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BRICS and MICs in Bolivia's 'value'-chain agriculture

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Abstract

This paper analyzes Bolivia's industrial value-chain agriculture and argues that a new phase of 'foreignization' and land grabbing is occurring via value-chain relations. Exogenous forces from some BRICS and MICs are penetrating Bolivia's countryside and drastically changing social relations of production, reproduction, property and power. These processes are analyzed by disaggregating the agro-industrial value chain and revealing where the 'value' being generated is appropriated and how the terms of control and access are changing. While several phases of 'foreignization' have shaped the agrarian structure, the legalization of genetically-modified soybeans and the resultant 'appropriationism' have opened new spaces for capital accumulation and enabled capital to penetrate, particularly from Brazil, Argentina, and China. This is understood using Harvey's concept of a spatio-temporal fix as new forms of commodification have developed and small farmers are becoming absorbed into value-chain relations, threatening their ability to work their land now and in the future.

Keywords: Bolivia; Brazil; foreignization; agricultural value-chains; commodification

1 INTRODUCTION

Significant agrarian changes are emerging in Bolivia as a result of its insertion into a globalized agro-industrial value chain – itself, part of a much broader global food and agro-commodity regime. While a convergence of crises around food prices, peak oil, finance, and climate change has fueled interests in ‘flex crops’¹ and, of course land and other natural resources, emerging economies such as Brazil, Russia, India, China, and South Africa (BRICS) and some Middle-Income-Countries (MICs) are changing the global political and economic landscape. These changing dynamics are resulting in a “spatial restructuring process” (McMichael 2013) of the global food regime, reshaping patterns of production, distribution, and consumption worldwide. Brazil and China, for example, are two increasingly important and influential players in this changing ‘polycentric’ global food and agro-commodity regime (Borras et al. 2012). Brazil is now a world leader in soybean and sugarcane production; while China’s soy imports account for almost two-thirds of the total global soy trade as well as being one of the top five leading soy producing countries worldwide (USDA 2015, ANAPO 2013). Though soybeans originated in China as a food staple, the oilseed crop is now being increasingly used and promoted for its potential to be ‘flexed’ for multiple purposes, predominantly to feed a growing livestock industry in China, but also as edible oil, biodiesel, and bioplastics for industrial uses worldwide (Oliveira and Schneider 2015).

This has led to new capital investment, new market opportunities, frontier and industrial expansion, and as a result, often forms of dispossession and conflict. While accumulation processes have been rapidly expanding in Brazil – especially in regard to its agro-industrial sector and the ‘new bioeconomy’ (McKay and Nehring 2014) – they are also having broader regional effects among neighbouring countries like Bolivia (Urioste 2012) and Paraguay (Galeano 2012). This can be thought of as ‘capital overflow’, or what David Harvey calls a spatio-temporal ‘fix’, whereby capital seeks to expand and circulate through un- or under-saturated markets for accumulation purposes. This occurs through the commodification of land and other natural resources or the creation of new factors of production – such as agro-industrial inputs, for example. Naturally, processes of capital accumulation seek to expand geographically (agricultural frontier expansion) and sectorally (controlling forward and backward linkages in the supply chain) where convenient and strategic. Brazil’s longest bordering neighbour, Bolivia, is both conveniently and strategically located near Mato Grosso – Brazil’s leading soy producing state. Due to such proximity and certain politico-economic circumstances, individuals and agribusinesses from Brazil have come to control vast swaths of land in Bolivia, while agro-inputs from Argentina and China dominate agricultural input markets. The majority of Bolivia’s agricultural value chain has thus become highly ‘foreignized’ – from seed to silo. This expanding agro-industrial complex is now threatening to absorb the majority of Bolivia’s agricultural producers in the eastern lowlands. This paper analyzes these new dynamics of agrarian change by disaggregating the agro-industrial value chain and revealing where the ‘value’ being generated is appropriated and how the terms of control and access are changing.

This paper is structured as follows: First, a brief overview of ‘land grabbing’ and ‘foreignization’ of land in Bolivia is necessary to position this analysis in relation to existing literature. The second section provides a brief historical account of Bolivia’s eastern lowlands to understand the development of the current agrarian structure. In the third section, I disaggregate the industrial value-chain of soybean agriculture and demonstrate how a new phase of ‘foreignization’ has come to absorb much of the value through the creation of and control over new factors of production. The fourth section suggests that the penetration of new agro-

¹ “Crops that have multiple uses (food, feed, fuel, industrial material) that can be easily and flexibly inter-changed: soya (feed, food, biodiesel), sugarcane (food, ethanol), oil palm (food, biodiesel, commercial/industrial uses), corn (food, feed, ethanol)” according to favorable market conditions (Borras et al, 2012: 851). See also TNI Flex Crop Working Paper Series

capital via value-chain agriculture in Bolivia can be understood as a 'spatio-temporal fix' as small-scale farmers become absorbed through value-chain relations (Harvey 2003; and see McMichael 2013). The last section concludes the paper.

2 LAND GRABBING IN BOLIVIA: A REVIEW

Recently, a number of studies have highlighted the 'foreignization' of land in Bolivia – particularly focusing on the Brazilian presence in Santa Cruz (Urioste 2012, Mackey 2011, Redo et al 2011, Marques Gimenez 2010). This has coincided with provocative studies by the World Bank on whether the 'rising global interest in farmland' could 'yield sustainable and equitable benefits' and the Food and Agriculture Organization's commissioned report featuring seventeen country case studies on land grabbing in Latin America and the Caribbean (World Bank 2011, FAO 2011). According to the World Bank's report, there are some 445 million 'available' hectares worldwide which are not being used 'efficiently', while showing serious 'yield gaps' and therefore should be invested in to foster economic growth (World Bank 2011:77). These are classified as being 'suitable noncropped, nonprotected, and nonforested' with a population density of less than 25 people per square kilometer (World Bank 2011). Bolivia is classified in a group of countries which has "large potential for area expansion but currently has little area under production" with an estimated 8,317,000 hectares of 'available and suitable land' (World Bank 2011:84). However, as Borras and Franco (2012) have shown, these types of classifications can be 'highly problematic and increasingly contested' as this type of 'simplification' strategy often disregards important socio-environmental relations and traditional ecosystem management strategies (see Scott 1998).

