



12

Territorial Changes Around Biodiesel: A Case Study of North-Western Argentina

Virginia Toledo López

12.1 Introduction

At the beginning of the new millennium, several biodiesel projects were announced in Argentina, driven mostly by the world market. However, a national law covering agrofuels was not passed until 2006.¹ The new law created a local consumer market for biodiesel and ethanol as of 2010. At this time, Argentina became the world's largest exporter and fourth-largest producer of biodiesel. Recently, this sector has experienced a further boom due to the promotion of the “bioeconomy”, with

¹The most widely used term is “biofuels”; however, this term has been questioned in environmental debates. In this article, I refer to them as “agrofuels”, thus, avoiding the positive connotations inherent in the “bio” prefix. I define agrofuels as fuels based on flex crops that derive from industrial agriculture and are produced by agribusiness (Gras and Hernández 2016).

V. Toledo López (✉)

Institute of Studies of Social Development (INDES), University of Santiago de Estero (UNSE)-National Scientific and Technical Research Council (CONICET), Santiago de Estero, Argentina

biodiesel as the favoured product in this new area in terms of production volume and territorial expansion. The purpose of this chapter is to use a case study to understand the territorial changes related to biodiesel production in Argentina.²

The chapter begins with a brief description of the theoretical framework and the methodological approach used for the analysis. The next section considers the political and economic context of biodiesel production in Argentina. The sections that follow assess the territorial impacts of the agroindustrial frontier in north-western Argentina (NWA) and the specific territorial changes linked to biodiesel production within that area. This is done by focusing on the case of Santiago del Estero. Finally, some considerations of the ongoing process are drawn.

Social research in Argentina has already produced some noteworthy analyses of agrofuel public policies (Wehbe et al. 2008), their economic potential (Gorenstein and Gutman 2016; Rozemberg et al. 2009; Scheinkerman de Obschatko and Begenisic 2006; Carrizo et al. 2009; Chidiak et al. 2012; Dam et al. 2009), the effects of international specialization and trade (Lorenzo 2015). Studies have also been conducted into the environmental impact of agrofuels, and these also assess the energy balance of soya biodiesel (Donato et al. 2008; Iermanó and Sarandón 2009) and greenhouse gases (Hilbert and Galbusera 2011; Hilbert et al. 2012). Furthermore, Andersen et al. (2012) studied the relationship between land use and agrofuel based on different biomasses (soya, sunflower, jatropha). In addition, agrofuels have been considered in terms of extractivism (Toledo López 2013) and within a conceptual framework on energy and food sovereignty (Toledo López 2018). However, the research literature has not yet systematically analysed the social and environmental impact of biodiesel production from the perspective of political ecology (PE).

²This contribution is a synthesis of some findings from my doctoral thesis in social sciences, which I completed in 2016. The research was continued thanks to a postdoctoral fellowship from the National Council for Scientific and Technical Research, *Consejo Nacional de Investigaciones Científicas y Técnicas* (CONICET).

12.2 Theoretical and Methodological Framework

This work is situated within a broad political ecology (PE) perspective (Alimonda 2002, 2011; Martin and Larsimont 2016) and focuses on power within societal–nature relations, ecological distribution, environmental appropriation and valuation conflicts. Therefore, assuming that environmental impacts are unequally distributed amongst societies, social groups, communities and classes, I use the *territorial* approach from critical geography to elaborate on this perspective and to point to social practices that create a spatial distribution as a starting point for understanding the complexity around societal–nature relations, which are shaped by power (Harvey 1989, 2001; Santos 2000; Haesbaert 2007). Harvey argues that “the production of spatial organization” (2001, p. 327) involves the production of space and nature.³ In this viewpoint, “territory” is a multiple, diverse and complex social construction that is shaped by simultaneous processes of domination, appropriation and resistance and expressed in both material and symbolic terms. In focusing on territorial changes around agrofuels, therefore, I refer to both the environmental and the social changes and the ways in which they are outlined by power relations. The focus on the material and symbolic dimensions of socio-ecological dynamics led me to consider the “valuation of nature”, as promoted by different territorial agents, and the resulting conflicts (Harvey 1996, p. 150).

Environmental appropriation is considered a form of accumulation by dispossession that involves a wide range of processes.

These include the commodification and privatization of land and the forceful expulsion of peasant populations; conversion of various forms of property rights – common, collective, state, etc. – into exclusive private property rights; suppression of alternative, indigenous, forms of production and consumption; colonial, neo-colonial and imperial process of appropriation of assets, including natural resources; monetization

³This implies that “material spatial practices”, “representations of space” and “spaces of representation” of space (and time) are set by power relations (Harvey 1989, p. 220).

of exchange and taxation, particularly of land; slave trade; and usury, the national debt and ultimately the credit system. The state, with its monopoly of violence and definitions of legality, plays a crucial role in both backing and promoting these process [...]. Wholly new mechanisms of accumulation by dispossession have also opened up. (Harvey 2004, pp. 74–75)

In this sense, “bio” or agrofuels can be seen as a “new appropriation of nature” and the continuation of capitalism through projects with green ends (Fairhead et al. 2012).

This section first considers environmental transformations related to agribusiness expansion such as pesticide use, deforestation, loss of biodiversity, water contamination and the destruction of the material basis for life, especially in areas where both soya and biodiesel have been recently introduced. Second, this section also focuses on socio-political impacts, such as the construction of “development narratives” (Svampa and Antonelli 2009), that legitimize the practices of agribusiness. This finally leads to the concept of hegemony (Gramsci 2011; Gras and Hernández 2016). This concept helps provide a better understanding of the power dimension within the societal–nature relations identified by the case study (understood in the sense of Flyvbjerg 2011).

