

Oil palm and Development

An in-depth analysis of oil palm expansion in Para, Brazil

Anya Salcedo Orozco

MSc International Development Studies

August 2014

Student number: **3912108**

Supervisor: **Prof. dr. Annelies Zoomers**

Host organization: **ADM do Brasil**



Universiteit Utrecht



Abstract

Ever since the 17th century concerns have been raised about the rapid growth population in relation to food production. Launched by respectable academics as Malthus, the question that always remained is how to cope with the food demands of a growing world population. Recently, alternative energy sources have also become subject of discussion given the limitations of traditional existing ones. Oil palm has emerged as a crop with the potential of satisfies both concerns: food demands and sustainable energy. Its high productivity levels and low costs of input make investments in this sector highly attractive for different actors. However, concerns around effects of this crop rapid expansion have been highly controversial, especially due to negative impacts highlighted by civil society in many traditional producer countries. Brazil, a country that seems to meet all the conditions to establish oil palm in large-scale proportions, has prioritized the crop development as a driver to national economic development by lifting millions working in the agricultural sector out of poverty as well as to strengthen their already competitive biofuels and commodities sector. This research aims to understand oil palm expansion processes in northern Brazil, and effects on local development in municipalities where it is being established. From studying oil palm from an initial stage perspective, in which there is no production yet. The work will explore importance of governance in the attempt of achieving the most benefits on social, environmental and economic aspects for population, from analyzing different businesses present in oil palm development in Brazil and local dynamics between different stakeholders.

Key words: oil palm, local development, Brazil, private sector, smallholders, Latin America, governance

Acknowledgments

First of all, I would like to thank my host organization ADM do Brazil for facilitating all necessary tools for conducting this research. I would especially like to thank the Oil Palm project team in Sao Domingos do Capim and Mae do Rio for their support, guidance and making me feel home. Special thanks to Amanda and Diego for making this possible, and off course Leonardo Dutra for your patience and constant mentoring. Thanks Luiz, for being part of this process together with Carolina, Leandro and Romualdo.

Secondly, Annelies Zoomers for addressing me and encouraging me to follow this exciting, interesting and inspiring path. Also to Frederico Brandao: thanks for all the support and mentorship in field.

Thanks to my family for always supporting me in all my endeavors and for always believe in me. I have no words to express my gratitude to you.

Last but not least, thanks to my friends and colleagues for existing: I am glad to walk this path next to all of you. Special gratefulness to you, Daniel for your infinite patience, care and love.

Table of Contents

1. INTRODUCTION.....	8
2. THEORETICAL FRAMEWORK	11
2.1 OIL PALM	11
2.2 SCHOOL OF THOUGHTS AND DISCUSSION AROUND OIL PALM.....	14
2.2.1 <i>Debate around different business models impacts: Smallholding versus Large-scale investments.....</i>	<i>18</i>
2.3 DEVELOPMENT AND GOVERNANCE AT LOCAL LEVELS	20
2.5 KNOWLEDGE GAP, CONCEPTUAL MODEL AND QUESTIONS	22
2.5.1 <i>Research questions</i>	<i>24</i>
2.6 OPERATIONALIZATION OF VARIABLES.....	24
3. METHODOLOGY	26
3.1 GENERAL INVOLVEMENT OF ADM BUSINESS MODEL AND FAMILY AGRICULTURE STRUCTURE	28
3.2 INVOLVEMENT WITH FAMILY AGRICULTURE FIELD ACTIVITIES	29
3.3 LOCAL AND REGIONAL INSTANCES INTERVIEWS.....	30
3.4 INVOLVEMENT WITH LARGE-SCALE INVESTMENTS.....	31
3.5 VISIT TO DIFFERENT COMPANIES	32
3.6 FOLLOW UP, DAY-TO-DAY OBSERVATION AND GENERAL ANALYSIS	33
3.7 LIMITATIONS	33
4. THEMATIC AND GEOGRAPHIC CONTEXT	35
4.2 OIL PALM NATIONAL AND INTERNATIONAL REGULATION.....	39
4.3 HOST ORGANIZATION: ADM DO BRAZIL.....	42
5. FINDINGS	44
5.1 OIL PALM IN BRAZIL: BUSINESS MODELS AND MAIN ACTORS	44
5.1.1 <i>Business models description</i>	<i>46</i>
5.1.2 <i>The ADM way.....</i>	<i>48</i>
5.1.3 <i>Socio-economic and environmental characterization of communities.....</i>	<i>52</i>
5.1.4 <i>Stakeholders and their role within the crop expansion.....</i>	<i>57</i>
5.2 EXPECTATIONS AROUND OIL PALM EXPANSION: AN STAKEHOLDERS' PERSPECTIVE	61
5.2.1 <i>Expectations: Family agriculture.....</i>	<i>62</i>
5.2.2 <i>Expectations: large-scale investments.....</i>	<i>66</i>
5.2.3 <i>Final remarks: what to expect?.....</i>	<i>67</i>
5.3 REGIONAL DEVELOPMENT: MAIN IMPACTS	67
5.3.1 <i>Aspects subject to impact from oil palm expansion: family agriculture and large-scale investments.....</i>	<i>68</i>
5.4 LOCAL GOVERNANCE & INSTITUTIONS	76
6. CONCLUSIONS	80
7. RECOMMENDATIONS.....	83
8. DISCUSSION	86
9. REFERENCES.....	87
10. ANNEXES	90

List of figures

Figure 1: Oil palm plantations in Sao Domingos do Capim. (Source: Author 2014)	12
Figure 2: Conceptual model	23
Figure 3: Map of Brazil and Pará including municipalities of action	27
Figure 4: Phases and Activities carried out in field.....	28
Figure 5: Oil palm demand worldwide, top 10 importer countries	37
Figure 6: Historical deforestation in Brazilian Amazon	45
Figure 7: Workers in ADM do Brazil nursery. Source: Author 2014.....	49
Figure 9: Monthly Income from Traditional crops (Cassava) among smallholders	54
Figure 10: school in a local community. Source: Author 2014.....	55
Figure 11: Educational level in communities involved with family agriculture	56
Figure 12: Meeting of different stakeholders in Sao Domingos do Capim. Source: Author 2014	58
Figure 13: Training session on Agrochemicals usage. Source: Author 2014	69
Figure 14: : Expected income increase among smallholders	71
Figure 15: Training session in safety at work, rural community. Source: Author 2014.....	72
Figure 16: Jobs created distribution by education levels	72
Figure 17: Program coordinator giving a talk to workers in large-scale investment. Source: Author 2014.....	73
Figure 18: First year oil palm large-scale plantation with forest on the background. Source: Author 2014.....	74
Figure 19: Sloth in AGROPALMA oil palm plantations. Source: Author 2014	75

List of tables

Table 1: Ideal climate conditions for oil palm plantation	13
Table 2: Different local and stakeholders interviewed in second stage	31
Table 3: Oil palm producer companies within the region.....	47
Table 4: Stakeholders' characterization and role within oil palm expansion in Brazil.....	59
Table 5: Stakeholders' position within family agriculture scheme of production in Para.....	65

List of abbreviations

BRICS: Association of five majors emerging economies, Brazil, Russia, India, China and South Africa

GDP: Gross Domestic Product

FAO: Food and Agriculture Organization of the United Nations

MDA: Ministry of Agriculture Development of Brazil

ADM: Archer Daniels Midland company from Brazil

FPPSOP: Federal Program of Sustainable Oil Palm Production

UNPD: United Nations Development Programme

RSPO: Roundtable on Sustainable Palm Oil

PRONAF: National Program for Family Agriculture

1. Introduction

Ever since the 17th century concerns have been raised about the rapid growth population in relation to food production. Launched by respectable academics as Malthus, the question that always remained is how to cope with the food demands of a growing world population. Recently, and partly result from pace of population growth, alternative energy sources have also become subject of discussion given the limitations of traditional existing ones. Oil palm has emerged as a crop with the potential of satisfies both concerns: food demands and sustainable energy sources. Its high productivity together with low costs of input makes investments in this sector highly attractive for different actors and consequently a rapid expansion has been witnessed in recent years.

The global south seems to meet all the conditions to establish oil palm in large-scale proportions. As such, oil palm has been put on the agendas of countries in the global south in order to pursue national economic development and lift millions working in the agricultural sector out of poverty.

However, concerns around the crop rapid production increase have also emerged. Different sectors of society, as academia and civil society, have raised awareness around negative social and environmental impacts caused by different business models established in main producer countries as Indonesia, Malaysia or Colombia. Thus, debate on whether effects are rather negative or positive for producing countries has taken place and different schools of thoughts started to appear.

Meanwhile, a crescent market demand for the crop is a reality. In recent years consumption of oil palm worldwide as an important input for different industries and countries have increased, while forecast predicts a steady growth for upcoming years.

This context has led different sectors in society, especially producer countries, to think on alternative initiatives that guarantee a sustainable oil palm production. Example of emerging initiatives is the Roundtable on Sustainable Oil Palm (RSPO); created in 2004 it is an international mechanism to promote the production of the crop under fair and sustainable schemes to protect both producers and consumers whilst working under environmental friendly conditions. Another relevant example of attempts to avoid highlighted negative impacts has to do with the creation of specific national regulations to dictate norms under which oil palm expansion must take place.

Brazil is example of the latter mentioned. Part of the emerging BRICS, Brazil has established

itself as an important global potency, the world's seventh wealthiest economy (World Bank, 2014) and as an economic leader in Latin America region. The country is responsible for a great proportion of the international agriculture and commodities supply and it is one of the biggest providers of biofuels worldwide. In recent years, Brazil has witnessed an increase in oil palm production, which takes place mainly in the bio diverse Amazonian region.

At the same time Brazil, as many countries today considered "developing" and neighbors in the region, has a strong colonial and extractive history that influenced, to some extent, the social and economic up-to-date situation of the country. Thus, high inequalities persist in Brazil's contemporary population. Since 2002, several administrations have oriented their development plans towards zero poverty and inequality, and attempts to lift millions out of poverty have resulted in some of the following indicators: the national rate of extreme poverty fell from 42.9% in 1978 to 9.4% in 2008; rural poverty declined from 72.5% to 22.9%, while urban poverty fell more rapidly. Still, there seems to be challenges to overcome: for every existing poor person in major metropolitan centers, there are four times as many in the rural areas. In order to overcome extreme poverty, which still affects one in ten Brazilians, seems to require further refinement of policies, especially in rural areas (Foresight, 2011).

In 2010 Brazilian federal government created a legal framework to regulate different business models emerged around oil palm in the country. The program was established under the name of "Program for Oil Palm Sustainable Production". This initiative aimed to both incentive and regulates the oil palm production as a prioritized economic model in a number of suitable states in Brazil. Under this framework, the government establishes clear conditions to guarantee an oil palm sustainable production.

This thesis aims to understand how is oil palm expansion through its different businesses models contributing to generate positive social, economic and environmental results within local scenarios where expansion takes place and how are these kind of innovative programs and arrival of private companies are perceived by different sectors in society.

For achieving this purpose two approaches will be combined, first one will focus on studying dynamics generated by a recent established company and host organization: the company is still at a very initial stage (pre-production) in which no production is existing yet, but provides the opportunity of studying two main businesses models present in the area from the beginning of establishment. Secondly, the work will analyze and contrast different stakeholders involved with oil palm expansion processes positions, to obtain a big picture of both national and local dynamics taking place around oil palm development in Brazil.

Finally, the study aims to identify potential challenges and long-term concerns that may

emerge from rapid increases on oil palm extensions in Brazilian Amazon. As well as provide some recommendations that may enrich sector development of the region.

The research is divided in six sections: first one examines different literature and schools of thought around oil palm and different impacts over sustainable development in countries where it has established and contrasts arguments in favor and against different schemes of production worldwide; secondly a description of methodology used to grasp empirical information from field research; a third part extensively describe and analyze information found during research internship; the fourth and fifth chapters conclude and provides recommendations about the oil palm expansion in northern Brazil from findings and analysis and sixth section discuss the findings and compare them with different theories that were already explained in theoretical section.

2. Theoretical framework

This chapter aims to provide a review of relevant existing knowledge around palm oil production's expansion processes and main contributions to sustainable development. The chapter is divided into four sub-sections; first one consists of a general characterization of the crop, taking into account ecological aspects, market main usages, and principal impacts on society. The second part consists of exposing different school of thoughts around palm oil in the world and its contributions, both positive and negatives, to development. Within this section, an analysis of what have been debated around different businesses models on oil palm will take place. A third section introduces the concept of governance and its relationship with oil palm as a local development accelerator. A fourth section presents gaps of knowledge as well as main research questions formulated after an extended literature review. A final section operationalizes main variables to be taken into account to analyze empirical results.

2.1 Oil palm

Palm oil is a vegetal oil obtained from the fruit of African oil palms or *Elaeis guineensis*. It is generally agreed that the Oil Palm originated in the tropical rain forest region of West Africa. Principally, southern latitudes of Cameroon, Côte d'Ivoire, Ghana, Liberia, Nigeria, Sierra Leone, Togo and the equatorial region of Angola and Congo. Processing oil palm fruits for edible palm oil has been practiced in Africa for thousands of years, the oil produced is an essential ingredient in much of the traditional West African cuisine (Fao.org, 2014).

However, palm oil has not only been utilized for food production. The crop, which has proven health benefits in food consumption, is also a sustainable feedstock for biodiesel production. On the other hand, the oil can be used for several purposes such as to cosmetics elaboration and engine lubricants. These applications have made palm oil an increasingly important agricultural product for tropical countries around the world, especially as crude oil prices are getting higher than ever (Lam et al., 2009).

In terms of production, palm oil is the leading vegetable oil with the highest production of 38.5 million tons that accounts for a 25% of total oil and fats world production, thus far the crop has proven its capacity to be the largest source of edible oil, which was previously dominated by soybean oil (Lam et al., 2009). At the same time, the high demand for world energy has led different sectors to explore alternative sources that can balance both development and sustainability needs. This context, started about two decades ago, has given

biodiesel attention due its chemical properties and energy content similarities to conventional diesel. Moreover, oil palm seems to suit as a biodiesel replacement: from 1983 to 1994, palm diesel was successfully evaluated as diesel substituted with extensively field trial. It was reported that neat palm biodiesel could be used as fuel in diesel engine without any modification (MPOB).



Figure 1: Oil palm plantations in Sao Domingos do Capim. (Source: Author 2014)

Agro climatic conditions as soil and climate are fundamental aspects to grow any crop. In order to establish oil palm plantations, these are essential factors to be taken into account for a successful crop establishment. Even though the plant is, in general terms, adaptable to extreme conditions as climatic regime of summer rainfall and winter draught, soil and climate highly determine areas in which oil palm expansion can be sought. The ideal climate requirements accordingly to different authors are summarized in table 1:

Table 1: Ideal climate conditions for oil palm plantation

Aspect / Author	Hartley, 1988	Goh, 2000
Water	Annual rainfall of 2000 mm or greater, evenly distributed, without a marked dry season, and preferably at least 100 mm in each month	Annual rainfall of 2000–2500mm
Temperature	A mean maximum temperature of about 29–33°C and a mean minimum temperature of about 22–24°C	No extreme temperatures or wind speed
Radiation	Sunshine of 5–7 h/day in all months and solar radiation of 15MJ/m ² per day.	Adequate sunshine hours and solar radiation of 16–17MJ/m ² per day.
Humidity		Relative humidity above 85% and low vapor pressure deficit

Source: Corley and Tinker, 2007

Soil conditions are also a critical aspect when planting oil palm. There exist a broad variety of soils and also different types of them can be used to obtain an adequate plantation. Soils in Latin America are, in general, adequate in different measures to cultivate oil palm successfully. The three classes are: (1) exceptional soils: volcanic ash soils (andosols) of Equator; alluvial soils on plains of Colombia; (2) moderately good soils: old alluvial soils of Peru; clay soils of Panama; and (3) poorer soils: Brazilian vertisols; sandy soils of Mexico (Corley and Tinker, 2007).

These factors explain why tropical regions, characterized by high precipitation levels, humidity, high temperature, among other specific climate factors are regions where oil palm has expanded. As mentioned by FAO, the extensive development of oil palm industries in many countries in the tropics has been motivated by its extremely high potential productivity (FAO, 2014).

In order to properly obtain a high productivity, which may vary depending on several factors, the crop must be planted following certain criteria: plants must be separated from about 9 meters, reason why most of cases it is possible to implant 143 trees per hectare. Thus, oil palm development requires large extension of land in order to give the plants an adequate space and geographic conditions to its adequate performance.

Oil palm represents a long-term crop given its lasting life cycle; the crop tends to be productive for around 25 to 28 years, although 3 first years are mostly unproductive, and demand high investments levels to obtain significant returns in future. Its productivity tends to vary during this cycle, it is frequently recognized that from year 8 to year 16 the crop reach

its highest productive point: 24 tons / hectare of raw product; which translates in approximately 4000-6000 kg/ha of oil compared to 400-600 kg/ha for soybeans.

Oil palm is a perennial crop, thus production is continuous throughout every month of year, fact that represents a high advantage (Olivera et al, 2013). However, according to African trends, highest productive months seem to be March, April, May, June and October (FAO, 2014).

Nevertheless, different oil palm business models have been established in producer countries, as well as production schemes. These schemes combined with a specific regional context, have led to different impacts generated in economic, social and environmental aspects, mainly over micro-locations where oil palm has established. Consequently, discussion and controversy around the crop and its impacts for society of different businesses models established have been present throughout history. Exploring in-depth different consequences and positions within academy are main objectives of next sub-section.

2.2 School of thoughts and discussion around Oil Palm

From all aforementioned, several academic institutions, civil society in the form of non-governmental organizations and different sectors, have devoted efforts and resources to properly determine the relationship between oil palm and sustainable development in producer countries. Attention towards crop expansion started by environmental alerts and, later on, other specific concerns started to make an appearance.

It is important to note that main research conducted as of today has been completed mainly in Asian countries, such as Malaysia and Indonesia. These traditional countries together represent about 80% of total worldwide production and were pioneers in oil palm exploitation in past decades. Hence, it would not come as a mere surprise that particularly in these countries the oil palm industry was and is scrutinized.

Within different positions about oil palm and development, first ones to explore are negative impacts generated by the crop expansion. Main arguments against the crop of this school of thought, point towards the rejection of oil palm expansion as driver of development.

