

TWO SIDES OF THE SAME COIN: **Agriculture and Food Security in Bolivia**

Enrique Castañón Ballivián
Fundación TIERRA



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Enrique Castañón Ballivián | FDCL | February 2014

Editors:

Forschungs- und Dokumentationszentrum
Chile-Lateinamerika – FDCL e.V.
Gneisenaustraße 2a, D-10961 Berlin
Fon: +49 30 693 40 29
Fax: +49 30 692 65 90
eMail: info@fdcl.org
Internet: <http://www.fdcl.org>

Author: Enrique Castañón Ballivián

Layout: Monika Brinkmüller

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Enrique Castañón Ballivián

A Bolivian agronomical engineer with a master in Environment and Development at King's College London. The author gratefully acknowledges support from Fundación TIERRA, the Centre for Research and Documentation Chile-Latin America (FDCL) and Alexis Williams in the elaboration of this paper. He can be contacted at: e.castanon@ftierra.org or enriquedcb@hotmail.com.

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1. Introduction

During the last decades, Bolivia has experienced significant economic and social progress. An important economic growth coupled with social inclusion of historically marginalised groups have translated into better days for Bolivian society. As expected, however, many challenges remain. One of the pending tasks is to enhance the population's nutritional levels as well as to reduce food insecurity in some rural areas. In addressing this task, many structural factors should be considered such as poverty prevalence, lack of appropriate infrastructure, sanitation, and the country's agricultural structure. This document deliberately focuses on the latter factor as it seeks to highlight the importance of domestic agriculture for Bolivia's food security.

The 2008 international food crisis has revived the debate regarding the efficiency of the current agri-food system to satisfy a growing demand for food. At the crux of this discussion lies the need to rethink the way agriculture is performed. Although in a simplistic fashion, there is arguably a fundamental conflict between two different agricultural models. On the one hand, the agroindustry linked to powerful business groups that advocates for large-scale monocrop production with high levels of external inputs; and, on the other hand, the peasant family agriculture based on family's labour, agroecological principles and low levels of external inputs. Recent evidence shows that the former model is gaining ground rapidly as a result of significant political and economic support from nation states and transnational corporations.

In Bolivia the trend is very similar. The peasant agriculture that has historically provided food

for the population is currently stagnant whereas the agroindustry, through soybean production, is moving forward very quickly. Albeit both agricultural models form the "dual character" of the country's agricultural structure, the sharp contrast in their present circumstances allow us to pose the title's analogy. Needless to say, that this dichotomy is essentially reductionist, but nonetheless useful for analytical purposes. That noted, the aim of this paper is to weave a general picture of the state of agriculture in Bolivia and its relation to food security concerns. Based on secondary data and semi-structured interviews with key informants¹, the paper pretends to put forward relevant information and arguments to enrich food security discussions in the country.

This document is comprised of six sections, including this introduction. The second section briefly presents the food insecurity context in Bolivia focusing in particular on the most vulnerable municipalities. The third section reviews official data to depict trends of agricultural production and its implications on the country's food security. Subsequently, in the fourth section, an analysis of the current situation of the peasant agriculture is conducted in order to show its characteristics, the causes of its stagnation and the livelihood transitions that are emerging as a result. The fifth section pays attention to the expansion of the agroindustry that today is closely related to the growth of soybean production in the eastern part of the country. The final section offers the principal conclusions of the study as well as some relevant recommendations for decision makers.

2. Food Insecurity in Bolivia

Social conditions in Bolivia have improved significantly in the last decades. Between 1975 and 2007, the country's Human Development Index increased from 0.512 to 0.729, placing it in the medium human development category according to the United Nations Development Programme. Before 2005, progress is basically explained by ad-

vances in health and education coverage, whereas from 2006 onwards the country has been experiencing a period marked by a considerable economic growth and the social inclusion of historically marginalised population groups (PNUD, 2011). In spite of these advances, however, the country faces many challenges that stem mainly from its

high levels of inequality. Amongst these challenges are the reduction of food insecurity that remains high in some rural contexts and the improvement of nutritional levels of the population as a whole. As a matter of fact, it has been established that the average Bolivian does not satisfy properly his/her energy requirements as he/she consumes around 2,137 kcal/person/day, while the recommended consumption for the country is 2,700 kcal/person/day (Prudencio, 2008).

In 2012, the *Ministerio de Desarrollo Rural y Tierras* (MDRyT) in association with the World Food Programme (WFP) released the study entitled “Vulnerability, Analysis and Mapping of Food Insecurity in Bolivia – VAM 2012” (MDRyT - PMA, 2012). Arguably one of the most comprehensive efforts on this issue, the study is based on the WFP’s food insecurity index that measures the difference between the risk of facing food insecurity situations

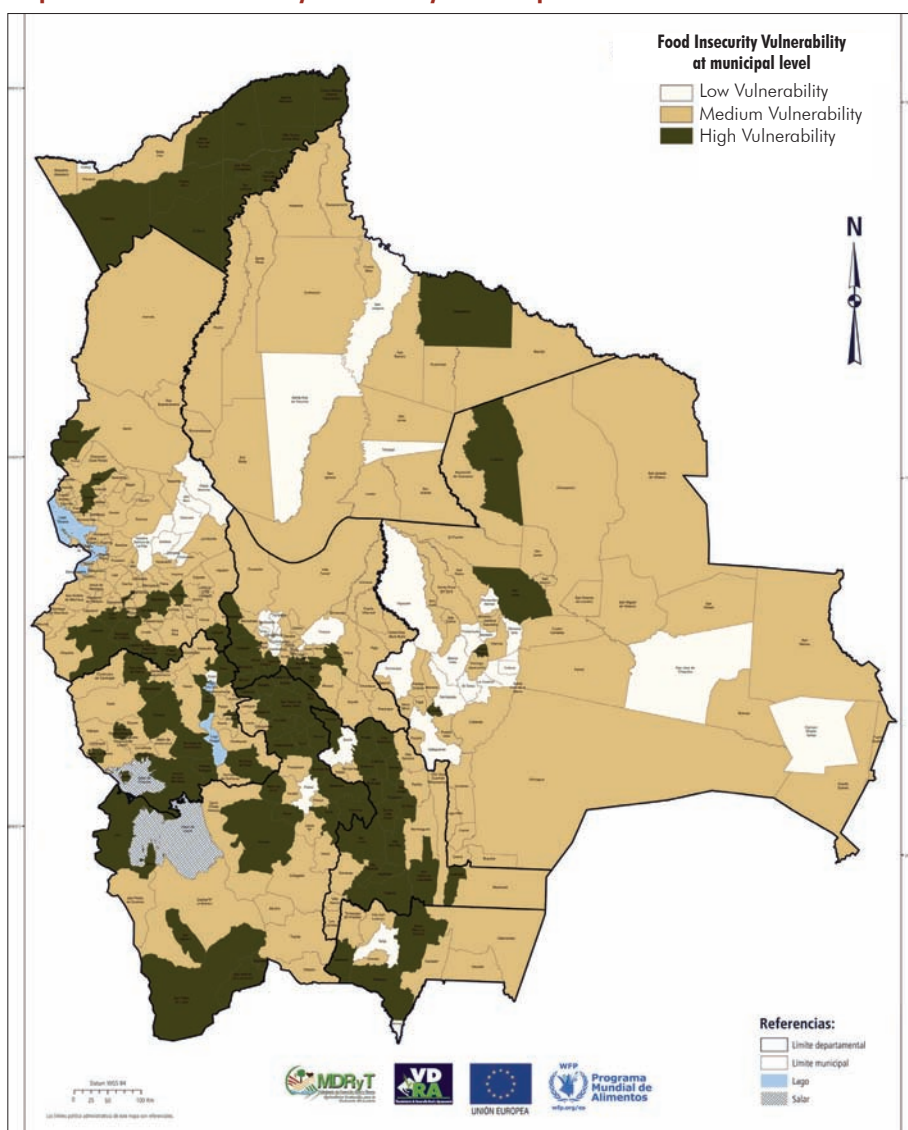
and the response capacity of a given unit to cope with such risk. The index takes into account numerous factors both exogenous (climate risk, environmental degradation, etc.) and endogenous (people’s incomes, infrastructure, sanitation, etc.).

Based on multisectorial data, the aforementioned study found high levels of food insecurity in various municipalities of the country (MDRyT - PMA, 2012). From a total of 339 municipalities, 30.1% were said to be highly vulnerable to food insecurity, while the rest were assigned either medium (58.7%) or low (11.2%) levels of vulnerability. Nonetheless, it is worth noting that in demographic terms², the highly vulnerable municipalities encompass 11% of the country’s total population whereas the remaining 40 and 49% resides in municipalities with medium and low levels of vulnerability, respectively. Municipalities with high levels of vulnerability to food insecurity can be found throughout

the country; however, they tend to be concentrated in two main areas: the northern Amazon in the Pando Department and the interandean valleys located in the Departments of Chuquisaca and Potosí (See Map 1). It is estimated that the total population living in these municipalities reaches around 1,148,295 people (MDRyT - PMA, 2012). A considerable fraction of this population has an indigenous origin and its livelihood strategy is typically based on subsistence agriculture. This is precisely the population segment more susceptible to suffer chronic malnutrition, which according to the *Sistema Nacional de Información en Salud* (SNIS) affects 9.5 out of 100 Bolivians (Dávalos, 2013).

Disaggregating the overall vulnerability index into its components of availabil-

Map 1 Bolivia: Food insecurity vulnerability at municipal level



Source: MDRyT – PMA (2012).

ity, access and utilization, allow us to unveil the main structural factors that prevent food security in various municipalities of the country. According to MDRyT – PMA (2012), food availability is largely determined by a proper access to water for agriculture. Indeed, municipalities that ranked highly vulnerable in this component suffer a combination of arid soils and a clear water deficit reporting an annual rainfall of less than 289 millimetres. Partly because of this limitation, these municipalities allocate less than 20% of its territory to food production. Consequently, it has been estimated that agricultural production in these zones generates on average only 1,622 kcal/person/day³ (MDRyT - PMA, 2012).

Furthermore, the study shows how poverty and poor infrastructure conditions restrict an adequate access to sufficient and innocuous food. Municipalities with high levels of vulnerability to food insecurity exhibit poverty incidence levels of approximately 70% and an average unemployment rate of 10.7%. As a result, it is usually the case that people cannot afford quality food and instead are forced to have an inadequate diet and even to reduce their food consumption during critical times. Although low incomes might be offset with people's own food production, soil and climate limitations that characterised these contexts undermine such an option. Similarly, the lack of proper infrastructure limits physical access not only to food itself but also to other elements that are necessary in order to ensure

people's wellbeing and nourishment such as health and education services. In fact, due to a poor road infrastructure it is not rare that in these municipalities some basic food products become scarce during the rainy season (MDRyT - PMA, 2012).

With regard to utilization, indicators related to health, nutrition and basic services were analysed as complementary elements for people's diet. In highly vulnerable municipalities, the enhancement of basic services remains a key challenge. As a matter of fact, on average 37.7% of the families have access to drinking water, about 41.6% to electricity and only 3% to sanitation (MDRyT - PMA, 2012). In part, these limitations explain the high levels of chronic malnutrition of children under 5 years old that on average reaches 33.64% of this population, as well as elevated incidence of diarrheal and respiratory diseases, especially for children and the elderly.

As reflected by this study, food insecurity results from a combination of several structural factors. In fact, the four dimensions ascribed to the conventional food security concept⁴ try to account for such complexity that ultimately determines people's access to food. Nevertheless, given the explicit purpose of this paper, in what follows the analysis focuses deliberately on the domestic agricultural structure. It is argued that this is a key factor influencing food security in the country, which by no means suggests that other factors are of secondary importance.