The methodological approach includes a combination of a literature review, statistics and reports by official Argentinian institutions, media data and in-depth, field-based research. Primary sources were collected mostly in 2012, when (participatory) observations and about 30 semi-structured interviews were conducted with employees and former staff from a biodiesel factory, managers and administrative staff, local and provincial public officials, technicians, key informants, members of educational institutions and non-governmental organizations, neighbours and small farmers from the area.

12.3 Agrofuels Production in Argentina

To understand the agrofuels boom and its territorial implications, I first consider the conditions that made biodiesel production in Argentina possible. A crucial moment in this process was when permission was

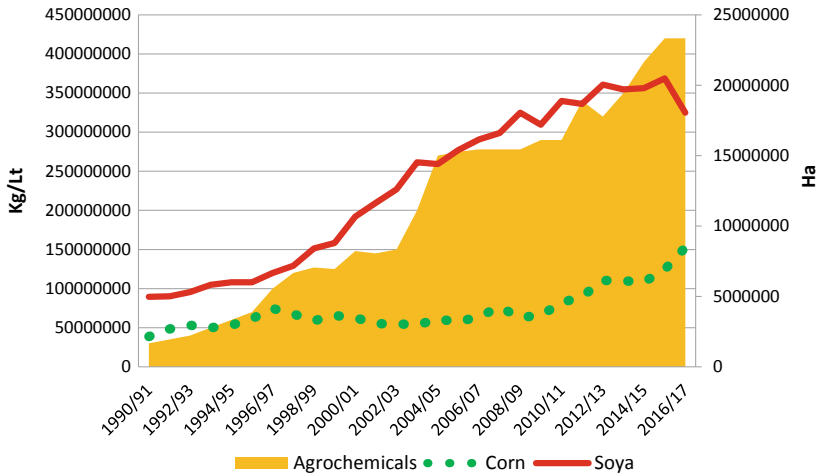


Fig. 12.1 Agrochemicals use (kg/Lt) and soya Farmland (ha). 1990/1991–2016/2017 (Source Own elaboration, adapted from *Sistema de Datos Abiertos de la Secretaría de Agroindustria*, <https://datos.agroindustria.gov.ar/dataset/estimaciones-agricolas> and *Naturaleza de derechos* 2019)

granted to produce and trade glyphosate-tolerant soya (a genetically modified organism—GMO) in 1996 (Teubal 2009). In 1980, less than one million hectares (ha) of land was being used for soya farming; by 2012/2013, this had risen to 20 million ha out of a total of 34 million ha of agricultural land in the country.⁴ The introduction of GMOs led to an intensification and expansion of industrial agriculture—driven by soya production (Gras and Hernández 2013, 2016).

As a result, soya became the main annual crop, in terms of both land use and production levels. The approval of further GMOs extended this logic to other products (today, more than 60 GMOs are authorized in Argentina) and positioned Argentina as the country with the third-largest level of land used for GMOs, or 12.5% of the world's farmland. This also led to an increased use of pesticides in agriculture. As Fig. 12.1 shows, the use of agrochemicals has increased from 30 million lt/kg in 1990 to 525 million lt/kg in 2018. In recent years, Argentina has become the

⁴See, <https://datos.agroindustria.gov.ar/dataset/estimaciones-agricolas>. Accessed 29 Oct 2019.

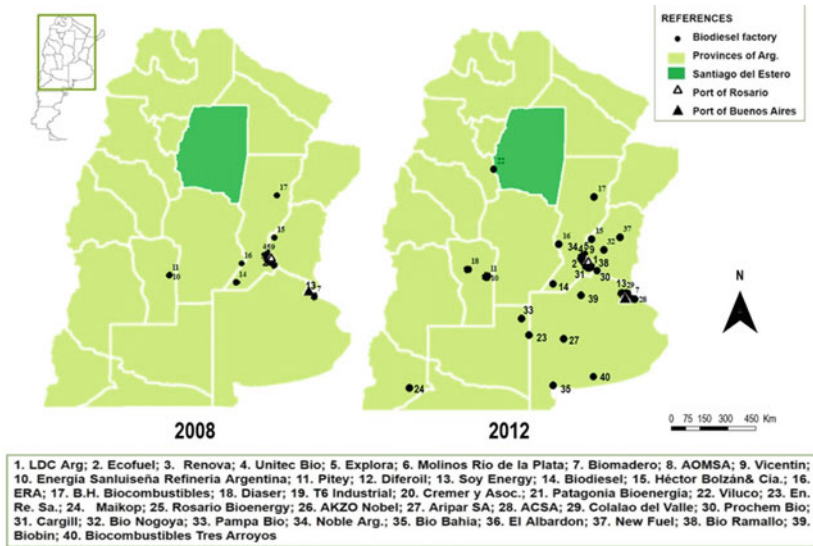


Fig. 12.2 Biodiesel agroindustry in Argentina. Location in 2008 and 2012 (Source Own elaboration, adapted from *Secretaría de Energía*. See, <https://www.argentina.gob.ar/produccion/energia/>. Accessed 12 May 2015)

focus of growing conflicts and controversies over environmental issues and the health consequences associated with agrochemical use.

The production of oilseed, led by soya (93% of the total), is the country's main export (amounting to almost 30% of total exports). In particular, the oil industry is export-oriented, and its main input is soya, with more than 90% of production aimed at the world market (MH⁵ 2017). As such, it could easily be adapted to biodiesel production. The possibility of adding value to soya grain by turning it into fuel was attractive for sectors that saw "agriculture as a business" (Gras and Hernández 2013).

