Territorializando STS: an analysis of current discussions about agro-biotechnology governance in Latin America, Europe, and the USA

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ABSTRACT
In this article I examine current discussions about the governance of agro-biotechnology in Latin America, Europe, and the USA, based on a comparative reading of critical scholarship about the topic (Bravo, Toro, and Vélez 2014; Parthasarathy 2017; Oliveira and Hecht 2018). In the first section I explain how agro-biotechnology has become a salient issue for international agencies, nation-states, corporations, and communities. I then show that, for the authors, intellectual property regimes are a key part of the process of governance and should be understood as much more than mere techno-legal tools. In the second section I focus on the critical approach to biosecurity taken by Latin American scholars. In the third section I explore how soy expansion has radically transformed South American territories. I close with a reflection on how the STS community can expand and sharpen its intellectual insights and practical value by pairing up with critical community-based studies that decentralize the discussion about public governance of agro-biotechnology from the nation-state and move it to more locally situated spaces.

KEYWORDS
Latin American STS; public governance; agro-biotechnology

List of books reviewed

La Ecología Política de la Bioseguridad en América Latina, by Elizabeth Bravo, Catalina Toro, and Germán Vélez, Universidad Nacional de Colombia, 2014.

Soy, Globalization, and Environmental Politics in South America, by Gustavo De L. T. Oliveira, and Susanna B. Hecht, Routledge, 2018.

Patent Politics: Life Forms, Markets, and the Public Interest in the United States and Europe, by Shobita Parthasarathy, University of Chicago Press, 2017.

In the late twentieth century, biotechnology emerged as one of the most revolutionary sets of technologies due to its potential to modify the human and non-human life worlds in a variety of ways. In biological terms, biotechnology intervenes in life at the
cellular and molecular levels. At the biosocial level, it has proved to have the potential to disrupt moral and political relationships that have historically organized modern life, including citizens’ trust in the state apparatus to protect them from harms and calamities, and the very categories of nature and non-nature.

Although biotechnology has been applied for multiple purposes, such as biomedicine and fuel production, there is no doubt that its application for agricultural purposes has deeply impacted the biosocial world in multiple ways, causing agitation and controversies of all kinds across the globe. Attentive to the rise of such controversies, some STS scholarship has shifted its gaze from the lab to the court and the streets (Newell 2009; Fitting 2011; Kinchy 2012; Parthasarathy 2017), places that are becoming increasingly relevant to understand the nature and political consequences of the use of biotechnology in agriculture. In this regard, scholars in the field have investigated how Genetically Engineered (GE) organisms are governed across the world, and how governance is related to democracy and privatization. Furthermore, they have shown that biotechnology, in general, and agro-biotechnology, in particular, are opening new spaces to challenge, question, and redo (for the good and the bad) biosocial–political arrangements and relations.

This essay is a review of three pieces of scholarship that are helpful to trace the logics that operate at the center of the discussions about agro-biotechnology governance in Latin America, Europe, and the USA. The books examined offer a solid analysis about each of the cases selected by the authors, which allows the reader to understand particularities and similarities, differences, and convergences that are increasingly relevant to study biotechnology’s governance processes across the world. It is important to take a comparative perspective on this topic when thinking about agro-biotechnology because it opens a space in which the micro and macro politics of it become apparent, concrete, and visible through processes, not sealed with heavy words and categorizations.

In the following pages, I will discuss processes that are part of the governance of agro-biotechnology, such as patenting, biosecuritizing, and the expansion of specific genetically engineered crops (GE crops), such as soy. The article is structured in four sections. The first one focuses on Parthasarathy’s book (2017) and delves into the governance of agro-biotechnology in the USA and Europe. The second section focuses on Latin America and, based on the work of Elizabeth Bravo, Catalina Toro, and Germán Vélez (2014), highlights the danger of using biosecurity as a “neutral,” “scientific” tool for risk assessment without further taking into consideration other biosocial processes that traverse the development and use of agro-biotechnology. The third section builds on the illustrative case of soybeans, as explored by Oliveira and Hecht (2018). Here, I connect their detailed account of how GE soy has become one of the most pervasive agricultural commodities in the world with a reflection of how ideas of modernity and nation-state form particular territories. Finally, from a careful reading of these three texts, I draw some lessons that I think are important for STS today. My aim is to show that scholarship coming from LA is asking questions about agro-biotechnology governance that require greater attention to place, as well as the incorporation of critical ways of doing STS that allow us to think about Latin America from Latin America, and for Latin America. In this perspective, the concept of territory, an idea with a long history in geography and other social sciences, becomes a fundamental unit of analysis. It reveals the relations between the creation of identities, the organization and reorganization of biosocial life, and place, which are embodied and embedded in the processes of appropriating materially
and symbolically particular spaces. Thus, agro-biotech governance in LA is studied at the territorial level, not only at the nation-state and supranational levels, which is the approach that has prevailed in Europe and the USA.