3. Domestic agricultural structure and its implications for food security

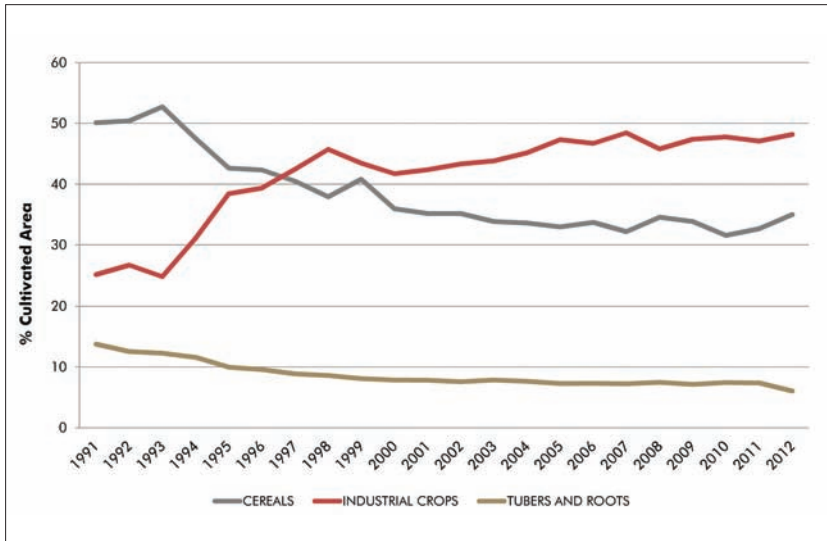
3.1 General trends within the agricultural structure

In the mid-80s nearly 91% of Bolivia's cultivated area was allocated to staple crops and only 9% to industrial commodities (Pacheco D. , 2011). At present, however, from a total of 3.1 million hectares under cultivation, 1.5 million (48%) correspond to industrial commodities (soybean, sugar cane, cotton, sunflower and others) and 1.6 million (52%) to staple crops (cereals, vegetables, fruits and tubers) which are mainly produced by peasants and indigenous people⁵ (INE, 2012). Such drastic

modification of the agricultural structure cannot be explained without considering the neoliberal turn that the country's political economy underwent since 1985 (Pacheco D. , 2011; Pérez M. , 2009).

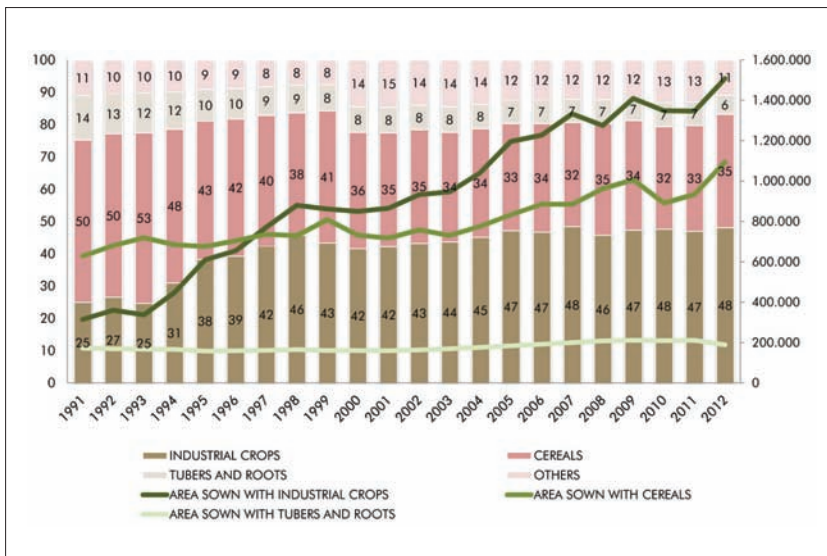
Following neoliberal tenets, all governments since 1985 to 2005 systematically reduced the State's role in the economy. Only normative and regulative functions were assigned to the state as it was viewed simply as an institution whose sole purpose was to guarantee a "good business climate". The implications for the peasant agriculture were disastrous as practically all the State's programmes and institutions

Figure 1 Proportion of cultivated area by crop type



Own elaboration based on data from INE (2012) and INE (2009).

Figure 2 Percentage of cultivated area by crop type



Own elaboration based on data from INE (2012) and INE (2009).

that had been created to support and promote this type of agriculture were destroyed. In sharp contrast, these very same neoliberal governments established several mechanisms of economic and political support to the agroindustry and the forestry sectors that have been historically controlled by powerful economic elites (Pacheco D. , 2011). In other words, these governments showed a clear commitment to the development of the agroindustrial enterprise in the lowlands at the expense of the traditional peasant farming in the highlands. Ultimately, these policies have shaped the Bolivian agricultural structure that is currently characterised by two main trends:

1) A proportional reduction of the cultivated area allocated to staple crops in relation to the area set aside for industrial crops.

2) Relative stagnation of peasant-based agricultural production compared to a significant increase in agroindustrial production.

As shown in figure 1, in the early 1990s the proportion of cultivated area allocated to staple crops (cereals and tubers, mainly) reached 64%, whereas industrial crops, controlled by the agribusiness, accounted only for 25% of the total area. However, a few years later the support from neoliberal governments to the agroindustry started to materialise. One of the key initiatives was the implementation of the "Low Lands Project" cofounded by the World Bank and the Interamerican Development Bank. This project was implemented by the regional development corporation (CORDECRUZ) between 1990 and 1997 and had the stated purpose of making viable the expansion of the agroindustry to the east side of the city of Santa Cruz de la Sierra. This was a huge an integrated effort that entailed support concerning infrastructure, credits, land use planning and land poli-

cies. In fact, it has been argued that the remarkable increase of agroindustrial production since 1993 is basically explained by the influence of this project (Vadillo, 2013).

In the last two decades, the area under industrial crops has expanded fivefold from 314,518 hectares in 1991 to 1,507,857 hectares in 2012 (INE, 2012). During the same period, the area under cereals has also increased, although much more modestly, from 627,918 to 1,095,239 hectares whereas the area of tubers has experienced a negligible growth from 172,348 to 189,052 hectares (See figure 2). Nevertheless, in proportional terms, the relationship amongst these crop types has changed notably in the last

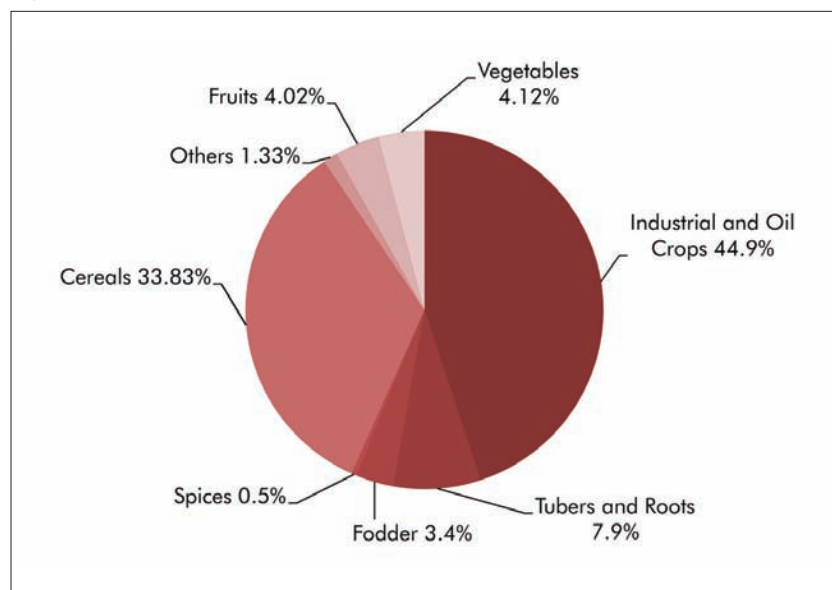
decades. As depicted in figure 2, the area cultivated with industrial crops currently reaches 48% of the total while the proportion of both cereals and tubers has decreased to a 35 and 6% respectively (INE, 2012). It is therefore evident that the agroindustry has consolidated its supremacy.

Such supremacy of the agroindustry in terms of cultivated area is clearly reflected in the production sphere. The latest National Agricultural Survey carried out in 2008 reveals that agroindustrial crops account for at least 44.9% of the whole agricultural production in the country (INE, 2009) (See figure 3). In addition, if we compare production growth rates during the last years, it is clear that the agroindustry is gaining ground and that the peasant agriculture is becoming stagnant. Indeed, from 1991 to 2012 the production of industrial crops increased from 4,306,853 to 10,173,363 tons (136%) whereas the production of tubers - which is closely linked to the peasant agriculture – showed no significant expansion from 1,055,989 to 1,246,101 tons (18%) (INE, 2012).

Further analysis based on the main agricultural products confirm the general trends already described (See table 1; page 8). For instance, between 1991 and 2012 the area of agroindustrial crops such as soybeans, sorghum and sunflower has been multiplied by 5, 6 and 20 times, respectively. In contrast, staple crops expansion has been notably more moderate (e.g. potato 18%, fruits 12%, vegetables 3%). Moreover, out of the four crops that have experienced a decrease in cultivated area, three can be related to the peasant agriculture (i.e. barley, peas and cassava) and only cotton⁶ belongs to the agroindustry (INE, 2012).

In the light of the preceding analysis, it becomes apparent that the Bolivian agricultural structure is currently marked by a clear superiority of the agroindustry over the peasant agriculture. At the crux of this fact lie two separate, although interwoven, dynamics. On the one hand, the stagnation of the peasant agriculture due to structural factors that constraint its development, and, on the other hand, the expansion of the

Figure 3 Production proportions by crop type



Own elaboration based on INE (2009).

agroindustry closely link to soybean production. Before examining these dynamics in more detail, the remaining of this section intends to point out some implications that the described trends might have on the country's food security.

3.2 Implications for food security

As shown previously, Bolivia has increased its agricultural production in the last years. Without belabouring the point, however, it is worth noting that such increase is mainly due to the expansion of the agroindustry as the growth of traditional peasant-based agriculture has been very modest. In other words, the production of food for domestic consumption has not kept pace with the production of industrial commodities for export. In fact, Gudynas (2007) estimates that between 1996 and 2005 agricultural production in the country grew at an average rate of 3.2%, while food production per capita grew only at a 1.1% rate. This has implications for the national food security as it influences both food price inflation and food trade balance.

In spite of problems with the production of certain key items such as potato and cassava, data suggest that the country is still capable of satisfying most of its domestic food consumption. According to official sources, a total of 12 million tons of food were produced in 2010 of which nearly 10 million were sold in the domestic market, 1.5 million were stored by the government as a reserve and the remaining was exported (Peres & Medeiros, 2011). While food

Table 1 Evolution of land area and production levels of the main agricultural products

| PRODUCTS | Area (ha) 1991 | Area (ha) 2012 | % Increase | Pro. (Ton) 1991 | Pro. (Ton) 2012 | % Increase |
|---------------------------------|-------------------|-------------------|------------|--------------------|--------------------|------------|
| CEREALS | 627.918 | 1.095.239 | 74 | 904.222 | 2.224.394 | 146 |
| Rice | 114.560 | 183.854 | 60 | 240.770 | 578.636 | 140 |
| Barley | 95.397 | 52.831 | -45 | 65.064 | 46.503 | -29 |
| Maize | 234.696 | 409.310 | 74 | 390.952 | 1.036.148 | 165 |
| Quinoa | 38.791 | 96.544 | 149 | 19.651 | 50.566 | 157 |
| Sorghum | 28.048 | 193.378 | 589 | 79.052 | 366.679 | 364 |
| Wheat | 116.426 | 159.322 | 37 | 108.733 | 145.862 | 34 |
| OTHERS | 22.092 | 36.182 | 64 | 14.071 | 14.809 | 5 |
| Coffee | 22.092 | 36.182 | 64 | 14.071 | 14.809 | 5 |
| FRUITS | 53.575 | 60.043 | 12 | 482.476 | 421.284 | -13 |
| Banana | 18.099 | 18.036 | 0 | 138.906 | 73.935 | -47 |
| Plátano | 32.308 | 37.650 | 17 | 325.882 | 311.450 | -4 |
| Grape | 3.168 | 4.357 | 38 | 17.688 | 35.899 | 103 |
| VEGETABLES | 44.689 | 46.193 | 3 | 104.724 | 111.280 | 6 |
| Pea | 12.960 | 5.924 | -54 | 17.582 | 16.508 | -6 |
| Bean | 27.260 | 35.242 | 29 | 37.112 | 43.023 | 16 |
| Tomato | 4.469 | 5.027 | 12 | 50.030 | 51.749 | 3 |
| OIL AND INDUSTRIAL CROPS | 314.518 | 1.482.715 | 371 | 4.306.853 | 10.160.339 | 136 |
| Cotton | 16.803 | 4.500 | -73 | 8.931 | 3.128 | -65 |
| Sugar Cane | 83.669 | 148.334 | 77 | 3.880.186 | 7.602.558 | 96 |
| Sunflower | 10.217 | 221.633 | 2.069 | 11.870 | 182.817 | 1.440 |
| Peanut | 10.540 | 12.871 | 22 | 12.248 | 16.538 | 35 |
| Soybean | 193.289 | 1.095.377 | 467 | 393.618 | 2.355.298 | 498 |
| TUBERS AND ROOTS | 172.348 | 189.052 | 10 | 1.055.989 | 1.246.101 | 18 |
| Potato | 140.053 | 165.161 | 18 | 691.935 | 974.029 | 41 |
| Cassava | 32.295 | 23.891 | -26 | 364.054 | 272.072 | -25 |
| FODDER | 17.816 | 9.263 | -48 | 139.082 | 127.142 | -9 |
| Alfalfa | 17.816 | 9.263 | -48 | 139.082 | 127.142 | -9 |
| TOTAL | 1.252.956 | 2.918.687 | 133 | 7.007.417 | 14.305.349 | 104 |

