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The environmental and social consequences of palm oil production in Colombia

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Abbreviations

BMZ	–	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, english: Ministry for economic cooperation and development
CBA	–	Collective Bargaining Agreements
CBD	–	Convention on Biological Diversity
CSPO	–	Certified Sustainable Palm Oil
CTA	–	Cooperativas de Trabajo Asosiado, english: Worker Cooperatives
EIA	–	Environmental Investigation Agency
ELN	–	Ejército de Liberación Nacional, english: National Liberation Army
et seq.	–	'et sequens', english: and following page
FAO	–	Food and Agriculture Organization
FDCL	–	Forschungs- und Dokumentationszentrum Chile-Lateinamerika e.V., english: Research and Documentation Center Chile-Latin America e.V.
Fedepalma	–	La Federación Nacional de Cultivadores de Palma de Aceite, english: The National Federation of Palm Oil Cultivators
FNR	–	Fachagentur für Nachwachsende Rohstoffe, english: Agency for renewable raw materials
FSC	–	Forest Stewardship Council
GDP	–	Gross Domestic Product
ibid.	–	'ibidem', english: at the same place
IIED	–	International Institute for Environment and Development
IWGIA	–	International Work Group for Indigenous Affairs
ILO	–	International Labor Organization
IUCN	–	International Union for Conservation of Nature
MDGs	–	Millennium Development Goals
MPOC	–	Malaysian Palm Oil Council
NGO	–	Non-governmental Organization
OECD	–	Organization for Economic Co-operation and Development
OVID	–	Verband der Ölsaatenverarbeitenden Industrie in Deutschland, english: Association of the Oilseed Processing Industry in Germany
PFAD	–	Palm Fatty Acid Distillates
REDD	–	Reducing Emissions from Deforestation and Forest Degradation
RSPO	–	Round Table on Sustainable Palm Oil

RQ	–	Research Question
SAS	–	Sociedad por Acciones Simplificada, english: Simplified Stock Company
SPOTT	–	Sustainable Policy Transparency Toolkit
UN	–	United Nations
UNCED	–	United Nations Conference on Environment and Development
UNFCCC	–	United Nations Framework Convention on Climate Change
UNHCHR	–	United Nations High Commission for Human Rights
UP	–	Unión Patriótica
USAID	–	United States Agency for International Development
WB	–	World Bank
WCED	–	UN World Commission on Environment and Development
WOLA	–	Washington Office on Latin America
WWF	–	World Wide Fund For Nature

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Declaration

I, Iris Albertin, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature 

Date 14.08.2021

Abstract

Palm oil production has been steadily growing worldwide since the end of the 20th century and has increased 15-fold between 1980 and 2014 (IUCN, 2021). Besides the main production countries Indonesia and Malaysia, Latin American countries start playing an increasing important role on the global palm oil production market. Colombia is the country in Latin America with the highest production. The growing production rates of the last years have caused a controversial discussion of the consequences of palm oil production such as the deforestation of large areas of tropical rain forest on the one hand but higher yields in terms of plantation sizes and harvests in comparison to other oils such as sunflower or rapeseed oil on the other hand. Recognizing these controversies connected to large-scale oil palm cultivation, this thesis aims to answer the following research question (RQ): What are the environmental and social impacts of palm oil production in Colombia considering the increasing demand for palm oil and how sustainable can be the palm oil production in Colombia?

This case study looks at the consequences of palm oil plantations for the local environment and society in Colombia. As part of this analysis it is important to consider the history of Colombian land disputes and the war with the FARC (Revolutionary Armed Forces of Colombia) guerilla movement. The national palm oil boom has its roots in this civil conflict. Recognizing that palm oil cultivation results in the deforestation of rain forest and other impacts on the environment, questions need to be asked as to what extent the palm oil production can be realized in a sustainable way. To answer the research questions, particular theoretical foundations were chosen and used as the basis of the analysis. As the thesis was written under special circumstances (COVID-19) making field work impossible, the data used for this thesis was drawn predominantly from secondary sources produced by NGOs such as the WWF or the FAO as well as national palm oil organizations such as Fedepalma.

The analysis of the impacts of the palm oil production in Colombia shows that it is a complex issue which has both good and bad environmental and social impacts at the same time. First, I will demonstrate that palm oil production plays an important role when it comes to the creation of jobs. However, as I will also show that the large-scale cultivation of oil palms has undeniable impacts on the environment. Furthermore, I will highlight that vulnerable minorities of the Colombian population have been violently displaced by paramilitaries to clear the land for palm oil plantations. In a conclusion, I argue that we as consumers of palm oil in daily products can indirectly influence the palm oil production and working conditions in the production countries by the consumption choices we make and therefore contribute to sustainability.