1. Agro-biotechnology in Europe and the United States: governing through political ideologies and cultures

What is a human invention and what is nature? Should the state intervene in the market dynamics or should it leave that work to Smith’s “invisible hand”? These seem to be questions posed in a political science introductory class. But no doubt, these are questions that have generated a rich body of scholarship on agro-biotechnology, questioning its capacity to contribute to democracy and focusing on three main aspects. First is the relation that agro-biotechnology has with the expansion and deepening of social inequality. This research has been particularly keen to analyze forms of accumulation by dispossession used by the agri-food industry, and the consequences for the poor and marginalized. For example, Kloppenburg (1998) and Prudham (2007) have emphasized the problematic consequences of the generation of patents, certification and commercialization laws (CCL) associated with agro-biotechnology development for small-scale farmers who were used to saving and reusing their own selected seeds. This obliges them to buy new seeds for each new harvest. For those who cannot afford it, farming becomes unaffordable or a vehicle to perpetual indebtedness. Second is questions regarding environmental health problems related to the use of agrochemicals and consumption of GE foods (Azevedo and Araujo 2003; Singh et al. 2006) and risk management and assessment techniques (Gonzales 2004; Abergel 2007) have also been tackled by critics of agro-biotechnology. These studies show that systems of agro-biotechnology governance are created and structured for export-based agri-economies, forcing producers to align their mechanisms for risk prevention and management with international standards. And third, scholars have also adopted critical perspectives on the role that national political cultures play at the time of making public policy decisions about GE crop production, regulation, and consumption (Chauvet, Chavero, and Zavala 2014).

The work of Shobita Parthasarathy, entitled Patent Politics: Life Forms, Markets, and the Public Interest in the United States and Europe (2017), adds another analytical perspective to these scholarly efforts to unpack the complexity of agro-biotechnology. Situated as an STS study, the book shows that intellectual property rights (IPRs), merely thought of as technological tools, are actually the outcome of complex processes of debate and discussion of several actors and social institutions, such as political representatives, public officials, biotechnology companies, social movements, civil society organizations, and communities. As the title of the book indicates, the author focuses on the patent system of the USA and Europe. One of the most well-known differences among these two systems is that the first is based on the principle of substantial equivalence and the second on the precautionary principle. The book tells us the history of why the systems are different, and how did they come to be so. The answers, as one can expect, reveal that the ways in

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1Substantial equivalence means that GE organisms have to be as “safe” as their non-GE counterparts. Biosecurity is central to this framework because it is the tool to quantify and universalize health and environmental “risks.”

2The precautionary principle understands that the state’s main objective is to safeguard the life and dignity of people, animals, and the environment. It establishes that it is producers and not consumers who have to keep technologies
which patents governed in Europe and the USA are deeply tied to histories, political cultures, and ideologies that both transcend and traverse the technical realm.

On the one hand, the US patent system has been set to favor rapid and extensive processes of privatization of knowledge and life. This system is undergirded by three technocultural ideas. First is the notion that nature and culture, or human and natural life, are two separate things that work independently from each other. Second is that what makes humans different from non-humans is their capacity to transform nature, or to create “new” things, to be novel. Third is that the inventor’s interest is aligned with the public interest, or, in other words, that private interests tend to align with the public good. Based on these political assumptions, Parthasarathy shows, policy-makers in the USA tend to understand patentability mainly as a techno-legal issue in which socio-environmental concerns are usually not taken into account.

On the other hand, in Europe, the ideas under which public policy-makers operate are quite different. They do not seem to rely on the classic separation of culture and nature but to understand human relations with environments as dynamic and reciprocal. They see questions of novelty as being secondary in the decision-making processes regarding life form patents (LFP) and, instead, prioritize socio-economic and socio-environmental factors. Finally, European policy-makers conceive the inventor’s interest separated from and not always aligned with the public interest, which ends up generating a more participatory process of decision-making in which some parts of the civil society are included.