Own elaboration based on INE (2012) and INE (2009).

availability is not yet a serious problem, access to food is increasingly hampered by higher prices. The increase in food prices has been mainly attributed to a smaller supply of food coming from the peasant sector, which in turn led to an increase in importation of selected products. Predictably, higher prices prompted inflationary processes⁷ as in 2008 when food prices inflation reached 15.16%; such inflation rate triggered the Government's decision to establish controlling measures on food trade. While it is true that the international food crisis had an impact at that time, it has been argued that this particular problem was deliberately orchestrated by con-

servative elites – that opposed Evo Morales- who hid food products with political purposes (Pérez M. , 2009). This incident aside, food inflation has been effectively controlled in the following years, although this last year has revived concerns as the inflation rate reached 12.75% (Fundación Jubileo, 2013).

As for the food trade balance, the latest figures show a positive balance given that Bolivia currently exports 300 thousand tons more than it needs to import (INE, 2012). As illustrated in figure 4 (page 9), this positive trend started in 2008 reversing a long negative period since 1999 that was characterised by vast amounts

of food imports⁸. However, a positive food trade balance might not be enough to claim progress regarding food security; therefore, it is necessary to delve into the nature of both food imports and food exports.

With regard to food imports, it is important to note two main trends. Firstly, importation of some basic food products such as potato, maize, rice, vegetables and fruits has increased in the last years. To take but one example, the Bolivian Foreign Trade Institute asserts that vegetable imports have grown 58% between 2005 and 2012⁹ (El Deber, 2013). While the increasing need to import these products has been ascribed to the impact of climate disasters, it can also be considered an indication that the peasant agriculture has become stagnant. In any case, the slow albeit steady trend to increase imports of food items that were historically produced in the country illustrates setbacks in terms of food sovereignty.

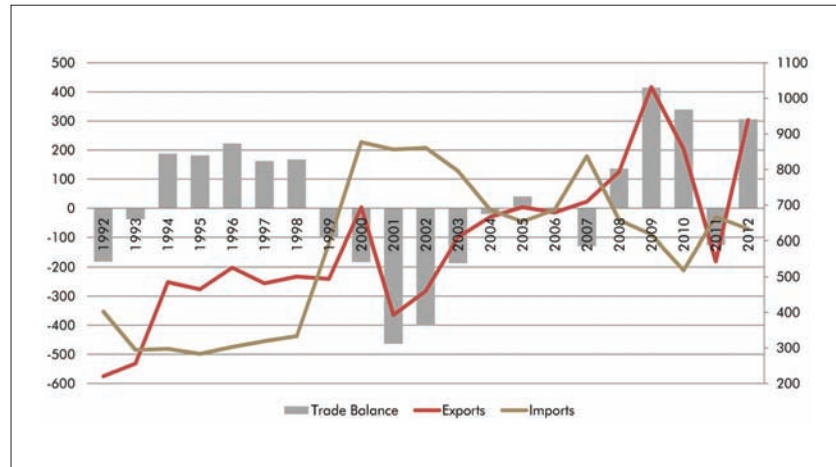
Secondly, it is indisputable that the country suffers a chronic dependence on wheat imports. Each year, Bolivia needs to import more than 80,000 tons of wheat grain and about 225,000 tons of wheat flour. While it is true that the imports of wheat grain have tended to reduce in the last years, the opposite has been the case for wheat flour imports (See figure 5). Overall, it is estimated that approximately 60% of the domestic wheat demand is covered by means of importation (See table 2; page 10). Wheat is one of the most consumed crops in the country due to Bolivians high preference for bread. In fact, it has been calculated that roughly 70% of the wheat flour imported is distributed to bakers at a subsidised price of around 25% of its total value (Ormachea, 2010).

According to official figures, Bolivia currently sows 159,332 hectares of wheat. The majority of this area (67%) is managed by the agroindustry and the rest by the traditional peasant agricul-

ture. The latter cannot produce more wheat due to technical and water limitations, whereas the former has claimed problems with seed quality and lack of irrigation. However, what the agroindustrial entrepreneurs usually avoid admitting is that wheat production is comparatively less profitable than the production of crops such as soybeans and sunflowers and thus it is simply not a priority for this sector. Apart from the modest production of such important crop, Ormachea (2010) identifies difficulties regarding processing capacity as in recent years eight of the 18 mills have closed for various reasons; such processing deficit might explain in part the growth of wheat flour imports.

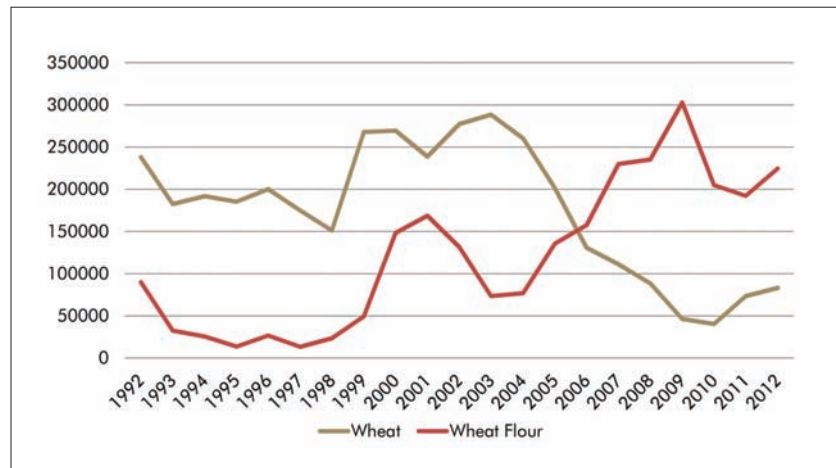
On the other hand, the positive trend regarding the country's food exports is largely explained by a greater production of soybean and its sub products. Here is useful to point out soybean's role on the country's food security in

Figure 4 Historical food trade balance (Thousands of tons)



Own elaboration based on data from INE (2012) compiled by UDAPRO.

Figure 5 Wheat imports trends (Ton)



Own elaboration based on data from INE (2012) compiled by UDAPRO.

Table 2 Wheat import dependency in 2011¹⁰

| WHEAT | Unit | 2011 |
|---|-------------|--------------|
| Domestic production of wheat (grain) | ton | 237.847 |
| DIRECT IMPORTS | | |
| Raw wheat, not grinded | ton | 843,93 |
| Other types of wheat | ton | 79.286,70 |
| DERIVATIVES IMPORTS | | |
| Wheat flour | ton | 274.736,76 |
| Macaroni, noodles and similar products | ton | 2.246,04 |
| Bread, cakes, sponge cake and other bakery products | ton | 9.476,87 |
| Imports subtotal: | ton | 366.590,30 |
| Total available | ton | 604.437,30 |
| Wheat import dependency | % | 60,65 |

Source: MDRyT and INE (2012)

order to demystify some arguments from the agribusiness sector. In Bolivia, roughly 20% of soybean production is converted to oil and the remaining 80% ends up as dry matter in the form of soybean pellets (Pacheco D. , 2011). Both products contribute to people's food security. Oil is indeed an essential item in the Bolivian's diet and gastronomy, while soybean pellets remains an important input for cattle feeding. That said, soybean's real contribution to Bolivia's food security must be considered in light of the following factors.

Firstly, the vast majority of the soybean produced in the country is exported to international markets in the Andean region. As a matter of fact, only 15 to 20% of the oil manufactured stays in the country for domestic consumption. Secondly, soybean profitability not only means massive profits for the agribusiness sector, it also means that land is increasingly used for this commodity ignoring the need to expand the pro-

duction of other crops such as wheat, rice and potato. As depicted in table 3, for each hectare of the aforementioned crops there are currently six hectares of soybean. Furthermore, it has been argued that such land use misbalance could be exacerbated if biofuel production were authorised¹¹. Projections run by Pacheco (2011) indicate that a significant proportion of land currently used for staple crops would be substituted for soybean cultivation should commercial biofuel production is permitted.

One may conclude that agroindustrial expansion under these conditions is at odds with any notion of food sovereignty given that it focuses on the production of export-orientated commodities looking right through the population food needs.

In this context, government policy – in line with constitutional mandate¹² – has sought to promote food security with a series of initiatives and acts of legislation¹³. While a detailed analysis of these policies lies beyond this paper¹⁴, it is important to highlight some key elements.

Food trade control has been arguably the most effective governmental policy. At the centre of this policy lie three main actions: 1) temporal export prohibition for those products that have not meet domestic demand; 2) importation and direct subsidised commercialisation of key food products through the State-owned enterprise EMAPA; and 3) establishment of price bands on products with higher inflation rates

Table 3 Ratio between area planted with soybean and the area planted with other important crops

| Crop | 1991 | | 2001 | | 2012 | | % Increase 1991-2012 |
|-------------|------------------|-------------------------------|------------------|-------------------------------|------------------|-------------------------------|-----------------------------|
| | Area (ha) | Ratio soybean - others | Area (ha) | Ratio soybean - others | Area (ha) | Ratio soybean - others | |
| Soybean | 193.289 | --- | 629.000 | --- | 1.165.000 | --- | 502,72 |
| Wheat | 116.426 | 1,66 | 113.396 | 5,55 | 159.322 | 7,31 | 36,84 |
| Maize | 234.696 | 0,82 | 289.489 | 2,17 | 409.310 | 2,85 | 74,40 |
| Rice | 114.560 | 1,69 | 147.992 | 4,25 | 183.854 | 6,34 | 60,49 |
| Potato | 140.053 | 1,38 | 124.357 | 5,06 | 165.161 | 7,05 | 17,93 |
| Sunflower | 10.217 | 18,92 | 135.000 | 4,66 | 221.633 | 5,26 | 2069,26 |

Own elaboration based on data from INE (2012) and CAO (2013).

(Pérez M. , 2009). Thanks to this action bundle, food inflation has been effectively controlled and food availability has been guaranteed (Pérez M. , 2009; Dávalos, 2013).

In parallel, the State has opted to support the agricultural sector as a whole through several initiatives. For peasant agriculture, three grant funding (non-refundable) programmes have been created, these are: EMPODERAR-PAR that fosters local alliances amongst small producers supporting them with technology and access to resources; CRIAR-PASA that builds road and irrigation infrastructure to highly vulnerable communities; and “*Agua para la Producción*” that focuses exclusively on access to irrigation¹⁵. Unfortunately, economic resources allocated to these programmes are insufficient and there are considerable execution deficiencies. Furthermore, Evo Morales’s government has created an agricultural insurance for small producers called “*Pachamama*”. This mechanism aims to mitigate the impact of climate risk that has been on the

rise in the past decades. According to official sources, nearly Bs. 28 million (USD 4 million) will be invested in its pilot stage benefiting more than 50.000 producers in 63 of the poorest municipalities (La Razón, 2013).