The biodiesel agroindustry in Argentina also contributes to economic and territorial concentrations. As Fig. 12.2 shows, the location of the first factories, close to the ports of Rosario and Buenos Aires, demonstrates that the agroindustry is focused on exports and the territorial

⁵Ministerio de Hacienda – Ministry of Finance.

concentration of biodiesel. 80% of Argentina's biodiesel production takes place close to this area. There are currently 50 active biodiesel companies, but the 8 most important (all of which are primarily oil-focused agroindustrial) companies produce almost 80% of the country's biodiesel and mainly target the world market (MH 2017). In particular, the large-scale biodiesel factories profited from the introduction of a national quota for biodiesel (see below): the four biggest enterprises alone supplied 40% of the biodiesel quota.

Biodiesel production rose from the least important source of agrofuels (around 711,864 tonnes) in 2008 to around 2.5 million tonnes (t) in 2012 (Fig. 12.3). Before 2010, all Argentinian biodiesel was destined for export. The rise in its production is mostly explained by increased demand from the European Union, which was initially the only destination of Argentinian biodiesel. As such, the supply of agrofuels in Argentina, which was strongly driven by the production of biodiesel, was stimulated by the world market and the promising exchange rate available as of 2002 (Toledo López 2013). In a global context, which has been

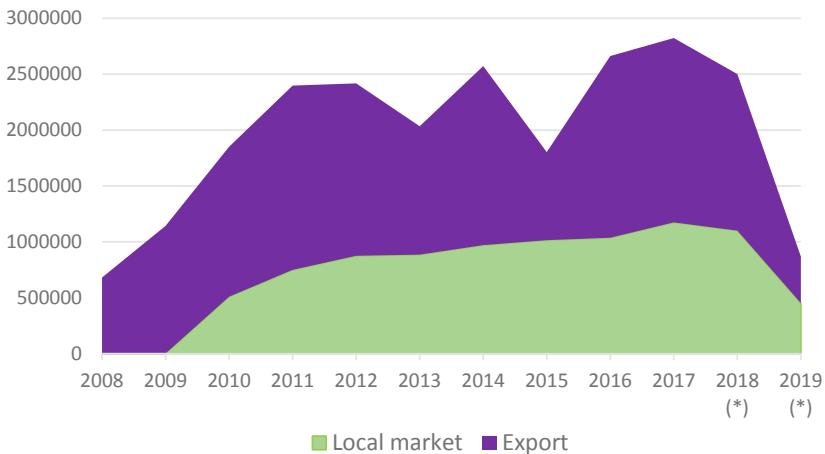


Fig. 12.3 Main destinations of Argentinian Biodiesel (t). Provisional data (Source Secretaría de Energía. See, <https://www.argentina.gob.ar>. Accessed 29 Oct 2019)

described as the “commodities consensus” (Svampa 2012) and the “neo-developmental stage” of the Argentinian accumulation regime (Félix and López 2012), agrofuels were promoted through a green-friendly narrative that emphasized the industrialization of “existing raw materials” (Toledo López 2017). During this period, many agrofuel factories opened in the country, mostly located close to the area used for soya production and to the ports of Buenos Aires and Rosario, as Fig. 12.2 shows.

It was not only in 2006 that a national law covering agrofuels was passed: the “Biofuels Law” 26093, established a local consumer market for biodiesel and ethanol. It also created a national quota stipulating that petrol and gasoil had to contain a minimum blend of 5% of agrofuels as of 2010 and set a promotional regime for enterprises that became biofuel providers. In July 2010, the quota was increased to 10%. Since 2006, Law 26190 (updated in 2015 by Law 27191) has promoted agrofuels as renewable energy sources of electricity generation. Thus, agrofuels have taken on a leading role, not only in the transport sector, but also as part of an energy diversification policy. Nevertheless, with less than 10% of the national energy matrix, renewable sources continue to occupy a marginal space in Argentina’s energy supply.

By 2010, Argentina was the world’s fourth-largest biodiesel producer and the world’s largest exporter. In terms of agricultural land use, estimates suggest that about a quarter of the soya crop is used for fuel production in the country.⁶ In 2016, official data shows that Argentina produced 2.65 million t of biodiesel from soya oil, of which 39% was used for the national quota, with the remaining one and a half million t being exported (MH 2017).

Under Macri’s administration,⁷ agrofuels acquired new dynamics based on a green-friendly narrative that emphasized the benefits of renewable energy sources in solving the energy crisis as part of a liberalized macroeconomic programme (Seoane 2017; Varesi 2016; Félix 2016; Toledo López 2018). In this context, the government gradually introduced the bioeconomy narrative (see Tittor in this volume) as a

⁶Ámbito (2011, April 19). See, <https://www.ambito.com/edicion-impresa/la-produccion-biodiesel-demando-un-26-la-cosecha-n3678440>. Accessed 1 Feb 2020.

⁷President of Argentina between 2015 and 2019.

new perspective, and in 2017, the Ministries of Science, Agroindustry and Production signed an agreement to promote it (CONVE-2017-12130310).⁸ Biodiesel is still the main product in this new bioeconomy consensus, and it is viewed as the path to achieving sustainable development and shifting capitalism to “green” or “bio” production patterns.

The next two sections assess the general territorial impacts of the agroindustrial frontier in north-western Argentina and the specific impact of biodiesel production by one newly built factory within that area.