Turning to the FAO's report on 'Land market dynamics in Latin America: concentration and foreignization' (*Dinámicas del Mercado de la tierra en América Latina y el Caribe: concentración y extranjerización*) (2011), it concludes that despite the 'high' presence of recent large-scale (foreign) investments in land in the Bolivia, such land and resource control does not constitute 'land grabbing' nor does it have a negative impact on food security. This, however, is restricted to an interpretation of 'land grabbing' which includes the following three characteristics: (i) Large-scale land transaction; (ii) participation of a foreign government in the transaction; (iii) and the transaction leads to large-scale agro-industrial production for mass consumption which negatively affects food security in the recipient country (FAO 2011:565). Indeed, while there have been recent large-scale land transactions in Bolivia, they have not involved the participation of foreign governments, but rather private, individual capitalists and multinational/trans-Latin American Companies. But despite substantial increases in food imports and the replacement of traditional crops for domestic consumption with agro-industrial crops for export, recent studies show that food security has not been compromised (Colque 2014, Castañon 2014). However, such changes have certainly led to a heightened dependency on international markets and food prices and are severely altering the rural social relations of production, reproduction, property and power. As such, analyzing recent agrarian changes in Bolivia and the penetration of new (domestic and foreign) capital in rural areas within the FAO's 'land grab' framework misses significant aspects of the changing relations of resource control and access, processes of exclusion and dependency, and the socio-economic and environmental consequences of an expanding agro-industrial soy complex fueled by foreign capital.

Taking into account the broader changes in the social relations of production, reproduction, property and power, Borras et al (2012) provide a much more nuanced characterization of contemporary 'land grabs' by delving deeper into land-based social relations of control and access, the multiple dimensions of scale, and the broader changing dynamics of the global political economy. This study therefore employs a characterization for contemporary land grabs in Bolivia based on the following three interlinked features: (i) the power to *control* land and its productive resources (ie. 'control grabbing'); (ii) large-scale, in terms of either relative land size or capital involved; and (iii) a response to the convergence of multiple crises and the

emerging needs for resources by 'newer hubs of global capital', particularly BRICS and MICs (Borras et al. 2012:850-1). Using this particular analytical framing provides a much more rigorous and critical approach to understanding new dynamics and trajectories of agrarian change. First, instead of 'land acquisitions' based on property rights, Ribot and Peluso's 'theory of access' is employed as a more comprehensive way of understanding relations of power in agrarian society based on, among other relations, the *ability* to derive benefits from things and not just the formal rights (2003:154). Second, the scale of the land grab must be *relatively* large in two senses: the scale of land/resource 'grabbed' and the scale of capital involved in production. Additionally, we cannot quantify all land grabs around the world with a specific area or capital benchmark given the significant differences that an area of 1000 hectares can mean in one geographic location compared to another, for example.² Thirdly, contemporary land grabs are understood as a response to the broader restructuring of the global agro-food and commodity regime, the convergence of crises, the real and perceived ability to 'flex' crops and emerging economies changing the global political and economic landscape.

Applying this framework to Bolivia's soy complex enables us to go beyond the land question to broader forms of control of value chain agriculture whereby peasants and small scale farmers are incorporated into commercial agricultural relations (McMichael 2013a). Recent studies focusing on this 'foreignization' process in Bolivia have tended to concentrate on the issue of land, leaving out important factors of production which bind farmers into a relationship of dependency and virtually controls productive activity without formally holding land rights.³

Zoomers, for example, examined the workings of Bolivia's visible (formal) and invisible (informal) land market in the late 1990s, when many small farmers were not yet producing soybeans or using machinery (2003:255). During this period, Zoomers' study shows that based on a survey of 149 families in three communities "there was no systematic transfer of land from the smaller to the larger farmers, which means that there were no substantial changes in the landholding structure" (Zoomers 2003:256). Zoomers points to the ability of small farmers⁴ to persist through times of drudgery and diversify their livelihood strategies, lessen consumption, and/or sell a portion of their land as a means to maintain their parcel, or part of it. This continues today, though land fragmentation is increasing as farmers continue to "sell their land bit by bit" as Zoomers mentions, and the second generation of small farmers (Colonizadores) are now seeking employment, putting more pressure on the land. According to the National Association of Oilseed and Wheat Producers (*La Asociación de Productores de Oleaginosas y Trigo*, ANAPO), which is responsible for collecting data for the National Institute of Statistics (*Instituto Nacional de Estadísticas*, INE), 78% of soy producers are classified as small farmers. This is a very misleading statistic, however, as processes of 'productive exclusion' and '*partida*' arrangements are changing the terms of access and control over productive resources, resulting in a separation of small farmers from accessing the necessary factors of production to work their land (McKay and Colque, 2016). But while Zoomers does not engage with the 'foreignization' of land, since her study focuses moreso on the functioning of land markets, Urioste (2012) examines this issue in greater detail.

It has been during the last twenty years that foreigners – specifically Brazilians – have rapidly increased their control and access over Bolivian agricultural land and resources. In 2006/07, for example, Brazilians controlled 40.3% of total soy plantation area in Bolivia, up from 19.6% in 1994/95 (Urioste 2012). Although there is no available data on the total amount of land controlled by Brazilians at present, the most reliable and recent study conducted by Miguel Urioste of TIERRA suggests that "in oilseeds alone, Brazilians own

² According to Borras et al 2012, a 1000-ha benchmark is used by Oxfam, ILC, and World Bank in qualifying land acquisitions as land grabs (850).

³ For an exception see McKay and Colque (forthcoming, 2016) and their concept of 'productive exclusion'.

⁴ 50 hectares or less

approximately half a million hectares of the best agricultural lands, both category I (intensive agricultural use) and category II (extensive agricultural use), without counting those that are in fallow or rotation, nor those that are directed towards other crops or ranching, which usually comprise larger areas” (2012, 449). Urioste also suggests that the more recent investments from Brazilians in Bolivia are in pasture lands for cattle ranching. It is estimated that Brazilian cattle ranchers occupy 700,000 hectares in the three provinces bordering Brazil (German Busch, Velasco and Angel Sandoval) within the Department of Santa Cruz (Urioste, 2012:451). Brazilian capital therefore controls an estimated 1.2 million hectares of Bolivia’s 2.86 million total hectares of cultivated land with Brazilian-based corporations ‘Grupo Monica’ (Monica Semillas), Gama Group, and UNISOYA controlling over 200,000 ha of land (Urioste 2012; INE, 2011). However, this data is very much outdated and with the state’s land titling process (*saneamiento*) still incomplete, the 2012 Agricultural Census still not released, and ANAPO’s unwillingness to release specific data on its members, land concentration and ‘foreignization’ could be much higher than these figures show. Moreover, based on discussions with key informants working in the municipal governments of San Julián and Cuatro Cañada – the two main communities in the soy expansion zone – as well as numerous small farmers, it is clear that a culture of illegal land appropriation and land grabbing continues in the eastern lowlands.