On the other hand, the agroindustry receives considerable support from the State without which its competitiveness can be questioned. To begin with, an important part of the hydrocarbons subsidy directly favours this sector so highly dependent on fossil fuels. In fact, it is estimated that the State spends more than USD 250 million annually on diesel subsidy which is mainly used by the agroindustry¹⁶ (Pacheco D. , 2011). Other measures that have benefited this type of agriculture are the authorisation of genetically modified soybean varieties in 2005¹⁷ and the Law 337 that provides an exception on sanctions for illegal deforestation -carried out mainly by agroindustrial entrepreneurs- in exchange of partial reforestation and the production of selected food items.

4. Stagnation of peasant agriculture in Bolivia

4.1 General characteristics of peasant agriculture

In general terms, peasant agriculture can be defined as a land-based productive system where family plays the central role in both production and consumption. In addition, unlike other productive systems, it employs mainly family’s own labour although it can occasionally be supplemented with external labour (IICA, 2004). In Bolivia, this type of agriculture has historically produced endemic crops that are mainstay products of people’s diet. Peasant agriculture is normally diversified as it usually combines crop growing and livestock rearing. Most of the production is typically consumed by the household although it is not rare for families to market any surpluses. Infrastructure conditions and proximity to markets determine peasants’ commercial strategies and final markets, which range from local fairs to urban markets in departmental capitals.

As in other contexts, peasant agriculture in Bolivia remains important both socially and environmentally. Studies have noted that peasant’s traditional practices tend to preserve soil fertility and local biodiversity. At this point in time, how-

ever, peasants apply both traditional and modern practices¹⁸, a fact that can be read as a result of people’s contextual adaptation. While such combination of practices may seem to alter the system’s sustainability, it has been argued that its environmental and social sustainability stems from people’s organisation forms and communal institutions and not from the practices per se¹⁹ (Tapia, 2002; Soliz, 2005). On the other hand, peasant agriculture continues to be central for rural employment that currently accounts for approximately 42% of the country’s economically active population (UDAPE, 2009). Here it should be noted though that while peasant agriculture provides a livelihood for an important part of the rural population, these are not always sustainable livelihoods. Indeed, poverty incidence and food insecurity tend to be concentrated on peasant households as their livelihoods are constrained by several structural factors (See below).

Geographically, the peasant sector is distributed across the country and encompasses most of the productive units. According to the Agricultural National Survey, Bolivia currently has 775 thousand productive units of which nearly 728 thousands (94%) can be classified as peasant

agriculture (INE, 2009). Located mainly in the highlands and valleys, these units face very different circumstances: from high levels of poverty and low productivity to successful enterprises able to generate substantial incomes. Consequently, food conditions amongst peasant families vary greatly. Such difference is largely the result of structural factors conditioning access to resources, technology and infrastructure. Important to note here is that municipalities with high levels of vulnerability to food insecurity are marked with biophysical and infrastructure limitations that ultimately restrict agricultural activities, as described in section 2.

Without a doubt, the contemporary configuration of the peasant economy has been greatly influenced by the 1953 agrarian reform. This historical event had a profound impact on the highlands and valleys, as it allowed indigenous and peasant communities to recover virtually all land from big colonial landowners (Urioste, 2011). Over time, however, land dynamics in these regions have changed as a result of demographic and market pressures.

In the highlands, land is increasingly scarce as inheritance processes have resulted in excessive fragmentation. It is estimated that on average each family holds about 1.5 hectares (Urioste, Barragán, & Colque, 2007). While this average might not restrict agriculture viability, smaller plots of land are common in various zones. Therefore, agriculture in such contexts does not allow a decent living standard for the families. Parallel to the latter, a change on land tenure regime is in place as collective rights are being gradually replaced by individual rights. Nonetheless, this remains a complex process because complying with communal norms is still relevant to secure access to land in many communities. The latter is said to be generating conflicts between former peasants that shifted from agriculture to other activities in the cities – commonly known as “residents”- and peasants that remain practicing agriculture in the rural area (Urioste, Barragán, & Colque, 2007).

Similarly, in the valleys collective land is gradually being fragmented into individual plots, although this is not the case in some indigenous jurisdictions called “ayllus”. In these contexts, land is still collectively owned but at the same time, it may be assigned in a familiar basis. As with the highlands, the primary means to access land in the valleys is through inheritance although renting is becoming increasingly important. On average, families in this region

own about 1.15 hectares to cultivate and it is also common to possess other pieces of land for cattle grazing. Nevertheless, the proportional relationship between cultivated and grazing area differs in relation to the different land tenure systems of the region. For instance, in the traditional *ayllus* this proportional relationship is 1:20 whereas in peasant communities it is usually 1:3. In general, however, it is evident that the agricultural frontier cannot be expanded any longer and so the pressure over land is on the rise (Pacheco & Valda, 2003).

4.2 Stagnation of peasant agriculture

In recent years, much controversy has emerged regarding the current condition of peasant agriculture in Bolivia. Optimistic accounts argue that in spite of an unfavourable context, peasant agriculture remains central to food production in the country (Pacheco D., 2011). On the contrary, pessimist views claim that this type of agriculture faces a terminal decline as the agroindustry consolidates its hegemony (Ormachea, 2010). Leaving aside such polarization, the fact is that official statistics indicate that in the last decades peasant agriculture has experienced a marginal growth, thus speaking of a stagnation seems appropriate. In order to illustrate the latter, the paper turns to briefly analyse the situation of potato, arguably the most emblematic crop of this type of agriculture in Bolivia.

Historically, potato has had a great significance for Bolivian society. According to a specialised study (Zeballos, Balderrama, Condori, & Blajos, 2009), potato production generated near USD 300 million in 2008 – a considerable amount if one takes into account the size of the Bolivian economy – and about 126,000 direct jobs in 2003. However, potato’s relative importance on the country’s agricultural sector has tended to diminish in the last decades.

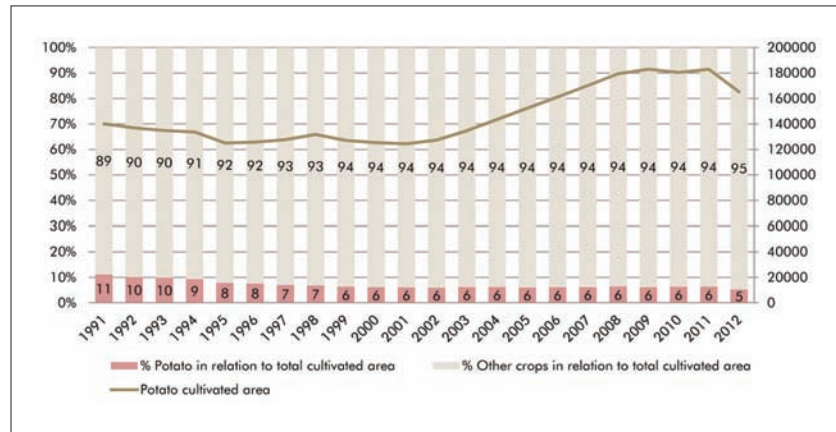
During the 1970, the area cultivated with potato experienced a steady growth reaching 177,165 hectares in 1981. Nonetheless, in 1983 the country is hit by one of the most severe droughts in its history which had disastrous consequences for the agricultural sector in general, and the potato area in particular which is sharply reduced to 108,156 hectares (Crespo F., 1993). In the following years, the potato area slowly recovers; although to this date it has not been able to reach levels experienced in the 1980s²⁰. While potato’s cultivated area has been on the rise, its proportional sig-

nificance for the Bolivian agriculture is constantly declining. Whereas in 1991 potato production was about 11% of the country's total cultivated area, nowadays it accounts for only 5% (See figure 6).

On the other hand, potato production has improved in the last decades. Between 1991 and 2012, the production of this tuber has raised from 691,935 to 974,029 tons, an increase of about 40% (INE, 2012). Given the marginal increase on cultivated area, production growth is basically explained by higher yields that in turn are the result of new varieties and improved seeds. Current yields reach 5.90 ton/ha (See figure 7), a value that remains very low in comparison to other countries of the region²¹. Despite its growth, potato production seems to have reached its limit as in the last few years, production levels have been virtually the same. In sharp contrast, soybean production has increased significantly and in a steady fashion reaching currently more than 2.5 million tons (See below). Potato's condition, as with the whole peasant agriculture, is constrained by several structural factors. Analysing these factors is a complex task, one that certainly lies beyond this paper; yet, for the sake of illustration, the main factors are succinctly mentioned.

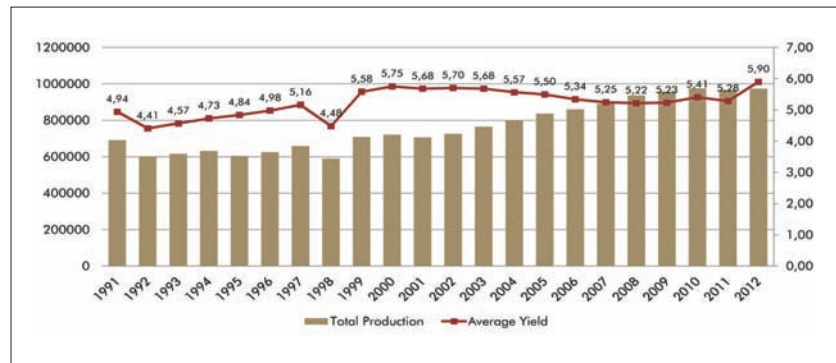
Firstly, access to land continues to be a key obstacle for peasant families in the highlands and valleys. In various zones of these regions, land fragmentation -derived mainly from inheritance processes- has been so severe that agriculture is no longer a viable option. According to Morales (2011), in the Bolivian highlands more than half of peasants do not possess enough land to generate decent incomes or to fully employ their family labour. In addition, land scarcity usually leads to a more intensive use of this resource, which in turn reduces its fertility faster. Here it is crucial to note, however, that land by itself does not guarantee agricul-

Figure 6 Evolution of potato's cultivated area in Bolivia



Own elaboration based on INE (2012).

Figure 7 Evolution of potato production in Bolivia



Own elaboration based on INE (2012).

tural viability in many of these contexts for local climate conditions also demand appropriate access to irrigation.

Secondly, as mentioned earlier, trade liberalization is another structural factor constraining peasant agriculture as it has allowed a tax-free entry of a variety of products. In this context, Bolivian peasants have simply not been able to compete with these foreign products due to unequal biophysical and infrastructure conditions. Returning to the case of potatoes, in the mid-90s, under the frame of these neoliberal policies, cheaper potato from Argentina was introduced which caused a collapse in the domestic price and thousands of peasants were severely hit. Indeed, Pérez (2013) argues that trade liberalization policies reshaped Bolivia's agricultural sector by sacrificing peasant agriculture in exchange for commercial preferences for agroindustrial commodities, especially soybean.

Thirdly, the State's withdrawal from rural areas as part of the structural adjustment programme has contributed to the current situation

of peasant agriculture. Useful State programmes and initiatives destroyed by neoliberal governments were much needed by peasant producers that had to cope with an increasing climate and market risk with virtually no support. Nevertheless, since Evo Morales took office in 2006, the State has returned to the rural areas with a series of research and promotion initiatives to assist peasant farmers²². State's investment for this sector, however, remains low in comparison with other sectors. In the last years, 11% of public spending was allocated for the agricultural sector as a whole, but if we consider only those activities directly related to enhance peasants productive conditions, public spending does not exceed 2.6% (Peres & Medeiros, 2011).

Finally, changes on the population's diet seem to be a fourth factor hindering peasant agriculture. Traditional products such as potato, maize and traditional types of meat (goat, sheep and llama) are gradually been replaced by standard products such as rice, noodles and chicken. Such diet change appears to be closely linked with the growing urbanization process that is taking place in the country. In this regard, the Budget and Expenditure Survey, conducted between 2004 and 2005, found evidence of these changes in the Bolivians' diet. For example, families spend 6% of their budgets on potato while their combined expenditure in rice and noodle is 6.5%. Similarly, when it comes to meat expenditure, 63.7% usually corresponds to beef and pork, 23.1% to chicken and only 4.6% to traditional sources of meat such as sheep, goats and llamas (Ormachea, 2010).