For instance, Tan et al 2007 present a number of issues that are globally accepted as negative environmental impacts resulting from oil palm expansion in Malaysia. In this article, the authors also present a number of counterarguments of what they label as misconceptions. According to the authors main negative issues around oil palm include and are not limited to

the following: deforestation, orangutan extinction, and peatland destruction. Without doubt deforestation has been highlighted the most in academic debates. Fitzherbert et al 2008 establishes four ways in which oil palm induce deforestation: the first one is clearance of forest that are yet to be intact, secondly the use of forest that were already degraded by a variety of reasons, third by combining productive activities as timber exploitation, paper pulp, among others to obtain financial resources to invest in oil palm production and finally through generating improved road access to previously inaccessible forest or displacing other crops into forests. The second point of Tan et al 2007 is orangutan extinction; arguments find themselves on high dependency on tropical forests for food and nesting sites. When they find their natural habitats degraded for agricultural processes it is necessary to migrate to less ideal conditions. Consequently, higher death occurs and fewer births take place. On this aspect, Fitzherbert adds the loss of biodiversity by using oil palm in biofuels production, as well as factors as exacerbation of climate change and rising in food prices.

A last aspect exposed by Tan et al 2007 has to do with peatland destruction due to oil palm expansion. Peatland is a type of land where the soil contains a high proportion of incomplete decomposed organic matter. Peatland then plays an important role as a carbon sink as well as important water retention areas. International demand for oil palm has raised the conversion activity of peatland in suitable area to plant the crop, especially in Indonesia, where nearly 25% of oil palm plantations are in these areas.

According to Fitzherbert et al 2008, palm oil has an enormous responsibility in biodiversity loss in Malaysia and from their study it is possible to derive conclusions that oil palm is a poor substitute for primary or degraded forest arguing that any conversion of natural forest is damaging biodiversity. Oil palm plantations support few species of conservation importance, affect several species habitats, and among others negative impacts on nature and environment. A final negative aspect related to environmental issues is the use of pesticides and fertilizers in oil palm plantations, even though authors as Donald (2004) have stated that the ecological impact of displacing agricultural activities and standing forest overshadow the high impact of using pesticides and fertilizers for both people and the environment.

However, these are some of the environmental impacts identified in literature; and, even though environmental issues are predominant within negative arguments around oil palm, it is also possible to find social consequences related to smallholders' livelihoods and vulnerable communities affected by oil palm expansion activities. Within this school of thought Dauvergne and Neville (2010), studied social and environmental consequences of emerging biofuels policies, including oil palm expansion, and explore how the political economy of

biofuels is shaping change in rural communities in tropical regions. According to the authors biofuels policies set to displace livelihoods and reinforce and extend previous waves of adversity for marginalized social groups as indigenous, subsistence farmers and communities with insecure land rights. The authors also argue that effects as increasing land and food prices and incentives to deforestation seems to affect poorer communities disproportionately due the shifts in costs of resource-based industries into vulnerable countries and communities. As for many rural households land tenure is not secure, efforts to integrate them into oil palm value-chain will exclude many rural people: these excluded people tend to have complex relationships with state and ecosystems they depend on.

On the other side of the debate, it is possible to find arguments pointing towards a positive relationship between oil palm and sustainable development. After years of research in northern Brazil to properly understand environmental effects of planting oil palm in the Brazilian Amazon, Olivera et al (2013) came to the conclusion that the crop actually works as a carbon sink as it fixes around 1,1 times more CO₂ than it releases. At the same time, oil palm seems to be appropriate to replace degraded lands that suffered traumatic deforestation processes years ago in northern areas of the country. Given its high productivity, authors consider a convenient alternative for biofuels production: compared to other crops as soy beans to biofuels production, oil palm represents an advantage given its potential when compared with soy productivity. With regards to fertilizers usage, the author argues that the substitution of synthetic fertilizer for compost may contribute to reduce Greenhouse gas emissions.

At the same time, (Lam et al., 2009) argue that in terms of a sustainable production, oil palm requires a smaller area to achieve certain production compared to other vegetable oils: the crop is grown on less than 5% of world's agriculture land and represents 25% of total market share. Thus, in order to satisfy worldwide consumption demands, oil palm represents high productive oil given its high production potential against land required. Meanwhile, evidence presented by the authors assert that more than 25% of total area planted in Malaysia resulted from land previously planted with rubber, coconut and cocoa that driven by low prices in the market, were replaced by oil palm plantations. Besides, over 50% of country's land is tropical forest adding that claims of deforestation for palm oil plantations are baseless.

With regards the food security versus biofuels production discussion on oil palm, the authors have stated the increasing world urgency for both fuel and food and excluding one from another is no longer an option as they are necessary in human civilization, rather than luxury. However, clearing more land without planning in order to increase crop production should

also not be the solution. It is important to create proper management strategies for making oil palm production sustainable and highly productive and as such they can both contribute to the world's increasing demand for sources of energy and food.

Another relevant study within this school of thought, focuses more on social impact from oil palm extension processes. Indeed Rist, Feintrenie and Levang, (2010) explore impact of oil palm on smallholders' livelihoods; more specifically authors assessed the impact of oil palm development on the economic wellbeing of rural farmers in Indonesia. Research was carried out in different municipalities across Indonesia, and in general they suggest that oil palm has been source of livelihood improvement for many rural communities: it offers high returns to labor and shorter fallow period. Main findings have to do with better income levels and diversification of traditional product production. Rural farmers are not impoverished by oil palm, and the risk factor is represented by the possibility of abandon their lands as consequence of selling them. In fact, main recommendations of this study have to do with raising environmental standards via policy interventions as well as legislation at national level in order to strongly support smallholder development and move to a land rental system rather than purchase, as it is right now.

Another point found in this study has to do with conflict after plantation between parts involved: lack of contracts clarity, weak local governance and failure of companies to meet their obligations are repeatedly present on communities and it is a point of improvement in order to obtain benefits for all from these expansion processes.

Tan et al. 2009 conclude that the negative image around oil palm is mainly product of boycott campaigns around the crop, while they also highlight the importance of introducing policies and strategies that will guide oil palm production towards a sustainable and inclusive model. Thus, parties involved into different stages of the crop expansion should work together and ensure that oil palm expands under sustainable criteria and positive impacts for all actors directly associated. Consequently, it appears as a very important conclusion from debate between different schools that a fundamental factor around oil palm expansion has to do with governance and legal structure around crop expansion in order to guarantee fair conditions to vulnerable populations.

2.2.1 Debate around different business models impacts: Smallholding versus Large-scale investments

Schools of thoughts around oil palm have highlighted main effects related to the crop production in general terms. However, within these schools it is also possible to encounter specific arguments about two main production schemes: large-scale investments and small-scale production exhorting by smallholders. Critics and support towards both business models are present within the debate; this section will provide arguments on both sides. It will first analyze evidence around large-scale investment models and later on will show arguments on smallholders' inclusion into the value chain. The section will finalize with a short analysis on arguments exposed.

Large-scale investments, occurring mainly by large companies establishment, represent the highest area of planted hectares in producing countries. In Indonesia, as stated by (Lee et al., 2014), private sector still represents the highest oil palm plantations' areas with a total of 4,366,617 hectares as of 2012. Large-scale investments have been highly criticized, especially given the argued environmental negative effects experienced in forests areas within Asian countries.

As stated earlier in this section, main impacts related to large-scale are based on environmental facts as, high GHG emissions, rapid deforestation processes, intensive usage of agrochemicals, and threaten to existence of native species. All these arguments are related to negative effects for the environment in producer countries.

Another important factor that has been recognized as a consequence of oil palm expansion has to do with land conflicts. Oil palm's high profitability has incentivized different foreign companies to invest large amounts of money in suitable countries from the global south. As stated by Zoomers 2010, the diminishing supply of non-renewable sources of energy makes biofuels an interesting option in the long-term. The author highlights the great interest of private investors, attentive to benefit from the biofuels' boom, whom have been looking for land in suitable countries: oil palm is an attractive crop for fulfilling these goals and Malaysia, Indonesia and Colombia have witnessed a land rush for oil palm plantations. These land acquiring processes, according to (Feintrenie, Chong and Levang, 2010), have generated both: land conflicts and land prices increases. Under this scenarios, characterized for a lack of appropriate methods to land acquirement and compensation, several smallholders found themselves negatively affected by expropriations processes.

On the other hand, arguments in favor of large-scale investments have also appeared. According to Olivera et al, 2013, the GHG balance of crude palm oil production of Brazil showed that this system works as carbon sink: it fixes approximately 1.1 times more CO₂ than it releases. At the same time, deforestation processes have been proved not to be completely due oil palm expansion, in fact some of today's plantations are being done in areas where other crops as cocoa, existed.

Finally, land conflicts are related to unclear land tenure and centralized regulation far from local needs, more than just private companies mere willingness. Consequently authors as Feintrenie et al, 2010 have highlighted the importance of national regulation being aligned to local compliances.

Smallholders' schemes of production have also being center of debate. However, it is important to highlight a common conception found within discussion around small-scale inclusion and effects on local development: in most of cases investigated (especially Asia) inclusiveness of smallholders differs depending companies negotiation processes with producer groups or associations. Reason why, quantifying negative or positive impacts will also be subject to the specific business model being analyzed.

First negative consequence related to smallholder inclusiveness has to do with unfair contracts where lacks transparency. Thus, consequences as high interest rates, unfair prices negotiated, etc. are visible. Consequently, good partnerships seem to highly depend on company's policies and leadership levels of negotiating cooperatives.

Phenomenon as transmigration from one region to another, have also appeared as a negative social consequence of oil palm plantations. Occasionally conflicts between different ethnics appear given incentives of planting oil palm in specific zones within a country.

Independent smallholders find themselves in a disadvantage situation due lack to Access technology, knowledge and good seedlings. At the same time, they have to conform to access less productive lands.

Finally, and as a concern raised by Lee et al., 2014, lack of environmental control over smallholders is resulting in high contamination and deforestation levels that remain relatively silent given most of attention addressed towards high impacts caused by large-scale investments.

On the other hand, arguments supporting oil palm production as an excellent opportunity to lift farmers out of poverty and consequently guaranteeing a higher life quality are also part of debate. First positive impact, the abovementioned, is the income increase and diversification.

Second one has to do with employment generation. Finally, the crop represents a source of livelihood improvement.

Consequently, different production schemes have proven effects that, depending the perspective, will appear as positive or negative. However, it seems that clear guidelines to properly address different schemes expansion are necessary as they determine, to some extent, results on local development. It appears then, that appropriate alignment between policy makers and local level needs are determinant for oil palm to be a driver of development in producer countries. Next section will elaborate more on the relationship between governance, oil palm and development.

2.3 Development and Governance at local levels

From all debate around oil palm and its impact on sustainable development, it is possible to state the importance of adopting adequate guidelines that address expansion processes and so, transform its potential into positive results for communities, populations and municipalities where crop is being implanted. For instance, it seems relevant that policies created at national levels are able to impact local contexts where oil palm plantations take place. It is here where alignment between federal policies and local governance gain attentiveness; a proper alignment may determine results on regional development. This context is more evident in countries where a decentralized power division exists, where high responsibilities are committed to regional and local governments especially in spreading welfare amongst population.

Consequently, an allignment between different stakeholders appear important to achieve local development. Several authors have introduced this concept and to explore it in detail seems relevant for achieving goals of this study. Within globalization processes, local development has gained more relevance and has been considered sometimes an answer to macroeconomic crisis and failures. Consequently, understanding the concept implies a need of taking global context into account. Buarque, (2002) has defined the concept as: “local development within globalization is a result of local society actors’ capacities of organizing and mobilize themselves, based on their potentialities and cultural matrix, to define and explore priorities and specifics, looking forward competitiveness in a context of fast deep transformations”. At the same time, the World Bank has defined local economic development as the process by

which public, business and nongovernmental sector partners work collectively to create better conditions for economic growth and employment generation.

Within concepts exposed above, it appears relevant to define governance within a local level. Local Governance is defined as processes by which public decisions are made and implemented (UNDP). These processes are result of interactions, relationships and networks between the different sectors (government, public sector, private sector and civil society) and involve decisions, negotiation, and different power relations between stakeholders to determine who gets what, when and how. It is then local governance exhorted in proper manners, which highly determine the success of different top-down policies to generate local development. Consequently, being able to engage different actors in a beneficial way for society is a key challenge.

Different stakeholders appear directly involved in oil palm value chain: private sector, civil society, smallholders, and federal governments. However, an important actor within local development and consequently governance are local governments given the wave of decentralization processes started in the 70s worldwide. Andersson, Gibson and Lehoucq, 2006 show that local-level institutional incentives are systematically linked to variations in local politicians' interest and investment decisions in the forestry sector. Through studying decentralization through forest management in different countries of Latin America, authors find that incentives of local politicians shape policy outcomes. Local politicians incentives, as staying in power, may be against federal or national programs. Consequently local governments are highly determinants in policy implementation processes and success.

Moreover, Souza et al carry out an extensive analysis of Brazilian decentralization system and role of local governments. Authors explain in detail a system characterized by political and financial dependence amongst governmental spheres and by varying routes for delivering policies. Among their findings it is possible to find that despite the uneven capability of local governments to deliver social service and democracy, it is a consensus that progress has been achieved through local governance. At the same time, regional differences within the country highly determine the performance of local governments and their capability of implement policies and to be able to survive without federal help. It is finally suggested that in order to obtain a successful policy implementation as well as upgrade the role of local governments, an appropriate coordination between federal instances and local governments is necessary.

Finally, Pui, S. Y. 2012 shows, through analyzing the Brazilian federal program of conditional cash transfer (Bolsa Familia) for poorest sector of population, the different effects of decentralization through local governments may have in implementation and later impacts

of the program. Her analysis enables to discern the intervention of federal government and regulation over decentralized social policies in order to get them to be effective. However, local decentralization has increased local capacities and innovation of some municipalities, although social inequalities are still not equalized among all municipalities nor are local capacities. Consequently, impacts tend to be higher in municipalities with stronger administrative capacity. In fact, other aspects as economic resources are not as relevant as local governments capacities. An important suggestion emerges from the study: how to boost local capacity?

From all this literature review, it appears relevant to understand how are federal policies aligned with local compliances as well as if local instances are participating in oil palm expansion processes. If so analyzing in depth positions, expectations and contributions seem key to evaluate in order to better predict potential impacts in the long-term and challenges from oil palm development in producing countries.

2.5 Knowledge gap, conceptual model and questions

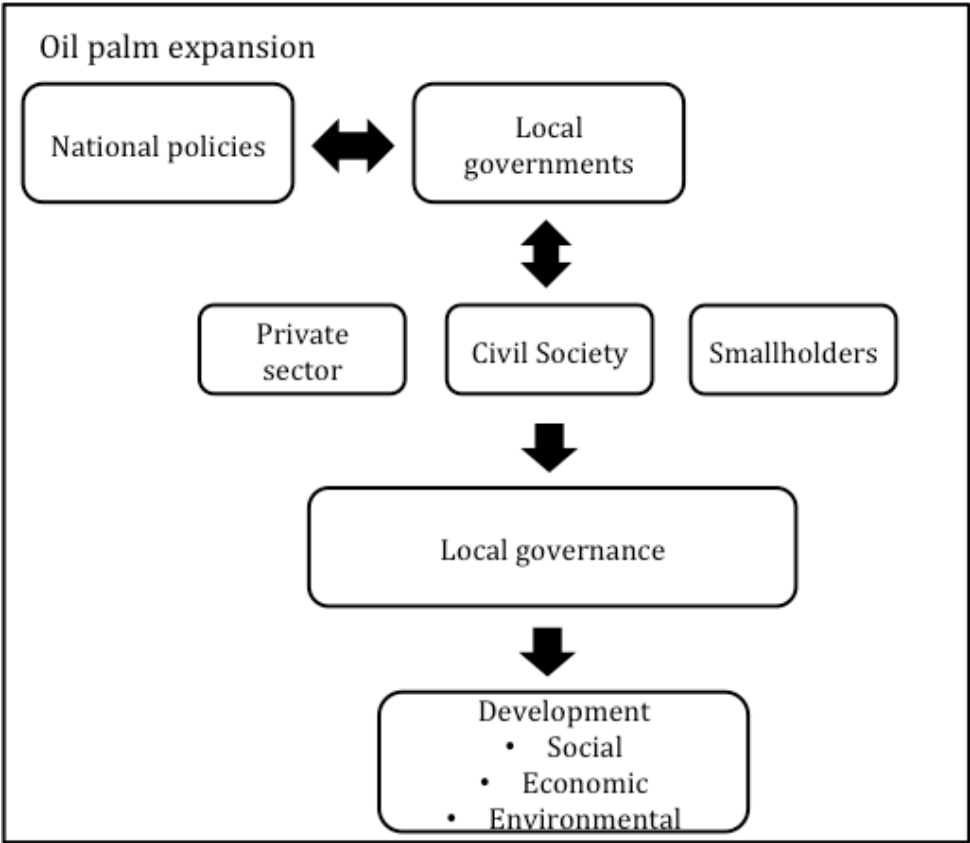
Oil palm expansion is a relatively recent phenomenon in Brazil, its growth has accelerated over past five years and smallholder inclusion is a recent production scheme adopted by different companies under legal framework provided by Federal Government. This expansion is also occurring under the shadow of negative reputation from some failures in models that have been tried in Indonesia or Malaysia years ago. Literature relating to development in local communities in Brazilian areas where oil palm is establishing seems limited, and it focuses mainly on environmental aspects. On the other hand, institutional context and governance is, occasionally, excluded from studies.

As explained earlier in this work, this thesis aims to contribute to existing knowledge gaps in oil palm expansion in Brazil. The work aims to assess contribution of oil palm to local development through analyzing a specific case in which evaluating two main businesses models present in Brazil was possible. However, the analysis is mainly executed from a pre-investment phase perspective, thus given the planting phase in which host organization is still in. At the same time, it was possible to visit different companies already witness of more measurable impacts which will contribute to complete the desired picture of oil palm in Brazil.

The study is compounded of a stakeholder analysis of the situation and it takes local governance, expectations and already visible impacts on a social, economic and environmental aspect within the municipalities' subject of study into account.