Urioste’s data, for example, is based on reports published by ANAPO, which is Bolivia’s politically and economically influential association of large-scale agro-industrialists, aiming to reproduce the Brazilian model of agriculture in Bolivia. ANAPO has access to the most accurate information regarding land tenure (and nationality) since its members report this data to the association. However, ANAPO’s publications in recent years no longer include specific information on producer nationality, largely due to publications released by a Bolivian non-governmental organization (NGO) on the issue of foreignization which created a large public backlash, not only against ANAPO from its members, but also from the public at large – especially rural worker associations which only recently put the issue against the ‘foreignization’ of land on their political agenda (Machaca, personal communication, 15 October 2014). It is clear, however, that ANAPO values and encourages foreign investment, especially from Brazil. According to ANAPO’s President, Demetrio Perez, investment from Brazil, Argentina, and other countries has helped and continues to modernize Bolivia’s soy sector with new machinery, seed and agrochemical technologies, expertise, and highway development (Perez, personal communication, February 2014). Urioste also points out that “two of the leading Brazilian soybean producers serve on the board of the National Association of Soybean Producers (ANAPO), even though this requires changes to organizational statutes (2012:446). ANAPO’s agenda then, is clearly to support the development and expansion of agro-industry for export, representing those medium and large-scale farmers (22% of total farm units) who control 90% of cultivated soybean area (ANAPO 2011). Urioste also suggests a general acceptance of the foreign presence – especially among the middle classes of Santa Cruz – so as to secure access to “sources of capital, technology, employment, business, market knowledge, inputs and genetically-modified seeds” (Urioste, 2012:450).

This general acceptance is similar to Mackey’s (2011) research findings in the region which gives primacy to Brazilian technological transfer in ‘manufacturing consent’ amongst Bolivian farmers. Like Urioste, Mackey points to the use of technology as a terrain of legitimation and the informal class alliances among Bolivian and Brazilian agro-industrialists, which have led to the ‘foreignization’ of Bolivia’s eastern lowlands (2011). Mackey also rightly suggests that it is important to consider the Brazilian presence in Bolivia in terms of the much broader political economic relationships between the two countries and Brazil’s position as a regional hegemony and alternative to western imperialism (2011). Brazil’s role in the production and consumption of the Bolivian hydrocarbon sector, as well as its role as a leading creditor, primarily for transportation infrastructure, but also credit for agricultural machinery has solidified bilateral relations between the countries and led to a general acceptance of Brazilians in the country (Mackey 2011). According to Brazil’s Foreign Affairs Minister of Economic Affairs in South America, Joao Parkinson de

Castro, the Ministry always prefers to avoid any discourse regarding 'Brazilians' in Bolivia, but they do support their citizens across the border through political negotiation if necessary. The Minister said that the relationship with the current government is delicate but positive and that they always "want to avoid any discourses of regional imperialism" (Parkinson de Castro, personal communication, 15 May 2014). He added that "the economic relationship between Santa Cruz and Mato Grosso/Mato Grosso do Sul is very important, but the politics in La Paz can sometimes threaten this relationship, so it is important that our government supports but does not over-extend its influence in Bolivia" (Parkinson de Castro, personal communication, 15 May 2014).

Further, even deforestation dynamics have been documented, as Redo et al. observe that "most [of the deforestation] resulted from Brazilian farmers and ranchers moving into the north-east of the region from Mato Grosso do Sul" (2011). These studies, and others, have brought to light the important and contested issue of the foreign (mainly Brazilian) presence in Bolivia's eastern lowlands. It is clear that foreigners, especially Brazilians, have come to control a large share of agricultural land in Bolivia over the past three decades. But what is of interest here is not only if and how foreigners are controlling large parcels of land in Bolivia but more importantly how this (foreign) capital investment is changing relations of production, property, and power; where the value generated by this agro-industrial expansion is appropriated; and what are some of the new trajectories and implications of this type of agrarian change. These new dynamics of agrarian change and processes of 'foreignization' must be contextualized in historical processes which have developed over specific politico-economic periods and have led to (foreign) capital's penetration into Bolivia's lowlands, defining the agrarian structure as we know it today.

3 THE DEVELOPMENT OF BOLIVIA'S EASTERN LOWLANDS AND PHASES OF 'FOREIGNIZATION'

Bolivia's first agrarian reform programme of 1953 achieved much success in redistributing landholdings to a large number of households. According to Thiesenhusen (1989), 83.4% of the total arable 'forest and agricultural surface' was redistributed to 74.5% of the total number of 'farming families' (Thiesenhusen, 1989:10). This was largely due to the dismantling of the hacienda regime, which restored original indigenous territories back to the indigenous and dismantled *latifundia*⁵ system. In 1950, for example, 0.72% of properties (615 estates), with an average size of 26,400 hectares, controlled roughly 50% of the owned land; while 60% of landholdings, with an average size of less than 5 hectares, controlled only 0.23% of the land (Kay and Urioste, 2005:12).

While the agrarian reform of the Nationalist Revolutionary Movement (*Movimiento Nacionalista Revolucionario, MNR*) did restore indigenous territorial claims, freed the labour force of a highly exploitative work environment, and gave the indigenous population the right to vote, the failure to implement complementary agricultural support programs and extension services for small farm beneficiaries led to reform failure. This is partly due to the broader two-track agricultural development strategy heavily influenced by the United States through a USD 25 million agreement with the U.S. Export-Import Bank to promote Bolivian economic development (Malloy and Thorn, 1971:165). Known as the 'Bohan Plan', State Department official Merwin L. Bohan "recommended that the population be shifted from the poor lands of the Altiplano to the fertile lands of the east (Malloy and Thorn, 1971:165). The ensuing migration referred to as '*la marcha al oriente*' ('march to the east') resulted in 'highland colonists' accounting for 41% of the population of Santa Cruz by 1980 (Valdivia, 2010:69). Peasants from the Altiplano received plots of land between 20-50 hectares to produce for the domestic food supply (ibid.). Large-scale landholdings between

⁵ Large, landed estates

500-50,000 ha – known as ‘enterprises’ not latifundium⁶ – were also distributed to capitalist entrepreneurs, local elites, and the politically well-connected to encourage export agriculture. (Valdivia, 2010:69). This intentionally uneven distribution of land is an important historical feature of the development of today’s highly unequal agrarian structure and the concentration of capital and wealth that continues to exist in Santa Cruz. Massive resource transfers and state support also created a polarized development strategy which has led to an agro-industrial ‘growth pole’ in Santa Cruz (Perroux, 1950).

This dual agricultural development model managed to dissolve the latifundia in the western Andean region, redistributing small plots to landless peasants; while it created a new regime of latifundia in the east as huge tracts of public lands were distributed to the politically and economically privileged classes of society (Kay and Urioste, 2007:55). However, driven by the interests of the Inter-American Agricultural Service, an ‘eastern landlord bias’⁷ emerged, favouring large-scale export-oriented agriculture. As an export-oriented agricultural development model was pursued, technology, low-interest credit, and infrastructural investment policies were directed towards modernizing large-scale agriculture (Valdivia, 2010; Ormachea, 2007; Kay and Urioste, 2007). Despite distributing 83.4% of the total available arable land to 74.3% of the total number of ‘farming families’, the lack of supportive policies and extension services such as technological assistance, training, access to credit, marketing and distribution services resulted in internal contradictions in the reform process, forcing those with little resources to abandon their land as they struggled to maintain viable and productive farms. In fact, many small farmers were forced to work as wage labourers to supplement their household farm income (Ormachea, 2007: 26). While the agrarian structure in the western Andes became plagued with “economically and technically unsustainable” *minifundios*; the eastern lowlands were characterized by an increasingly dominant agricultural ‘enterprise’ regime (Kay and Urioste, 2007:58).