4.3 Transitions in peasant's livelihoods

Within this general context of productive stagnation, peasant livelihoods have undergone different types of transitions. Peasant families – far from being passive spectators – have been building new livelihood strategies in accord with the determinants of the wider political economy. While some of these strategies may still incorporate agriculture as a complementary activity, they also reveal the need to look at other types of resource, institutions and markets opportunities that families access in building non-agricultural, yet sometimes viable, livelihoods. Therefore, this implies shifting orthodox conceptualizations of rural livelihoods as being equitable to agrarian livelihoods, a trend that has been termed “the new rural”²³. Consistent with this train of thought, Bebbington (1999) identifies several transitions in rural and agricultural livelihoods in

the Andean region. Following this author, four main transitions can be identified in Bolivia, these are: 1) productive specialisation through capitalised family farms, 2) rural proletarianisation, 3) temporary or permanent migration, and 4) commerce-based livelihoods.

A transition to capitalised family farms necessarily entails intensification in the household peasant economy. Therefore, families adopting this accumulation strategy strive to achieve productive specialization, which in practice usually means leaving behind more traditional and diversified productive systems. Examples of this transition in Bolivia are the dairy production in the northern highlands and the mechanised quinoa production in southern highlands. The adoption of this strategy, however, demands certain conditions in order to be successful and so it is only viable in some specific contexts. Common factors to the success of these capitalised family farms have been: egalitarian agrarian structures, access to credit, labour availability, market opportunities, as well as appropriate State support. In fact, a recent study conducted in the valleys of Santa Cruz found a proliferation of these types of farms thanks to a relative even distribution of land, adequate access to irrigation and favourable municipal policies (Jaldín, 2012).

Where agriculture faces serious limitations, families have opted to sell their labour to other producers in contexts more favourable for agricultural purposes. In other words, a rural proletariat has emerged in some regional economies. Being a labourer or “*jornalero*” typically implies traveling long distances in order to satisfy labour demands from other successful producers, especially during harvest seasons. Illustrative examples are the quinoa harvest that needs substantial numbers of workers for tasks such as the “*venteado*” and “*trillado*”; the sugar cane harvest in the eastern part of the country as well as with other crops that require manual harvesting (e.g. potato in the highlands and strawberry in the valleys). Nevertheless, it should be noted that rarely this strategy leads to sustainable livelihoods as working conditions in most cases are inadequate.

In yet other contexts, migration, either temporal or definitive, has become a central strategy for many peasant families. Migration is usually associated with survival concerns and contexts where neither agriculture nor local employment are viable options. This is the case in some parts of the southern highlands and the high valleys of Potosí. While an important portion of migrants sell

their labour in cities, rural-rural migration is also common. Examples of the latter are the Chapare region in the Department of Cochabamba and several colonization frontiers in both the northern part of the La Paz Department and the lowlands in the Department of Santa Cruz. These migration dynamics are rather complex and while they are thought as a last resort, they can also be part of an accumulation strategy. In fact, in some instances remittances sent by migrants have been translated into investment in their communities of origin, improving their housing conditions or even their productive infrastructure.

Finally, a segment of the peasant population has found in commerce an opportunity to build their livelihoods. From local retailers in rural communities to informal commerce of myriad

products in the urban centres, this transition has allowed some peasant families to keep their rural residence without sacrificing their economic stability. Key to this strategy, it seems, are: initial capital usually accessed through micro-finance organisations and social networks to facilitate insertion into markets.

The transitions described reflect peasant families' agency to alter their livelihood strategies in relation to prevalent economic, social and political conditions. Nonetheless, it is fair to argue that, in some areas, these transitions might also arise as a response to a productive stagnation in the agricultural activities. The unfortunate state of peasant agriculture contrasts sharply with the current conditions of the agroindustry that this paper now turns to describe.

5. Expansion of the agroindustry in Bolivia²⁴

5.1 General characteristics of the agroindustry

Agroindustrial production in Bolivia is largely concentrated in the Department of Santa Cruz located in the eastern part of the country. As evidenced in the regional Land Use Plan (Gobierno Autónomo Departamental Santa Cruz, 2009), an important portion of the most fertile soil is currently used for agroindustrial commodities. Virtually the entire agroindustrial production is rain-fed, therefore rainfall patterns are central for productivity and they usually allow two harvests per year. During summer, soybean is by far the main crop cultivated in the whole region reaching near 890,000 hectares, followed by maize with only 178,200 hectares (CAO, 2013). Conversely, the characteristics of the winter harvest vary within the region. In this regard, two main production zones can be distinguished: the *"norte integral"* and the *"este de expansion"*, located to the north and east of the city of Santa Cruz de la Sierra, respectively. Whereas in the *"norte integral"* humidity conditions allow a second harvest of soybean during winter, in the *"este de expansion"* sunflower and sorghum are the main crops in this time of the year (Crespo M. A., 2013).

The agroindustrial model currently implemented in Bolivia is characterised by an intensive use of capital and technology. Throughout the production cycle, specialised heavy ma-

chinery is required as large portions of land have to be planted for the business to be lucrative (Suárez, Camburn, & Crespo, 2010). Furthermore, the utilization of modern agricultural inputs – from fertilizers to transgenic seeds – is ubiquitous. For instance, it has been estimated that nowadays more than 90% of Bolivian soybean is genetically modified (Catacora-Vargas, y otros, 2012). As a matter of fact, soybean production in the country is underpinned by the usage of transgenic RR seeds²⁵, glyphosate-based herbicide "Round-up" and tillage system²⁶.

Predictably, the implementation of this productive model demands significant capital investment. In the case of soybean, for example, total cost per hectare hinges around USD 406 and 576 (See table 4; page 16). Agricultural inputs (i.e. agrochemicals and transgenic seeds) represent more than 60% of the total cost. According to the budget presented, investment in seeds ranges from 64 to 72 USD/ha, while investment in agrochemicals goes from 177 to 313 USD/ha (CAO, 2013). Important to note here, that Glyphosate is usually complemented with other highly toxic products such as 2.4D and Paraquat. In effect, the latter has been prohibited in the European Union since 2007 because its relation with neurological and reproductive disorders has been scientifically proved (Catacora-Vargas, y otros, 2012).

Table 4 Soybean production budget (Summer 2010/2011)

| | ZONE „Este de Expansión“ | ZONE „Norte Integral“ |
|---|---------------------------------|------------------------------|
| DESCRIPTION | USD/Ha | USD/Ha |
| A - OPERATIONS | 118 | 142 |
| A.1 Soil preparation | 6 | 8 |
| 1st Drained Application (Before sowing) + 1st Application of Insecticide | 6 | 8 |
| A.2. Sowing | 21 | 23 |
| Sowing | 20 | 22 |
| Seed preparation (Labour) | 1 | 1 |
| A.3. Cultivation procedures | 36 | 56 |
| 1st Application of Herbicides (post emergence) + 2nd Application of Insecticide | 6 | 8 |
| 3rd Application of insecticide + 1st Application of Fungicide | 6 | 8 |
| 4th Application of Insecticide | 6 | 8 |
| 2nd Application of Fungicide + Application of Leaf Fertiliser | 6 | 8 |
| 3rd Application of Fungicide | 6 | 8 |
| 4th Application of Fungicide + 5th Application of Insecticide | 0 | 8 |
| 2nd Drained Application (Harvest) | 6 | 8 |
| A.4 Harvest | 55 | 55 |
| Combine harvester | 55 | 55 |
| B - INPUTS | 253 | 399 |
| B.1. Seeds / Sowing Materials | 77 | 86 |
| Seeds | 64 | 72 |
| Seed treatment (Fungicide + Inoculating + Insecticide) | 13 | 14 |
| B.2. Defensive Products | 177 | 313 |
| Desiccation | 17 | 22 |
| Herbicide (post emergence) | 8 | 11 |
| Insecticide | 64 | 82 |
| Fungicide | 67 | 94 |
| Desiccation (Harvest) | 9 | 9 |
| Leaf Fertilisers | 13 | 13 |
| Granulated Fertilisers | 0 | 82 |
| C- POST HARVEST | 35 | 35 |
| Transport to Silo (14 USD/Ton; Yield 2,5 Ton/ha) | 35 | 35 |
| Total Cost (USD/Ha) | 406 | 576 |

Source: CAO (2013)

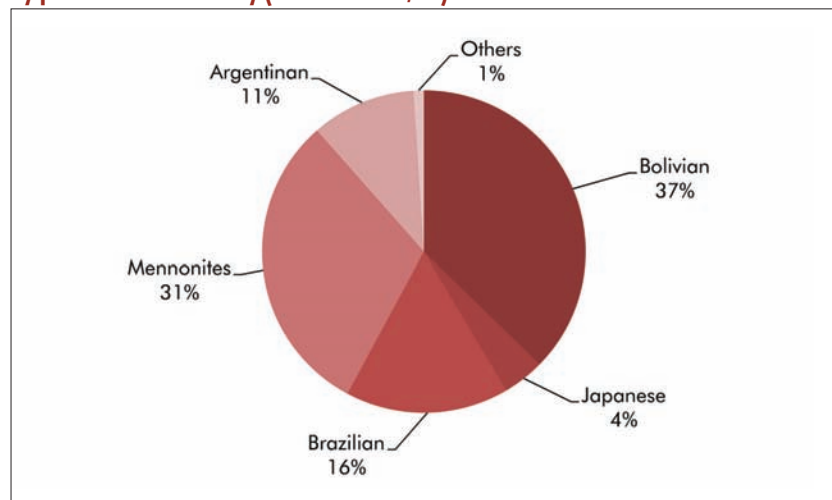
While technical considerations for agroindustrial production are essentially the same in all countries of the Southern Cone of the Americas (Catacora-Vargas, y otros, 2012), a distinctive attribute of the Bolivian agroindustry is its composition marked by various types of producers. Such unusual composition is the result of historical colonization processes and, more recently, markets dynamics. Today, this complex array includes producers with different nationalities, production scales and forms of organisation.

According to the *Cámara Agropecuaria del Oriente* (CAO, 2013), during the summer of 2009/10 631,500 hectares of soybean were planted; of this total area, 37% belonged to Bolivian producers and the remaining 63% to foreign producers (See figure 8; page 17). It is therefore appropriate to talk about a “land foreignisation” process affecting what has been considered the most fertile region in the country. However, amongst these foreign producers, it is pertinent to distinguish those who settled thanks to State

sponsored agreements as part of the colonization effort (Mennonites and Japanese), and those that arrived more recently due to land dynamics and market opportunities (Argentines and Brazilians). In other words, most of these new producers that came to Santa Cruz where incentivised by low prices of land - in comparison with those in neighbouring countries - and by the hydrocarbons subsidy currently in place that favours greatly the agroindustry's profits. In the last decades, the arrival of these producers has created a very dynamic land market in spite of the fact that most of the land is not yet legally recognised (i.e. without a legal property title). Apparently, profit margins are such that even justify the potential risk of losing the land by reversion to the State. That is not to say, however, that these foreign producers do not take measures to protect their lands; quite the contrary, they usually split their property using Bolivians citizens as false owners in order to hide the real dimension of their holdings as well as make lobby through their diplomatic representations in Bolivia (Urioste, 2011).