As the author shows, the debate about LFP is actually the controversy about who, how, where, and when (or if at all) GE seeds and foods should be produced and sold, who should regulate such activities, and how should profits be distributed. And it is also a question about knowledge: should it be understood as a common good or as that which can be appropriated and owned? In other words, it is a question that asks about our understanding of democracy and how it should or should not intervene in technoscientific endeavors mostly controlled by large and powerful corporations.

While Parthasarathy’s book is not entirely centered on IPRs and the governance of agrobiotech, her focus on IPRs is important because it shows that the privatization of life forms has added normative and practical horizons to the question of how should life be governed. In this regard, how Parthasarathy re-centers the notion of human and animal dignity in controversies about property rights is particularly significant. This notion seemed to have faded in agro-biotechnology controversies, but Parthasarathy’s repositioning of it takes us back to the roots of progressive thought in Europe that put at the forefront questions about the limits of private property. For example, the notion of human dignity was central in debates about the abolishment of slavery in the nineteenth century (Parthasarathy 2017, 67) and has served throughout the centuries as a liberatory principle in political struggles across the world.

Making further use of detailed historical research, in the first chapter of Parthasarathy’s book, entitled “Defining the Public Interest in the US and European Patent Systems,” she traces the history of the patent system to fifteenth-century Venice and England, where patents were used as “tools to enable the Royal courts to create and expand markets” (Parthasarathy 2017, 22). Through this brief historical exploration, the author shows the

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“safe.” To reach this goal, the patent system incorporates not only quantitative information coming from biosecurity operations but also citizens’ concerns, among others.
deeply colonial character of the figure of the patent, which has worked as a material and symbolic engine of colonial economies and political regimes. However, while European countries kept state power and the public good over the interests of the marketplace, the USA did almost the opposite. Importantly, for the USA – a former colony and a new empire – the patent became a symbol of progress. Thus, patents were seen as a product of human invention, a proof of high technical expertise that could only affect the public good in positive ways. This contribution is particularly important to understand the ways in which global politics of agro-biotechnology operate under neoliberalism and its strong emphasis on innovation as a basis of competitiveness. Other scholars have also elaborated on this, emphasizing that “the increase in global competition, which trade liberalization under neoliberalism facilitated, resulted in a shift of government and industrial research funding toward technological innovation, and new intellectual property regimes facilitated new relationships between universities and industry” (Moore et al. 2011, 514).

Parthasarathy’s work prioritizes classical debates in liberal societies about the relations about the public and the private, the borderlines between nature and culture, and the politics of life and death. Without a doubt, these questions are pivotal to understand the challenges that the rapid development of agro-biotechnology presents us. The author also expands our knowledge about the way in which the European and US IPRs handle issues of profit distribution, which is a key point when thinking about the political economy of agro-biotech.

*Patent Politics: Life Forms, Markets, and the Public Interest in the United States and Europe* (2017) is a careful and detailed study of the politics of life form patenting in Europe and the USA. It combines methods that range from more than a hundred in-depth interviews to meticulously done archival research. The result is a remarkable piece of scholarship that sheds light on why the systems of agro-biotechnology governance of two initially similar political powers are substantially different.

In addition, her analysis pays special attention to the political processes that have allowed patents to concentrate more or less biotechnical power in Europe and the USA. By providing such detailed insights on the mechanisms and politics that produce differences in governance models, Parthasarathy also helps us to understand Latin American positionality in the global politics of agro-biotechnology. In the following section, I discuss this point and some of the contributions made from Latin America to Latin America.

2. De-biosecuritizing agriculture in LA: a critical reading of biosecurity in the region

A major starting point for understanding how technoscientific governance has been approached in Latin America (LA) is the work of dependency theorists (see Sábato 1975) that critically analyzes the ways in which nation-states in this region have taken decisions regarding technoscience. As Kreimer and Vessuri (2017, 22–23) note, this branch of research revealed that public policy for science and technology in LA was set up, in the last half of the twentieth century, following the directions of the US government and international organizations such as UNESCO. Embedded in these policies was a

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3Although Parthasarathy does not expand on this point, many of the contributors to The Political Ecology of Biosecurity do. Their critical analyses show that those relations between academia and corporations undermine public trust in science, creating a crisis of scientific legitimation and authority in controversies around agro-biotechnology.
displacement of place, such that the policies created an abstract, universal, movable, and transportable technoscience policy that, its architects hoped, could be applied everywhere, at any time, by expert technocrats. This project, created under a modern capitalist imaginary, saw LA countries as underdeveloped, chaotic, governed by savages, and inhabited by ignorami. By no means did they consider these places as having particular histories of knowledge extraction and creation, or of epistemic subordination and resistance.