This period coincided with the first phase of ‘foreignization’. Supreme Decree 6030 of 1962 allowed Mennonites to purchase agricultural land in Bolivia. Immigrating mainly from Canada, Mexico, and Belize, Mennonite farmers slowly started to move to Bolivia’s eastern lowlands in groups, purchasing vast rural areas known as ‘colonies’ (*colonias*) – some up to 20,000 hectares and beyond. With them, they brought capital, machinery, and technological know-how. This phase of foreignization overlapped with the Japanese colonization project, which introduced soybeans to Bolivia, based on small-scale production for consumption. Mennonites, however, were the first to bring agricultural machinery and initiated the first phase of industrial agricultural production in the lowlands of Santa Cruz.

By the 1980s, commercial soy production – driven by the presence of Japanese and Mennonite colonists – began to take off (Hecht, 2005:380). During this period of structural adjustment and the ‘eastern-landlord’ bias, a massive expansion of soybean plantations emerged by means of deforestation. During the late 1980s and early 1990s, the neoliberal period attracted another phase of ‘foreignization’. This time, Brazilians and Argentinians took advantage of extremely low land prices. Trade liberalization, financial deregulation and the World Bank’s USD 56.4 million “Eastern Lowlands Project” and its Soil Use Plan (*Plan de Uso de Suelos, PLUS*) implemented from 1991-1997 facilitated this large-scale land expansion for export-oriented industrial agriculture, namely for soy production (World Bank, 1990; Redo et al., 2011). The main objectives for the World Bank’s Eastern Lowlands Project were to transfer financial and technical resources to support large-scale farmers increase their productive capacity for export-oriented development⁸. The

⁶ For Kay and Urioste (2007), “the 1953 law legitimated disguised forms of neo-latidfundism, under the generic heading of ‘enterprise’.”

⁷ Building off Michael Lipton’s (1977) Urban Bias Thesis (UBT), but more-so on Kay’s (2009) UBT critique and subsequent ‘landlord bias’, I use the term ‘eastern-landlord bias’ to understand and explain processes of differentiation brought about by policies which favour the landed agro-capitalists, most of which are located in the eastern lowlands.

⁸ See Appendix I for list of project objectives.

'eastern-landlord' bias and growth pole strategy for agro-industrial soy plantations was further solidified with a large resource transfer directed at this 'propulsive' economic unit. From 1990-1996 agricultural exports from Santa Cruz increased 400%, while the gross value of agricultural output almost doubled from USD 350 million to USD 685 million during the same period. Further, transportation linkages were improved with 410 km of road maintenance and improvements. This period attracted many foreigners as land markets opened up and foreign capital, especially from Brazil, penetrated into Bolivia's fertile lowlands.

As one Brazilian producer with 1,400 ha in San Julian, Bolivia explained, he arrived to Bolivia in 1990 from Rio Grande do Sul (southern-most state of Brazil) because land prices were extremely expensive in the south (of Brazil) and the Bolivian government was trying to attract Brazilian producers to invest in their country and bring their machinery and technological know-how (Klaus, personal communication, 14 April 2014). This Brazilian farmer bought his land for USD 30/ha in the 1990s, while its present day value is estimated between USD 2,000-3,000/ha. In Brazil, he estimates that the same type of land would cost between USD 20,000-30,000/ha. Moreover, the costs of production are much cheaper in Bolivia, he explains. For example, diesel and gasoline are both subsidized by the state at roughly USD 0.50/liter. Using an estimated 40 liters of diesel between sowing and harvesting (Urioste 2012), this equates to a state subsidy of roughly USD 23.6 million per year in mechanized soy production alone⁹. Large-scale industrial soybean plantations also began much earlier in Brazil, so as land became scarce and more expensive, and technologies were still developing for industrial soybean plantations in the Cerrado region, many Brazilian took advantage of Bolivia's easily accessible, cheap, and fertile lands across the border. This wave of experienced, Brazilian capitalist farmers and agribusinesses began another phase of foreignization as thousands of hectares were purchased at extremely low prices.

Prior to the implementation of World Bank-imposed structural adjustment programs in 1985, Bolivia's internal supply of food was able to meet the demand of the Bolivian population (Kay and Urioste, 2007:53). With trade liberalization, privatization, deregulation, the influx of foreign capital and a slash in social spending, Bolivia's peasant economy was unable to compete with subsidized crop inflows from foreign countries¹⁰. During this period, regional discrepancies increased as the Andean region was further neglected with the 'eastern-landlord' bias prioritizing export-oriented agro-industry. As indicated in Table 1, from 1950-2014 the growth index for agricultural production in the Andean region went from 100 to 183; while in the eastern lowlands of Santa Cruz the index went from 100 to 5,424 (Kay and Urioste, 2007:54).

The crisis of agriculture in the Altiplano, severe class and geographical inequalities, the emergence of economically and technically unsustainable *minifundios*¹¹, and widespread corruption¹² eventually led to the official demise of the agrarian reform programme in 1992. The new Administration headed by President Gonzalo Sanchez de Lozada (1993-1997) then signed an agreement with the World Bank to write a new land law – the INRA Law of 1996 (*Instituto Nacional de Reforma Agraria*) (Kay and Urioste, 2007:59). The 1996 INRA Land Law initiated a process of '*saneamiento*', or land formalization and titling, to increase property rights legibility and transparency. This was an attempt to 'make society legible' and build a functioning property rights system to simplify classic state functions (Scott, 1998). Nearly 20 years later however, this process remains incomplete.

As of 2004, only 10.7% of the land subject to '*saneamiento*' had been formalized, 32.6% were in 'the process of regularization', and 56.7% had not yet been surveyed (INRA, 2006). In other words, after nearly

⁹ Based on the combined area of soybean cultivation in summer 2013 (1,180,000 ha) (ANAPO 2013).

¹⁰ For more on the 'economics of Bolivia's adjustment' under neoliberal policies, see Petras and Veltmeyer (2005)

¹¹ Extremely small plots of land caused by subdividing property due to population growth and land constraints.

¹² According to Kay and Urioste, in 1992 a Minister of State attempted to appropriate 100,000 hectares of prime arable land for soy cultivation in the eastern lowlands and "political favouritism and patronage gave rise to a black market in land in the east of Bolivia" (2007,44). Also see Hernaiz, 1993.