At the end of this chapter, in which it was attempted to provide a solid framework of theories, the conceptual model is presented (figure 2). As the conceptual model shows, national policies are the starting point to discern how oil palm expansion affects the communities in a tripartite of factors: social, economic and environmental. In this stage it is relevant to understand how national policies are transferred into a local level. The actors subject to research here are the local governments. The relation between the national policies and local governments is reciprocal, as local governments have to provide performance results to the upper scales of governance. In return, local governments have to deal with a variety of actors on the local scale. For this research the following relevant actors have been discerned: the private sector, civil society and smallholders. This conjugation results into a dynamic playing field between the aforementioned actors and the local governments. Local governance is a product of this playing field, which, if properly exhorted, is expected to impact positively environmental, social and economic aspects of the population.

Figure 2: Conceptual model



2.5.1 Research questions

All the above leads to the central question to solve throughout this research: How is the oil palm expansion, in its different production schemes, contributing to Local Development within Para's region in Brazilian Amazon? Subsequently, some of the sub questions are designed to support the aims of the research:

- What schemes of production and business models are present in the region?
- Who are the main stakeholders involved in oil palm expansion processes? And what are their different expectations with regards this phenomenon?
- What are, according to different actors, the main expected and already visible impacts as well as challenges faced by establishment of oil palm businesses models in Pará?
- How do federal programs created around oil palm expansion taking place at local levels? And what are main achievements of them in a local scale?
- How do local governments in Para's State participate in the expansion of Oil Palm in the region and their contribution in spreading socioeconomic and environmental benefits across populations?
- What are important criteria at the beginning of an innovating program in order to be successfully implemented in rural communities?
- How do local governments contribute to challenges and needs in rural areas in Northern Brazil?

2.6 Operationalization of variables

Final part of this chapter consists in highlight most relevant variables that will lead empirical results analysis. It is the result of deep theoretical analysis and some extra variables may be added later on, however principal ones will be described as follow:

- **Local Governance:** in order to measure this variable, a deep analysis of different stakeholders roles within the value chain and institutional relations was conducted. Main aspects to explore were: partnership established in the region, relations in between different stakeholders, communication channels between civil society, private sector and governments, and other network relations that allowed to establish how is

local governance being exhorted and how this affects oil palm expansion processes.

- Infrastructure and basic services providing: understanding basic access to services situation among rural sectors will help in clarifying what are contributions from local governments to development municipalities where oil palm is established. At the same time, infrastructure appears as a relevant factor to a proper development of crop in the region.
- Income diversification and employment: as shown thoroughly in the literature review, income has been an aspect resulted from oil palm expansion processes. It will also be explored through analyzing expected changes and scenarios for smallholders. At the same time, employment generation through the establishment of different models will be analyzed.
- Human capital: it is important to explore how learning and empowering processes through education and the provision of training are taking place in municipalities of oil palm influence. This variable is measured by contrasting initial conditions to contemporary progress by companies' arrival to the region.
- Modernization of agricultural practices: it is of common agreement that oil palm changes landscape, but it also demands drastic changes in traditional production schemes. This aspect is fundamental to understand changes in productivity, usage of fertilizers and agrochemicals, among other factors.
- Human Development Indexes: an important measure of development has to do with the Human Development Index. Even though this indicator is externally measured, taken it into account will provide context in communities performance through history.

3. Methodology

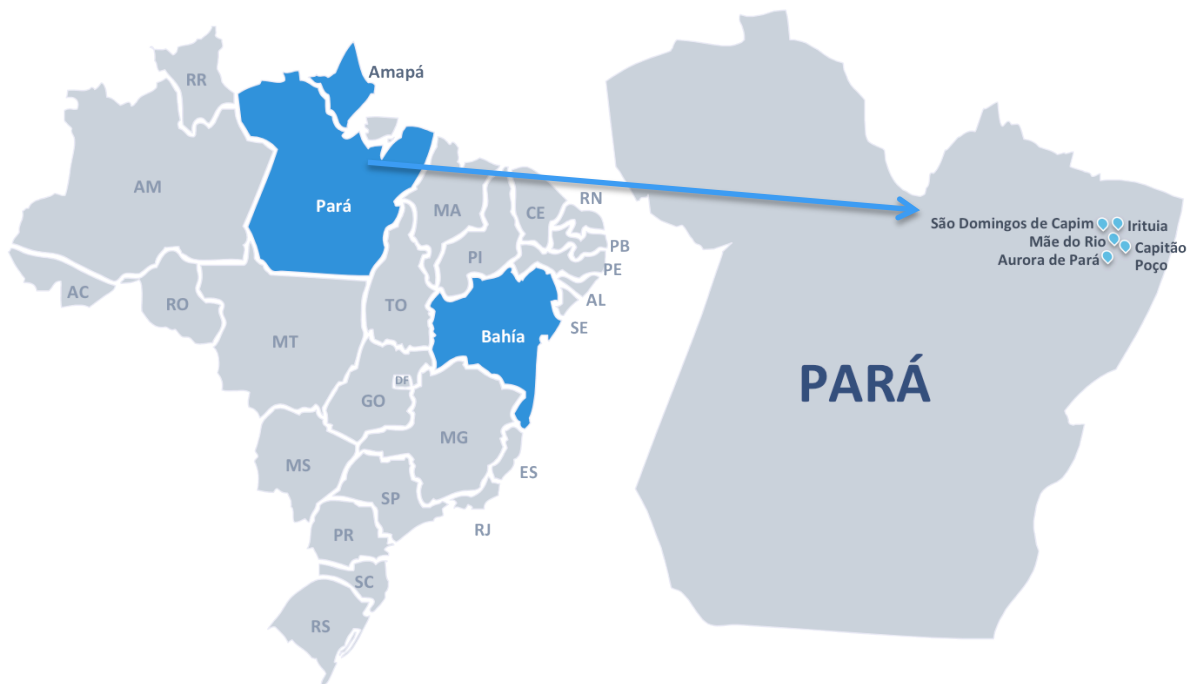
The research followed an inductive approach in which the field investigation commence with collecting the relevant data related to the topic of interest; later on, and once all data is collected, the researcher usually takes a breather from the data and step back in order to obtain a bird's eye view on it (2012books.lardbucket.org, 2014). Reason behind deciding upon this approach is the lack of literature on Oil Palm in Brazil; therefore the exploratory nature of this research will provide a better understanding of the aforementioned theme. The said exploratory nature of the research allows room to incorporate a stakeholders' analysis within the research, which thoroughly shed light on the different parties within the oil palm chain expansion in the region and their interests.

Research tools were mainly designed to obtain qualitative data. They seem convenient given the following: explorative approach of the research, time and language limitations and the flexibility needed to properly obtain a big picture of the crop expansion in Brazil and consequences of different businesses models established in the region of study. However, quantitative analysis was conducted in order to better grasp specific crucial aspects of communities and municipalities already defined in the theoretical framework. Research techniques that were used are mainly baseline surveys analysis, open-ended interviews, semi-structured interviews, focus groups and day-to-day participative observation.

Geographic area chosen for properly conduct fieldwork in Brazil is the northern state of Pará. Located in the Brazilian Amazon, the region has the highest production of oil palm within the country and hosts several companies, both national and international, that have commenced their activities in the region to develop new business lines through oil palm value chain development.

Figure 3 shows a map of Brazil highlighted with main producer regions, followed by a single map of the region to study, where host organization is based and field research was conducted.

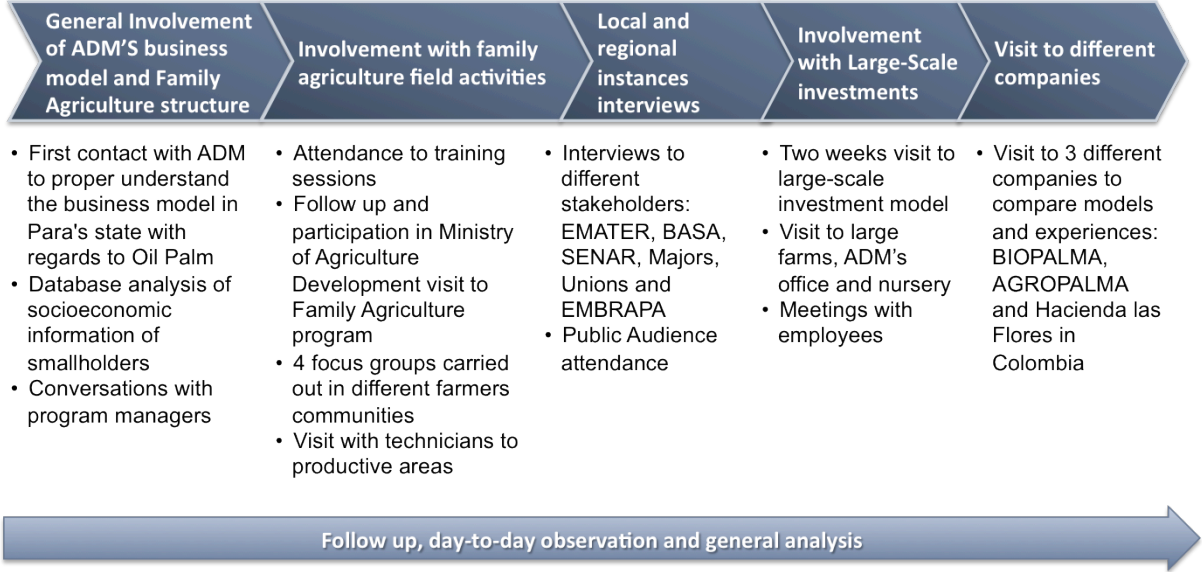
Figure 3: Map of Brazil and Pará including municipalities of action



Source: Author (2014)

As shown by figure 3 (specific map of Pará), the geographic area of study is mostly limited to five municipalities where the company and host organization ADM do Brazil operates. Together, municipalities represent the two businesses models to analyze: Sao Domingos do Capim and Irituia hold the total universe of smallholders inclusion scheme while Mae do Rio, Aurora de Pará and Capitao Poço represent large-scale investment production model. Other municipalities were also part of the investigation process for either their importance within the chain or past experiences with oil palm production. They will be mentioned when necessary through the study. At the same time the capital of Pará, Belem was a fundamental area of study given high presence of competent authorities involved in oil palm expansion. Fieldwork lasted 12 weeks and activities conducted were divided into 5 main stages; contacts were possible thanks to the host organization that acted as both a model of study as well as facilitator to access key stakeholders. The stakeholders cannot be easily accessed given high bureaucracies procedures for independent researchers in the region. Stages are summarized in figure 2 and are described below.

Figure 4: Phases and Activities carried out in field



3.1 General involvement of ADM business model and family agriculture structure

Research started by accomplishing a preliminary stage. This stage took place in Sao Paulo, where host organization is headquartered, and aimed to set up common goals as well as to gain a global vision of the company with regards the development of Oil Palm. After executing this stage, it followed a first phase that includes secondary data review as main activity in order to learn beforehand important dynamics within Brazil and local scenarios. Activities included exploring local sources as newspapers and files. Part of it was also introductory talks with members of ADM do Brazil of sustainability and Oil Palm project teams.

Part of the fulfillment of this stage consisted in analyzing information obtained from baseline surveys implemented in 2012, that were deployed amongst 143 smallholders in ADM area of influence; from this group of farmers, 95 are active part of the company's activities and 48 are not part of it as of 2014. Active farmers interviewed are part of ADM family agriculture production scheme and belong to the first stage of oil palm program, started in 2012. Farmers of this group are mainly from Sao Domingos do Capim municipality. The survey (See annex 1) contains questions about several aspects of farmers' social, economic and environmental situation before the implantation started. Analyzing information contained in questionnaires allowed to obtain a characterization of communities directly involved to value chains and will be used as base to compare and measure program results.

Six open-ended interviews with members of the sustainability area and oil palm project team were conducted, this included:

- Amanda Cosenza, Coordinator of sustainability area
- Diego di Martino, Palm oil General Manager
- Rodrigo Curvo, Sustainability Coordinator palm oil project
- Paul Steffen, Regional Development Manager
- Luiz Bregalda, Forestry engineer large-scale investments palm oil project
- Leonardo Dutra, Coordinator of Family Agriculture palm oil project

The interviews aimed to understand basis of the crop expansion in northern Brazil as well as present the research project for later coordination of activities in field.

Finally, a last activity executed in this part of the research was to identify and to map the main stakeholders within the oil palm value chain in Brazil to different levels: federal, regional and local as well as international instances, if necessary.

3.2 Involvement with family agriculture field activities

A second stage after gaining a general picture of company's model and stakeholders, consisted in getting involved with program execution and later on deploy different methods and techniques across an important player in the oil palm expansion scene: smallholders.

Taking into account language barriers presented, that represented an initial limitation and its overcoming will be explained later on, approaching farmers started with an observation and follow up process into one of the company's activities with family agriculture: weekly training sessions provided to farmers and their families in their communities. In total 14 communities were visited, out of 16 communities that conform the whole family agriculture production scheme universe and sum up a total of 267 smallholders. The main purpose was to establish a first contact with them and to observe and follow lessons contents as well as interaction processes in between the company, the educational part and smallholders. Training sessions lasted in total 5 days per week with an intensity of 5 hours a day; the selection of communities to visit was random, although visits sometimes depended on logistical availability as transport means.

Once a first approach was established and language barriers closing, main activities planned for this stage were conducted. First of them consisted in visiting farmers in their own productive areas accompanied of a technician in charge of the area; in total two sub-areas within two main municipalities where family agriculture is present were visited and informal

talks and open ended interviews were realized to 8 farmers to explore aspects as: family labor used in palm oil production, sources of income, general satisfaction with program technical assistance and assisted evaluation of plantation technical progress.

A second activity consisted in accompanying a follow up meeting from Ministry of Agricultural Development (MDA) to ADM do Brazil; in this opportunity it was possible to visit two smallholders farms and to hold a meeting with three fundamental parts within the chain:

- Private sector, represented by ADM do Brazil through its representatives from two important value chains soy & oil palm. Team on field was also present, as well as a commercial area deputy.
- Ministry of Agriculture Development was present and represented by a team of 4 people directly involved with the biofuels program and the so-called “selo combustível social”. In this opportunity two interviews were carried out with key representatives and biofuels program coordinator.
- Smallholders: two smallholders represented the first group of farmers with whom ADM started the initial stage of family agriculture inclusiveness into the chain.

A final activity executed consisted in four focus groups among different family farmers communities. Specific localities were selected from two municipalities with highest family agriculture representation (the two abovementioned), and specific groups were randomly selected from 16 in total. A total of 88 people attended the meetings, and every meeting lasted between 1 and 2 hours depending the group proactivity and participation. The meetings tried to explore different aspects from oil palm expansion and consequently farmers’ involvement within these processes. Perceptions, expectations and impacts already visible were part of specific aspects to explore in focus groups deployment.

3.3 Local and regional instances interviews

To grasp local and regional perception was part of initial goals of this work. In this stage interviewing different public institutions and organizations was the main activity conducted and, as mentioned before, most of contacts were facilitated by ADM do Brazil given the broad network the company has established in the region. Interviews were mostly unstructured and according to the level of involvement presented by the interviewee with oil palm expansion the interview lasted more or less. Interviews aimed to understand different expectations related to oil palm expansion in the region, about the two main business models

established in Pará. In total 14 people were consulted in different municipalities whom represented different production schemes perspectives; positions and geographic areas are described in the table e below:

Table 2: Different local and stakeholders interviewed in second stage

	Mae do Rio	Irituia	Sao Domingos do Capim	Castanhal	Guamal	Belem
Mayor	✓		✓			
Secretary of social development	✓		✓			
Secretary of agriculture	✓	✓	✓			
Secretary of environment	✓					
Unions representative			✓			
Educational institutions			✓			✓
Banks				✓	✓	

Source: Author (2014)

As an additional activity and in order to witness the general perception of crop expansion and debate around smallholders involvement within the chain from different sectors in society it was possible to attend a public audience in Belem; attendants included: public state ministries, civil society, NGOs, Federal Government, Unions, Local governments, private sector and smallholders.

3.4 Involvement with large-scale investments

This stage of field research aimed to obtain a deeper understanding of large-scale investments scheme from ADM do Brazil. In order to gain a proper involvement with the model, a two weeks visit was realized in which meetings with employees, interviews with coordinators and visit to farms were part of activities conducted. The visit took place in Mae do Rio municipality where offices coordinating large-scale investment are established. However, it was possible to make one-day trips to different municipalities involved in this scheme.

In total, 4 people from coordinating team were interviewed, 4 agronomist technicians were also interviewed and two 30 minutes sessions of meetings with field workers in which contact with 50 employees was possible. Direct observation activities as well as daily visits to farms in different production stages were done during this two weeks period that contributed to achieve the final goal. Interviews followed a semi-structured scheme that gave space to go in depth where interests points required it but at the same time scheme allowed to answer fundamental questions, which needed to be solved. With regards meetings with group of employees, main tool used was an open-ended questionnaire to answer basic questions about working with the company.

3.5 Visit to different companies

Understanding different companies' business models, expectations and impacts throughout operating time was main objective of this section. Two Brazilian and one Colombian companies were studied in this part of field research. Activities were carried out differently in every company due specific policies and conditions of visits, still similar questionnaires when performing interviews were deployed in order to obtain comparable information from all of them. Companies were selected taking into account hectares planted within countries, representativeness through executing similar business models, as well as availability and openness to share their experiences. A brief description of activities follows:

- **AGROPALMA:** exploring in depth the company was decided due its high influence for the development of oil palm value chain within Para region. Investigation consisted in a three days guided visit in which interaction both with different areas coordinators as well as small and medium partners were possible. In total, 7 interviews took place with: partnerships manager, socio-environmental manager, research manager, chief of family agriculture department, chief of integral agriculture, industry coordinator and technical general manager. It was possible to visit different farmers under partnership schemes: 1 representative of smallholders and 2 representatives of medium farmers; amongst these farmers, three surveys were deployed in order to properly understand investment conditions and general satisfaction with the program. Finally, a general visit of installations and nursery was conducted by AGROPALMA hosting staff.
- **BIOPALMA / VALE:** the one-day visit to company was mainly focused in gaining a deep understanding of their family agriculture scheme. Visiting one smallholder was possible and attending a session in which the company invites more farmers to join

under family agriculture partnerships was part of activities conducted. Informal interviews with 3 members of the company's family agriculture team were conducted.