The work of Bravo, Toro Pérez, and Vélez, entitled Political Ecology of Biosecurity in Latin America (2014), shows that these premises are still operating as the very basis through which governance models, particularly for science and technology, are designed in LA today. The authors focus on biosecurity, which they understand as the privatization of risk assessment. Contributors incorporate their specific areas of expertise to explore how the accumulation and exercise of agro-biotechnology companies’ biotechnical and political power not only destroy socio-environments further but also reinforce and deepen socio-environmental historical inequalities in the region. They also pay special attention to how a combination of new laws, which aim to regulate biosecurity, genetic resources, and intellectual property, work as a way to expand human and social power over nature.

Doing justice to the understanding that LA is a highly diverse space (in terms of histories, cultures, socio-environments, economies, etc.), the editors bring together social and natural scientists, and activists from countries as distant and different from one another as Argentina, Colombia, Ecuador, Costa Rica, México, Chile, and Bolivia. Instead of claiming a totalizing view of LA, editors and contributors bring this broad diversity into a single text in order to highlight their political commitment to exploring, from a situated standpoint, the distinct ways in which biosecurity has come to articulate some of the most relevant questions about the global politics of food and agriculture in the twenty-first century. It also propels the study of LA STS into new directions, and refuses to see it as an undifferentiated mass of knowledge produced by elite researchers located in elite institutions. Instead, it is being produced as a collective effort by intellectuals who are part of social and environmental justice-oriented groups and research collectives in and outside academia (e.g. Latin American Council of Social Sciences [CLACSO] research group on Latin American Political Ecology [LAPE]).

Three basic questions are articulated in the compilation. First, who is in charge of analyzing the risks that come with the production and use of GE seeds for agriculture? Second, who is excluded from such analyses? And third, how are the processes of risk assessment performed?

Two basic arguments serve as a basis to answer those questions: the first one is that risk assessment, instead of fulfilling its duty as a mechanism to prevent harms associated with the use of agro-biotechnology, often works as a political tool employed by governments and corporations to legitimate the indiscriminate use of GE seeds and other agro-biotechnology products in fields across the region. Such use benefits the profit-making of food and seeds corporations and assures their industrial monopoly. The second argument is that, in order to analyze and understand how the politics of biosecurity work in LA, we need to articulate a critical analysis of the discourse of public governance of agro-biotechnology with an examination of how such politics are grounded on a modern-Western narrative and practice of technoscience that sees agro-biotechnology as the engine for “development.”

Chapters present two kinds of analysis: one based on general critiques to how biosecurity practices have been constructed and implemented in LA and another of particular
cases. Chapters 1–6 do the more general critiques. Chapters 7–12 develop the case studies exploring the effects of such practices in specific countries such as Chile, Colombia, Bolivia, Ecuador, and Argentina.

The book begins with Toro Pérez’s overview of when and where in LA biosecurity norms and GE crops have been incorporated. Toro Pérez argues that biosecurity is an interlocking axis of power, legislation, and capital accumulation that protects private capital and exposes people and their socio-environments to harms that cannot be anticipated in the very processes attempted by risk assessment practices. Nevertheless, the studies in the book also demonstrate that how this happens in each case is closely tied to each country’s historical and political specificities. For example, Bravo shows how the Southern cone countries have reached a higher level of harmonization regarding IPRs, while countries located in the Andean region are more heterogeneous. In the latter we find countries such as Bolivia and Colombia, which differ radically in their political ideologies but coincide in the extractivist nature of their economies, as the ones pioneering the incorporation of such legislation. And then we have the cases of Peru and Ecuador, also almost on opposite sides of the spectrum regarding political culture and ideology, but aligned in the opposition to transgenics at the state level.

In the second chapter, entitled “Una vision de la bioseguridad en América Latina desde la Ecología Política” (A View of Biosecurity in LA from Political Ecology), Bravo argues that despite the differences in agro-biotechnology governance, the issue is not generally treated as a public matter. Rather, it has been confined to the maneuvers of companies who have the political and economic capital to lobby government officials and politicians, and who also control the technoscientific infrastructure needed in order to carry out key parts of the governance process such as how, when, and by whom is risk assessment performed. Bravo makes a powerful case in insisting that, in order to make the process truly public, it is of fundamental importance to involve actors that could be potentially affected by such techno-legal apparatuses. Those actors may not possess the technoscientific infrastructure needed for the construction of the algorithms and mathematical models used in risk assessment today, but they have valuable knowledge and experiences that must be taken into account by systems of governance at the nation-state level.