12.4 Territorial Changes Due to Agribusiness in North-Western Argentina

From a socio-economic perspective, the agricultural processes associated with agribusiness expansion involved deep changes to Argentinian rural areas. These changes included intensification by mechanization, the use of new technologies, the exclusion of the rural workforce, the expansion of flex crops, increased production for export and the deregulation of diverse productive activities in rural areas (Gras and Hernández 2016). Furthermore, economic liberalization led to increased economic and land concentration (Bisang and Gutman 2005; Giarracca and Teubal 2013; Gras and Hernández 2013, 2016).⁹ This process has strengthened vertical integration, leading to the creation of value chains that are mostly controlled by a small number of enterprises (Teubal 2006). Territorial changes were particularly visible in NWA, where this process stimulated the growth of “flex crops” (Gras and Hernández 2013, 2016) and changed the traditional role of these northern rural territories from suppliers of local markets to suppliers of the world market (Gorenstein et al. 2011).

⁸See, <http://www.bioeconomia.mincyt.gob.ar/wp-content/uploads/2017/07/Convenio-bioeconomia.pdf>. Accessed 15 March 2020.

⁹According to census data, between 1960 and 1988, 51,000 farms disappeared in Argentina: 1800 per year. Between 1988 and 2002, this trend intensified to 6263 farms per year. Those that disappeared were smaller than 200 ha. In contrast, farms larger than 500 ha increased, particularly those in the stratum from 1000 to 2500 ha (Teubal 2006, p. 81).

Located in NWA, the province of Santiago del Estero is known for its biological and cultural diversity, as well as being home to one of the largest numbers of peasants in Argentina, and a huge area of native forest. It is also characterized by the lowest per capita income and the highest rate of poverty, in addition to a traditional migratory flow towards the centre of the country (Neiman 2009). Primary activities such as small-scale farming, forestry etc., contributed greatly to Santiago del Estero's economy, but this has changed with a growing move towards agribusiness (initially marked by soya production, but more recently by corn production). The expansion of the agribusiness model has led many traditional activities to disappear, relocate or intensify, as is the case with livestock production (Pengue 2017). As such, bioeconomy expansion has led to the enhancement of some economic variables, but has not necessarily led to improvements in people's living conditions: in 2017, the Sustainable Development Index, which measures economic growth, social inclusion and environmental sustainability, rated the province last in the country, with an index score of just 0.31 (PNUD—Programa Naciones Unidas para el Desarrollo 2017).

Despite the overall drop in the size of rural populations in Argentina, Santiago del Estero has one of the highest numbers of rural inhabitants (31.3% according to CNPNyV 2010-INDEC). However, statistics show a high level of precarity in land tenure patterns: census data demonstrate that half of the farms in the area are unable to extend their territory because they lack property titles or due to unclear boundaries (CNA—Censo Nacional Agropecuario 2002). This illustrates the social vulnerability of peasants, family farmers and smallholders, who face threats to their property rights and (dis)possession of the lands on which they live.¹⁰ Inhabitants of rural areas, such as those in small areas of forest, are currently surrounded by large monocultures. Moreover, these people lack protection from violence and have no guaranteed human rights, as the growing conflicts around pesticide use, the privatization of land, the expulsion of peasants from their land, the conversion of various

¹⁰Argentinian law recognizes the rights of people to own land that possess through traditional occupation.

forms of property rights into private property and the suppression of native forms of production and consumption reveal.

The advancement of the agroindustrial frontier has involved an increase in grain and oilseed production, with changes to both the environmental and the social systems. According to census data, in 1988, 16% of farmland in the province was used to produce soya; in 2002, this had reached 38%; and in 2015, 58%, in other words, 980,572 ha of land are used to produce 2,498,134 t of soya (3.1% of the total Argentinian crop). In addition, recent years have seen an increase in corn production (MHFP and PEPD¹¹ 2016).

Several studies relate agribusiness expansion to higher levels of deforestation and loss of biodiversity, especially in the native forests of the Chaco, which is the largest dry forest in South America (Pengue 2017; Morello and Rodríguez 2009; Langbehn and Schmidt 2017). Regarding forests and their use, data from the corresponding monitoring unit (UMSEF 2016) show that 245,653 ha of native forest were cut down between 2009 and 2011 in Santiago del Estero; an additional 255,655 ha were cut down between 2011 and 2015. Thus, deforestation has destroyed the ecosystem in the Chaco where agribusiness has expanded. The historical coexistence of many smallholders and peasant communities in forest areas was built on a form of economic activity that values the ecosystem; this contrasts widely with the practices of agribusiness. Agribusiness expansion has particularly affected the continuity of small farmers and peasant forms of production, and their resistance to this situation is evident in the increasing conflicts over land (Slutzky 2005; Domínguez and Sabatino 2006; REDAF—Red Agroforestal Chaco 2013). In addition, some of these conflicts have been interpreted as accumulation by dispossession and land grabbing (Cáceres 2015; Gras 2017; Gras and Zorzoli 2019).

Thus, the expansion of the agroindustrial frontier in Santiago del Estero, which resulted in the production of soya for biodiesel, led to deep territorial transformations in terms of ecological distribution and environmental appropriation. These processes have had consequences

¹¹Ministerio de Hacienda y Finanzas Públicas & Secretaría de Política Económica y Planificación del Desarrollo which are the Ministry of Finance and Public Spending & Secretary of Economic Policy and Development Planning.

that involve economic, environmental and social aspects, which I define as territorial changes. Recently, the biodiesel boom has encouraged this capital-intensive mode of production, the consequences of which include the commodification and privatization of land, the forceful expulsion of peasant communities; the conversion of various forms of property rights into private property; the suppression of alternative forms of production and consumption; and the degradation of environmental commons. Additionally, the biodiesel industry has developed specific elements of territorial control concerning both the material and the symbolic dimensions, including the development of new mechanisms of accumulation by dispossession, and connecting their businesses to environmental discourse. Biodiesel production has encouraged this process by strengthening the presence of agribusiness in the area in many ways, and this has added new dimensions to the territorial changes that it causes. This will be explained further in the next section.