- Hacienda las Flores, Colombia: the company represents a high level player in oil palm production and processing in Colombia. In this occasion it was possible to hold a semi-structured interview with regional development manager to obtain a clearer idea about experiences in Colombia and similarities with Brazilian model and expectations around the crop.

3.6 Follow up, day-to-day observation and general analysis

Through the research process, it was possible to conduct general observation. The fact of living in field for a long period of time facilitated direct contact with every aspect of oil palm establishment by the host organization. It was also enriching in the sense that allowed understanding general context, cultural aspects and farmers' behaviors. At the same time it permitted to gain the confidence of people directly involved with the proper functioning of the program, as well as recognizing potential challenges and day-to-day difficulties presented.

3.7 Limitations

In general, methodology and estimated activities were conducted on schedule and without majors' difficulties, however there existed some limitations that will be explained below:

1. Language barrier: the lack of total dominance of native language, Portuguese, made the field study more difficult to conduct. At the beginning lessons were taken in order to overcome it, but it took a time until it stopped being a barrier and activities could be conducted fluently.
2. Time: gaining local instances confidence, specially host organization trust and respect, takes time. Three or four months represent a short period due the need of spending a considerable amount in setting up.
3. Non-updated baseline information: thus given the year in which were realized first surveys in order to record key information, still the fact that those are not updated does not necessarily reflect farmer's today reality, however information is very insightful to measure some impacts as of today.
4. Company as a host organization and facilitator: as security was an important issue when receiving an international student, staff from the company was required to keep

an eye most of time over activities conducted; this sometimes could make the interviewee uncomfortable or in a position of responding what should be expected to be said. At the same time there could exist some bias due the high involvement with the company.

4. Thematic and geographic context

Brazil is positioned as the world's seventh economy (World Bank, 2014). The country, which covers around 47% of total area of South America, is an important player both worldwide and at regional levels. Its high significance, has partly come from the richness and diverse tenure of natural resources together with smart ways in which the country has used its abundance to satisfy growing world's agricultural and energetic demands. Brazil is also part of the so-called BRICS and represents a highly strong emerging economy.

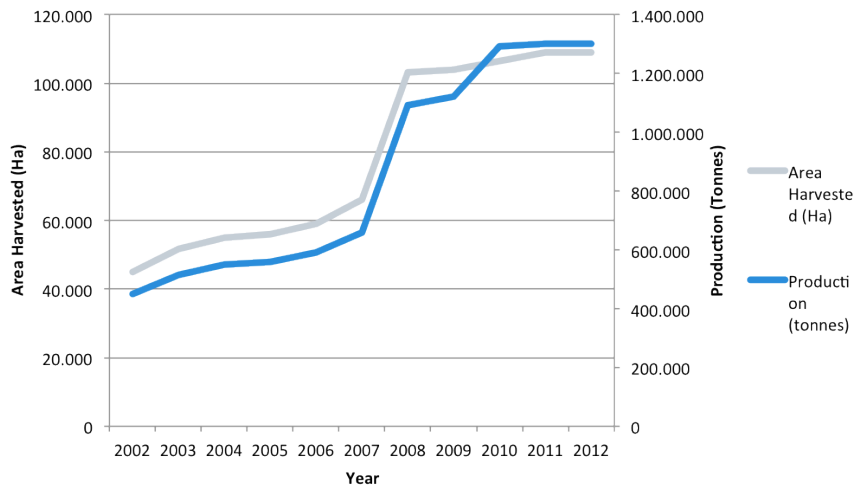
In recent years, the country has significantly increased its international supply of biofuels. Driven by internal and external markets needs, the country ambitious to increase both: commodities supply and biofuels production. As discussed by Andrade and Miccolis (2010b), four main factors have led to a growing biodiesel industry in Brazil, namely: 1) the growing demand for biodiesel on domestic and international markets, which in Brazil is underpinned by a mandatory 5% (B5) blend of biodiesel into diesel; 2) rising public and private investments in biodiesel R&D and refining capacity for an increasing variety of feedstock, especially soybeans (roughly 85%) and beef tallow, both being top Brazilian exports, as well as cottonseed, sunflower, castor beans, African oil palm and native palm trees; 3) specific policies aimed at promoting biodiesel production among smallholders, such as the PNPB, which established tax benefits for refineries that source the feedstock from family-based farmers; and, 4) climate change policies and mechanisms aimed at reducing CO₂ emissions targets, which tout bioenergy as 'green fuel' and work hand-in-hand with energy policies.



Figure 4: Brazilian Amazon Capim river (Author 2014)

Brazil has encountered 30 millions hectares suitable for oil palm production in deforested areas of Brazilian amazon. As a consequence, in recent years, Brazil has witnessed an expansion in oil palm production, partly incentivized by Federal government. The crop's suitability and profitability opportunities areas have attracted different sectors interested in investing resources in the crop value chain. This has, at the same time, led the Brazilian government to dictate specific parameters over this expansion as well as to regulate conditions under the crop should be planted and developed, thus utilize oil palm potential in favor of regional and rural development. This expansion has doubled in past four years and evolution of planted areas and national production can be seen in detail in figure 5.

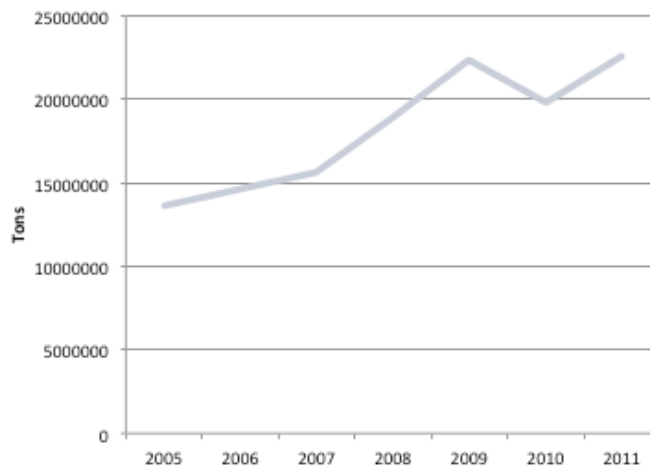
Figure 5: Historic Oil Palm National production and planted areas



Source: FAO Stat & Author

Thus, oil palm seems in line with Brazilian government rural development strategy as well as internal and external markets demands: this constant increase in the worldwide requirements is represented by the import rates of top 10 importer countries shown in figure 6.

Figure 5: Oil palm demand worldwide, top 10 importer countries



Source: FAO Stat & Author

However, Brazil's oil palm production still represents a small percentage of total global shares: and the country is number 11 on the list of producer, lead by Malaysia and Indonesia (FAO, 2014).

Brazil's richness in natural resources also characterizes many other countries in Latin America region, that have encountered in exploitation of natural resources an important

economic opportunity and engine of rural development. Within Latin America some countries as Colombia (highest producer of oil palm in region) and Argentina (through soy production) have taken advantage of worldwide biofuels demand and used the crops to foster economic development.

Several countries in Latin America have implemented internal policies to fight social disparities that seem to be partly inherited by institutions established in colonial times (North, 1999). Brazil is part of this group of countries: policies promoted in recent years, highly strengthened in Lula da Silva's administration, are distinguished for fighting poverty, misery and inequalities in Brazil. The country, as mentioned early in this study, has significantly improved the socio-economic situation of thousands, and a rising strong middle class is visible in the country's today reality.

High socio-economic inequalities still persist between northern and southern regions and between rural and urban sectors of society (Foresight, 2011). Disparities between Northern and Southern Brazil have always been matter of concern in the country. Recent attempts to explain and reduce these gaps have been made by the government and some academia sectors. Explanations about this situation have been mostly based on colonial institutions incepted years ago: extractive institutions in northern Brazil may explain today's lower income per capita, worse governance practices and less access to justice (Naritomi et al, 2009). Pará is example of both a Northern and Amazonian state: its socio-economic indicators are lagging behind those of southern states while at the same time presents a high biodiversity and richness in natural resources.

A first initiative to "push" forward situation in the north, was the **decentralization** of governments in which more power was transferred to local administrations in order to set programs that successfully meet local people's real needs; a second and more specific initiative is the promotion of oil palm production as a way to address some of the environmental, social and economic issues in the Brazilian Amazon in the north of the country.

The government of Brazil has been promoting the exploitation of Oil Palm; a main, launched four years ago, aims to achieve the following main points: preserve forest and native vegetation, expansion based on promoting integrated family agriculture, and two prioritized territories: degraded areas in the Amazon and rationalization of areas used to sugar cane plantation. As well as avoid biodiversity traumatic effects experienced by other countries, especially taking into account the natural importance that the Amazon presents for the region and the world. Next section will explain in detail different regulations around oil palm in

Brazil.

4.2 Oil palm national and international regulation

Combined with the prioritization of family agriculture development as a lifter out of poverty for thousands of families in Brazil, biofuels programs to guarantee energy to an emerging world power were flags of Lula da Silva (Former president of Brazil from 2002-2010) National Development Plan. Within the plan's main goals it was possible to find attempts to achieve zero poverty and family agriculture inclusiveness into competitive value chains, mainly through its "National Program for Family Agriculture Strengthening" (Programa Nacional de Fortalecimento da Agricultura Familiar (PRONAF)). Example of some of specific initiatives to develop Brazilian rural sector by providing support smallholders and to stop the exodus to urban centers have to do with the creation of new credit lines to promote strategic crops development as well as higher proportion of compulsory credits disbursed to family farmers. Design of integrated project that provides market security, technical assistance and financial stability to farmers were fundamental part of achieving government's initial purposes.

In response to this context, and in order to generate social and economic benefits from this worldwide setting, Brazil has implemented several programs, with the "Selo sustentável social" being the most important for biofuels production and smallholders inclusion in the value chain and "Sustainable Oil Palm Production program". Both of them intend to regulate the expansion of biofuels production in Brazil, and more specifically the oil palm value chain production. Today Oil Palm is regulated and controlled not only by Brazilian National laws as land regulation, labor, etc. but there are also specific programs that dictate parameters for a sustainable oil palm production.

Environmental Brazilian laws

It is important to note that oil palm expansion in Brazil is subject to national laws regarding to labor, Amazonian forest, fiscal policies, etc. as mentioned by representatives of Ministry of Agriculture Development, different programs have emerged to address basic parameters under which oil palm, for being incepted in the Amazon and being a government priority as rural development, must be planted and exploited. Programs are also an attempt to avoid different negative impacts experienced by biggest producer countries worldwide.

The Brazilian forest code appears to be relevant given Amazon importance for Brazil and the world. Modified several times, the code establishes minimum legal reserve in the Amazon with regards rural production in the region. Establishes minimum aspects as: First, in legal amazon it is necessary to reserve 80% in forest areas, 35% in tropical savanna Eco region and 20% in other regions and biomass within the country. Areas up to 200 hectares or 4 fiscal modules are not obliged to keep legal reserve. Secondly, authorization to explore with economic purpose needs to be obtained directly from Ministry of Environment. Final relevant aspect has to do with agricultural processes, as oil palm plantation must be carried out in areas already deforested prior to 2008.

Selo Combustível Social

This federal program created in 2005 puts together a set of specific measures to stimulate the social inclusion in agriculture. After the federal initiative of Brazilian government to introduce biofuels into the energetic matrix by first demanding 2% of biofuels component in oil to be commercialized in the country, and a later 5% of total oil composition. After the introduction of this regulation, and given the great potential of agriculture in generating jobs and income opportunities, the government started the promotion of family agriculture inclusion into different biofuels value chains.

In this program, companies involved in the biofuels value chain must present projects where include family agriculture into their chain or guarantee the purchase of commodities from this kind of production scheme. Most of the time what the federal government expect is to obtain a whole inclusiveness accompanied by technical assistance in areas where farmers precise it. These projects are later presented to the Ministry of Agriculture Development that analyze and assign the “selo” or label.

From this approval, the company starts to enjoy advantages as:

- The right to participate in public biofuels auctions for internal market
- Access to financial conditions with different institutions
- Different fiscal benefits
- Smallholders have also access to different credit lines in order to adapt their production systems if necessary

As Oil Palm is a crop suitable for biofuels production, the selo combustível social is a program that influences companies involved in Oil Palm production with biofuels purposes. It

is worth to say that the non-possession of this label means the impossibility of commercialize in biofuels public auctions within Brazil.

Programa de Produção sustentável de Óleo de Palma no Brasil

A second federal program is the called “Sustainable Oil Palm Production in Brazil”; it aims to discipline the expansion of oil palm production in the country and provides tools to guarantee a production with solid environmental and social basis.

The program, looked up to discipline large-scale investments in establishing minimum standards for deforestation, forest preservation and in general ways in which oil palm could coexist in an environmental friendly way with the great biodiversity that is already part of the Brazilian Amazon. On the other hand the program aimed to generate a social inclusion of smallholders: The initiative looks for a source of income and development of family agriculture, and consists in rules that regulate these production scheme with private initiative: it is a business, and consequently economic incentives are of course involved.

The program of Oil Palm and Family agriculture is a created by the civil house of presidency of Brazil, and it involves not only MDA but also other instances of the Government. The program aims to tackle several errors from both: unsustainable production practices in different countries and failed programs incepted in the region years ago. The Oil Palm initiative limits the maximum area of plantation to maximum 10 hectares, and this is controlled by amounts disbursed through credit: the idea behind it is to protect them from monoculture, incentive crop diversification and forest minimum reserve.

In order to define aspects to guarantee success in this initiative, the program involves directly the private sector, which acts as technical assistance provider, buyer of product and as an intermediary between the bank and the smallholder. The Amazonian bank is also involved and is in charge of managing resources for developing the region but also to prioritize family agriculture in the area. As part of the oil palm initiative the Amazonian bank is the direct responsible for credits approval and disbursements throughout the program. Finally, smallholders represent an important productive part and their specific role will be explained more in detail in following sections.

Roundtable on Sustainable Palm Oil

The roundtable on sustainable oil palm is an international multi stakeholder organization and

certification scheme for sustainable palm oil. The initiative officially started in 2004 and it is conformed by different partners as private companies, non-governmental organizations, banks, and others directly involved in the crop value chain.

The organization emerged as a mechanism to regulate worldwide palm oil production worldwide and as a guarantee to civil society and consumers that the crop is implanted under fair conditions to maintain a social and environmental balance in places where the crop is being developed. Some of the main objectives of the roundtable are, to advance the production, procurement, finance and use of sustainable palm oil products, to develop, implement, verify, assure and periodically review credible global standards for the entire supply chain of sustainable palm oil, to monitor and evaluate the economic, environmental and social impacts of the uptake of sustainable palm oil in the market and to engage and commit all stakeholders throughout the supply chain, including governments and consumers (Rspo.org, 2014).

Brazilian Oil Palm traders show high interest in complying international standards and requirements and some companies are already certified or in the process to obtain the RSPO certification in order to fulfill minimum sustainability parameters demanded worldwide.

4.3 Host organization: ADM do Brazil

The host institution in field is **ADM**; the American company one of the largest agricultural processors in the world. The company's business model consist in taking crops from farmers and process them to make food ingredients, animal feed ingredients, renewable fuels and naturally derived alternatives to industrial chemicals and distribute them among different kind of customers.

In 2011, ADM developed a sustainable palm oil production and processing program in Pará, Brazil, in cooperation with the Brazilian government and local farmers. The program, which conforms to RSPO standards by allowing planting only in areas that were deforested prior to 2006, encompasses approximately 12,000 hectares of oil palm plantation land in areas that have been approved by the government for palm cultivation. A production facility to support oil palm farmed in these government-approved areas is slated to open in 2016 (ADM, 2014).

The company's main office is based in Sao Paulo and it has production in three municipalities within the state of Pará: Sao Domingos do Capim, Mae do Rio and Sao Miguel do Guamá. ADM includes in its business models two main production schemes present in the region:

studying them in depth will shed light about how oil palm expansions processes are taking place in Brazil. As well as different impacts and expectations are generated by rapid sector growth experienced in recent years

5. Findings

After providing broad theoretical and thematic context about oil palm expansion in Brazil, it is necessary to provide deep information and analysis about what was found in field research. This chapter aims to provide empirical evidence encountered about oil palm expansion processes in Brazil, more specifically in the northern region of Pará. This chapter is divided into four main sections: first section will describe the oil palm sector in Brazil including main business models present, brief characterization of communities involved in oil palm production, and an introduction of relevant stakeholders. Secondly an analysis of different expectations generated amongst key stakeholders and their concerns derived from oil palm expansion will take place. A third section will analyze in deep main variables already impacted, or yet to be, by different production schemes established in the region. A final section will link the three sections with the concept of local governance.

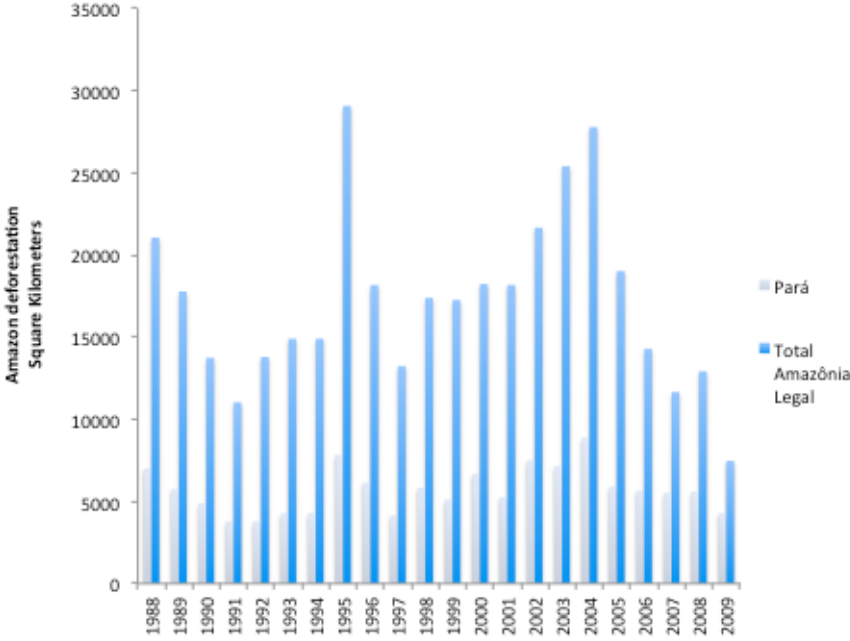
5.1 Oil palm in Brazil: Business models and main actors

First Oil Palm plantations appeared in Brazil in XIV century, these were mainly established in Brazilian North-East regions, colonizers and Africans introduced them as it represented important item in the provisioning trade supplying the caravans and ships of the Atlantic slave trade. Oil Palm was used mainly with culinary objectives and it still remains a popular foodstuff among people of African background in the Bahia region of Brazil. (Northrup 1978: 178—86; Hartley 1988: 1—3; R. Lago, personal communication, 1993). The later re-entrance of oil palm happened thanks to the United Fruit Company that started to introduce the crop in Central America along the first half of XX century.