To elaborate the critique to the idea of development as biosecurity’s basic operational principle, authors incorporate the contributions of well-known decolonial scholars in the region such as Arturo Escobar (2012) and Anibal Quijano (2007). Chapters 2 (“El extractivismo y el discurso de la seudociencia,” by Andrés Carrasco), 4 (“Los riesgos tecnológicos y la objetividad de la ciencia,” by Carmelo Ruiz Marrero) and 5 (“Para deconstruir el credo en la globalización y el progreso,” by María Fernanda Solíz) explore the modern-colonial discourse about scientific development as an engine for modernity and progress. Carrasco shows that, in Argentina, disciplinary knowledge has been chained to private capital’s will. Thus, universities become sites for the practice of corporate science that has little concern with the public good. This line of work is echoed by Ruiz Marrero’s critique of the idea of objectivity used in public policy decisions to legitimize decisions regarding agro-biotechnology governance. Finally, Solíz makes a case for the deconstruction and dismantling of the “creed of progress and civilization” to better understand how the agri-system is currently working. She argues that biosecurity becomes the contemporary way in which long-lasting practices of centers of power continue the processes of control and extraction of former colonies. One example of this is the problems created by international aid. First, it
operates under the idea that “sending” technoscience to the “third world” is the way to solve social problems. Second, it suggests that the poor are responsible for their own condition. And third, it perpetuates the othering of peoples of the South. Importantly, the author points out, international aid profits from the way in which the agro-food system is set. Thus, monocultures, agrochemicals, food overproduction, and now GE seeds and crops are a key part of the whole operation. In this context, says Soliz, risk assessment criteria are set to facilitate profit. For this very reason, risk assessment does not equal risk prevention, and much less the guarantee of socio-environmental health maintenance and enhancement.

Drawing a parallel with Parthasarathy’s contributions, authors of The Political Ecology of Biosecurity in LA emphasize that questions about risk do not require expert/quantitative technoscientific knowledge in order to be resolved, but the creation and maintenance of democratic practices of risk assessment that consider the ethical and political aspects behind the issues to be resolved. These practices should also open up spaces for discussing what kind of society we want to create and in which kind of world we want to live. They also underscore that socio-environmental health is a territorial expression, a process of resource transformation, distribution and consumption that happens, primarily, at the local level. Thus, they propose, other criteria that are designed from the beginning by and for communities should work as mechanisms of agro-biotechnology governance. These criteria are closely tied to their analysis of cases of civil society’s won and lost struggles for its involvement in biosecurity policy processes.

In this section of the book, the chapters narrate the fight against IPRs carried out by social movements, grassroots organizations, and Nonprofit Organizations. There is a focus on the important ways in which social movements contest the limits and possibilities of technoscience by shaping the present and future of agro-biotechnology governance. Ruiz offers an analysis of how Chilean civil society actors won the “right to know” in a fight against the agro-industry to protect apiculture from genetic contamination. The struggle took place between 2009 and 2012 when civil society organizations filed a lawsuit against the Chilean government and won it before the court. The lawsuit reclaimed civil society’s right to know where GE crops were located in the Chilean territory, something that was previously categorized as classified information by the government and industry. To oppose civil society’s demand to have the right to know, government agencies and corporations argued for their right to hold this knowledge secret. This right, they stated, was based on the idea that this was a matter of national security and technoscientific expertise. Such information should not be made available to civil society members until it became translated into concrete public policies.

