina and Brazil, women's movements, mostly mothers, positioned their struggle within a perspective of care (Leguizamón 2020) by which they claimed the risks and threats that GEOs represent to health and especially to children. The Argentinian case informs how women were the most representative political subjects that brought to the public attention the risks and concerns experienced in households by the consumption and cultivation of GEOs. Thus, "the gendered identity of mother became mobilized as a political identity to fight the agrarian model" (Motta 2016, 26), and the role that women played within the anti-GEO movement was for the defense of the dignity of life. This meant that these movements did not lead to a struggle to seize power, or to redefine women's status within the generic order of the agrarian system as subordinate subjects, but to mobilize directly against the policies of the global agribusiness model.

Women's struggles in Brazil and Argentina preceded an inadequate health risk management of GEOs' use. Motta points out that the "Movement of Agrarian Women in Fight" in Argentina and the "Movement of Peasant Women in Brazil" were mainly led by mothers who denounced that the consumption of transgenic foods is harmful to

health. These women argued that the proximity of housing to GEO crops as well as their consumption caused abortions and malformations in newborns. The movement gained strength by strategically highlighting the traditional and socially constructed roles of mothers and care-givers. Motta argues that this was what allowed them to gain a voice within the anti-GEO movement and take their struggle to the streets. These women's movements show how class politics, relations of power, markets, and state–society relations are not the only units of analysis to look at movements against the entry of GEOs, as some studies from the critical agrarian studies have framed them (Razavi 2009). Feminist and gender studies provide insights on how market and state politics are contested in the most microsocial aspects of everyday life (Allen and Sachs 2007). Thus, *bio-hegemonies*, *epistemic boomerangs*, and *power asymmetries* are not only dynamics contested at a decision-making process level, institutional agreements, or normative frameworks, but also on a daily basis through negotiations between different actors distinguished by gender relations and other intersectionalities.

For Leguizamón (2020), the issue of gender is also essential in the debate on GEOs as she mentions that GEO politics are based on extractivist models that perpetuate an agrifood system that is “patriarchal, capitalist, and modern” (107). The argument of the author remarks that the agrifood system in Argentina was built based on a hierarchical structure of racialized bodies. Thus, descendants of Europeans were able to control at a large-scale the soybean production of both GEOs and organic crops. While indigenous peasants, especially from the Pampas, were in the lowest tier of control over GE soybean production. But not only did race play a relevant role in the structuring of the agrifood system. Throughout Argentina's colonial history, gender political economy was also based on the project of Europeanization and whitening of the country. Taking race and gender as units of analysis, Leguizamón shows how the European national myth in Argentina keeps internal colonialism alive, which historically supports the introduction of GEOs perpetuating systems of oppressions and colonial patterns of power. For instance, “women (who identify primarily as mothers and caregivers) are lower in the social hierarchy and thus excluded from decision-making power over large-scale farming” (Leguizamón 2020, 18).

The introduction of GEOs intensifies a gendered political economy that directly affects the role of women at different scales within agribusiness. Gender relations, as a unit of analysis, inform how decisions on agrarian change, food market relations, and place-specific agricultural production are not only concentrated in corporations, courts, or state institutions. They are contested by actors distinguished by gender relations that negotiate the access, production, and use of GEOs. Nevertheless, within an agribusiness built on systems of oppression, these can be used strategically. In both Brazil and Argentina, women's struggle was framed by the socially attributed role of women in reproductive work as care-givers. A condition of oppression denounced by feminist economists for serving the reproduction of capitalism and inequalities (Pateman 1988), this condition was strategically used by women to denounce, consolidate networks, and perform collective work that otherwise would have been excluded, obscured, or neglected by those in power. This movement flourished within a framework of gender inequalities that gave voice to women only because of their condition as care-givers. These relations of oppression still need to be problematized in order to realize a real agrarian change that gives a voice to political subjects regardless of their gender condition.