12.5 Biodiesel and the Impacts of Agroindustry in Santiago Del Estero

In 2009, a mega biodiesel production venture, Viluco, with capacity to grind one million t of soya beans and to generate 200,000 t of fuel per year, started operation in Santiago del Estero (no. 22, Figure 12.2). It was the first agroindustrial biodiesel plant to be located in NWA, where the economic, social and environmental transformations caused by the expanding agroindustrial frontier are still underway. Indeed, the provincial government had advocated the growth of this “value chain”, and it promoted the industrialization of the province with “Industrial Promotion” Provincial Law 6.750. The law was passed in 2005, and it was accompanied by infrastructure development in order to attract investment. Thus, government action strengthened rural actors by providing greater levels of capitalization (for Viluco). This was in line with the expansion of agribusiness and the “development narrative” that stressed the goal of “adding value” to raw materials. This was foreseen as part of the “neo-developmental stage” of the Argentinian accumulation regime (Félic and López 2012; Svampa and Antonelli 2009). For instance,

locating the plant in NWA meant a change in the spatial trend of biodiesel agroindustry. I view this as a signal of a progressing agribusiness frontier. Viluco also explicitly aimed to take advantage of the “lack” of a biodiesel plant in the region (Toledo López 2016).

In this sense, the case study provides more information about territorial changes associated with agribusiness, focusing on biodiesel production and how power relations affect ecological distribution in two ways. First, as the testimony of a rural priest from Santiago del Estero shows, the presence of a biodiesel company—as a key agent of agribusiness expansion in the area—contributed to the decline of communal forms of life:

the reality of the peasant communities in our area and the difficulties faced by many of our brothers and sisters in the countryside, especially in terms of health, production, animal breeding and in the fields, are due to aerial and land spraying by large companies that are dedicated to soya bean plantations here in our area. There are large companies such as Viluco, part of the Lucci Group from Tucuman [...], to name a few of the big businesses that have thousands and thousands of hectares of soya bean and who periodically spray their soya fields, especially with light aircraft... and peasant communities often find themselves isolated by these farms and are facing health problems. (local priest, Interview no. 1)

Secondly, some irregularities in effluent management are demonstrative of inequalities in the distribution, use and access to water sources in this dry ecoregion in which water is scarce. This led to controversy over the contamination of water related to biodiesel production, which can be understood in terms of environmental appropriation. The first production of biodiesel in the town of Frias occurred in June 2010 (as part of the national quota) and in the beginning of the plant released untreated effluents. The delay in considering the treatment of liquid wastes from

industrial processes was said to be justified because the “crown technology” they used was promoted by the company as “zero effluent”.¹² This led state officials to approve the obligatory environmental impact study without considering these wastes: “when they presented the Environmental Impact Valuation it was approved; it was not until they [Viluco] were up and running that we realized that effluents were being produced” (environmental director, Interview no. 2).

In search of a “solution”, the effluents were routed through canals that had been created as part of flood prevention measures to channel water to the (dry) Albigasta River. This led to a conflict because the “solution” affected the local area. The first formal complaints about biodiesel liquid effluents were made to the ombudsman of the town of Frias in the beginning of 2011. People in the town complained about a bad smell and pointed to the death of horses and goats that had drunk water from the canal. At the same time, the local population underlined the lack of water in the area. However, state officials and the company questioned the toxicity of liquid effluents and the dominant opinion was that the effluents were biodegradable. The following statement is exemplary of this position: “Which products are washed out during the production process? Oil, some soya oil, which is biodegradable, and traces of flour” (secretary of production, Frias Municipality, Interview no. 3). This assertion ignores the fact that the process through which biodiesel is obtained requires toxic agents such as methanol (Sorichetti and Romano 2012). Asked about the lack of foresight when it came to effluents, the ombudsman stated: “I asked them the same question and they told me exactly the same thing: ‘We’ll deal with it after the company starts operating’” (Frias ombudsman, Interview no. 4). In summary, the case study shows that biodiesel production involves a risk of water pollution and that this can affect the living conditions of local communities in different ways.

Third, the way Viluco implemented its business, ignoring environmental law and social and ecological impacts, reveals the power

¹²El Liberal (2010, Aug 11). See, <http://biodiesel.com.ar/3667/ag-energy-el-primer-biodiesel-producido-en-la-localiad-de-frias-en-santiago-del-estero-sale-al-mercado-nacional>. Accessed 18 July 2012.

dimension of societal–nature relations and how it influences ecological distribution as well as environmental appropriation and valuation practices. Indeed, state officials call the company “a source of pride for Santiago del Estero and for the town of Frias” (school director, Interviews no. 6 and 7). Once the controversy around the water contamination became public, the company signed a “Clean Production Agreement” with the provincial government. As part of the agreement, the company committed itself to building an effluent treatment in three stages and to preparing an “Environmental Management Plan”. State officials used their speeches to underscore the company’s compliance with the plan as a way of safeguarding its prestige and image and, thus, ensuring that the development narrative remained linked to the venture. In this sense, they highlighted that some environmental aims must be “sacrificed” in chase of “development”, differentiating between what is possible and what is “desirable” (environmental director of Santiago del Estero, Interview no. 2). Therefore, once again the “development narrative” managed to obfuscate the negative social and ecological effects of biodiesel production. However, the solution to the controversy over effluents did not satisfy some locals, who viewed their way of life as under threat. Nevertheless, the current distribution of power places the company in a superior position to the demands made by the local population. The problem increased because the company continued to release effluents while the treatment pools were being constructed. This issue remained unresolved and the conflict only diminished when the company announced its closure in April 2019.¹³ At the same time, the authority displayed by the company was also evident in the huge level of vulnerability faced by workers due to the “massive layoffs”, suspensions (workers, Interview no. 5) and the lack of agencies able to guarantee their rights.