The terminology of the right to know and the right to secrets signals a form of approaching issues of risk assessment that goes beyond concerns about biosecurity mechanisms. It does so by asking questions related to issues about access to knowledge. The reason for this, Ruiz argues, lies perhaps in LA countries’ histories of coup d’état, civil war, and systematic violence. In these histories, secrecy in the form of the impossibility to know what happened to bodies under authoritarian regimes has operated as a key mechanism for the maintenance of power. These histories resonate particularly in the Southern Cone civil society and social movements.
Finally, the case of Colombia also offers important insights for the understanding of the relations between IPRs, certification, and commercialization laws with agro-biotechnology. In chapters 8 (“Colombia: una evaluación de los cultivos genéticamente modificados en Colombia”) and 9 (“Las leyes de semillas en Colombia contra la soberanía y autonomía alimentaria de las comunidades”), Germán Vélez shows that, in the Colombian case, it is difficult to trace the origins of the techno-legal approach to agro-biotechnology governance to a coherent political ideology. Although Vélez does not make this point explicitly, it can be said that one of the reasons for this is that the state has not set a clear political agenda with which to deal with socio-environmental conflicts that have derived from the extractivist economic model. As with many other issues, perhaps the 50-year long armed conflict overshadowed any other relevant social problems, even, in fact, the very connection between the economy of war and the politics of socio-environmental devastation.

In the next chapter, Vélez also provides an example of the work done by nation-wide grassroots organizations that are collectively building their own systems of agricultural governance. There, he examines the organizing process made by La Red Nacional de Semillas Libres de Colombia (The National Network of Free Seeds of Colombia) in the last years and the models of bottom-to-top governance they have been developing together with other prominent social organizations of the region. As I show in my own research (Gutiérrez Escobar and Hernández Vidal, forthcoming), these models are heterogeneous, deeply tied to place, and centered on the materialities and epistemologies of native seeds (non-transgenic seeds) as axes of the articulation of life and resistance.

The book closes with the public declaration of “La Red por una América Latina Libre de Transgénicos” (The Network for a Latin America Free of Transgenics) on the meaning and consequences of 20 years of GE crops in the region. The statement underscores that risk assessment and management have been shown to be practices that do not resolve or prevent socio-environmental problems associated with the use of GE crops and agro-chemicals. On the contrary, the statement stresses, these technologies have become participants in the destruction of biodiversity and the violation of basic human rights of communities affected by the IPR and the CCLs. There is no doubt that these words are powerful. In them lies the hope to rethink and redo agricultural and agro-biotechnology governance to create radically different futures.

These immensely important perspectives come from LA scholars-activists who are committed to put socio-environmental conflicts at the forefront of governance concerns in the region. They are engaged in the transformation of knowledge production practices in academia through which scholars become real allies of social movements, not their enemies or inactive bystanders. These critiques are also fruitful in the making of a critical/decolonial STS scholarship that engages with coloniality and the ideologies of progress and development as prominent and prevalent mechanisms of power that traverse governance in its plurality of forms and locations. This new work takes seriously the historical production of inequality from an STS approach while also looking into questions about how mainstream technoscience is used as a mechanism for further extraction and marginalization of peoples and their socio-environments, while acknowledging movements and communities’ contributions to the making of agricultural alternative pathways (borrowing David Hess’s language (2007)).
3. GE soy: creating and governing neo-natures and biosocial orders in South America

Many studies about agro-biotechnology governance and use follow techno-political trajectories of specific crops to illuminate how commodification itself shapes potential and actual governance. *Soy, Globalization, and Environmental Politics in South America* (Oliveira and Hecht 2018) uses this approach. The value of this analytical strategy is that it allows us to show that, although following global logics of GE crops’ management and implementation, the particularities of locations reveal patterns of governance and contestation that are non-transferable to other contexts. As Oliveira and Hecht’s compilation shows, GE soy crops have captured the attention of the media, the courts, corporations, and the civil society; their growth in the last decades reveals the logic of global capitalism, local styles of government, and their entanglements with corporate technoscience.

*Soy, Globalization, and Environmental Politics in South America* is divided into four sections. The first section is devoted to show the dynamics of socio-environmental and techno-political homogenization behind the creation of “The United Soybean Republic.” The second section is focused on revealing the specificities of the relations of production created by soy expansion, both in large GE soy monocultures and small-scale farms. The third section analyzes the socio-environmental politics of the soy model. In this section, the article entitled “On the Margins of Soy Farms: Traditional Populations and Selective Environmental Policies in the Brazilian Cerrado” (written by Ludivine Eloy, Catherine Aubertin, Fabiano Toni, Silvia Laine Borges, and Lucio and Marion Bosguiraud) is perhaps the most illuminating. There, it is shown that the way in which the politics of soy works in Brazil are deeply linked with how knowledge about social and ecological harms is understood by government and research agencies. Such understanding determines strongly the outcomes of public policy decisions about how to govern soy in particular, and agro-biotechnology in general. The fourth section digs into how the GE soy expansion has developed in Bolivia and Argentina, opening new agricultural frontiers and changing the political and social geographies of these countries. Special attention is given also to the role that land has in the development of the soy economy.