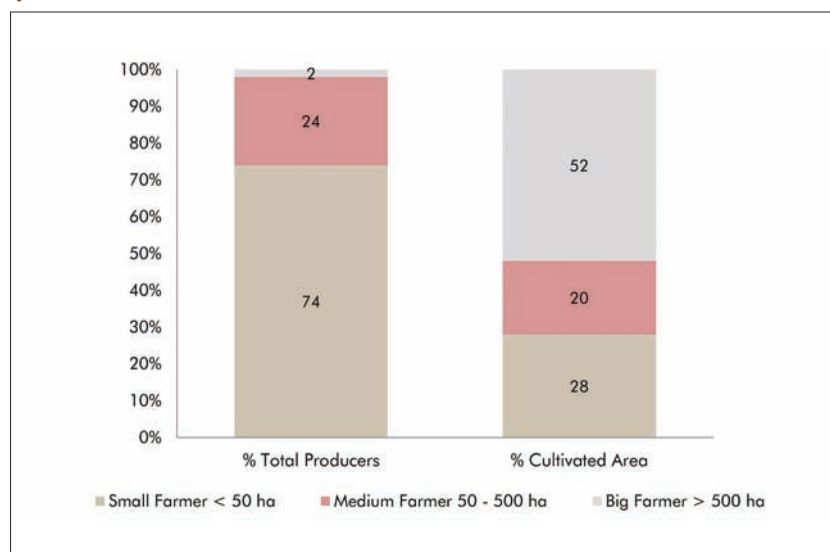
Land tenure structure in the Santa Cruz's low lands is marked by deep inequality and the predominance of private property regime (Durán, 2001). Within this structure, one can find producers with very different social and economic circumstances. Given that official data concerning land tenure in the region is not yet available, it is difficult to determine the very nature of this structure. However, by triangulating soybean's cultivated area with data regarding the number of producers, it is possible to illustrate land concentration patterns in the region (See figure 9). It has been estimated that a total of 14,000 soybean farmers²⁷ currently work in Santa Cruz. Of this total, it is said that approximately 2% corresponds to big farmers that control near 52% of

Figure 8 Percentage of soybean cultivated area by producer's nationality (Summer 2009/10)



Source: CAO (2013)

Figure 9 Proportion of soybean cultivated area by size of farmer



Own elaboration based on Anapo (2010).

the total cultivated area; whereas small farmers, being the vast majority (74%), control at most 28% of the same area (Anapo, 2010).

Given different scales of production, agroindustrial farmers face diverse circumstances. Big and medium farmers usually have enough capital and are well connected with the local industry. In contrast, small farmers need credits in order to begin producing which means that part of their profit is absorbed by either the industry or other actors of the productive chain (Suárez, Camburn, & Crespo, 2010). Furthermore, tensions can be found between small producers and the local industry. In fact, many testimonials claim that small producers are victims of discrimination by the industry, and particularly by

the collection centres, as they typically are subject to discounts and lower prices for their production²⁸ (Castañón, 2013).

5.2 Expansion of the agroindustry

In Bolivia, the expansion of the agroindustry has been closely linked to colonization processes in the Department of Santa Cruz. At its inception in the early 1950s, the agroindustry was mainly focused on the production of sugar cane as part of the economic policy of import substitution. Subsequently, during the 1970s, the sector turns to cotton production reaching approximately 67,000 hectares; a remarkable increase close to 280% in relation to previous years. However, cotton production experienced a terminal decline in the early 1990s due to soil management difficulties, unfortunate climate conditions, but more importantly, a swift reduction on international prices (Urioste, 2001). A third period of the agroindustry is characterised by a focus on few commodities with high levels of demand in international markets. Starting in the 1980s, this productive period remains in good shape until these days thanks broadly to the great expansion of soybean cultivation. Therefore, it seems appropriate to analyse soybean production as the main representation of the current agroindustrial expansion in the country.

The first soybean plantations in Bolivia were undertaken by Japanese colonies in the decade of 1960. Nonetheless, its large-scale expansion began only during the 1990s in the zone known as “*norte integral*”. Arguably, the soybean boom was largely the result of policies implemented by past neoliberal regimes. In a sense, soybean was seen as one of the country’s most promising alternatives to generate foreign currency, a new commodity with a reasonable comparative advantage. Therefore, governmental support to the agroindustry in general, and to soybean production in particular, was explicit in both public policies and investment programmes (Pacheco P., 2006; Pérez, 2007).

Major public policies pursued in order to strengthen the agroindustry include: trade liberalisation, diesel subsidy and the consolidation of markets in the Andean region²⁹. With regard to investment programmes, one of the most notable efforts was the “Eastern Low Lands Project” executed in the early 1990s. In fact, this project played a central role in forming a new productive zone currently called “*este de expansion*”; a zone that in the late

1990s already accounted for 60% of all soybean production in Bolivia. Nevertheless, in present days, figures show that soybean production is equally divided between the two aforementioned zones – i.e. *norte integral* and *este de expansion* - of the Department of Santa Cruz (See map 2; page 19).

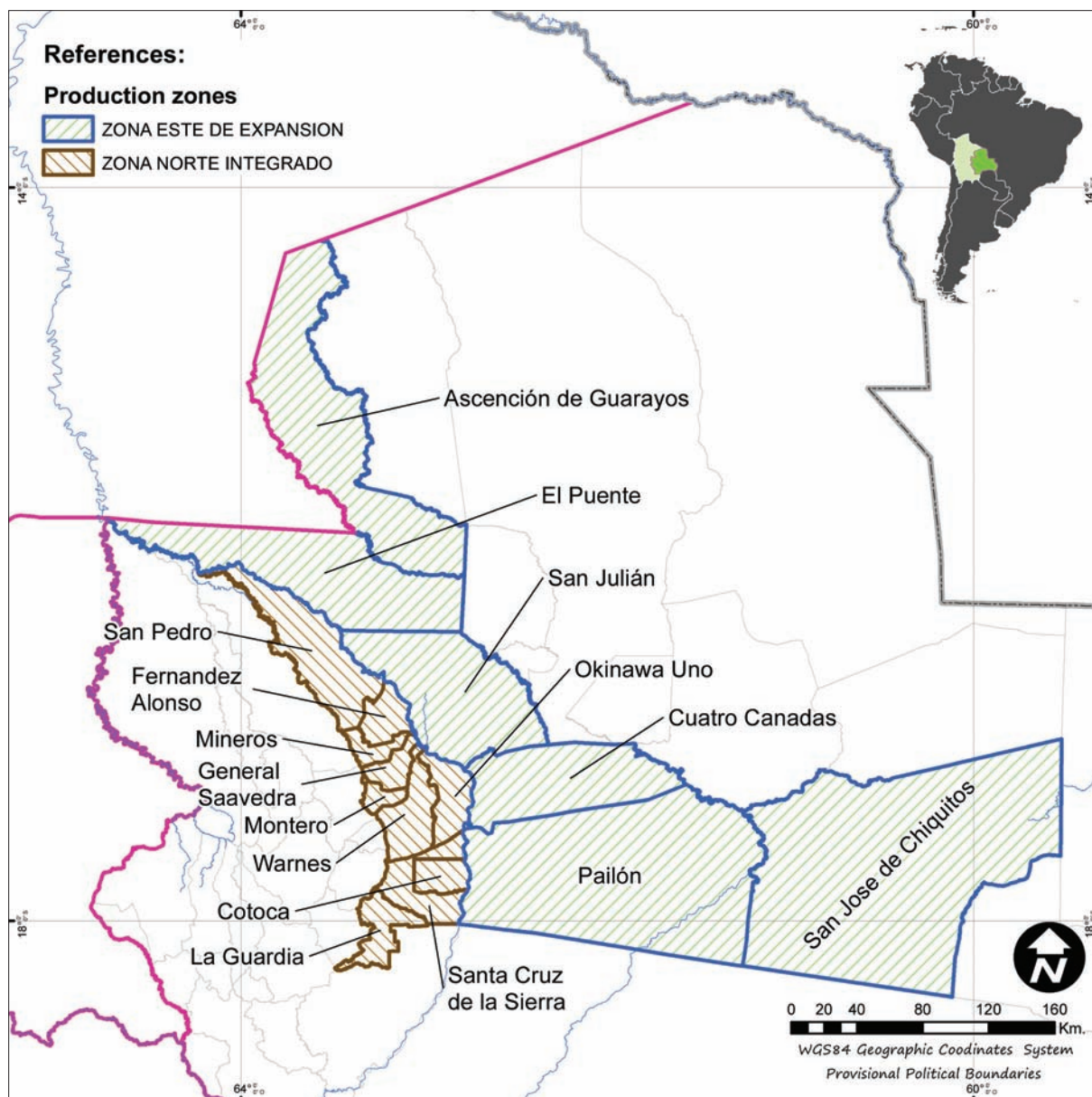
In the last two decades, soybean expansion in Bolivia has been quite significant. While in 1991 soybean cultivated area reached less than 200,000 hectares, in 2012 nearly 1,165,000 hectares were planted with this crop; that is a 500% increase (CAO, 2013). As illustrated in figure 10 (page 20), it is in 1994 when soybean growth accelerates as a result of the impact of governmental support policies and especially the opening of markets in the Andean region. Such growth trend has remained fairly constant since then with the exception of the period between 2007 and 2008. Entrepreneurs attributed this temporary decline to unfavourable climate conditions and to Evo Morales’ policy to restrict food exports in case of an internal deficit (FM Bolivia, 2008).

In terms of land use, soybean has become the crop most widely grown in Bolivia. Although in 1991, it already constituted 15% of the country’s total cultivated area, at present it represents 37% of the same area. That is to say, all other crops account for only 63% of the total area under production in the country. In other words, more than a third of what is sown in Bolivia is soybean (See figure 10; page 20).

As soybean area expanded so did its production levels. While in 1998 nearly 950,000 tons were produced, last year’s total production reached 2,602,350 tons; a significant increase of 174% (CAO, 2013). During the same period, soybean average yield has increased modestly from 1.41 to 2.20 ton/ha, the lowest yield in the region. One may conclude then that growth in soybean production is mostly explained by its expansion on new lands and not by productivity improvements; a common tendency in the Southern Cone of the Americas (Catacora-Vargas, et al., 2012).

Apart of being the lowest in the region, soybean yields in Bolivia can be described as erratic (See figure 11; page 20). The introduction of genetically modified seeds did not change this pattern nor did it mean a significant yield increase. In effect, after its approval in 2005, soybean yields have remained low. While in the last years there has been some modest, yet ir-

Map 2 Soybean production zones in Santa Cruz



Own elaboration.

regular increase, other factors such as climate conditions and pest incidence might explain this. In this regard, it can be concluded that the utilization of transgenic seeds responds primarily to a cost reduction strategy³⁰ and not to a productivity enhancement, as has been argued by the agroindustry.

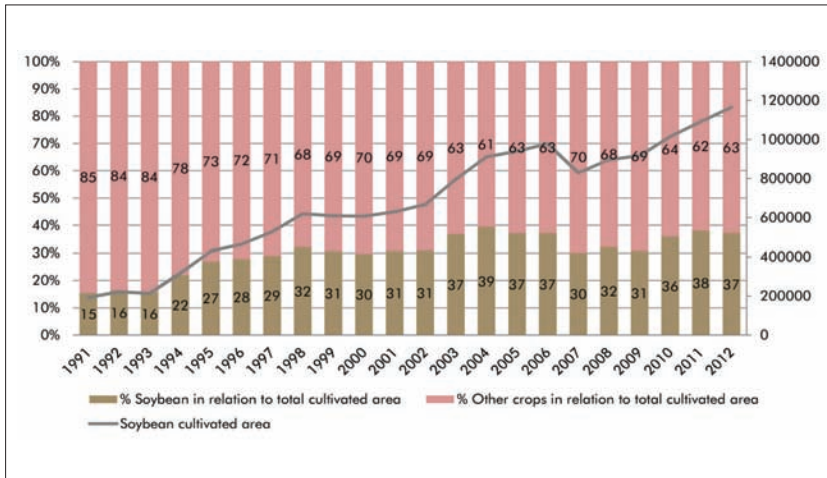
High international prices and secured state support³¹ means that soybean expansion in Bolivia will continue. According to local experts (Vadillo 2013; Crespo 2013; Toro 2013), the expansion will take place in three main areas: 1) along the new road to Puerto Suarez, especially in the sectors of Carmen Rivero Torres and Rincon del Tigre; 2) towards the Guarayos province following the interdepartmental road to Beni; and 3) to

the north in the San Pedro municipality (See map 3; page 21). Broadly speaking, big and middle farmers are to blame for most of resulting deforestation as small farmers' presence is only significant in the earlier stages of the expansion given that these small farmers are usually the first to open the gap. Finally, it is crucial to point out that in these new areas most soils are not suitable for intensive agriculture, thus serious soil degradation processes can be expected.