10 years, close to 90% of Bolivia's total land area (excluding urban areas, water areas and salt flats) failed to be 'regularized' and were therefore subject to the local and regional power relations governing society based on the aforementioned unequal agrarian structure. Moreover, only 11.1% of the land in Santa Cruz had been titled (INRA, 2006).

It was during this very tumultuous political phase coupled with neoliberal policies in which agro-capital solidified a pathway towards mechanized industrial agriculture, spearheaded first by Mennonites then by Brazilians. Soybean plantations were increasing at unprecedented rates, from just 182,334 hectares in 1990 to 1,180,000 in 2013 – an increase of over five-fold (ANAPO 2013). In 2005, genetically modified (GM) soybeans were legalized, though it is well known that GM seeds were being smuggled into Bolivia via Argentina and Brazil years prior. With the introduction with new genetically modified technologies, agro-chemicals such as pesticides, herbicides, fungicides, and fertilizers began to penetrate the market as new agro-industrial companies introduced these new products bundled as 'technological packages'.

4 INDUSTRIAL VALUE-CHAIN AGRICULTURE AND TRANSNATIONAL CAPITAL

As the expansion of soybean plantations has continued throughout the past decade, traditional peasant farmers (*colonizadores*) who arrived to Santa Cruz from Potosi, Oruro, Cochabamba, La Paz, among other places, have been transitioning from their 'peasant way' of cultivating traditional crops such as maize, yucca, rice, beans, etc., using family labour and producing for household consumption, to a capital intensive model of mechanized agriculture for export. Without access to sufficient capital, many small-scale farmers continued to produce traditional crops up until around 2005. Currently, in the two principal communities in the agricultural 'expansion zone' of Santa Cruz – Cuatro Canadas and San Julian – almost everyone with over 20 hectares of land are engaged in GM soybean production.

The abandonment of peasant-based farming was triggered by several factors. The phases of 'foreignization', predominantly the arrival of Mennonites followed by Brazilians, brought an influx of foreign capital and investment with new machinery and technologies being introduced to the region. As new capital started to penetrate the region in the 1990s, discourses of modernization, progress, and technological advancement via the agro-industrial model also emerged. Transitioning governments, a new agrarian reform programme and highly inefficient land titling process (*saneamiento*) coupled with extremely unfavourable agricultural conditions between 1996-2003 (floods, drought, poor yields) and a lack of support for small-scale peasant agriculture resulted in many people leaving their land for new opportunities elsewhere. Those who stayed however depended on self-exploitation, drudgery, and attempted to diversify their livelihood strategies as much as possible. In 2004, soybeans surpassed USD 200/ton for the first time since the early 1980s, reaching USD 235/ton (ANAPO 2013). By 2006, Evo Morales was elected as President and his political party, 'Movement Towards Socialism' (*Movimiento al Socialismo, MAS*) promised an 'Agrarian Revolution', putting agrarian reform back on the political agenda and prioritizing small-scale and peasant farming. While many contradictions have emerged since, the charismatic leadership, discourses of populism and indigeneity of Evo Morales sparked a new sense of hope amongst the peasantry and small farmers. Political support and more importantly, small farmer/peasant associations were established, and by 2008, soybean prices set off by a commodities boom jumped to USD 400/ton after fluctuating at an average price of USD 166/ton from 1990-2007 (ANAPO 2013). At this point, those who had not already made the transition did so, as the economic opportunities of converting one's land from traditional crop production to monocrop soybean production were attractive and offered farmers the chance to 'advance', 'modernize', and obtain a disposable income. This, however, came at the cost of entering into such value-chain relations of debt and dependency and for some, the loss of autonomy over their land.

Economic incentives were not the only reason many abandoned diversified crop production for
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monocultures. Mrs. Choque, for example, arrived to the soy expansion region in the late 1980s. The daughter of a *'colonizador'* and *'dirigente'* of Villa Primavera, her family used to produce maize, rice, yucca, plantains, tomatoes, onions, and other vegetables, while they also had a few heads of cattle and pigs. The only things they needed to buy, she explained, were salt and oil. They worked their land using family labour, all for household consumption, and had more than enough to live off. In the early 2000s, the Brazilian agribusiness Sojima, who controls over 100,000 ha in the region, purchased vast amounts of land near their family's parcel for large-scale GM soybean production. The company uses aircraft fumigation for their crops, contaminating the nearby area with glyphosate and other herbicides and pesticides. As the soil of all nearby parcels became contaminated, farmers were essentially forced to make the transition to GM (glyphosate resistant) crop production. This is a common story not only in her community but throughout the agricultural expansion zone in Santa Cruz.

In her community of Villa Primavera, only two out of twenty families have agricultural machinery. The rest, like herself, engage in a rental agreement with someone who has machinery to work their land. She says a Brazilian landowner works the majority of the land in the community, and though he does not formally own the land, he has direct access to it and derives the most benefits from it. When asked about the future of small farmers in the region, Mrs. Choque's response was quite grim: "In the future, small farmers are not going to be able to produce", she says, "every year the costs of production are increasing as we need to buy more and more chemicals. The weather has also changed, it is less predictable and we have less rainfall. And since the majority of us (small farmers) don't have access to machinery, we are dependent on others and have to wait until they have time to work our land, losing out on the best times for sowing, fumigating, and harvesting." She went on to explain that in the near future her family plans on going back to a diversified production system for self-consumption with a variety of vegetables, cattle and pigs, and go back to the peasant way of life that they had before (Choque, personal communication, 9 December 2014).

But while most small-scale farmers are renting their land or entering into an arrangement *'al partida'*, processes of productive exclusion are separating farmers from accessing the necessary factors to put their land into production (see McKay and Colque 2016). Others, however, have advanced and built up enough savings to buy a tractor and have become fully integrated into the 'soy complex', dependent on corporate controlled agro-industrial inputs such as GM seeds and agro-chemicals (i.e. the 'technological package' complete with growing instructions). Short-term credit and growing contracts have bound farmers into relationships of dependency with agribusiness as they enter into a cycle of indebtedness and control. As McMichael puts it, "the producer enters a particular kind of value relation that has the potential to become an instrument of control, debt dependency and dispossession" (2013a, 671). This is precisely the type of value relation which has come to control small farmers in Santa Cruz. Farmers' autonomy over their land is threatened, as it becomes nearly impossible to break away from these 'chains of dependency' due to both economic (supplier contracts, indebtedness) and ecological (soil degradation, contamination, large-scale spraying activity) circumstances.