“The United Soybean Republic,” financed by Monsanto and Syngenta, among other seed corporations, is the neocolonial effort to make Argentina, Brazil, Paraguay, Uruguay, and Bolivia into GE soy monocultures. These were the very same countries that were part of what was known in the USA as the “pink tide,” or “Latin American left turn.” Except for Paraguay, these countries made transformations from neo-liberal governance to what were seen at the time as progressive left-wing governments. However, the illusion of change faded in these countries when leaders began to implement extractivist economies as means of funding their regimes.4

Today, the panorama of GE soy use in the “The United Soybean Republic” is astonishing: 88% in Brazil to 93% in Bolivia, 95% in Paraguay, and over 99% in Uruguay and Argentina (Oliveira and Hecht 2018, 6). However, as is shown in the volume, this high level of techno-

4Karen Pomier shows this in her contribution to the Political Ecology of Biosecurity. In the case of Bolivia, for example, she traces the history of creation of the “Law for a Productive Communitarian Revolution,” which was supposed to stop soy expansion. The first version of it, which was the outcome of a long process of grassroots deliberation, actually had incorporated mechanisms that fulfilled such purpose. However, as Morales’ government became increasingly neoliberal and authoritarian, the same law turned into a techno-legal tool that included very strong IP laws and commercialization laws that benefit soy corporations and hurt small-scale farmers.
corporate homogeneity does not imply the absolute removal of local politics and territorial dynamics from the map. On the contrary, the level of state intervention to facilitate the implementation of GE soy models in the region has been key to its expansion. Some of the ways in which the state has intervened has been through the creation of “government-subsidized credit, modernization of cadastral data and land titling, state-supported infrastructure development and machinery imports, and significant research and development funding” (Oliveira and Hecht 2018, 18). In this regard, one of the main arguments that traverse the work of contributors to this book is that “soy has become the central means for contemporary state ‘territorialization,’ expanding and integrating state presence into remote areas of national hinterlands” (Oliveira and Hecht 2018, 18).

The importance that the attention to place gets in this volume is remarkable. And perhaps the most revealing aspect of it is the description of how GE soy expansion is actually making neo-natures and new agro-industrial landscapes that include the creation of agro-industrial urbanisms that house not only labor, but also service provisioning, industrial processing, and finance. As Oliveira shows in his own chapter (“The Geopolitics of Brazilian Soybeans”), the ideology of agrarian modernism embodied by the GE model has made of soy cities, that are literally built on dead land, a national symbol of progress and modernity.

The articles of this compilation offer some of the most detailed and carefully done studies on transgenic soy in LA that capture not only its expansion but also the political meanings and logics that are mediating it. The power of the soy model is also a reflection of how neocolonialism is a much more complex phenomenon than a unidirectional oppression North to the South. The fact that more than 70% of the cultivated land in Bolivia is in foreign hands, particularly of Brazilian investors, makes a point for the inclusion of internal colonialism in the region as a key factor to understand socio-economic and political trends affecting the governance of agro-biotechnology. Internal colonialism also becomes a variable to take into account when thinking about how LA perspectives emphasize place as a key factor to think about when analyzing differences in agro-biotechnology governance models and impacts.

4. Lessons learned

In approaching their own themes and developing distinct arguments, the books reviewed in this essay show how political cultures and ideologies embedded and embodied in the political economy of biocapitalism help to create different patent regimes and worlds of agro-biotechnology governance. Parthasarathy does it primarily, I would say, at a macro-political-historical level in which she is interested in the national and supranational instances of governance. Her detailed and rich analysis of life form patenting controversies in the USA and Europe reveals the multiple ways in which liberalism and neoliberalism have influenced the faith of technological developments. Also thinking on the role of political cultures and ideologies, Oliveira and Hecht make an exhaustive and thought-provoking analysis of case studies that carefully show how South American territories are being radically transformed by the introduction of GE soy crops. Although studying a diverse pool of cases, the authors of the book hold that in order to comprehend the implications of the expansion of the GE soy model, it is not enough to look at US patent and certification laws, and the World Trade Organization’s demands for international food trade
regulations. Instead, it is also important, they emphasize, to understand that “powerful narratives about soy itself are complemented with symbolic content about what it means to be modern in rural areas” (Oliveira and Hecht 2018, 4). Thus, their work aligns with Parthasarathy’s argument that biotechnology governance is not a neutral “science of government” (to use Foucault’s term) but a deployment of tactics entrenched in particular political cultures and ideologies of modernity.