5.3 Socio-environmental implications of the agroindustry's expansion

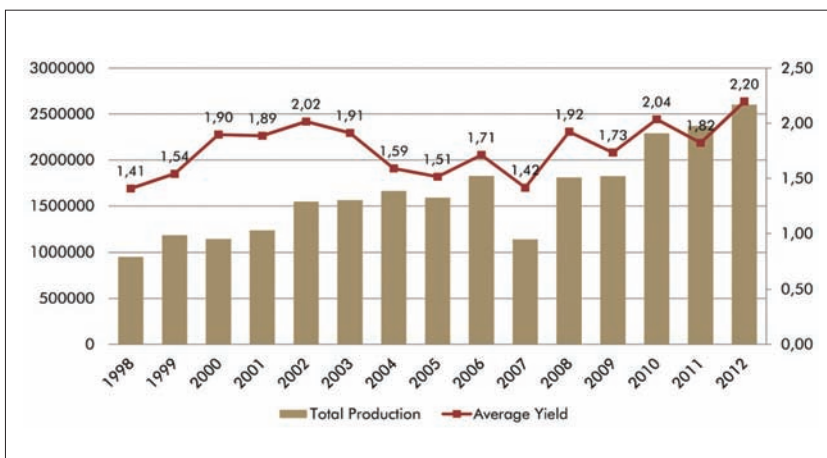
Predictably, the agroindustrial expansion in Bolivia has important economic, social and envi-

Figure 10 Evolution of soybean cultivated area in Bolivia



Own elaboration based on INE (2012) and CAO (2013).

Figure 11 Evolution of soybean production in Bolivia



Own elaboration based on CAO (2013).

ronmental implications. Firstly, on the economic front, the agroindustry has become one of the pillars of the economy. Solely in 2012, agroindustrial production generated more than USD 800 million, of which 75% corresponds to soybean, the country's most important non-traditional export³² (INE, 2012). Profitable as it is, the agroindustry lacks the appropriate institutional arrangements to promote income redistribution; in fact, it is clear that it tends to concentrate capital in just few elite groups. As one instance, Pérez (2007) found a rather unequal distribution of the benefits derived from the soybean harvest of 2003/04. According to this author, the average net profit of a big farmer was near USD 183,000, while that of the middle and small farmers just reached USD 27,000 and 1,100, respectively.

On the other hand, interviews with foreign producers revealed that a significant portion

of their profits is usually invested in their countries of origin (Urioste, 2011). Therefore, while the agroindustry's economic leverage should not be ignored, it is equally important to question its effective contribution to the Bolivian society as a whole³³. Nevertheless, it should be noted that the economic sustainability of this sector is highly dependent on external factors – such as international soybean and agrochemical prices – which in turn makes it very vulnerable.

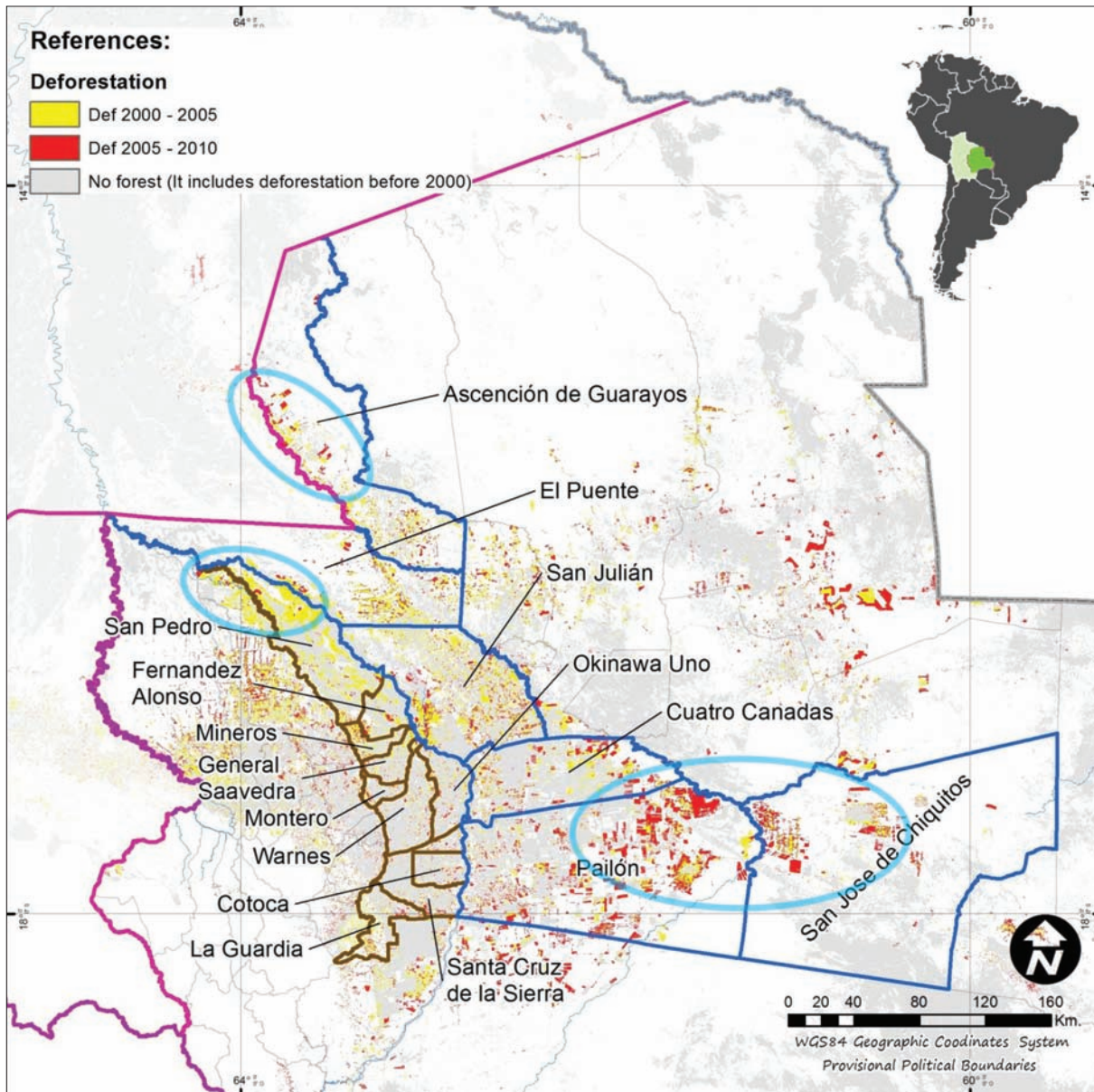
Secondly, on the social front, the nature of the agroindustrial production entails social exclusion and differentiation. For example, in the municipality of Cuatro Cañadas located at the very centre of the "este de expansion" zone, the incursion of soybean agribusiness has rapidly established high levels of social differentiation amongst peasant communities. Power in these communities is clearly concentrated on

those few families who succeeded in adopting the agroindustrial model (roughly 20% of total families), whereas the remaining families have no option but to rent their lands – when they possess any – or to join the region's proletariat with very precarious working conditions³⁴ (Castañón, 2013).

In addition, the implementation of the agribusiness model tends to exacerbate processes of land concentration. Indeed, producers' accumulation strategy depends largely on land grabbing dynamics be it through purchase or lease. This phenomenon is quite palpable in the Guarayos province where big and middle producers are increasingly acquiring indigenous land. Although there is generally no violence involved, such cases may well be interpreted as market-based land dispossession.

Furthermore, agribusiness dynamics unveil subordinated relations between small

Map 3 Areas of soybean expansion in Bolivia



Own elaboration.

producers and the industry. At the crux of this is the establishment of “contract farming” as the standard working tenet. This means that it is the buyer who practically determines the conditions of the whole productive process. Therefore, capital and power tend to concentrate on this actor and so producers become a sort of proletariat. What’s more, pressure to meet required standards might lead to autonomy loss and unsustainable land management.

Finally, agroindustry’s expansion results in severe impacts on the environment. In fact, mechanised agriculture is by far the main cause of deforestation in Bolivia. A recent research indicates that agroindustrial production ac-

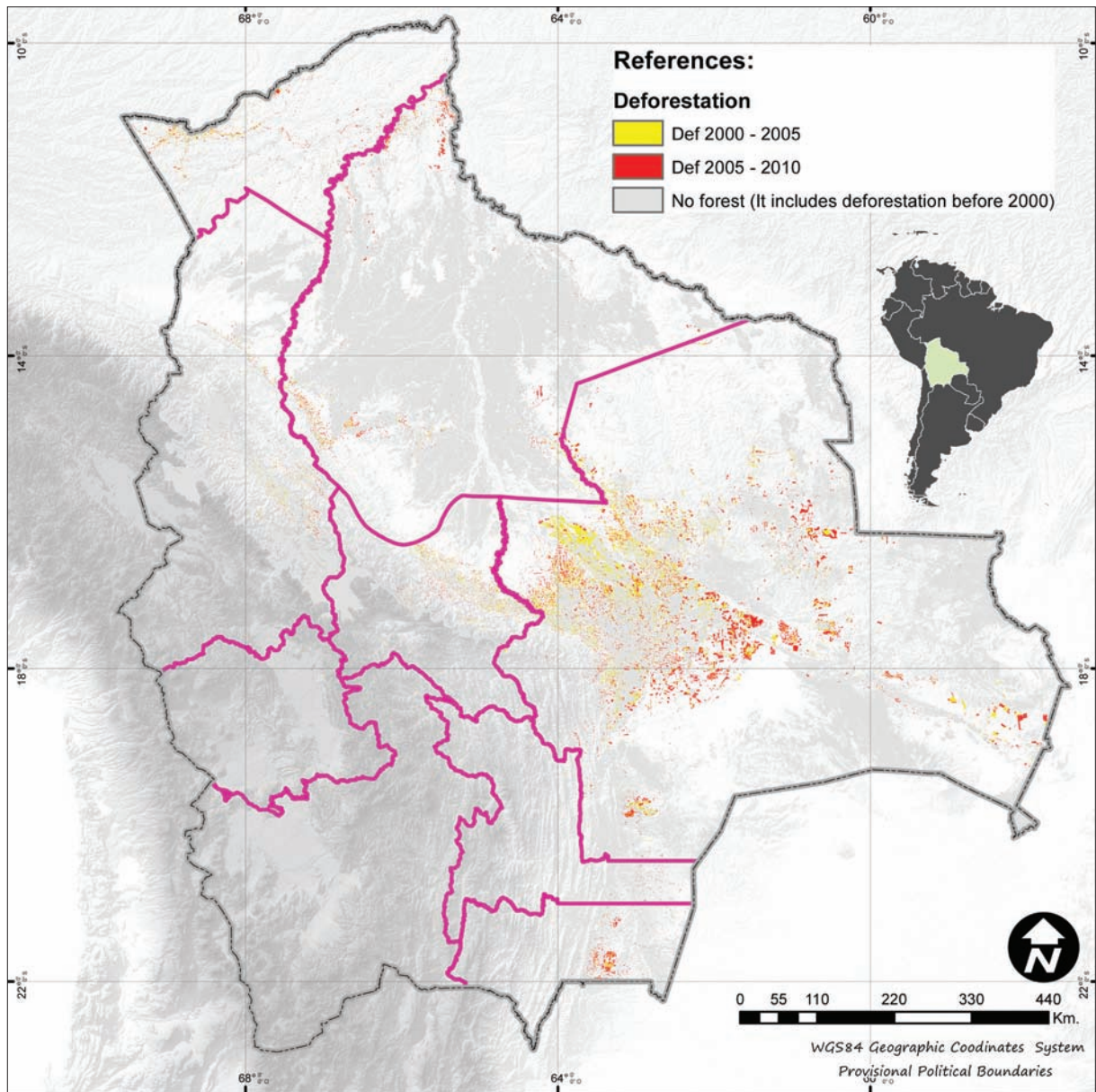
counts for 53.7% of the country’s total deforestation³⁵ (Muller, Muller, Schierhorn, Gerold, & Pacheco, 2012). Another study conducted by Cuéllar, et.al. (2012), found that between 2000 and 2010 Bolivia lost 1,821,153 hectares of forest; 76% of this total took place within the two agroindustrial zones of the Department of Santa Cruz. What’s more, of the 10 municipalities with the highest levels of deforestation, 7 belong to zones of agroindustrial production (See map 4; page 22). Here it is important to mention that more than 80% of total deforestation caused by the agroindustry should be attributed to big and middle farmers (Wachholtz, Artola, Camargo, & Yucra, 2006). While deforestation is naturally associated to biodiversity loss, it also alters rain-

fall patterns, which, ironically, is hindering yields of many agroindustrial crops.