Finally, the case study reveals that pedagogical practices were carried out by the company in public and private schools in the town of Frias as a way of spreading its “development narrative” and encouraging young people to consider a job at the company. As a sign of its corporate social responsibility, the executive director of the company’s foundation put

¹³Clarín (2019, April 26). See, https://www.clarin.com/rural/viluco-cierra-fabrica-biodiesel_0_kBkFhpQlv.html. Accessed 29 Oct 2019.

forward a “Community Integration Plan” to the local authorities that included “values tutoring”, and courses and training for school teachers as “volunteers” (schools’ director, Interview no. 6 and 7). These kinds of practices led the company to play an educational and moral role in the town, through which it reinforced existing power relations, a process that can be understood as building hegemony (Gramsci 2011), and that is related to appropriation by dispossession.

12.6 Conclusions

The biodiesel agroindustry in Argentina has contributed to economic concentration and territorial deterioration, and this has reinforced the impact of agribusiness. The land used for soya production has expanded dramatically in NWA, threatening native forests, grassland and fragile ecosystems, and displacing family farming, traditional agriculture, peasants’ communities and indigenous people. The announcement that the biodiesel project was to be built in this area implied a new stage in agribusiness expansion. Nevertheless, it did not generate any major resistance at the local level, despite the numerous conflicts over land connected to the expansion of the industrial agricultural frontier. The case study of biodiesel production in Santiago del Estero reveals new impacts on the area linked to the degradation of local and communal ways of life, labour precarization, water pollution and the appropriation of common goods in the territory due to agribusiness expansion. In terms of societal–nature relations, the territory perspective shows that biodiesel is connected to processes of accumulation by dispossession, which are also linked to agribusiness territoriality. Moreover, the case study shows how biodiesel production involves shifting capitalism to “green” or “bio” productions. This takes place through the “valuation of nature”, as promoted by agribusiness agents, the commodification and privatization of land and the forceful expulsion of peasant populations, and the deterioration of the material basis for life (including deforestation and the contamination of water, soil and air). The company’s high level of symbolic power is analogous to the “development narrative”

promoted by the state (Toledo López 2016), which also helped state authorities exercise territorial control.

The state plays a crucial role by promoting these (export-oriented) activities that reinforce the reprimarization of productive structures with “green” or “bio” narratives and modernization discourses. The dominant discourse of ecological modernization in the case of biodiesel production in Santiago del Estero, reinforced by the bioeconomy narrative, shows that the relationship between nature and society continues to be shaped by money (Harvey 1996, p. 150). In this perspective, nature is seen as a “resource” within capitalism and a paradigm that views economic and environmental goals as in opposition to one another. In this way, the study also illustrates the “valuation of nature” promoted by different territorial agents and the resulting conflicts (*ibid.*). This, in turn, affects the ecological distribution and the use of common goods for the benefit of profit-making and businesses.

It is also important to recognize how the distribution of power influences the government’s environmental action. For instance, the company’s environmental practices reveal the value placed on the symbolic dimension of territorial accumulation processes, which can also be defined as ecological appropriation, or a mode of green grabbing (Fairhead et al. 2012). In this perspective, considering the bioeconomy as a development narrative enables us to visualize the intrinsic valuation conflict underlying this type of territorial process, as emphasized within PE literature. Finally, biodiesel appears as a crucial product in this new bioeconomy consensus and is viewed as a manner of recycling capitalism through green (neo)developmental narratives.

List of Interviews quoted

Interview no.	Institution/organization	Date and place
Interview no. 1	Local priest	17/05/2019, La voz de la Pacha, Capital—Santiago del Estero
Interview no. 2	Environmental director of the province of Santiago del Estero	19/03/2012, Capital—Santiago del Estero

(continued)

(continued)

Interview no.	Institution/organization	Date and place
Interview no. 3	Secretary of production of Frias Municipality	20/03/2012, Frias—Santiago del Estero
Interview no. 4	Frias town ombudsman	26/03/2012, Frias—Santiago del Estero
Interview no. 5	Workers from the agroindustry	26/03/2012, Frias—Santiago del Estero
Interview no. 6	Director of school no. 1	27/03/2012, Frias—Santiago del Estero
Interview no. 7	Director of school no. 2	27/03/2012, Frias—Santiago del Estero

References

- Alimonda, H. (2002). *Ecología política. Naturaleza, sociedad y utopía*. Buenos Aires: CLACSO.
- Alimonda, H. (2011). *La Naturaleza colonizada. Ecología política y minería en América Latina*. Buenos Aires: CLACSO.
- Andersen, F., Iturmendi, F., Espinosa, S., & Diaz, M. S. (2012). Optimal Design and Planning of Biodiesel Supply Chain with Land Competition. *Computers & Chemical Engineering*, 47, 170–182.
- Bisang, R., & Gutman, G. (2005). Acumulación y Tramas Agroalimentarias en América Latina. *Revista de la CEPAL*, 87, 115–129.
- Cáceres, D.M. (2015). Accumulation by Dispossession and Socio-Environmental Conflicts Caused by the Expansion of Agribusiness in Argentina. *Journal of Agrarian Change*, 15(1), 116–147.
- Carrizo, S., Guibert, M., & Berdolini, J. (2009). Actores y mercados de los biocombustibles argentinos: entre incertidumbre y diversificación. Presentation 12th Encuentro de Geógrafos de América Latina (EGAL), 3–7 April 2009, Montevideo, Uruguay.
- CNA (2002). Definiciones censales y metodología de relevamiento. INDEC.