Decades ago the crop started to be re-incepted in Brazil, mainly in the Northern state of Pará. The 70's political context in the country incentivized individuals and entrepreneurs from different regions in the country to “colonize for not to be colonized”; this specific policy promoted the deforestation and exploitation of Brazilian Amazon and was accompanied by financial and infrastructure incentives to attract inhabitants to the zone: large extensions of land were assigned to migrant families. This context attracted several entrepreneurs who found in timber exploitation, livestock, among others new business opportunities (Fanzeres, 2014). The Amazon exploitation occurred then in a disorganized manner and high levels of

deforestation occurred in a short period of time. Figure 7 shows historical evolution of deforestation in the Brazilian amazon.

Figure 6: Historical deforestation in Brazilian Amazon



Source: National Institute of Spatial Research Brazil (INPE)

As stated by Jair Carrera, Regional Coordinator of one of the biggest agricultural educational institutions, Oil Palm production is relatively new in the region, and the development of the crop has several challenges after the high levels of deforestation and production without proper planning in the 60s & 70s, the dictatorial period of Brazil.

Another main consequence of these processes was a high land concentration; in the region it is possible to find landowners with total areas of 8,000 hectares or above. Meanwhile a family farmer or smallholder is defined as a person whom its income depends on agricultural production and holds maximum 4 fiscal modules, which in Pará it is in total around 200 hectares.

One of the first companies in taking advantage of the national-international context, to explore agriculture development in the Amazon, and to take advantage of Oil Palm market is the Brazilian company AGROPALMA. The company, created in the 70’s under the political context described above, started plantations and consequently expansion of the culture. Following AGROPALMA’s successful operations, several companies started to explore the

oil palm market and today different businesses models are present in the region.

5.1.2 Business models description

After an extensive mapping of different companies schemes of productions, two main businesses models were identified in Pará. First model consists in large-scale production scheme. In this model, private companies follow a vertical structure in which the company controls all stages in the value chain:

1. Nursery: companies tend to control and grow seeds until these are ready to be transferred to implantations areas.
2. Plantation: companies hire and supervise labor to execute planting of oil palm trees in selected areas.
3. Maintenance and collection: companies' workers are in charge of maintaining plantations and exhort activities as fertilizing, cleaning, collection, etc. during productive period.
4. Processing: as oil palm requires to be processed right after being collected, companies establish processing industries to extract palm oil and process it into different sub-products.
5. Commercialization: final stage has to do with commercialization and marketing of processed product.

Generally, within this production scheme, national companies own the land in which the oil palm is planted. In the case of international companies this land is accessed thanks to a rental model where strategic partnerships with landlords take place.

The second model happens under different partnerships, where owners of land control the crop production under supervision of the buyer company; within the region partnerships are being established with small, medium and big farmers.

1. Large and medium farms: partnerships with large and medium farms are established for some companies within oil palm sector. Most of the cases partnerships with medium and big farms consist in agreements where the company provides direct credits to the producer to cover aspects as implantation, technical assistance (delivered by company), fertilizers, amongst different investments required for appropriate crop establishment. These partnerships are legalized by contracts lasting on average 25

years where company and partner commit to buy-sell oil palm. Specific prices settings and minor conditions tend to be negotiated between parts involved.

2. Partnerships with smallholders, or what is considered family agriculture, as described above, occur in a different manner and it is regulated and support by federal government through its different programs. The inclusion of smallholders into oil palm value chain happens thanks to a three partite partnership between private sector, bank and smallholders. Production is in charge of farmer, although technical assistance is provided in order to guarantee production standards. A credit is disbursed for the farmer to establish and maintain crop, especially during first unproductive years. Again, a contract is signed to guarantee buy-sell of product and it endures 25 years on average.

It is observed that areas under a large-scale production scheme are more representative overall. However, inclusion of smallholders started to be promoted in 2010 and companies are enthusiastic about supporting this model. Table 1 shows the distribution of companies in region and, when possible, areas are divided into production schemes.

Tabla 3: Oil palm producer companies within the region

Company	Municipality	Planted area (Hectares)	Areas under partnership (Ha)	Expansion goals (2015-18) Ha
ADM do Brasil	São Domingos do Capim	5500	2030	24000
AGROPALMA	Tailândia	45000	11500	5500
BIOPALMA	Mojú	70000	2408	80000
Dentauá	Santa Isabel do Pará	5546	N.A.	5600
Denpasa	Santa Barbara do Pará	1750	N.A.	10000
Marborges	Mojú	4671	N.A.	5500
Mejer	Bonito	6500	N.A.	5000

Palmasa	Igarapé-Açu	4200	N.A.	5000
PETROBRAS	Tailândia	5000	N.A.	70000
	Total	148167	15938	

Source: Author research 2014 & SAGRI 2013

5.1.2 The ADM way

Archer Daniels Midland is an American company and one of the largest agricultural processors in the world. Under the legal name ADM do Brazil, the company has held operations for about 17 years and today it is present in almost every country's region with different crops, businesses models and strategies. In 2011, ADM do Brazil developed a sustainable palm oil production and processing program in Pará, a cooperation between the Brazilian government, local farmers and different organizations. The project aims to explore a new value chain for the company as it represents an interesting economic opportunity, at the same time and as stated by Alex from commercial area "It is the social flag of ADM do Brazil, and the oil palm project expects to impact positively social and environmental aspects in areas of influence". ADM do Brazil has adopted two productions schemes present in region. Initially, the company intended to develop a project with family farmers mainly. However, some limitations presented along the way, led the company to explore large-scale investments as an alternative to justify a high investments in a processor industry: initial target of smallholders involved were not fulfilled, consequently minimum processing amounts were impossible to meet.



Figure 7: Workers in ADM do Brazil nursery. Source: Author 2014

Large-scale crop production

“ADM do Brazil, under its large-scale model is contributing with improving environmental conditions in the region and also productivity of land is increasing; thus without mentioning other positive aspects as job generation in the zone and big push for local economy”. Mayor, Mae do Rio municipality

ADM has based its large-scale production scheme in establishing strategic partnerships with large farms owners in the region. As an international company the Brazilian law does not allow the acquirement of large land extensions in national territory, reason why the company opted for launching these partnerships that work, until some extend, as a land rental model: the company takes care in all stages of Oil Palm production and the land owner provides the area and guarantee the sale of Oil Palm fruit. Today the company controls 5,500 hectares under this system, and partners with 14 farms in the region, the agreement occurs as follows:

1. Mapping of Potential farms: this is the first step conducted by ADM before

establishing any partnership with large-scale farms. This mapping is general and it is being done in areas previously identified. Aspects as agro climatic conditions, logistics and municipal infrastructure are taken into account for defining ADM areas of influence.

2. A second stage consists in having a first approach with farmers to measure their interest in partnership.
3. Thirdly, interested farms must start a strict process in which the company review all legal aspects related to the farm as: proper land titles, forest reserve of at least 50% of total area (as indicated by national laws), specific logistic issues, and agronomic aspects, etc.
4. After this, if the farm happens to meet all demanded requirements by Brazilian law and RSPO guidelines, it starts a negotiation phase where owner and ADM define conditions of contract for the following years. In most of cases contracts last 25 years, prices are based on CIF Rotterdam, and two contracts are signed: one to guarantee the rent and management of Oil Palm cultivation and a second one in which the land-owner commits to “sell” the product to the company.

Family Agriculture

“We decided to enter the project because our traditional means of production were not providing us enough money to maintain the family anymore, the program represents new opportunities for agriculture in this region” Junior, Smallholder, Sao Domingos do Capim

Family agriculture has been integrated into the ADM Oil Palm project following the guidelines of national programs as the abovementioned Selo Combustível Social and National Program for Sustainable Oil Palm Production. Besides the economic incentives that Oil Palm represents, the production scheme also aims to improve the smallholder quality of life through technology and knowledge transfer, link into world markets, and income increase and diversification, among others; The program is also part of the company’s sustainability strategy. This scheme of production works as follow:

1. The model consists in a three-partite alliance in between a financial institution (Banco da Amazônia), ADM do Brazil through the Oil Palm project and Smallholders.

2. ADM do Brazil is the “integrator”, consequently it is in charge of designing the project, selecting potential farmers and go through all verification process that will validate if the farmer meets requirements established by federal guidelines, explained above. Main requirements:
 - Land titles or proof of property rights
 - Location in ADM’s identified areas of interest
 - Area must be aligned with environmental laws
 - Farmers can not present unpaid debts with any financial institutions
 - “DAP” document which works as family farmer identification
 - Farmer’s interest in being part of the program
3. If all the above-mentioned requirements are met, the process continue with the assignment of a 25 years relationship contract that contains the following highlights and commitments from the parties:
 - ADM do Brazil must guarantee the technical assistance providing to family farmers in oil palm production and good agricultural practices
 - ADM do Brazil commits to buy the product for the length of the contract, since the production starts, under international prices: 10% of Rotterdam CIF oil palm prices; farmer is compromised to sell the product to the company
 - ADM must also provide production inputs to farmers (including seedlings), even though this is covered by the farmer’s credit, as a condition demanded by the bank to control the proper use of money from the farmer while guaranteeing minimum agrochemical and fertilizer allowance to the crop’s success
 - Farmers are committed to follow the assistance and company requirements, as well as committed to pay the loan, which is provided under around 2% interest rate and a grace period of 6 years. Farmers have the responsibility of planning their finances in order to re-pay because there is not an auto-debit system from their product payments.
 - Banco da Amazonia disburses the loan and posterior credit recovery

Under this scheme, ADM includes 267 smallholders into their value chain that represent 2,030 hectares planted with oil palm whom receive permanent technical assistance from 7 agronomist technicians. The company is also promoting additional training sessions in aspects as: agrochemical application, associations, basic ecology, management in rural businesses,

and safety at work. Main objective of these additional training provided by the company is to incentive farmers strengthen their management and producing abilities, as well as improve their quality of life and their communities’.

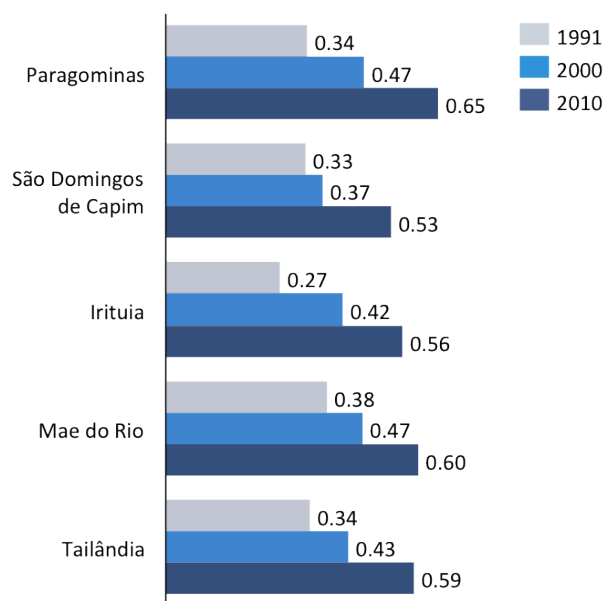
5.1.3 Socio-economic and environmental characterization of communities

As this research aims to understand local dynamics around oil palm expansion from a pre-production phase given the early stage in which host organization processes are, it seems important to provide a clear picture of how communities looked like before the entrance of a new company in the region. Characterizing municipalities will also function as baseline to future studies and impact assessments. This characterization is also relevant to understand different drivers and expectations from stakeholders around oil palm in several municipalities of Pará state.

General region overview

Municipalities where oil palm companies have entered are characterized for low human development indicators and high poverty levels; the evolution through history of these indexes has been clearly slow, as shown in figure 11; their human development index indicators are below of Brazilian average, which is of 0,744. Meanwhile these towns present little access to basic services as sanitation, water sewerages, energy, among others; municipalities are also characterized for having strong rural populations: usually between 60 – 80% of incidence, thus negative life quality conditions tends to worsen in rural communities.

Figure 8: Human Development Index in oil palm producer municipalities



Source: Instituto Brasileiro de Geografia e Estatística (IBGE)

The graph shows how Human Indexes in different municipalities in Pará have evolved through time. Tailândia, even though it does not make part directly of main areas of study, seems relevant given one of the biggest and oldest company (AGROPALMA) holds operations in there. Paragominas on the other hand is a differentiate municipality in the region due different processes, especially political, that have taken place throughout history and will be presented later on this study.

Family Agriculture

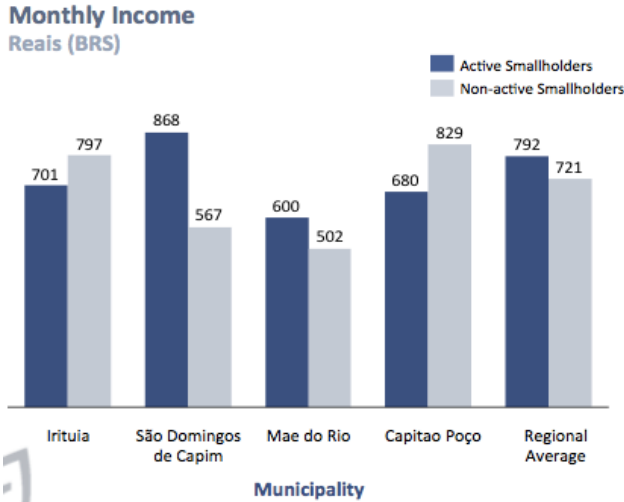
“This project is attractive and my sons are interested in returning to work the land, we totally believe in oil palm as an opportunity for the whole family group”. CLEMENTE DO SOCORRO SOARES DE ALMEIDA, Sao Domingos do Capim.

Two municipalities where family agriculture projects are established are Sao Domingos do Capim and Irituia, both of them with a rural population of 60% and 80% respectively. One of the main reasons to establish family agriculture projects in this area is the high incidence of smallholders and the great opportunity to impact these farmers’ lives.

Right before the project started, the main source of income for smallholders was cassava production and processing better known as “farinha de mandioca”. This ancestral crop is

source of income and alimentation for thousands of families in northern Brazil, including several municipalities within Pará: together with Açaí they represent main agricultural products for smallholders in the region. The production and commercialization of this crop represented for farmers an income of around 358 USD monthly. Figure 9 shows in detail the income distribution among different municipalities,

Figure 9: Monthly Income from Traditional crops (Cassava) among smallholders



Source: Company’s socioeconomic surveys & Author analysis

Besides agricultural activities another source of employment, as mentioned by the mayor of Sao Domingos do Capim, used to be the mayoralty; this limited source of employment generated incentives for people to migrate to bigger urban centers causing, sometimes, social pressure under cities and even though criminality.

Environmental aspects

Farmers involved in the Oil Palm project tended to perform poor environmental practices before the company’s entrance: the burning of agrochemical packages or the non-treatment of water for human consumption are some of the actions practiced by farmers that confirm the little knowledge with regards to good environmental practices.

Figure 13 shows farmers different water treatments among communities of influence. Evidence showed that most of them do not realize an adequate water treatments, this is partly due common beliefs that suggest all sources of water are cleaned and purified.

Planting trees is a common practice, although it is not possible to say if it is for reforestation or what is the proportion planted with regards total areas. Some of the reasons why farmers

practice land burning and some other ancestral methods are ignorance of adequate procedures or the miss-conception of land getting more productive and fertile by doing this. These practices tend to be conducted greatly because of non-access to adequate sources of knowledge. Most of farmers interviewed recognized that never received technical assistance before the oil palm project one from any official nor private sector organization.

Social aspects and infrastructure

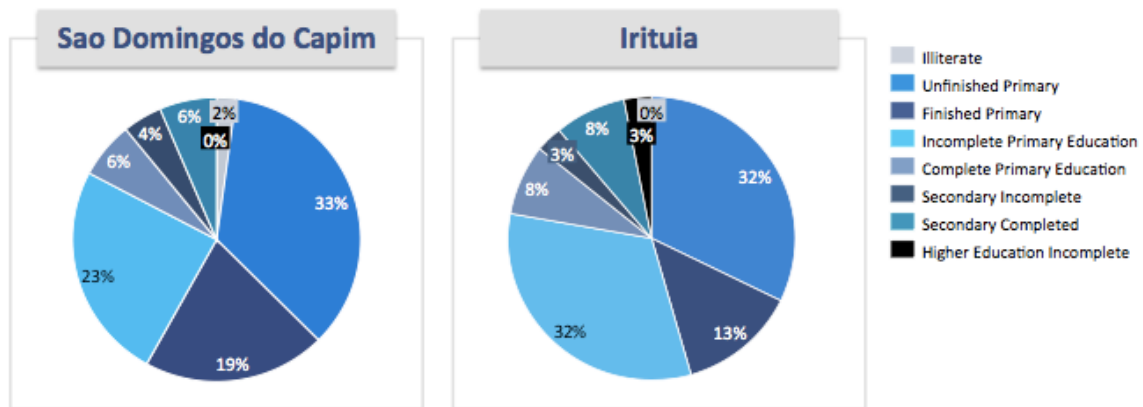
Aspects as education, health and basic infrastructure providing, are important in order to picture how communities are with regards to access to basic services and social aspects within communities.



Figure 10: school in a local community. Source: Author 2014

Family farmers involved with Oil Palm project, are characterized for low education levels or illiteracy, as shown in figure 11 achievement of superior education levels are zero and most of farmers do not finish school. At the same time, about 15% of them do not know how to read and write.

Figure 11: Educational level in communities involved with family agriculture



Source: Company's socioeconomic surveys & Author analysis

Farmers recognize having extensive families; on average smallholders participating in oil palm project have 5 children and their ages go between 17 and 20 years old. About half of their sons admitted to work in oil palm plantations, while at the same time this group of young people recognizes that incentives to stick in rural areas working for palm oil are mainly related to income levels. On the other hand, and contrary to the farmer's generation trend, most of these youth have accessed education and today 75% of them still attend school, infrastructure as proper school transport when required is available. Around 10% of rural producers in Sao Domingos do Capim municipality have the intention of investing extra money from oil palm in children education. Still and as evidenced in field visits, some of communities do not have adequate schooling infrastructure, which make educational progress more difficult for most of people, especially when it comes to higher educational levels.