On the other hand, practices such as monocropping and intensive use of agrochemicals lead to soil degradation and environmental contamination. To take but one example, the municipality of Pailón - that in the 1990s was declared Bolivia's soybean capital - is currently facing serious problems as a result of decades of agroindustrial production. It is estimated that nowadays nearly 270,000 hectares have been completely degraded in this municipality

alone (Crespo M. A., 2013). Actually, a clear pattern has emerged: the older the production zone, the lower its yields. Moreover, contamination derived from agrochemicals seems to be on the rise. Such contamination not only affects soils³⁶ but also pollutes water and air. While specialised studies have not been carried out yet, people's testimonials suggest that cases of chronic intoxication are common in local communities and even some people have died because of acute intoxication with agrochemicals.

Map 4 Deforestation in Bolivia



6. Conclusions and recommendations

The state of agriculture in Bolivia is currently marked by two contrasting, yet interwoven, realities. On the one hand, the agroindustry keeps gaining ground as it increasingly occupies more land and augments its leverage in the country. At the forefront of this phenomenon is the soybean cultivation that has increased 500-fold in the last two decades reaching 1,165,000 hectares; that is, more than a third of the Bolivia's total cultivated area. The flipside of this is represented by the peasant agriculture that suffers stagnation due to various structural factors that constrain its development. While this type of agriculture has had a marginal growth in absolute terms, its share of the country's cultivated area has reduced substantially. In effect, peasant products such as tubers that in the early 1990s accounted for 14% of Bolivia's cultivated area, nowadays only reach 6% of this area.

Such contrasting realities are products of neoliberal policies implemented since 1985. Trade liberalisation and the abating of the state had a significant role in the reconfiguration of the country's agricultural structure. While markets and investment programmes were sought to foster soybean production, unfair competition with foreign products and the rolling back of State's support affected badly peasant agriculture. The current administration of Evo Morales had renewed State's support to the peasant sector, although its endorsement to the agroindustry remains greater. This is a central issue to debate as recent research has demonstrated the relevance of the State in consolidating the agroindustry at the expense of the peasant agriculture (Guereña, 2011).

In relation to food security, the account that this paper presents highlights the need to ensure food self-sufficiency and to address high levels of food insecurity in some rural areas. Several factors should be considered in such an endeavour; however, the argument here emphasises the importance of the domestic agricultural structure as a determining factor in food production. Up until now, it seems that agricultural production in Bolivia still satisfies the majority of food demand with some exceptions, most notably wheat of which nearly 60% is imported. Nevertheless, if trends identified by this study continue, it is likely that in the medi-

um term the stagnation of the peasant agriculture will result in a significant increase of food imports. In fact, we are currently witnessing a slow but rather constant growth of imports in some products such as potato, maize, fruits and vegetables. Furthermore, given that food insecurity is mostly concentrated in agrarian-based households, their vulnerability might increase should such stagnation is not reversed. On the other hand, while the agroindustrial expansion in the Department of Santa Cruz generates substantial profits for the business sector, it will represent little contribution to the country's food security as long as export commodities such as soybean are prioritised over other crops central to population's diet such as wheat. Both larger food imports and bigger commodity production can be interpreted as setbacks in relation to food sovereignty.

On the socio-environmental front, peasant agriculture remains fundamental for rural employment and so supporting this type of agriculture not only enhances food sovereignty but also reduces poverty. Moreover, peasant practices tend to be more environmentally friendly as these usually stem from agroecological principles and use few external inputs. In contrast, agroindustrial production is largely unsustainable as it entails high rates of deforestation – economies of scale are crucial to its profitability – and depends greatly on fossil fuels. Moreover, agroindustry's expansion in Bolivia is likely to derive in soil degradation processes as this expansion is taking place on soils not suitable for intensive agriculture. Finally, just like in Argentina and Paraguay, agroindustry's environmental pollution might have serious consequences on local people's health.

In the light of the analysis presented above, this document closes with the following recommendations for decision makers:

1. Promote a food security debate with different actors that explicitly considers the role of both peasant agriculture and agroindustry. Such debate must be framed within the relevant guidelines established in the new Political Constitution that emphasises the importance of food sovereignty.

2. Situate peasant agriculture at the centre of rural development policies and public investment programmes in recognition of its significance for food sovereignty, poverty reduction and sustainable rural development.
- 3- Address structural factors that constrain peasant agriculture, in particular access to key resources such as land and water as well as basic infrastructure to enable better living conditions in rural areas.
4. Expand and strengthen support programmes and technical assistance to the peasant sector following the National Development Plan and the Political Constitution.
5. Build sound incentive mechanisms so that the peasant population has the opportunity to remain in rural areas despite increasing climate and market risks. In this regard, it will be crucial to expand the current agricultural insurance put forward by Evo Morales's administration.
6. Promote short food supply chains as means to ensure better prices for peasant producers and healthier diets for consumers.
7. In those contexts where agriculture might not be viable, it is important to support people's livelihood transitions as part of a wider rural territorial development strategy.
8. Although this paper has not addressed gender relations, it is essential to visualise women's contribution to peasant agriculture and thus promote their effective access to productive resources. It has been already established that reducing gender inequality in agriculture will increase agricultural production and reduce the number of people with malnutrition.
9. With regard to the agroindustry, it is necessary to develop institutional arrangements to prevent land concentration and high levels of deforestation. Here the State should have a central role when it comes to regulate land markets and to enforce legal norms such as the "Función Económica Social" and Constitutional limit to agrarian property of five thousand hectares. In parallel, the State and the civil society should work on development alternatives to agribusiness given its unsustainability in the long run.
10. It is vital to develop sound research regarding agroindustry's environmental contamination and its impacts on people's health. Once developed, these studies will serve as basis for relevant actions.
11. The State must control and guide agroindustrial production so that it can be refocused to tackle the country's wheat deficit.
12. A tax on soybean exports should be studied for its eventual establishment, as has been the case in other countries of the region. Such tax would generate substantial economic resources that could be used for public investment and redistributive programmes in line with the government's economic model.
13. Finally, international cooperation should make the case for greater investment in peasant agriculture and stricter control on the agroindustry. In addition, soybean imports in the European Union should comply with the same safety and quality standards applied within the union. Such measure will force the agroindustry in South America to abandon dangerous practices such as the use of Paraquat.

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Endnotes

- 1 These interviews were carried out by the author as part of a "Fact Finding Mission" funded for the development of this study.
- 2 Demographic calculations were based on a projection from the *Instituto Nacional de Estadística* (INE) for the year 2011, which estimates a total population of 10,624,581.
- 3 Hence local production in these municipalities does not generate the minimum energy requirements of 2,100 kcal/person/day established by the United Nations Food and Agriculture Organization.
- 4 Following FAO (2006), the food security concept encompasses four dimensions: 1) food availability, understood as the physical existence of enough quantities of food in a given area; 2) food access which is determined by the resources bundle that people use to acquire appropriate food; 3) utilization which refers to complementary elements such as drinking water, sanitation, healthcare, etc.; and 4) stability which highlights the importance to have food availability and access at all times.
- 5 Nonetheless, it is important to note that in the last years cereals are increasingly produced by the agroindustry.
- 6 Cotton cultivation decreased considerably as a result of a crisis in the late 90s due to commercialisation problems, low international prices and harsh climate conditions (Urioste, 2001).
- 7 These inflationary processes have often been accompanied by speculation.
- 8 For instance, in 2001 the country imported more than 856 thousand tons of food (INE, 2012).
- 9 This percentage might be underestimated as it does not take into account illegal contraband.
- 10 Table available at: <http://www.ine.gob.bo/indicadoresddhh/alim5.asp>
- 11 Initial studies have concluded that biofuel production in the country is only viable if it is based on soybean.
- 12 Article 16 of Bolivia's new Constitution explicitly recognises people's right to water and food entitlements assigning the State the responsibility to guarantee food security for all Bolivians. Moreover, articles 405 and 407 establish as a State's obligation to ensure appropriate nourishment of the population by the prioritisation of local production.

- 13 Under the aegis of the *Ministerio de Desarrollo Rural y Tierras* (MDRyT) a series of policies have been implemented, the most important are: Policy for the transformation of the agrarian structure, Policy for the transformation of productive patterns in order to ensure food security, and Policy of water for production. On the other hand, the most relevant pieces of legislation are: Law 144 of Productive Communitarian and Agricultural Revolution, Law 300 of Mother Earth and Integral Development for Living Well, and Law 765 of Promotion of Agroecological Production.
- 14 For a comprehensive analysis of current policies in relation to rural development and food security, see Dávalos (2013) and Liendo (2011).
- 15 This is a particularly important programme as irrigation remains a key barrier for agriculture. It is estimated that only 10% of the cultivated area in the country is equipped with irrigation (Baldivia, 2011).
- 16 For each litre of diesel the State subsidises 5.84 Bs. so that domestic price remains in 3.72 Bs.
- 17 It is important to note that the decree of authorisation of these GM seeds was passed by former president Eduardo Rodríguez Veltzé, although the current government appears to have no intention of reviewing it.
- 18 Traditional technologies include: crop rotation, associated crops, fallow periods, etc., whereas modern practices are mainly related to chemical fertilization and the use of specialised machinery (Tapia, 2002).
- 19 As one instance, land governance is usually administered by communal authorities who take into account social and environmental considerations. Therefore, it is common for poorer families to be assigned larger plots of land as well as the establishment of compulsory fallow periods to protect soil fertility (Tapia, 2002).
- 20 Potato cultivated area currently reaches 165,161 hectares (INE, 2012).
- 21 In Peru, for example, potato yields reach 17 ton/ha.
- 22 Amongst the most important efforts are: the *Instituto Nacional de Innovación Agropecuaria y Forestal* (INIAF) and LACTEOSBOL a public enterprise that supports peasant families in the dairy production.
- 23 For a comprehensive discussion about this new concept and its implications see Pérez, Farah, & De Grammont (2008).
- 24 Data used in this section was derived from the *Cámara Agropecuaria del Oriente* (CAO). As the official organisation of the agroindustry in the country, CAO provides sound data and information; nonetheless, this data does not fully coincide with that of the *Instituto Nacional de Estadística* (INE), used in the second section given the need to compare various crops.
- 25 These genetically modified seeds contain a bacterial gen that makes them resistant to glyphosate, the main chemical component of Monsanto's herbicide "Roundup"; hence the acronym RR (Round up Ready).
- 26 According to the *Asociación Nacional de Productores de Oleaginosas y Trigo* (Anapo) in 2011 more than 80% of agroindustrial producers used tillage system (Anapo, 2011).
- 27 By their scale of production, these farmers were classified in three categories: big farmer when their holdings exceed 500 hectares, medium farmer from 50 to 500 hectares and small farmers with less than 50 hectares.
- 28 In the last years, production levels seem to have exceeded the industry's collection capacity in the region. Consequently, farmers compete more to introduce their production in the silos. Apparently, the industry has taken advantage of this situation by offering lower prices, especially to small farmers.
- 29 In consolidating these markets in the Andean region a key achievement was the declaration of the *Comunidad Andina de Naciones* (CAN) as Customs Union in 1993.
- 30 It has been estimated that the utilization of conventional seeds increases costs of production by 40 USD/ha. However, it should be noted that such cost reduction strategy might only be viable in the short run, as using transgenic seeds eventually lead to a utilization of more agrochemicals which in turn might significantly increase production costs.
- 31 The government has ratified its support to the agroindustry by proposing to expand the agricultural frontier to 13 million hectares.
- 32 In Bolivia mining and hydrocarbons exports are considered traditional exports.
- 33 Unlike other countries such as Argentina, Bolivia has not established an export tax on soybean production. If such a measure were in place, considerable resources could be available for social policies and productive investment.
- 34 Rarely they sign contracts, let alone be entitled to social benefits or safety equipment.
- 35 Such estimation corresponds to the period 1992/2004.
- 36 Some of these toxic substances remain in the soil for more than 30 years.

TWO SIDES OF THE SAME COIN:

Agriculture and Food Security in Bolivia

Enrique Castañón Ballivián | FDCL | February 2014