The introduction of GM soybeans has opened up new market opportunities for agribusiness as Bolivia's untapped agricultural market launched a new frontier of accumulation. Rather than land purchases, transnational capital can still appropriate value from industrial agriculture via agro-inputs, storage and processing facilities, credit and debt relations, and export markets. This is the new phase of foreignization of Bolivian agriculture. While existing large-scale landowners are expanding their landholdings via appropriation and land purchases (Colque, 2014), new transnational capital is penetrating the market via control over seeds, agro-chemical inputs, silos, and export markets. For example, four of the top six companies which control 85% of soybean market for storage and processing (silos) are owned by foreign capital (AEMP 2013). With a monopoly over the soybean market, these six companies are able to set prices and therefore greatly influence crop production. Through supply contracts, these companies virtually control production processes as they have access to export markets, and therefore, the country's soybeans. Without

actually owning the land or having legal land tenure rights, the relations of control and access over land and its productive resources are largely in the hands of foreign capital. Small farmers therefore bear the majority of the risk in this value relation. International price volatility, drought, floods, pests and weeds, etc., are all potential threats that must be absorbed by the producer. Meanwhile, agribusiness benefits from the sale of agro-inputs – such as seeds, agro-chemicals, machinery, technical assistance, credit – and often binds the buyer of its products (the producer) into selling his or her crops, in their entirety, back to the corporations' silos/processing facilities.

The terms of access and control have thus become transformed. Owning land is no longer a sufficient asset when one enters into this particular type of value relation, becoming both dependent on agribusiness for the necessary factors of production and to sell the final product. McMichael, for example, literally breaks down the value-chain relation as establishing “*chains of dependency*, with smallholders entering markets over which they have no ultimate control”, while serving to “generate *value* that can be appropriated by agribusiness and its financiers – in the commodity form of food, feed and agrofuels for elite consumers, redistributing value from producers to corporate financiers (whether in agribusiness or any other economic sector)” (2013a: 672). All the risks of production are therefore assumed by the producers, while the value that they add is through labour power and the ecological value extracted from their lands. At the time of harvest, producers sell their crops to the agro-industry, receiving a price per ton which is bound to the Chicago Board of Trade (CBOT) and discounted approximately USD 150/ton according to the adjustments agreed upon the six companies which have a monopoly over Bolivia's silo and export markets. In order to clean their fields and make the necessary initial investment for the next season¹³, indebtedness through supplier contracts is usually a necessity. Debt is therefore a key mechanism of the value-chain relation, “constituting the ‘chain’ through which such new contract farming is activated, reproduced and, in some cases, dispossessed” (McMichael 2013a: 672).

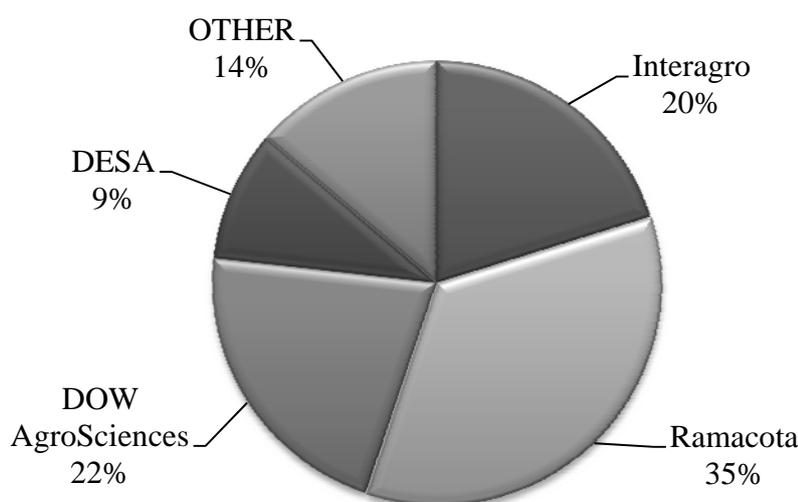
Capital penetration via industrial value-chain agriculture has managed to “create sectors of accumulation by re-structuring the inherited ‘pre-industrial’ rural production process” (Goodman et al. 1987, 8). This occurs through what Goodman et al (1987) call ‘appropriationism’, defined as “the discontinuous but persistent undermining of discrete elements of the agricultural production process, their transformation into industrial activities, and their re-incorporation into agricultural as inputs” (2). As accumulation processes become limited in the agricultural sector due to inherent natural plant cycles and processes, industrial capital seeks to *appropriate* any and all factors of production including seeds, organic inputs, labour, and land. This has been accomplished in Bolivia's lowlands with GM seeds, agro-chemicals, agricultural machinery, and land markets. At the other end of the value-chain, agricultural crops are increasingly being substituted or ‘flexed’ as an industrial input – what Goodman et al. have termed ‘substitutionism’. This is even more evident today, as crops can be used in multiple ways (food, animal feed, fuel, industrial material) and can be (or are thought to be) ‘flexed’ according to market conditions (Borras et al. 2014). Soybeans, for example, can be used as animal feed, food and oils, biodiesel and as a petroleum replacement for manufacturing (Oliveira and Schneider 2014); sugarcane for refined sugar, ethanol, fertilizer, animal feed, bioelectricity (bagasse), and biopolymers (plastics) (McKay et al. 2014); corn for food, feed, and ethanol; trees, used not only for timber and pulp, but for second-generation bioenergy, biomass, and carbon-credit markets (Kroger 2014); among a growing number of other ‘flex’ crops (see Borras et al. 2014). Through scientific and technological advancement, industrial value-chain agriculture has thus appropriated and substituted the natural inputs and outputs of farming to render it as ‘industrial’ as possible and open new possibilities for commodification and capital accumulation.

Appropriationism and the ‘technological packages’ complete with seeds, agro-chemicals, and the

¹³ Production costs ranges from US\$420 to US\$560 per hectare in Bolivia's expansion and integrated zones (IBCE 2014).

application instructions it has facilitated, has led to increases in both costs and quantity of inputs used in production. In 2004, for example, Bolivia imported 198 tons of soybean seeds at an average cost of USD 301/ton; in 2012, seed imports amounted to 9862 tons, an increase of 4881%, with an average cost of USD 738/ton (INE 2012, AEMP 2013). During the same period, soybean cultivation area increased from 852,000 ha to 1,103,390 ha (29.5%). This exponential increase of seed imports which vastly outpaces area expansion is largely due to the legalization of genetically modified (GM) soybean seeds. In 2005, GM seeds from Argentina came to dominate the market, accounting for an average of 99.9% of Bolivia's soybean imports each year until present (INIAF 2005-2014). Although this has led to a proliferation of agro-chemical and GM seed distributors, only a few companies control the entire import market.