Around 50% of smallholders in the project, have had accidents at work and most of them happened due lack of knowledge of proper safety at work methods and practices.

With regards to health coverage there seems to be a deficiency service providing, especially in more isolated communities. Approximately 43% of farmers do not have health units in their areas and even though community health agents visit communities once in a month, this frequency does not seem enough according to their perceptions.

Finally, there does not seem to be a strong association culture within the region, and little sense of common development as part of the program expectations is perceived. Associations are not always constituted to fulfill common goals for the long run, but most of times existing associations have been result of federal programs that require farmers to be associated in order to provide a specific benefit.

From this characterization it is visible that even though farmers, active and non-active in the project have homogeneous socioeconomic and environmental situations, evidence suggests that there exists a natural selection for better farmers whom end up as part of the program. This may be due to multiple reasons, including of course the high level of initiative and organization to meet initial requirements to become part of this long-term project.

Large-Scale Investments

Oil palm is a crop characterized by the high demand of non-skilled labor. As mentioned by the technical manager from AGROPALMA: “Malaysia and Indonesia are pioneers countries and, as labor is cheap over there, there are little incentives to develop advanced technologies in the plantation stage”. Consequently, characterize workers seems relevant for future analysis of expected impacts.

In Mae do Rio area, where ADM do Brazil has mainly started with large-scale schemes, workers used to plant subsistence crops (mainly cassava) in their own areas; Income tended to be low, and as family farmers, ancestral production methods were commonly practiced. These workers also served as daily labor when needed in the region, where livestock and large farms are important part of productive activities. Daily jobs were usually under informal conditions, without proper health systems and sometimes-unfair labor relationships.

Finally, and similar to what happens with smallholders, workers tend to have numerous families, a situation that according to some technicians forces them to start looking for jobs at a very early stage and stop education given responsibilities that this represents.

The above characterization proves the difficulties these communities face to access basic services and also low-income levels that most of times are below minimum legal Brazilian income that was as to 2013 around \$310 USD per month. However, workers little knowledge around finances, instead of reinvest money (when possible, given low income levels) this significant income is usually spent in alcohol, parties and celebrations. In fact, technicians and supervisors estimate that only around 10% of workers are spending money differently than this.

5.1.4 Stakeholders and their role within the crop expansion

Different actors are involved directly or indirectly in Oil Palm expansion in Brazil. Besides

private sector, banks and smallholders, there are some others parties that contribute in a greater or lesser extend with the crop's development. Characterizing them seems important to understand how local dynamics are taking place and what are the roles and responsibilities of each actor within the chain.



Figure 12: Meeting of different stakeholders in Sao Domingos do Capim. Source: Author 2014

A brief description of different stakeholders and their level of involvement within agricultural development, more specifically within oil palm expansion in Brazil are shown in table 4. The description intend to explain in general terms how is the involvement with expansion in general, without making a distinction of which production scheme is the stakeholder directly involved with.

Tabla 4: Stakeholders' characterization and role within oil palm expansion in Brazil

Stakeholder	Level of involvement	Role within agricultural development / oil palm
Federal government	Direct	Creator of legal and normative framework to incentive and regulate oil palm expansion. Monitor and control private sector activities. MDA: Design of specific programs to develop family agriculture in Brazil.
Regional Government & State Organizations	Medium	Monitor and follow up different economic and productive activity, especially those related to the Amazon exploitation. To attract investors, foster regional development and together with local governments work to improve social, economic and environmental indicators.
Local Governments	Low	Natural role for municipality is to work towards its benefits in rural and urban sector. Within agriculture: design instruments to develop the sector.
Unions	Direct	Rural unions must oversee for farmers' general welfare. Within program: certify proper functioning of program and relations between smallholders and companies.
Educational institutions		
EMBRAPA	Direct	As a research institution their role is to generate knowledge around the crop technic, social and economic aspects generated by oil palm expansion in the region. To delimitate and establish, based on technical guidelines, suitable areas for crop plantation.
EMATER	Low	Brazilian institution in charge of providing technical assistance to smallholders. (Not including oil palm producers)
SENAR	Direct	Companies partner with the organization to bring farmers additional knowledge useful for different aspects of the farm and their successful oil palm production.
Financial Institutions	Direct	Administrare resources for family agriculture programs. Disburse credits to support oil palm inclusion programs to family agriculture
Smallholders	Direct	Production and later commercialization of oil palm
Civil Society / NGOS	Medium	Social role of monitor and follow up different process that involves vulnerable populations or minority groups in society

Key stakeholder: private sector

Private sector may be considered the engine of oil palm expansion in Brazil, their role in the expansion is crucial as they act as buyers, integrators, and traders; in general their existence highly determines others' parties existence. Oil palm represents, as mentioned before, a very interesting investment opportunity for many companies that are already involved into the commodities and fats value chains; Brazilian internal market is not totally satisfied by internal production and it is recognized that half of oil palm consumed in Brazil is imported. As stated by Sebastiao Sinimbú from Agropalma "*The internal market has capacity to absorb around 250,000 hectares more in the region in order to fully satisfy the internal demand; companies would totally stand these competitions levels*". According to data showed above about rising oil palm demand, there seems to be potential to supply not only national markets but also international ones. At the same time, companies find in Pará an interesting region to develop family agriculture and consequently to obtain a better recognition with regards social responsibility.

However, companies have specific interests and drivers that may vary depending their internal policies, customers, production models, etc. referring to three different companies drivers, motivations and expectations will help understand in-depth different private sector perspective's within the region:

AGROPALMA represents one of the first companies entering the region; with a trajectory of 32 years, the company started with a vertical production model in response to incentives given by federal government of investing in Brazilian Amazon. Company is driven mostly by markets requirements, as such it began with the idea of supplying internal market and it led the company to acquire large land extensions, develop partnership with different type of farmers and to invest in a refinery in order to add value and provide a high level final product. On the other hand partnerships establishment, especially with smallholders, is highly motivated by attempts to remove negative reputation generated by different experiences in Malaysia and Indonesia with regards oil palm production. At the same time it was driven by the company's desire of contributing to develop the rural area where they are geographically located and link farmers with international markets. Finally the company's sustainable practices are motivated by market demands that require international certifications. Main buyers are from food and cosmetics sector, thus the company is not supplying biofuels markets giving price incentives from actual buyers.

BIOPALMA on the other hand, that was acquired by Brazilian company Vale: the second

biggest mining company worldwide, have different drivers to run oil palm plantations in Northern Brazil. Oil palm obtained from plantations and processing will be mainly used as biofuels for company self-operations within the country. Besides providing a sustainable biofuel source for internal transportation, the company also aims to build a strong social reputation by achieving the highest number of smallholders involved in oil palm value chain. Finally, the multinational ADM do Brazil is driven by different reasons. In the first place and as many others, exploring a new and promising value chain for their already broad portfolio of agricultural products traded within Brazil and internationally, as mentioned by regional development manager in Pará: “This is a very interesting region for ADM to expand and our businesses here are growing”; the company has recently invested in a port located in Barcarena, an strategic location for consolidating exporting processes from Brazil to the world. Secondly, the company’s national certification needs with regards biofuels production: as ADM do Brazil trades with biofuels, it is a requirement (as mentioned above) for them to obtain the “label” or selo combustível social in order to concur in national biofuels auctions; as including family farmers within the value chain is a requirement for the company it happens to be a relevant incentive for them to create social program. Finally, the program represents a social flag for the company, which also has a high marketing impact worldwide, given people’s changing preferences towards sustainability.

Although most of companies agree in the expansion processes and several incentives to plant the majority of hectares disposed to Oil Palm, it is also true that the future of crop expansion seems blurred. According to different program coordinators from different companies, the confusing legal framework present in the region as well as lack of labor and some other factors, the expansion may result paralyzed in 500,000 total hectares planted, contrary to different government’s expectations of around million of hectares, surpassing biggest producing countries as Malaysia and Indonesia.

5.2 Expectations around oil palm expansion: an stakeholders’ perspective

Oil Palm production model has been implemented in Brazil following guidelines to obtain a sustainable and social responsible program; this value chain aims not only to create economic opportunities, but also to generate social welfare as evidenced by the family agriculture inclusion into oil palm production. This initiative, aims to impact social, environmental and economical aspects of people whom never had a similar opportunity before.

One of most important goals from this study is to grasp deeper into different drivers, motivations, and expectations as a fundamental part of new production schemes entrance. In general terms the arrival of innovative programs, or non-traditional crops development, generates expectation among different actors involved, especially those directly related to it. Oil Palm's entrance is not the exception. In Pará, this crop's expansion is perceived positively from many sectors that recognize on it a great potential to transform and improve aspects in local communities is recognized. However, there are also opponent sectors that perceive it as negative and highlight several points of concerns and challenges from oil palm's recent expansion.

This chapter analyzes the empirical evidence and contrasts them with research questions and initial hypotheses exposed in chapter 2. The chapter will analyze different expectations and challenges perceived by different stakeholders about oil palm in its different businesses models present in Para.

5.2.1 Expectations: Family agriculture

"Agriculture here was dying, oil palm brought it back to life". Secretary of Agriculture, Irituia

"The program will have a revitalization of Sao Domingos do Capim economy, now if it will generate development for the whole municipality is still unknown: what are the factors that may determine this development?" André Grossi Machado, Coordinator of Biofuels, Ministry of Agricultural Development.

"I expect to life better, within 10 or 20 years I expect to see an improvement in my quality of life and in my family's". MANOEL LOPES DA FONSECA, Smallholder, Irituia.

Most of stakeholders characterized earlier, are involved to some extend with smallholders inclusion in oil palm value chain. In general terms, the program is perceived as positive and some of expected impacts are already visible in the region. However, concerns around long-term expansion have also shown up.

Positive aspects are expected from the entrance of this new family agriculture program. First recognized expectation has to do with farmers' economic situation: oil palm offers more competitive prices and promises a higher income than perceived by farmers right now. This aspect is expected to be impact thanks to secure markets part of program design. Second

expectation is related to knowledge creation as well as higher productivity through training sessions to farmers. Third factor is related to positivism perceived by agricultural products diversifications: farmers tend to depend on cassava production, which has low returns and poor agriculture practices. A fourth factor is related to employment creation, oil palm is labor intensive and will generate new jobs opportunities that will oxygenate traditional sources in municipalities. Fifth aspect has to do with fixation of men in rural areas: migration to urban centers is becoming a problem and oil palm represents an incentive for farmers to stay in their areas. Final aspects expected for household is an improvement in general life quality: “The crop represents a long-term income stability, within 20 years we will witness real changes in income increase and people’s better quality of life”. Secretary of agriculture, Sao Domingos do Capim. There is a general consensus about family’s improvement, especially through investments in education for new generations.

Some of farmers expect to be able to acquire goods as cars, motorbikes, or to improve housing; some of them also desire to reinvest the money by expanding farm and investing in different crops: “Partly, the success from this project will depend on how extra money gets invested”. Farmers also contemplate the possibility or spend less time in subsistence crops that have been problematic lately and represent too much work.

With regards environmental aspects, oil palm represents an opportunity to recover soils already unproductive due past deforestation as well as it avoids burns from farmers common in “mandioca” production practices. At the same time it is a new alternative for overcoming productive and health issues with cassava production: the traditional crop has presented different problems that threaten its sustainability and profitability. Oil palm is a culture approved by Amazonian studies, thus mean environmental impacts are not expected to be so traumatic.

Society is expected to be positively impact through different ways: first, by an infrastructure improvement as roads constructions, hospitals, schools, etc. Secondly, municipalities expect to perceive new economic resources from tax paid by companies that will be reinvested in developing rural sector. Finally, another advantage recognized has to do with the possibility of getting organized by producer associations that can be used as instrument to attract new projects, benefits and community improvements.

Challenges

Expectations are also related to challenges and long-term concerns. A first negative

expectation related to this business model is price oscillations: the high dependency on external prices changes could threaten farmers' income and consequently debt payments. Second aspect is related to the increase of agrochemicals use in the region: appearance of diseases and pests may contribute to the intensive use of new and harmful products. A third threat or challenge already perceived has to do with logistic and transport: the experience of other municipalities with high transport costs and so less profitability may be considered by companies to try and find the better and less inconvenient solution for farmers.

A main issue emerged in different reunions and focus groups with farmers is high level of investments: oil palm demands a high investment without return for the first years, during this time farmers are required to invest money from credit without perceiving much income. In fact, some NGOs affirm high levels of work associated with oil palm especially during first years; these groups also affirm oil palm is a mono-crop and it does not allow time to work in other productive activities, civil society seems concerned about profitability obtained from oil palm and extremist representatives admit that oil palm utilizes slavery into their production schemes.

Other sectors' concerns have to do with food security and the future of traditional crops due to little incentives to maintain them and high profitability from Oil Palm. Arguments against oil palm development are related to the perception of oil palm as a monoculture: according to these groups of people, farmers do not have time to spend working in anything else but oil palm production. Some of the expected difficulties are related to difficulties in disbursing more credits and rigidity of loans' models.

A final difficulty is infrastructure: poor conditions of roads and routes of communications may threaten the proper functioning of the program. Table 5 specifically describes different expectations divided into stakeholders involved:

Table 5: Stakeholders' position within family agriculture scheme of production in Para.

Oil palm family agriculture scheme of production			
Stakeholder	Positive expectations	Challenges	Long-term Concerns
Smallholders (Irituia and Sao Domingos do Capim)	Improvement in their quality of life through different means: income increase, economic stability, possibility of investments, and children education. Learning opportunities: through different training sessions and technical assistance. Access to physical capitals. Future generation involvement in rural activities: incentives to stick in the sector.	High investments levels and perceived amount of money is insufficient to cover it. Lack of adequate technical tools to plantation processes. More training sessions should be considered. Increase and strengthen of farmers associations.	Poor infrastructure in the region. Weak relationship with local governments. Prices oscillations.
Ministry of Agriculture Development	Improvements in Smallholders' quality of life through better income, diversification of production sources and market access. Revitalization of local economy.	Low association culture amongst farmers.	How to incentive higher inclusion of smallholders into value chains.
Mayor, Sao Domingos do Capim	Diversification of family agriculture and new employment opportunities for family group.	Concerns about transportation costs for producers. Generate incentives for future generations to stay in rural areas.	Prices oscillations in future.
Secretary of Agriculture, Sao Domingos do Capim	Life cycle of oil palm guarantees both: profitability and long-term economic safety. Great potential to impact positively farmers' quality of life. Alternative to diversify cassava production.	More partnerships with private company and higher participation of local governments in project. Pests and plant health issues.	Deficient local infrastructure. Higher involvement of local governments in Federal initiatives.
Rural workers union, Sao Domingos do Capim	Alternative to overcome health issues, crop is an alternative to soil recovering and does not bring land burning. Good and sustainable income.	Increase on agrochemicals not used before within the region. Generate incentive for future generations to stay in rural areas.	Prices oscillations in future. High debts acquisitions.
Secretary of Agriculture, Irituia	Good alternative to diversify traditional crops. Income is competitive. Incentive farmers to stay in rural areas.	Needs of work between different sectors.	Higher involvement of local governments in Federal initiatives.

5.2.2 Expectations: large-scale investments

“The arrival of ADM will bring other economic investments: it will push regional economy, it is a path without return”. Jose Ivaldo Badel, Mayor of Mae do Rio.

Large-scale investments are, in general, perceived as positive from different sectors involved directly or indirectly. These expectations are related to: revitalization of local economy through money already entered the municipalities the influence of these kinds of companies to attract more private investments in the area; with the arrival of national and international companies the area gains reputation, which may attract attention from other enterprises in different economic sectors. A progress for municipalities is also expected; mayors recognize that arrival of companies as ADM do Brazil contributes to higher local budgets as tax contributions, thus new resources may be redistributed in rural sector development.

Employment generation is also recognized, more than expectations it seems to already be a reality. Oil palm inception is related to the creation of new jobs positions and an inclusion into formal employment markets to several amounts of people. Employees perceive better income opportunities from working for an international company. Mae do Rio expects the creation of qualified jobs given the expectation of the processor industry in here. At the same time, employees notice the chance of learning technical aspects about oil palm that will for sure contribute to their own areas development.

Contrary to a traditional argument against oil palm production, there is a perception amongst local governments of contributing to global and local food security: people will have higher income, while at the same time oil palm generated is sold to food national and international markets.

Challenges

A first challenge associated to oil palm expansion have to do with legal protection of traditional Afro-Brazilians & Indigenous groups present in the Amazon, another concerning aspect is the ecological reserve that the region represents and consequently the carefulness with what it should be treated, as stated by a representative of Para’s public ministry: *“The Brazilian Amazon is not for dummies”*.

Another concerning aspect has to do with the employment generated and consequently incentives to leave farmers’ own production, as most of new workers hired from companies

usually own a piece of land.

Expansion of oil palm plantations is seen as concerning for some sectors: diseases may appear, scarcity of labor becomes a reality and negative reputation around oil palm may be a result. Also, the usage of agrochemicals and consequently contamination levels are challenges for producer companies, according to some stakeholders consulted.

5.2.3 Final remarks: what to expect?

After reviewing different expectations about main oil palm businesses models present in Para region, it is possible to perceive a general satisfaction and positive prospects towards establishment of the crop and its future within different municipalities. However, it is important to take into account that this initial phase may reflect high expectations and it would be relevant to evaluate how this evolve through time, especially when oil palm production becomes a reality.

However, and even though expansion in Brazil is still in a very early stage, forecasts predict that it will continue growing and consequently concerns that may look significant today, could worsen in the future. It is here where aspects as local government involvement and better coordination between different stakeholders may be key to the future of oil palm sector in Brazil.

It is also important to consider that lack of clarity around land titles and, in some cases, contradictory regulations around environmental aspects in the Brazilian Amazon is limiting expansion processes initially expected by Federal government. As stated by different companies interested in expanding their oil palm frontiers, it appears difficult to find available area to plant oil palm due past land conflicts that were not properly solved in the past. This concern does not only appear for large-scale initiatives, but also for smallholders' inclusion that find, most of cases, very strict requirements hard to meet.