- Chidiak, M., Rozemberg, R., Fillipello, C., Gutman, V., Rozenwurcel, G., & Affranchino, M. (2012). Sostenibilidad de biocombustibles e indicadores GBEP: un análisis de su relevancia y aplicabilidad en Argentina. *Documento IDEAS*, 11.
- Dam, J., Faaij, A.P.C., Hilbert, J., Petruzzi, H., & Turkenburg, W.C. (2009). Large-Scale Bioenergy Production from Soya Beans and Switchgrass in Argentina. Part A. Potential and Economic Feasibility for National and International Markets. *Renewable and Sustainable Energy Reviews*, 13, 1710–1733.
- Domínguez, D., & Sabatino, P. (2006). Con la soja al cuello: crónica de un país hambriento productor de divisas. In H. Alimonda (Ed.), *Los tormentos de la materia. Aportes para una ecología política latinoamericana* (pp. 249–274). Buenos Aires: CLACSO.
- Donato, L.B., Huerga, I.R., & Hilbert, J.A. (2008). Balance Energético de la producción de biodiesel a partir de soja en la República Argentina. INTA. https://inta.gob.ar/sites/default/files/script-tmp-bc-inf-08-08_balance_energetico.pdf. Accessed 15 May 2020.
- Fairhead, J., Leach, M., & Scoones, I. (2012). Green Grabbing: A New Appropriation of Nature? *Journal of Peasant Studies*, 2(39), 237–261.
- Félix, M., & López, E. (2012). *Proyecto neodesarrollista en la Argentina ¿Modelo nacional popular o nueva etapa del desarrollo capitalista?* Buenos Aires: Herramienta-El colectivo.
- Félix, M. (2016). Argentina: cambió el gobierno, ¿cambió el proyecto hegemónico? *Herramienta*, 58.
- Flyvbjerg, B. (2011). Case Study. In N. Denzin & Y. Lincoln (Eds.), *The Sage Handbook of Qualitative Research* (pp. 301–316). Thousand Oaks: Sage.
- Harvey, D. (1989). *The Condition of Postmodernity. An Enquiry into the Origins of Cultural Change*. Oxford: Blackwell.
- Harvey, D. (1996). *Justice, Nature, and the Geography of Difference*. Oxford: Blackwell.
- Harvey, D. (2001). *Spaces of Capital. Towards a Critical Geography*. Edinburg: Routledge.
- Harvey, D. (2004). The New Imperialism. *Socialist Register*, 40, 63–87.
- Haesbaert, R. (2007). Território e Multiterritorialidade: um debate. *GEOgraphia*, 9(17), 19–45.
- Giarracca, N., & Teubal, M. (2013). *El campo argentino en la encrucijada*. Buenos Aires: Alianza Editorial.

- Gorenstein, S., & Gutman, G. (2016). Nuevos debates sobre acumulación, desarrollo y territorio: Clusters tecnológicos en la periferia. *Petróleo, Royalties & Região*, 51(3), 8–17.
- Gorenstein, S., Schorr, M., & Soler, G. (2011). Dinámicas cambiantes de los complejos productivos en el norte argentino: los casos del tabaco, yerba mate y la soja. Un enfoque estilizado. *Revista interdisciplinaria de estudios agrarios*, 34, 5–33.
- Gramsci, A. (2011): *Antología*. Buenos Aires: Siglo XXI.
- Gras, C. (2017). Expansión sojera y acaparamiento de tierras en Argentina. *Desarrollo económico*, 57(221), 149–163.
- Gras, C., & Zorzoli, F. (2019). Ciclos de acaparamiento de tierra y procesos de diferenciación agraria en el noroeste de Argentina. *Trabajo y Sociedad*, 33, 129–151.
- Gras, C., & Hernández, V. (2016). Hegemony, Technological Innovation and Corporate Identities: 50 Years of Agricultural Revolutions in Argentina. *Journal of Agrarian Change*, 16(4), 675–683.
- Gras, C., & Hernández, V. (2013). *El agro como negocio. Producción, sociedad y territorios en la globalización*. Buenos Aires: Biblos.
- Hilbert, J.A., & Galbusera, S. (2011). Análisis de emisiones. Producción de biodiesel – Ag Energy. INTA. <http://inta.gob.ar/documentos/analisis-de-emisiones-produccion-de-biodiesel-2013-ag-energy/>. Accessed 1 March 2014.
- Hilbert, J.A., Sbarra, R., & López-Amorós, M. (2012). Producción de biodiesel a partir de aceite de soja. Contexto y Evolución Reciente. INTA. http://inta.gob.ar/sites/default/files/script-tmp-inta_biodiesel_de_aceite_de_soja_en_argentina.pdf. Accessed 1 March 2014.
- Iermanó, M.J., & Sarandón, S.J. (2009). Is It Sustainable the Production of Biofuels in Large Scale? The Case of Biodiesel in Argentina. *Revista Brasileira de Agroecologia*, 4(1), 4–17.
- Langbehn, L., & Schmidt, M. (2017). Bosques y extractivismo en la Argentina. *Voces en el Fenix*, 60(8), 88–95.
- Lorenzo, C. (2015). Domestic order and Argentinian's foreign policy: The issue of the biofuels. *Austral: Brazilian Journal of Strategy & International Relations*, 4(7). <https://doi.org/10.22456/2238-6912.42443>.
- MH (2017). Informes cadena de valor. *Oleaginosas*, 2(29). https://www.argentina.gob.ar/sites/default/files/sspmicro_cadena_de_valor_oleaginosa.pdf. Accessed 29 Oct 2019.
- MHFP & PEPD (2016). Informes productivos provinciales: Santiago del Estero. 1(9).