Figure 1 Soybean seed import market 2014 (99.8% from Argentina)



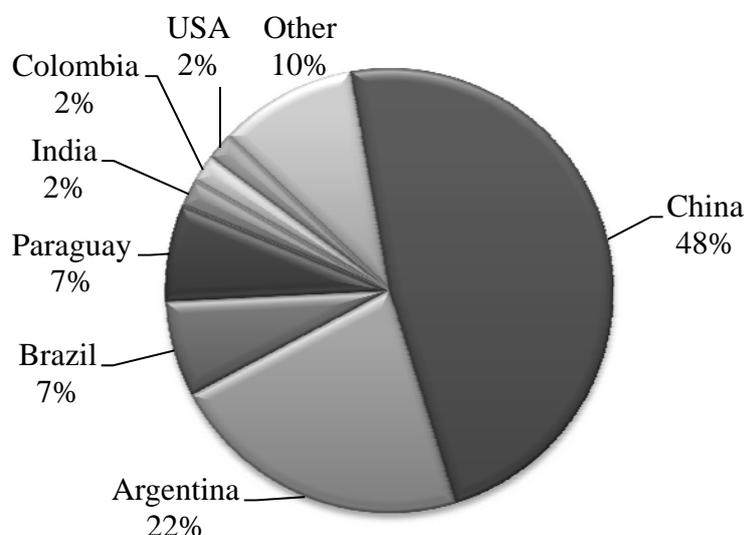
Source: INIAF, 2014

Since GM soybean seeds are engineered to tolerate the herbicide glyphosate, it comes as no surprise that a positive correlation exists between the increase in both the use of GM soybean seeds and herbicides, not only in Bolivia, but also throughout the region (see Catacora-Vargas et al. 2012). Further, the increased use of glyphosate combined with the adoption of a no-tillage seeding system has resulted in the “appearance of weeds resistant to glyphosate in GM soybean production...resulting in greater application of complementary herbicides” (Catacora-Vargas et al. 2012: 32). Any farmer in the soy expansion zone will agree with this statement. Mr. Fehr, who came to the region in the early 1980s to work the land, explains: “Before, the agro-chemicals were better, one chemical took care of everything. Now the technological packages require one product for one pest, another for a different pest, another for a weed and so on. Almost every year we have a new type of weed or pest that must be dealt with. Costs are increasing, but our yields are not. The only ones who keep benefiting are the agribusiness companies selling the chemicals” (Fehr, personal communication, 14 January 2015).

According to Bolivia's National Service for Agricultural Health and Food Safety (*Servicio Nacional de Sanidad Agropecuaria e Inocuidad Alimentaria, SENASAG*), from 2010 to 2014, the quantity of agro-chemicals registered in Bolivia increased from 12.6 million kg/l to 38.3 million kg/l in 2014 – a 204% increase, while the area under cultivation increased by just 28% (SENASAG 2014, ANAPO 2013). Based on both quantitative and qualitative data, it is clear that since the introduction of GM soybean seeds, agro-chemical consumption has increased at rates much higher than cultivation area increases. Furthermore, Figure 2 shows the origin of these agro-chemicals over the same time period, with China, Argentina, Brazil,

and Paraguay accounting for 84% of Bolivia's agro-chemical market.

Figure 2 Origin of agro-chemicals in Bolivia, 2009-2014



Source: SENASAG, 2014.

Furthermore, the six companies that have a monopoly over Bolivia's soybean processing, silos and exports, controlling 85% of the market share are also among the top 50 largest revenue-earning companies in the country. However, their contribution to the country's national tax revenue is much lower than their relative revenue ranking, as seen in Table 2. Moreover, the agricultural sector as a whole only contributed 0.9% of the national domestic tax revenue in 2013, meaning that not even the state appropriates much value from industrial value-chain agriculture.

Table 2 Market share of exports for soy and derivatives and national tax contribution

Company	Revenue Ranking 2013	Market share of Bolivia's soy (+derivatives) export market	Rank and contribution to total national tax revenue	Company origin
Industrias Aceite S.A (FINO)	9th	22%	38th (0.2%)	Peru
ADM SAO	11th	13%	41st (0.2%)	USA
Gravetal	16th	31%	77th (0.1%)	Venezuela
Industrias Oleaginosas (RICO)	28th	9%	n.r.	Bolivia
Granos	34th	9%	n.r.	Bolivia
Cargill	48th	11%	n.r.	USA

Source: Impuestos Nacionales (2013); Nueva Economía (2014)

The development of industrial agriculture through value-chain relations opens up new frontiers for capital to circulate and accumulate. But what we see in Bolivia is the importation of agro-inputs (seeds, agro-chemicals, machinery) and the exportation of a raw or semi-processed agro-'outputs' (soybeans and

derivatives). With both ends of this value-chain largely controlled by foreign capital, the soybean complex in Bolivia essentially extracts ecological value from its fertile lands, while the value-added activity (surplus value generated) is appropriated elsewhere. Due to its highly mechanized character, the need for labour power is also diminished, resulting in processes of 'productive exclusion' (McKay and Colque, 2016). The extractivist nature of this type of agro-industrial development – which we may call 'agrarian extractivism' – parallels the non-renewable resource extractive economy (minerals, natural gas) which has characterized Bolivia for the past 500 years. While similarities can be drawn between the extraction of the ecological value (soil, water, air pollution) and the extraction of the surplus value generated from exporting a raw or semi-processed resource (minerals, natural gas, soybeans and derivatives), such lines cannot be drawn with the issue of labour. Unlike labour intensive crop production such as sugarcane, soybean production is actually excluding the majority of Bolivia's farmers from engaging in productive activity, potentially leading to 'surplus populations' and a 'truncated trajectory of agrarian transition' through processes of dispossession (see McKay and Colque 2016, Li 2011, 2009).

5 LAND GRABS, 'FOREIGNIZATION' AND THE SPATIO-TEMPORAL FIX

Going back to the definition of land grabbing proposed by Borras et al (2012), their three key interlinked features include the power to control land and its productive resources; large in scale, in terms of capital or area involved; and as a response to the current crises and the emergence of new hubs of global capital accumulation. Urioste (2012), among others, have shown that vast swaths of land that have come under the ownership of Brazilian agro-capitalist predominantly throughout the past 25 years. What I have attempted to demonstrate here is how a new phase of 'foreignization' has developed via value-chain agriculture. The particular social relations of production this entails have enabled foreign capital to control and have access to land and its productive resources without necessarily having tenure rights to the land. This has allowed foreign capital to appropriate value through the commodification of new agro-inputs and land as well as through a cycle of debt and dependency.

In essence value-chain agriculture has created a 'spatio-temporal fix' whereby capital is able to circulate and accumulate, extracting surplus value from labour and the environment and later exported as a raw material for further value-added processing elsewhere. Harvey explains the 'spatio-temporal fix' as "a particular kind of solution to capitalist crises through temporal deferral and geographical expansion" (2003, 115). What the spatio-temporal fix requires is:

"[T]he production of space, the organization of wholly new territorial divisions of labour, the opening up of new and cheaper resource complexes, of new regions as dynamic spaces of capital accumulation, and the penetration of pre-existing social formations of capitalist social relations and institutional arrangement...[which]...provide important ways to absorb capital and labour surpluses" (Harvey 2003: 116).