Consequently, it seems important an alignment and higher coordination between different public institutions that push towards an efficient solution to better organize land distribution and titles in Northern Brazil.

5.3 Regional development: main impacts

It appears that oil palm, in its different production schemes, is expected to impact several aspects of municipalities where it has establish. In fact, there are visible impacts even though specific project subject to study is in a very initial stage. This section aims to analyze in depth

main aspects impacted and yet to be by oil palm expansion in northern Brazil. In general, it will elaborate in repetitive factors subject to change mentioned by different stakeholders in the region. The section will compare impacts generated by both large-scale investments and family agriculture schemes of production. Variables to be explored were the already defined in theoretical framework earlier in this study.

5.3.1 Aspects subject to impact from oil palm expansion: family agriculture and large-scale investments

Different production schemes generate specific expectations and lead to impact society in varied manners. However, there exists general aspects recognized to be affected to some extent by the arrival of oil palm projects. This section will describe every aspects in general terms and will present a summary of measurable impacts of two main oil palm businesses models.

“With oil palm program, our family’s life change, our neighbors’ situation, and consequently the community as a whole gets positively impacted”. GERALDO CORDEIRO DA FONSECA, Irituia.

“Working in oil palm plantations has provided me the opportunity of an stable job, while at the same time give me the change of learning about modern agricultural production practices” Large-scale worker, Mae do Rio

Educational aspects and Human Capital generation: Empowerment through knowledge

The model incepted in Brazil, tries to guarantee a permanent assistance to both farmers and employees involved in value chain production. Technical assistance providing as well as additional training sessions designed by some companies can be interpreted as an important attempt to reduce educational gaps existing in the region and empower communities through important agricultural learning. Farmers are highly satisfied with technical assistance providing and knowledge gained by training sessions attended so far. The program provides permanent technical assistance with regards oil palm plantation, fertilization, productivity, etc. In 2014 farmers related to host organization are receiving extra-training through 5 courses related to better practices in agriculture production.



Figure 13: Training session on Agrochemicals usage. Source: Author 2014

Employees on the other hand are also receiving training and knowledge empowerment in several aspects. As rural workers they must receive constant training in safety at work, sexuality, leadership, crop pests, health, etc. also, working with technology and advanced techniques have left important learning given traditional producing methods used by them before.

Income diversification, economy revitalization and employment

In family agriculture business model, economic benefits are mean to be shared with smallholders whom used to live mainly from cassava production and commercialization under low-technician practices and whom never had access to technical assistance nor successful governmental programs before. Monthly income of these small producers is on average 358 USD and programs implemented earlier within the region left a great proportion of them with high debts that are causing rejection to entering today’s programs. It is already possible to

perceive some benefits among starting programs and benefits from already existent ones are evident. As stated by a secretary of agriculture within the region: “in Irituia municipality it is possible to feel a revitalization of the economy and high amounts of new money coming mainly from credits disbursed are visible: around 1,5 million Brazilian Reais have entered”; as shown in table 6, oil palm programs with family agriculture have contributed great access to credit and all these money have entered municipalities economies:

Table 6: Credits disbursed to smallholders to oil palm plantations

Financiamento Palma de Óleo(dendê) - Pronaf Eco			
Ano	Municípios da Agência	Nº. Contratos	Valor Contratado
2010	ABAETETUBA	7	426.297,00
	TOMÉ-AÇU	39	2.309.997,00
	SUB-TOTAL	46	2.736.294,00
2011	CAPANEMA	19	1.055.433,00
	CASTANHAL	3	189.812,00
	TOMÉ-AÇU	44	2.789.723,00
	SUB-TOTAL	66	4.034.968,00
2012	ABAETETUBA	32	2.212.286,60
	CAPANEMA	1	78.144,30
	CASTANHAL	77	4.862.395,14
	SÃO MIGUEL DO GUAMÁ	95	5.902.313,39
	TAILÂNDIA	64	5.010.943,48
	TOMÉ-AÇU	83	5.975.021,54
	SUB-TOTAL	352	24.041.104,45
	Total Geral:	464	30.812.366,45

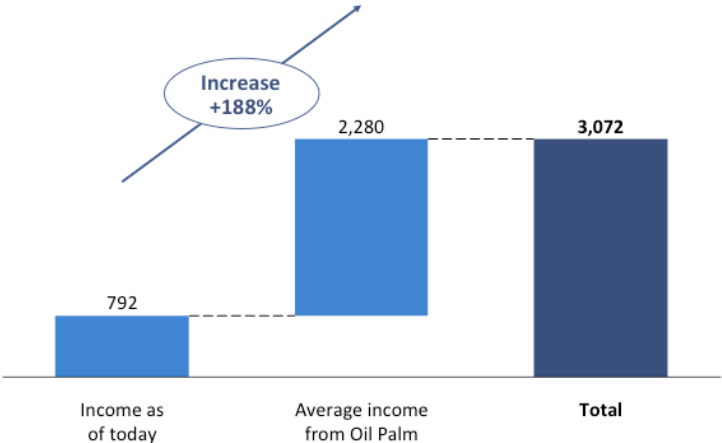
Fonte: Sig-
Controper-
GESOP/Banco da
Amazônia bases
maio/2012

Média de valor por contrato = R\$ 65.367,87

Source: Amazonian bank database 2012

As expected by many farmers, income will be the variable more impacted through oil palm plantations. However, most of them are today in a pre-production stage, reason why it seems more appropriate to work with forecasts. Based on international prices of oil palm during past years, productivity assumptions and average area planted, it was possible to estimate the percentages of income farmers will perceive in future, compared with the amount perceived nowadays. Figure 14 shows the result,

Figure 14: : Expected income increase among smallholders



Source: Author’s analysis

According to the graph, that assumes a productivity of 19 tons/hectare and an area of 7,5 hectares, farmers will perceive an increase of around 188% without taking into account production costs. Thus, if maintaining basic crops production as mandioca.

Farmers and different stakeholders consider that impacts are already visible: houses are improving, especially places where oil palm incepted years ago. Places that still do not have a production perform less improvement, however money from loan allows investing in crucial needs and variations on management highly influences people’s quality of life. Most of farmers interviewed part of ADM do Brazil program admit to have acquired some good as televisions, radios, motorbikes, among others. Others admit to have invested extra money perceived in house maintenance works.

It is important to notice that “farinha de mandioca” production, as a livelihood strategy does not allow much space for savings or for breaking poverty cycles. As agricultural modernization did not take place in previous years, farmers have to deal with problems related to crop production and so finding more efficient and profitable crops seems as a perfect way out of traditional methods of production.

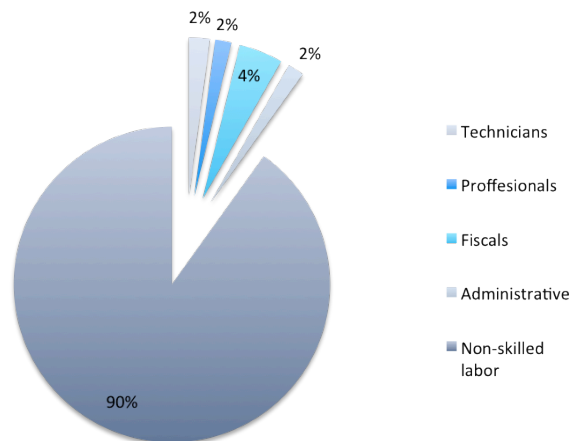
Finally, farm management sessions will be carried out through the year, thus farmers will be empower with better consumption, management and investments theories and knowledge, which is expected to create conscious and provide with tools that help them make strategic decisions on extra money and so that oil palm may be used as a mean to explore different business lines and so breaking poverty cycles become a reality in the region.



Figure 15: Training session in safety at work, rural community. Source: Author 2014.

With regards large-scale investments, jobs creation is one of the already visible consequences of oil palm inception. Companies precise to hire different kind of employees in order to properly work. Most of employment generation is non-skilled labor, so far investment has generated in the region around 350 new jobs, figure 20 shows distribution of positions generated by ADM do Brazil

Figure 16: Jobs created distribution by education levels



Source: Author analysis

As seen in figure 16, great proportions of created jobs are non-skilled labor. As mentioned before, oil palm is a labor-intensive crop. However, most of jobs created led to an inclusion into the formal sector for many of them. Income varies depending position and quality of work: for non-skilled labor salaries rank from 368 USD to 590 USD. These income levels are above regional average, while at the same time guarantees access to health systems and several benefits of being part of “formal” employment sector.



Figure 17: Program coordinator giving a talk to workers in large-scale investment. Source: Author 2014

Environmental & productivity aspects

“Actual success in reducing deforestation of our forest provide credibility to our attempt to reduce it in 80% by 2020. Amazonian countries are working in order to define a common position about climate change. We want a protected amazon, more sovereign over countries that conform it” Lula da Silva 2009

A first environmental base for oil palm production in Brazil, not only demanded by the government and Oil Palm programs, but a basic requirement for companies to partnership with different farms and vertical production: it is compulsory to preserve 50% of total area planted with oil palm to forestry, at the same time it is precise that the crop is planted in deforested land extensions. The crop has also proved not to be aggressive towards nature and

it helps to gasses processing.



Figure 18: First year oil palm large-scale plantation with forest on the background. Source: Author 2014

Levels of productivity have definitely increased in the region. Oil palm represents a highly productive crop, compared with under exploited large land extensions used to livestock in the past. The crop promises incept new and more productive methods to properly exploit the potential of Amazonian lands. Studies within the Amazon have confirmed the suitability of the crop and proper adaptation in the area. Different companies with years in the region admit that some fauna species have appeared again after years without showing up.



Figure 19: Sloth in AGROPALMA oil palm plantations. Source: Author 2014

Social aspects

With regards social aspects there are two main highlights with regards oil palm projects, especially those related to family agriculture promotion. First one, and recognized for most of stakeholders, including farmers themselves is the high incentives that rural men have now to not migrate to urban centers. Rural exodus has been recognized as a common livelihood strategy in Northern Brazil, lack of opportunities is main reason. However, oil palm has incentivized not only farmers to stay, but in some cases have attracted youth from cities to get back and use agriculture as income generator.

A second factor has to do with associativity: the program is already impacting association culture that was almost inexistent in region. Some companies establish as a requirement for smallholders to become part of the program being associated and organized as business producer groups; others will incentivize associativity through training sessions and permanent assistant on it.

Local infrastructure & public services

Infrastructure is a highly important aspect in oil palm projects. Not only for guaranteeing quality of life for farmers, but also in order to properly commercialize the product. Internal roads and bridges are in poor conditions within Pará, and more than anything it generates

concerns and threat projects. However, this factor is highly dependent on local governments management and initiatives, if it is possible to improve logistics conditions, the program not only will impact household economic and social situation, but also their environment and communities' quality of life.

In the other hand, public services providing as water sewerages, trash collection, health and education, among others are generally weak in municipalities of study. This represents some challenges for programs development as difficulties for learning processes within communities. This is a factor that again could generate benefits for population as well as for oil palm expansion in the region.

5.4 Local governance & institutions

“Oil Palm has the potential of being an important factor of development, but if not exhorted under proper control instruments it can generate a negative impact, as everyone at the audience may know” André Grossi Machado, Ministry of Agriculture Development at public audience about impact of oil palm in smallholders' communities.

Trying to solve one of the research questions is the main objective of this section. Empiric evidence as well as local economic development theories have shown different aspects that may be taken into account for a federal initiative to generates positive effects in local economies. Understanding how these aspects are happening in the region where the federal program is being incepted is fundamental. In this opportunity main aspect to be explored is governance, this is analyzed from studying and understanding institutional relations within the region and taking into account different governmental levels.

Governance

“If we want to take the most advantage from this crop expansion, local governments and private sector must work in the same direction” José Ivaldo Badel, major of Mae do Rio municipality.

As defined in theoretical framework, governance is about processes by which public decisions are made and implemented. When bringing it to our own research, it seems important to grasp amongst different actors on how do they perceive governance in their own environment.

However, for achieving this it is important to facilitate the concept to people so that it is possible to obtain appropriate information. That is the reason why instead of grasping about governance itself, questions are focused on understanding institutional relations within the region.

It is possible to observe, in general terms, the negative perception that different groups in society have with regards local governments. Most of stakeholders feel a lack of governance especially when it comes to rural development in municipalities where oil palm is today a reality. However, it is also possible to witness some of local government's acknowledgment the importance of local governance properly exhorted in order to take more advantage of new projects being incepted in the area. Different arguments will be exposed to demonstrate varying perceptions of governance in municipalities of study.

The way of how local governance is perceived touches upon one of the underlying issues: expectations. The private sector is expected to take the lead in pursuing local development through oil palm expansion. Simultaneously, the local government stands aside without any involvement whatsoever. Private companies conduct regular consultation sessions with the federal government, but a session on a local level could not be discerned. This is one of the main arguments why private companies criticize the local government. When consultation sessions are proposed, some of the local mayors seem to prefer to seclude their teams. Understandably, this manifestation raises cause for concern, as sessions from this type contrasts with the company's codes of conduct. As such, this creates the impression that the private companies, without proper consult on a local level, are pulling the cart in terms of transforming oil palm's expansion to the driver of local development. The relationship between these two organizations is good in general terms, however plans or partnerships to work together for common goals rarely happens or if does they do not necessarily are executed. Example of this is an statement from an pioneer company in the region representative: "We tried to work together with local governments, but lack of commitment made us step back and lead different processes by ourselves".

On the other hand, local communities do not feel a proper representation of their interests and needs through governments. According to an interviewed farmer: "Para's government has a debt with us, in order to obtain an improvement in communities quality of lives, it is necessarily that communities and governments work together". Farmers in general recognize that relationship with governments are zero, and if happens it tends to be during elections period.

In general, there is a perception from the private sector and farmers themselves of little

attention and minimum prioritization to rural development within municipalities; this fact was expressed several times by farmers when being asked about institutional relationships and communities' infrastructure. This is also evidenced by the limited access to basic public services as health, infrastructure, education and others that not only limit their welfare but also represent great challenges for companies' proper development.

Different public organizations on a higher level also agree that lack of proper management and initiative from municipalities determines improvement of rural sector situation; usually lack of governability does not allow expected progress. Actually, some members of local governments recognize little initiatives from local governments with regards rural sector development, especially with oil palm smallholders. More precisely, some of the interviewed staff admits that more actions could take place and a higher involvement could be possible. However these partnerships must come from different sectors initiatives.

In conclusion, private sector is highly perceived by local governments and civil society as a highly important actor and tries assigns their responsibilities with regards municipalities' development to them. Thus, better advantages could be taken from oil palm expansion, but also higher coordination from entities that could definitely contribute more into this phenomenon that is increasing in a rapid pace in Para region.

CASE STUDY

Paragominas, that used to be the most deforesting municipality in the world turned out to be the first "Green Municipality" in Brazil.

Paragominas represents a clear example in which local governance properly exhorted may generate whole benefits for the local development of a population. As many other municipalities in Northern Brazil, Paragominas emerged from the incentives given in 60 and 70s to colonize the Amazon and exploit natural resources provided by the rich region. In this period, people from Southern regions of Goiás and Minas Gerais migrated looking for better economic opportunities. Meanwhile, the government policy over the amazon was of deforestation and "land opening": Whomever who wanted to make a life out of deforesting land or exploiting timber was not only allowed but incentivized. Amazonian funds were created to develop the region, and large-scale investments were priority.

This led to different land title problems, disorganized urban and rural growth, land burning, among others resulted from federal policies incepted: the government had no control over the 1,948,000 ha that Paragominas owns, land titles issued around the river generated a series of

negative consequences as title falsification, that a helpless state could not regulate nor monitor. As timber represents a finite resource, it was towards the end of the 90s when exploiting companies started to move towards other direction, according to Osmar Scaramusa, business man from Paragominas: “*it started a need to open up other income sources*” so a group of businessmen commenced to explore agriculture and livestock as economic alternatives; soy, rice and corn were some of those.

At the same time, a new political movement started lead mainly by civil society and entrepreneurs especially migrants who founded the city that were concerned about life quality and future generation challenges; the economic growth that was being generated was not being reflected in people’s quality of life. “If the political leader thinks big, the rest of the population will follow it by thinking big too”. According to this group of civil society, the only way of improving it was through politics, and consequently a leader with ideas for society instead that personal interests was necessary to completely change reality, by prioritizing aspects as infrastructure, education, private investment, health, etc. This process ended up in an efficient public administration that led a socio economic transformation that today is visible in this differentiated municipality. The public-private partnerships started to be stronger and the people became supervisor of public administrations.

Meanwhile, when political changes started to happen, the number of rubber companies had came down from 368 to 120; still deforestation was already a reality and continued to be an important engine of economy for the municipality. In 2007/2008 timber buyers closed commercial doors to production from Paragominas, and the so-called “*operação arco de fogo*” a public initiative to close companies with wrong extractives practices.

In 2009 and in a partnership between a good public administration, companies, NGOs and civil society the municipality took the bad reputation to turn it into a good one, and started working towards the elimination of the name in deforesting lists worldwide. As mentioned by André Nascimento from private sector in Paragominas, “It was thanks to a good local governance that we achieved it”.

Today Paragominas is example of a progressive municipality that took advantage of negative context and economic opportunities to transform the environment and achieve one of the best human development indexes in the region. Governance properly exhorted and cohesion between different sectors in society to obtain a general welfare was key factors for today’s municipality success.

6. Conclusions

After analyzing in depth different businesses models and their influence over local development in Northern Brazil, it appears that the crop expansion through its main schemes of production is contributing to local development through different manners. Main two models predominant within the region observed are perceived to be positive for improving region overall social, economic and environmental situation from majority of actors involved in the oil palm value chain. However, and despite positivism towards the crop, there are still challenges and long-term concerns that could be addressed in early stages in order to avoid adverse effects that oil palm expansion can also generate.

Oil palm expansion in Brazil has occurred under the shadow of a negative reputation resulted from difficulties faced by pioneer countries as Malaysia, Indonesia and its neighbor Colombia. These difficulties point towards negative environmental and social impacts generated amongst parties involved in oil palm production, especially amongst vulnerable groups. However, not all the negative reputation around oil palm expansion is well sustained in Brazil: the federal government has spent efforts in creating a sustainable oil palm framework that tries to avoid negative issues presented in other countries. This legal framework aims to strengthen aspects as: biodiversity protection, sustainability, social inclusion, income generation and job creation, agro ecologic mapping, productivity, competitiveness and investment & development. Guidelines regulate different schemes of production present in the country: large-scale investments and smallholders' inclusion in oil palm value chain.