Aligned with a critique to modernity, Bravo, Toro Pérez, and Vélez illuminate distinctive ways of doing STS scholarship in LA that draws from decolonial thought born in the region. The authors claim that biosecurity has become the main channel through which biosocial life is controlled, privatized, and suppressed in Latin American territories. This focus on domination and oppression via critical analyses of agro-biotechnology governance goes beyond liberal and mainstream ways of doing STS. It does so by questioning the political logics of coloniality embedded in the processes of reorganization of biosociality implied in the use and development of biotechnology. This is important because it brings back questions regarding the relations between technoscience and the production of inequality, while reopening the space to even question capitalism as the de facto system in contemporary societies.

Another important contribution of the scholarship focused on LA is the emphasis on the concept of territory as a relevant unit of analysis. In this line, they also call attention to territorialization and de-territorialization as salient processes entangled with agricultural and technoscientific practices and ideologies. This is relevant for scholars and activists interested in the matter because it sheds light on the micropolitics of agro-biotech governance that need to be continuously unveiled and further understood.

The authors of the three pieces also demonstrate that social movements and civil society organizations are main actors in shaping the contours of agro-biotechnology governance. In LA, Europe, and the USA, social movements organize to contest not only the materiality of GE crops’ expansion but also the techno-legal discourses that corporate science uses to support claims in favor of the increasing power of agro-biotechnology/agro-business increasing power. In this process of contestation, they show how technoscientific practices and governance are delegitimized in the eyes of civil society, and other forms of knowledge begin to emerge as relevant. An example of this is the way in which in LA popular knowledge (I mean, indigenous, campesinx, afro-latinx) is contributing to the construction of other epistemic worlds for agriculture, and food production and management that operate under a logic that is still misunderstood and even unseen by nation-states and corporations. It is critical to notice, then, that the meaning that knowledge used to have under modern technoscientific ideological infrastructures is destabilized and reshaped, sometimes from the ground up, in the complex processes of structuring agro-biotechnology governance in LA, Europe, and the USA.

I want to underscore that I see it as key for STS to recognize this line of work that intentionally builds its theoretical and analytical apparatus with and for social movements in the hope of making a contribution that can back up grassroots organizations in their struggles for socio-environmental justice. This political gesture has the intention to achieve social justice through radical, transformative collaborative methods, such as Fals Borda’s participatory action research (Fals Borda and Rodríguez Brandao 1987). Because researchers learn and research with movements, they create a common political agenda. This epistemic move seems to be necessary due to the political climate for social leaders in LA today.
The assassination of environmental leader Berta Cáceres in Honduras in 2014, or the killing of the 173 indigenous, campesinxs, and Afro-descendent social and environmental activists in Colombia in 2017 by actors who have historically defended the agri-business industry in the region (González Parafán and Delgado Bolaños 2018), are proof of that. Thus, although the power of modern-Western understandings and practices of public governance end up, most of the time, exceeding the will of creating new, different, truly democratic systems of agricultural governance, we should not dismiss the importance of the articulation of alternatives, for these may be the bases of more successful contestations in the future.

Perhaps one of the gaps that the books reviewed for this essay have is that, in general, they do not pose questions related to how the construction of agro-biotechnology governance in different regions affects and is mediated by gendered and racialized understandings of the people who work the land and inhabit the territories in which GE crops are being used. These questions are important for STS in an age in which racism is rising in the USA and elsewhere.

Finally, I would like to add that although these studies tell us much about how GE seeds, chemicals, and other industrial inputs shape both land and government, they have less to say about how they are connected to the bodies of the people who are working the land or who had lived in areas colonized now by GE crops for centuries. Thus, taking seriously the call to pay attention to what happens at the territorial level, other questions that have great exploratory potential for future research in agro-biotechnology governance are: What are bodies telling us about socio-environmental transformations? How do bodies “count” at the time of making decisions about how such bodies eat, drink, sleep, work, get ill, and die? In answering these questions, we may gain different kinds of analytic depth that can help us answer a broader question about how and whether a territorialized STS might create an understanding of the relations between science, technology, and society more responsive to the relations that have managed to survive and those that were eaten by the militarized machine of extraction in LA.

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