- Martin, F., & Larsimont, R. (2016). ¿Es posible una ecología cosmo-política?: Notas hacia la desregionalización de las ecologías políticas. *Polis*, 15(45), 273–290.
- Morello, J., & Rodríguez, A. (2009). *El Chaco sin bosques: la Pampa o el desierto del futuro*. Buenos Aires: Orientación Gráfica Editora.
- Naturaleza de derechos (2019). “Collage de la depreciación humana”. Investigación naturaleza de derechos. <https://drive.google.com/file/d/1vb32EJJ7Trm0mP7EZrVZCHZT9T3lp7yu/view>. Accessed 4 Nov 2019.
- Neiman, G. (2009). *Estudio exploratorio y propuesta metodológica sobre trabajadores agrarios temporarios*. Buenos Aires: Ministerio de Economía y Producción, Secretaría de Agricultura Ganadería, Pesca y Alimentos. Proyecto de Desarrollo de Pequeños Productores Agropecuarios (PROINDER).
- Pengue, W. (2017). *Cultivos Transgénicos ¿hacia dónde fuimos? veinte años después: la soja argentina 1996–2016*. Buenos Aires, Santiago de Chile: Fundación Heinrich Böll, GEPAMA.
- PNUD (2017). Informe Nacional sobre Desarrollo Humano 2017. Información para el desarrollo sostenible: Argentina y la Agenda 2030. Buenos Aires.
- REDAF (2013). Conflictos sobre tenencia de tierra y ambientales en la región del Chaco argentino: 3º Informe. Reconquista (Arg.): REDAF. http://redaf.org.ar/wp-content/uploads/2013/07/3informeconflitos_observatorioredaf.pdf. Accessed 29 Oct 2019.
- Rozemberg, R., Saslavsky, D., & Svarzman, G. (2009). La Industria de Biocombustibles en Argentina. In López, A. (Coord.). *La Industria de Biocombustibles en el Mercosur*, Serie Red Mercosur (15).
- Santos, M. (2000): *La naturaleza del espacio. Técnica y tiempo. Razón y emoción*. Barcelona: Ariel.
- Scheinkerman de Obschatko, E., & Begenisic, F. (2006). *Perspectivas de los biocombustibles en la Argentina y Brasil*. Buenos Aires: IICA.
- Seoane, J. (2017). El tratamiento neoliberal de la cuestión ambiental. <http://www.opsur.org.ar/blog/2017/09/12/el-tratamiento-neoliberal-de-la-cuestion-ambiental/>. Accessed 1 April 2019.
- Slutzky, D. (2005). Los conflictos por la tierra en un área de expansión agropecuaria del NOA. La situación de los pequeños productores y los pueblos originarios. *Revista Interdisciplinaria de Estudios Agrarios*, 23, 59–100.
- Sorichetti, P.A., & Romano, S.D. (2012). Uso de agua en la purificación de biodiesel: optimización mediante el control de propiedades eléctricas de efluentes. VII Congreso de Medio Ambiente, AUGM, 22–24 May, UNLP,

- La Plata. http://sedici.unlp.edu.ar/bitstream/handle/10915/26938/Documento_completo.pdf?sequence=1. Accessed 16 Oct 2013.
- Svampa, M. (2012). Consenso de los commodities, giro ecoterritorial y pensamiento crítico en América Latina. *OSAL XIII*, 32.
- Svampa, M., & Antonelli, M. (Eds.) (2009). *Minería transnacional, narrativas del desarrollo y resistencias sociales*. Buenos Aires: Biblos.
- Teubal, M. (2009). Expansión de la soja transgénica en Argentina. In M. Pérez (Ed.), *Promesas y peligros de la liberalización del comercio agrícola: Lecciones desde América Latina* (pp. 73–91). La Paz: AIPE, GDAE.
- Teubal, M. (2006). Expansión del modelo sojero en la Argentina. De la producción de alimentos a la producción de commodities. *Realidad Económica*, 220, 71–96.
- Toledo López, V. (2013). Los agrocombustibles como eje del extractivismo en la Argentina. In N. Giarracca & M. Teubal (Eds.), *Actividades extractivas en expansión ¿Reprimerización de la economía argentina?* (pp. 137–158). Buenos Aires: Antropofagia.
- Toledo López, V. (2016). Desarrollo y agroenergía. Un análisis de narrativas regionales y locales a propósito de la producción de biodiesel en Santiago del Estero. In G. Merlinsky (Ed.), *Cartografías del conflicto ambiental en Argentina 2*. Buenos Aires: CLACSO.
- Toledo López, V. (2017). La política agraria del kirchnerismo. Entre el espejismo de la coexistencia y el predominio del agronegocio. *Mundo Agrario*, 18(37).
- Toledo López, V. (2018). Agroenergía en Argentina: una discusión sobre la renovabilidad y el despojo. In F. Gutiérrez (Ed.), *Soberanía energética, propuestas y debates desde el campo popular* (pp. 117–147). Buenos Aires: Ediciones del Jinete Insomne.
- UMSEF (2016). *Monitoreo de Bosque Nativo*. Buenos Aires: PEN.
- Varesi, G.A. (2016). Tiempos de restauración. Balance y caracterización del gobierno de Macri en sus primeros meses. *Realidad Económica*, 302, 6–34.
- Wehbe, M., Civitaresi, M., & Tarasconi, I. (2008). Promoción de agrocombustibles, oportunidades para la agricultura familiar en la provincia de Córdoba. IV Congreso Internacional de la Red SIAL, 7–31 October, Mar de Plata, Argentina.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