Contrary to much discussion generated around academic debate to measure and define whether large-scale investments or smallholders' inclusion are better or worse when it comes to local development, oil palm in Brazil has shown that both production scheme may bring benefits to local and regional development and those benefits depend on many factors, as for example, governance and clear guidelines to address expansion processes and convert negative aspects into development opportunities for population.

Main positive factors directly associated with oil palm expansion processes in northern Brazil have to do with diversification of production, household income increase and better agricultural practices. As consequence of these positive impacts, other societal aspects as revitalization of economy, new sources of employment and fixation of men in rural areas and consequently avoid rural exodus are repetitive amongst different stakeholders' perception of

oil palm production in Pará.

However, concerns are also present in the region. Main impacts are visible at a household level rather than a community one. Few of them aim to get a common improvement and there is little culture of work team in the region. The perception of oil palm as a monoculture also represents, for some groups, a threat for food security. Future prices oscillation together with exchange rates are also a high concern amongst population involved, and finally environmental possible impacts prevenient from agrochemicals and fertilizers usage.

Finally, it is possible to encounter challenges and long-term concerns generated by the arrival of oil palm to the region. First one has to do with ratio of inclusiveness of smallholders. The program seems strict about its requirements and that is probably the reason why the ratio of entrance is so limited. Finding ways in which the initiative may involve more people is challenging, especially because there seems to be a natural filter of best farmers whom end up in the program. Secondly, difficulties to transfer technological capacities due level of educations of farmers and their families may limit project success, these difficulties are associated with lack of infrastructure as schooling; but also absence of adequate physical infrastructure as roads, hospitals and basic services block somehow rural development in the region.

Sustainability of different aspects seems as a concerning point. Training sessions provided by companies are limited and there is no continuity scheduled. Also, as contracts are long-term designed, it is important to find ways to involve future generations so the production has continuity. To conclude, rigidity of credits could be an improving point so in the future flexibility may helps avoiding bureaucratic processes with banks.

To finalize, expansion processes seems concerning for oil palm industry. For large-scale investments lack of clarity around land titling in the region represents an impairment to expand. On the other hand for smallholders inclusion, problems are more related to incentives to include them in the chain: companies face challenges to control large amount of smallholders and incentives from governments are not clear when companies are not biofuels traders. As stated by an interviewee from MDA “The problem of family agriculture expansion does not have to do with problems of land titling; companies with a cosmetics or food market have sufficient incentives to include family farming into their production value chains”.

From all evidence and discussion presented above, it seems that the arrival of oil palm companies itself will not bring local development, it has to do with the mixture of several aspects that will help improving quality of life in the region and to generate social development among citizens, especially in rural areas. It is possible to perceive from most

local governments a belief that the arrival of private sector is, until some extend, the replacement of their roles and responsibilities towards generation of welfare amongst population, and instead of working together, they expect companies to solve rooted social problems faced by population.

Thus, the little presence and involvement of local governmental authorities with the program and moreover in rural sectors, as it is today in most of municipalities, may be considered as an obstacle for taking advantage of the full potential represented by the crop and actually may threat the arrival of different initiatives and new companies.

7. Recommendations

As concluding remark from deep analysis of oil palm expansion processes in Brazil, especially from a pre-investment approach, it is clear that oil palm has potential to push municipalities towards better life conditions. This chapter provides relevant recommendations to improve the way how oil palm is being expanded in Brazil, mainly taking into account general concerns, stakeholders suggestions and long term challenging scenarios.

1. Payment methods: as one of main concerning aspects within oil palm value chain expansion, prices and future payments should be adapted in order to provide tranquility and stability amongst farmers in the region. Tools to easily adjust payment methods in case of high prejudice from international prices should be considered in buying and selling contracts between parts.
2. Roles & different involvement levels: although there are basic roles established in legal frameworks created to support the sustainable expansion of oil palm in Brazil, there are different parties that could generate more valuable contribution in order to more successful results for municipalities. Local governments for instance could take leadership in establishing partnerships that may facilitate local dynamics and consequently foster benefits already perceived. Brazilian and international NGO could take a more active and responsible role within this phenomenon: instead of sometimes creating wrong or confusing arguments, should try to fill gaps within processes and through responsible research inform better to civil society what are tangible effects generated by the crop.
3. Flexibility: as oil palm is a long-term crop by nature and so it represents high investment levels, some people happens to get scared or terrified to establishes a long term commitment that appears unenforceable to them. Potentially, different terms could be offered and depending on farmers' ambitions, they should be able to choose the length of contract.
4. Methods of estimate amounts and expenses from financial institutions: according to a bank manager, methods of calculating expenses and amounts for credit disbursements are too rigid and sometimes harm farmers' finances. To adjust models may be a solution to improve program's operations.

5. Alliances with input producers: high prices in fertilizers and chemicals are also reason of concern amongst farmers. Alliances with input producers in order to get prices to smallholders and family agriculture is an idea that emerged from conversations with bank representatives. It will help reduce or stabilize high cost paid for inputs required in oil palm production.
6. Public audiences in communities to involve direct affected (Smallholders): after the first audience conducted in Belem, Para's state capital, it emerged as an important conclusion the importance of having main actors involved. An appropriate initiative is to conduct audiences directly in communities so that main interested stakeholders can actually have a higher participation.
7. Stronger incentives for Smallholders involvement in oil palm value chain: companies not involved with biofuels production and commercialization in Para, have little incentives from federal government of involve smallholders in value chains. Most of companies, who are doing it, do not seem very rushing for increasing the numbers of farmers, and those who are interested prefer to keep quality rather than quantity. Truth is: working with smallholders represents several challenges for companies, whom are mainly trading with food and cosmetic markets given interesting prices. Creating appropriate incentives to increase smallholders involved in oil palm value chain, as well as sufficient support to them seems as a key strategy.
8. Partnerships between federal and local agencies to properly address land-titling issues: land titling issues as lack of clarity and property rights are affecting large-scale investment expansion in the region. Companies do not want to risk large amounts of money and efforts without having a clear legal framework with regards Amazon areas in Para. In order to efficiently deal with these legal conflicts, harmonization between different governmental levels to accelerate land issues that have been a historic source of conflict.
9. Training in economic and management affairs to prepare farmers for higher incomes together with social work in order to orientate families to make adequate usage: the arrival of ambitious and long-term projects in communities with traditional systems of production seems challenging. Farmers will considerable increase their incomes and thus may become source of social problems in future: culturally the region has demonstrated the high consume of alcohol, partying, etc. partnership with educative institutions to prepare farmers and train them in management and basic finance could be an interesting initiative to prepare communities.

10. Labor: An emerging concern for future expansion has to do with labor availability. Aside land titling issues, lack of both qualified and unskilled labor seems as challenges for oil palm expansion. A suggestion has to do with public alliances to canalize employment opportunities and needs. Municipalities can contribute with training according companies' demands as well as link labor with jobs positions.
11. Pests: finally, expansion processes may lead to appearance of pest and health issues on oil palm plants. In this aspect is highly recommended to develop plant health research. Thus uncontrolled and unknown diseases that may result for expansion pace may be controlled on time and not having to go through plantations burning processes.

8. Discussion

Different school of thoughts around relationship between oil palm expansion and sustainable development emerged years ago in order to answer different questions about impact generated. However, main influencing schools of thoughts are based on experiences of Asian countries as Malaysia and Indonesia. This study focused in exploring a relatively recent phenomenon occurring in Brazilian Amazon, and contributing to literature and knowledge about consequences and expectation of oil palm expansion within Brazil was main goal.

As stated by several authors explored in this thesis, oil palm has caused considerable environmental and social impacts in host countries: argues go between negative and positive and how those should be addressed. In this study, some findings are related to different schools and some others do not apply given the differentiated context. For instance, Brazil is not yet using its production to biofuels markets supply; instead most of customers are related to cosmetics or food production. Moreover, government of Brazil has spent efforts to de-incentivize deforestation in the Amazon, and in order to avoid problems occurring in different countries areas allowed for crop expansion are clearly established and were product of deep environmental research processes.

It then seems that the main suggestion of exhorting governance and establish clear rules for the expansion of oil palm is a reality in Brazil, and even though there are still many challenges to overcome, they seem to vary to those faced by countries generators of knowledge.

An important conclusion to highlight is the eager need to generate more knowledge about the recent and fast oil palm expansion in Brazil. And thus with regards multiple aspects: environmental consequences, social and economic impacts and human development indexes. It is important to carry out impact assessments in new incepting companies, once they are in a more advanced stage and research on local governance could be interesting in order to follow up local dynamics generated by the entrance of innovative programs to rural areas in Northern Brazil.

9. References

1. 2012books.lardbucket.org, (2014). Inductive or Deductive? Two Different Approaches. [online] Available at: <http://2012books.lardbucket.org/books/sociological-inquiry-principles-qualitative-and-quantitative-methods/s05-03-inductive-or-deductive-two-dif.html> [Accessed 5 Aug. 2014].
2. Adm.com, (2014). *ADM: Home*. [online] Available at: <http://www.adm.com/en-US/Pages/default.aspx> [Accessed 18 Aug. 2014]
3. Andersson, K., Gibson, C. and Lehoucq, F. (2006). Municipal politics and forest governance: Comparative analysis of decentralization in Bolivia and Guatemala. *World Development*, 34(3), pp.576--595.
4. Bailis, R. and Baka, J. 2011. Constructing sustainable biofuels: governance of the emerging biofuel economy. *Annals of the Association of American Geographers*, 101 (4), pp. 827- 838.
5. Buarque, S. (2002). *Construindo o desenvolvimento local sustentável*. 1st ed. [Rio de Janeiro]: Garamond.
6. Cambridge.org, (2014). *The Cambridge World History of Food - Palm Oil*. [online] Available at: <http://www.cambridge.org/us/books/kiple/palmoil.htm> [Accessed 12 Aug. 2014].
7. Chaves, M., Dos Santos, A. L. and Borges, M. 2013. *Relatório Síntese do I Workshop do Programa de Produção Sustentável da Palma de Óleo no Brasil*. [Report] Belém: Embrapa Amazônia Oriental.
8. Corley, R. and Tinker, P. (2007). *The Oil Palm*. 1st ed. Oxford: John Wiley & Sons.
9. Dauvergne, P. and Neville, K. (2010). Forests, food, and fuel in the tropics: the uneven social and ecological consequences of the emerging political economy of biofuels. *The Journal of Peasant Studies*, 37(4), pp.631--660.
10. Fanzeres, A. (2014). *La historia contada de la deforestación*. [online] Oecoamazonia.com. Available at: <http://www.oecoamazonia.com/es/articulos/9-articulos/77-a-historia-contada-do-desmatamento> [Accessed 15 Jul. 2014]
11. Fao.org, (2014). 2 OIL PALM. [online] Available at: <http://www.fao.org/docrep/005/y4355e/y4355e03.htm#TopOfPage> [Accessed 7 Aug. 2014].

12. Feintrenie, L., Chong, W. and Levang, P. (2010). Why do farmers prefer oil palm? Lessons learnt from Bungo district, Indonesia. *Small-Scale Forestry*, 9(3), pp.379--396.
13. Fern, Es, B. M., Welch, C. A. and Gonçalves, E. C. 2010. Agrofuel policies in Brazil: paradigmatic and territorial disputes. *The Journal of Peasant Studies*, 37 (4), pp. 793—819
14. Fitzherbert, E., Struebige, M., Morel, A., Danielsen, F., Brühl, C., Donald, P. and Phalan, B. (2008). How will oil palm expansion affect biodiversity?. *Trends in ecology & evolution*, 23(10), pp.538--545.
15. Foresight, (2011). *Charting new directions: Brazil's role in a multi-polar world*. Berlin: Foresight.
16. Ibge.gov.br. 2014. *IBGE: Instituto Brasileiro de Geografia e Estatística*. [online] Available at: http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisa_resultados.php?id_pesquisa=40 [Accessed: 16 Jan 2014].
17. Lam, M., Tan, K., Lee, K. and Mohamed, A. (2009). Malaysian palm oil: surviving the food versus fuel dispute for a sustainable future. *Renewable and Sustainable Energy Reviews*, 13(6), pp.1456--1464.
18. Mongabay.com, (2014). *State deforestation in the Brazilian Amazon*. [online] Available at: http://www.mongabay.com/brazil-state_deforestation.html [Accessed 12 Aug. 2014].
19. Naritomi, J., Soares, R. and Assunção, J. J. 2009. Institutional development and colonial heritage within Brazil. *IZA Discussion Paper*.
20. Paulino, E. T. 2014. The agricultural, environmental and socio-political repercussions of Brazil's land governance system. *Land Use Policy*, 36 pp. 134--144.
21. Pui, S. Y. 2012. *Brazil's Bolsa Família: Do Local Governments Matter?*. MIDDLEBURY COLLEGE.
22. Rist, L., Feintrenie, L. and Levang, P. (2010). The livelihood impacts of oil palm: smallholders in Indonesia. *Biodiversity and Conservation*, 19(4), pp.1009--1024.
23. Rodrigues, T. O., Caldeira-Pires, A., Luz, S. and Frate, C. A. 2014. GHG balance of crude palm oil for biodiesel production in the northern region of Brazil. *Renewable Energy*, 62 pp. 516-521.

24. Senar.org.br, (2014). SENAR » Serviço Nacional de Aprendizagem Rural. [online]
Available at: <http://www.senar.org.br/quem-somos> [Accessed 25 Jul. 2014]
25. Souza, C. 2002. Brazil's system of local government, local finance and intergovernmental relations. *Birmingham, University of Birmingham*.
26. Tan, K., Lee, K., Mohamed, A. and Bhatia, S. (2009). Palm oil: addressing issues and towards sustainable development. *Renewable and Sustainable Energy Reviews*, 13(2), pp.420--427.
27. Zoomers, A. (2010). Globalisation and the foreignisation of space: seven processes driving the current global land grab. *The Journal of Peasant Studies*, 37(2), pp.429--447.

10. Annexes

Annex 1: Questionnaire ADM 2012/2013

QUESTIONÁRIOS (ADM) - PLANTIO 2012/2013		
Responda as Perguntas Seleccionando as opções Desejadas. Se necessário, Descreva a Situação ao Lado		
PRODUTOR(A):		Nº CPF:
MUNICÍPIO:		Nº DAP:
COMUNIDADE:		DATA DA PESQUISA:
AMBIENTAL		
Onde são descartadas as embalagens de produtos químicos?		
Usa para pegar água?	<input type="button" value="NÃO"/>	
Usa para guardar água?	<input type="button" value="NÃO"/>	
Queima?	<input type="button" value="NÃO"/>	
Realiza processo de lavagem?	<input type="button" value="NÃO"/>	
Devolve para revenda?	<input type="button" value="NÃO"/>	Quem entregou? <input type="text"/>
Utiliza fogo na limpeza de área para plantio de mandioca ou outra cultura?	<input type="button" value="SIM"/>	Sim - Qual cultura? <input type="text" value="MANDIOCA"/>
Faz tratamento para água que irá consumir?	<input type="text" value="CÔAA ÁGUA"/>	
Você ou alguém da família caça animais?	<input type="button" value="SIM"/>	Sim - Quais animais? <input type="text"/>
Você encontra muitos animais silvestres na propriedade?	<input type="button" value="NÃO"/>	Sim - Quais animais? <input type="text"/> E onde? <input type="text"/>
Você planta árvores?	<input type="button" value="NÃO"/>	Sim - Por que? <input type="text"/> O que planta? <input type="text"/>
EDUCAÇÃO		
Você sabe ler e escrever?	<input type="text" value="ESCREVE APENAS O NOME"/>	Qual o seu nível de escolaridade? <input type="text" value="PRIMÁRIO INCOMPLETO"/>
		Comentários: caso seja algum outro curso ou nível diferente <input type="text"/>
Você tem filhos?	<input type="button" value="NÃO"/>	Sim - Quantos? <input type="text"/>
		Idade dos filhos
		1º FILHO: <input type="text"/> 4º FILHO: <input type="text"/>
		2º FILHO: <input type="text"/> 5º FILHO: <input type="text"/>
		3º FILHO: <input type="text"/> 6º FILHO: <input type="text"/>
Qual o nível de escolaridade dos seus filhos?		Existe transporte escolar? <input type="button" value="SIM"/>
1º FILHO: <input type="text"/>	4º FILHO: <input type="text"/>	
2º FILHO: <input type="text"/>	5º FILHO: <input type="text"/>	Sim - Qual é o transporte? <input type="text" value="ÔNIBUS"/>
3º FILHO: <input type="text"/>	6º FILHO: <input type="text"/>	
Seus filhos trabalham no plantio de palma?	<input type="text"/>	Alguns de seus filhos se mudou para cidades maiores? <input type="text"/>
Seus filhos estão na escola?	<input type="text"/>	Comentários <input type="text"/>

SEGURANÇA

Já aconteceu algum tipo de violência com você ou sua família?

Sim - Comente o que houve:

Você vê pessoas da comunidade usando drogas?

Comentários

A polícia faz ronda na sua comunidade?

Sim - Quantas vezes por semana?

INFRA ESTRUTURA

Qual meio de transporte se utiliza?

Com que frequência vai à cidade?

Adquiriu algum bem nos últimos meses?

Geladeira

Aparelho de DVD

Fogão

Micro ondas

Televisão

Ventilador

Rádio

Outros

Se a opção for Outros, descreva abaixo:

O que você espera do Projeto Palma?

Se a opção for Outros, Descreva:

SAÚDE

Existe posto de saúde na sua região?

Sim - Em que comunidade?

Existem agentes comunitários que visitam a sua comunidade?

Sim - Quantas vezes eles visitam?

Quantas vezes vocês precisam de atendimento no mês?

SEGURANÇA NO TRABALHO

Você já se machucou trabalhando na lavoura?

Sim - Como?

Você já se machucou trabalhando no plantio de Palma?

Sim - Como?

Você está sendo orientado a usar os equipamentos de segurança (EPI)?

Você utiliza os EPI's ?

Não - Por que?

COMUNIDADE

Sua comunidade realiza reuniões?

Quantas vezes por mês?

Vocês possuem Associação?