As agro-industrial soybean production developed much earlier in Argentina and Brazil – both growing hubs of global (agro)-capital – Bolivia offered both a strategic and convenient space to absorb capital surpluses. In the 1990s, for example, when many Brazilians purchased land in Bolivia, the Brazilian land market was becoming saturated, expensive, and newer technologies were still developing to expand into the Cerrado region. This phase of foreignization was thus prompted by the opening up of Bolivia's land markets in Santa Cruz, offering new and cheaper spaces for capital absorption. With land markets at a point of near saturation and uncertainty, capital has penetrated once again via value-chain technologies, 'appropriationism'

and debt relations. It has managed to penetrate peasant farming, transforming peasants into small-scale capitalist producers and rentiers, or through displacement. This is drastically changing the social relations of production, power, and property in this region. As Harvey states, “such geographical expansions, reorganizations, and reconstructions often threaten, however, the values already fixed in place (embedded in the land) but not yet realized” (2003: 116). Instead of producing crops for household and local consumption for example, producers now purchase increasingly expensive, external agro-inputs controlled and produced by foreign capital and after adding labour and ecological value, sell this product to a monopolized market controlled by foreign capital for export. As a spatio-temporal fix for foreign capital (‘foreignization’), value-chain agriculture “encompasses smallholder farms as ‘resource complexes’ to absorb and create capital” (McMichael 2013a: 674).

Since Bolivia does not have the capacity to absorb the surplus value created, it is used as a space to temporarily absorb capital and add (mainly) ecological value, while China – which imports almost two-thirds of the global soy trade – absorbs (indirectly) the surplus value created on a global scale. Taking a broader perspective on value appropriation, we can observe that China largely benefits from both ends of industrial value-chain agriculture for soybean production. First, as a producer of agro-chemicals – a processed, value-added product exported around the world, and second, as the world’s largest importer and processor of soybeans primarily to feed a growing meat complex. A similar story can be told regarding seeds, machinery, storage and processing. Meanwhile, Bolivia is becoming more dependent on food imports and volatile international food prices, while state policies concerning food sovereignty remain little more than popular discourse (see McKay et al. 2014). The capitalization of the peasantry and commodification of industrial agriculture via value-chain technologies continue to change agrarian relations and are leading to the concentration of land and resource control relations in the hands of trans-national capital.

6 CONCLUSION

This paper has attempted to disaggregate Bolivia’s value-chain agriculture and demonstrate how a new phase of ‘foreignization’ has emerged via the penetration of agro-capital, particularly from emerging economies of BRICS and MICs. This type of ‘foreignization’ is considered a form of land grabbing – not necessarily in the sense of having tenure rights over land, but rather as having control over and access to the land-based resources via a value relation characterized by debt and dependency. This can be conceptualized as a ‘spatio-temporal fix’, first by the land market saturation in the south of Brazil, which brought many Brazilian agro-capitalist to Bolivia’s lowlands, and second, by the commodities boom in the 2000s and the subsequent crises (food prices, financial, climate) which triggered more global investment in land and natural resources. The introduction of GM soybean seeds facilitated a new phase of capital penetration into Bolivian agriculture, as appropriation and value-chain relations have significantly transformed the social relations of production, reproduction, property and power. ‘Capital overflow’ from Argentina and Brazil, two of the region’s most advanced agro-industrial hubs and largest economies, continue in different ways, to penetrate new spaces for capital accumulation in Bolivia. China, the world’s largest manufacturer, has also penetrated these spaces via a new dependency on the increasing use of agro-chemicals.

The scale at which these relations of debt and dependency have developed is very significant, as an estimated 86% of small farmers, who represent 78% of total soy-producing farm units, do not have access to machinery necessary for sowing and harvesting (Suárez et al. 2010: 83). Using this framework, this paper concludes that land grabbing continues in Bolivia – primarily through the resource control and access by means of industrial value-chain agricultural relations – appropriating and concentrating value in the hands of transnational corporations. While some may argue that this is a necessary and natural process of ‘modernization’, the current trajectory of agrarian change is threatening the ability of small scale farmers to work their lands, increasing the country’s dependency on food imports, and thus volatile international

markets, and leading to dire environmental degradation through deforestation and soil and river contamination.

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Table 1 Regional evolution of principle crops in Bolivia (in hectares), 1950-2014

Crop/Year	1950(a)	1972(a)	1991(a)	1997(a)	2002(b)	2004(b)	2006(b)	2008(b)	2010(b)	2012(b)*	2014(b)*
Andean Region(c)											
Maize	94,291	157,500	180,625	166,144	185071	185321	190609	195979	182469	197618.769	177894
Potato	111,680	107,200	135,881	121,914	121352	136765	154434	172875	173855	186532.395	190209
Onions	61,194	101,000	95,297	86,508	6415	6948	7638	8483	8772	9013.90251	9020
Wheat	82,950	61,066	77,933	81,536	76546	76740	77440	78698	83181	86418.4672	88230
Quinoa	18,998	15,000	38,791	38,680	37325	40541	46316	50356	63010	96544.3439	169093
Broad beans	9,226	21,000	27,210	27,649	29432	30679	32117	33640	33516	35186.5683	36596
Alfalfa	6,325	15,200	17,705	20,880	22225	23933	26593	29574	30237	30110.4745	31585
TOTAL	384,664	477,966	573,442	543,311	478366	500927	535147	569605	575040	641424.92	702627
Growth Index	100	122	140	130	124	130	139	148	149	167	183
Department of Santa Cruz											
Maize	19,177	57,940	43,500	99,300	124,225	124,957	156,465	209,221	128,522	206,622	188,989
Wheat	1,755	2,097	38,493	76,860	55,800	30,200	48,000	56,072	93,250	72,878	99,516
Rice	10,151	34,220	72,318	83,776	85,000	120,000	133,200	132,631	144,507	133,275	116,471
Sugar cane	10,548	37,500	67,458	75,120	87,525	91,242	99,624	135,415	136,217	131,680	139,957
Cotton	109	68,222	16,523	52,000	2,200	9,300	7,500	4,500	700	8,000	2,989
Soya	0	1,100	183,865	513,190	629,000	796,100	940,000	832,098	918,847	1,091,700	1,239,825
Sunflower	0	150	10,217	89,000	178,300	83,000	99,350	259,214	235,430	220,768	203,000
Sorghum	0	0	28,000	45,000	60,500	72,000	95,000	134,292	87,000	192,850	273,268
TOTAL	41,740	201,229	460,374	1,034,246	1,222,550	1326799	1579139	1763443	1744472.81	2057773	2264015
Growth Index	100	482	1,103	2,478	2,929	3,179	3,783	4,225	4,179	4,930	5,424

Sources: (a) Kay and Urioste (2007); (b) INE, various years; (c) The Andean region includes the departments of La Paz, Oruro, Cochabamba, Chuquisaca, Potosí and Tarija; *indicates preliminary results.



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