6. Conclusions

The arguments presented allow us to understand the different power relationships that shape the complex world of GEOs regarding *bio-hegemonies*, social mobilization, and gender inequalities. These highlight the constant abuse of power and power asymmetries used as vehicles for the introduction of GEOs where silencing of peasant voices and delegitimization of anti-GEO groups is a hallmark of abuse of power. Concepts such as *bio-hegemony*, *epistemic boomerang*, and *synergies of power* allow us to situate political subjects within structures, institutions, and state interventions, and regulations across different scales. Hence, power is disputed at a legislative level and decision-making channels and also at a scale of the body, the cognitive, and the emotional (Leguizamón 2020). These concepts show how power is strategically used to demobilize and silence movements. This is the case of the processes that lead to settle *bio-hegemonies with mobilization*, which exacerbate power inequalities through the domination of anti-GEO peasant movements. These concepts also show that the discrediting of mobilizations and legitimization of GEOs obey different time frames and scales that consolidate through narratives of agriculture development, modernization, and colonization.

In addition to the above, it is often pointed out that science plays a relevant role in justifying the introduction of GEOs by creating narratives that benefit the interests of corporations and rarely successfully benefit peasant needs and struggles. By presenting the concept *genes out of place*, Kinchy highlights the material risks faced by farmers, as well as the ecological damage caused by the release of GEOs into the environment. This concept emphasizes the need to propose strategies to mitigate, combat, and eliminate risks prior to the release of GEOs into the environment. This concept also denounces how science maintains a unilateral dialogue with societies and supports legal frameworks that legalize and allow the introduction of GEOs. Motta's arguments to this are that science legitimizes power and by doing so limits the diversification of actors within the decision-making process. Although other studies have already highlighted the role that science plays in legitimizing GEOs (Druker 2015; Flachs 2019; Heldman, Lund, and Sabliov 2018), Motta, Leguizamón, and Kinchy manage to show that science can also be challenged and lose power by its tools, as suggested by the concept of the *epistemic boomerang*. Hence, analyzing the role of science implies questioning it as a colonial legacy that proclaims itself superior to other actors and knowledge(s).

The study of gender, sex, race, and class are some of the patterns of power that inform about the inequalities reinforced by GEOs. Motta links this to a process of power exercised by those who constitute and carry out dynamics of *bio-hegemony*. Women's struggle against the entry of GEOs shows how the use of these organisms is intimately related to perceptions of risk that go far beyond a management plan to mitigate risk and that is found in the embodiment of risk in their everyday life. Race and ethnicity are also relevant patterns of power that inform how *bio-hegemonies* discredit anti-GEO movements by framing them as anti-science. Leguizamón broadens the perspective of inequalities and exercise of power over peasants and anti-GEO movements and points out through the concept of *synergies of power* that systems of oppression based on differences of gender, race, class, and ethnicity that constitute agribusiness are the result of an ongoing colonialism. This is a cleavage in the study of GEOs since this study shows

that GEOs must be framed in a colonial legacy and not only in a given time frame and space as Motta and Kinchy do.

Although the approaches presented by the three authors inform us of the various issues that make up the broad spectrum of GEOs, their studies focus only on the production phase of the food chain. Other studies have pointed out that food production should not be understood without considering the relationships it has with phases such as food transformation, consumption, and disposal (Allen and Sachs 2007; Moerbeek and Casimir 2005). This is because food cultures, food consumption habits, and food lifestyles are also relations of power that shape the production of certain foods. These inform how the exploitation of the fields, as well as the sexual division of labor, are affected or intensified by consumer preferences for specific products that strengthen their mass production. Likewise, the food chain continues to the phase of waste, a very controversial stage that shows that if food waste exists it is because there is also an overproduction of food. The problematization of this is to reveal how much of the production of GEOs ends up being wasted (Singh, Billingsley, and Ward 2006). In addition to this, other strategic powers such as media campaigns that disseminate the ease with which GEOs are cultivated need to be considered in relation to the need of farmers to revive their fields and secure the harvest that represent a means of subsistence for them. In conclusion, the issues presented by the authors should be extended to the rest of the phases of the food chain to understand the various actors and relations of powers that allow the formation of *bio-hegemonies*.

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