Keywords: palm oil, Colombia, RSPO, CSPO, Fedepalma, agriculture, small holders, farmers, FARC, land conflicts, indigenous people, environment

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I. Introduction with research objective and research question

Palm oil has raised many controversies in recent decades. The overall objective of this research is to analyze the sustainability of the palm oil production in the leading Latin American production country Colombia and the environmental and social impacts for the involved actors. To achieve this objective, the following research questions have been formulated:

RQ 1: What are the environmental and social impacts of palm oil production in Colombia?

- If any, who are the winners and losers of the palm oil production?
- What are possible scenarios for the future?

RQ 2: How sustainable can palm oil production be in Colombia?

- How is the term 'sustainability' defined in this context?
- Which efforts have been already made to make the palm oil production more sustainable? Are there signs of success?

1.1. Literature review

"Sustainable development is a term that everyone likes but nobody is sure of what it means."

(Daly, 1996, p. 1)

This quote by Daly (1996) illustrates that the concept of sustainability is a broad field and leaves many possibilities for interpretation. The term which seems to be clear on the macro level is not so easy to define on the micro level. Based on Geiss et al. (2003) there are over 70 different definitions of sustainability today. That means that after centuries of scientific debates about the term there is still no consent and a clear definition of the concept 'sustainability'. The controversial view on the global question of development is due to the different interests, norms and moral concepts as well as attitudes of different countries. Therefore, it is difficult to define the 'right' way of living together in a world community (Geiss et al., 2003).

In this context, Kates et al. (2005) criticize the term 'sustainable development' as an oxymoron, that

means that in their opinion the two terms ‘sustainable’ and ‘development’ contradict each other because development cannot be sustainable, and sustainability cannot come along with development. Having such a contradictive character, the concept ‘sustainable development’ seems to be only useful for greenwashing purposes (Kates et al., 2005). However, they acknowledge that every trial of a definition of the concept is an important piece of a continuing dialog which influences the development of ‘sustainable development’ as a globally approved concept.

“The concrete challenges of sustainable development are at least as heterogeneous and complex as the diversity of human societies and natural ecosystems around the world” (Kates et. al., 2005, p. 20). This quote shows that the involved parties can interpret the term ‘sustainability’ in a way that it corresponds to their own specific situation but still according to the global sustainability standards. This freedom of interpretation can be seen positively or negatively because without common standards and indicators it is difficult to implement treaties such as a global forest declaration. However, it is also necessary to consider the country specific situations because developing countries have for example different economic, ecologic and social preconditions than industrialized countries.

Furthermore, there are not only controversies about the definition of ‘sustainable development’ or ‘sustainability’ but also on terms like ‘forest’. According to the definition of the United Nations Framework Convention on Climate Change (UNFCCC) is a forest a “minimum area of land of 0.05-1.0 hectares […] of more than 10-30 % with trees with potential to reach a minimum height of 2-5 meters at maturity […]” (UNFCCC, 2002). This definition doesn’t distinguish between natural forests and plantations. It implies that this definition would not count a transformation of a natural forest into a palm oil plantation as a loss of forest because the land is still covered with trees that are higher than 2 meters and cover more than 10% of the land.

Further controversies can be found in the analysis of the so-called ‘New Green Deal’ which describes a form of ‘green’ economy or a ‘green’ capitalism (Kaufmann & Müller, 2009). This poses the question if the characteristics of capitalism – profit, growth, and private ownership – can be conciliated with an economy based on the principle of ‘sufficiency’ and the ‘limits of growth’ shown by the Club of Rome. Also, the economist Daly is in favor of growth but only as long as the ecosystems can bear it and every growth beyond, he criticizes as uneconomic (Daly, 1996). The trend towards more sustainability already reached the modern society of consumers. Many countries already changed their energy production towards green technologies such as solar energy or bio diesel instead of investing more into nuclear energy and coal-fired power stations. However, instead of questioning today’s pattern of consumption one can only observe a shift of the consumption towards ‘greener’ and more sustainable produced alternatives rather than a radical change in the consumption

and use of energy. The ‘New Green Deal’ only creates a system which economizes the environment and increases the demand. Indeed, this influences a cultural process of change but not a fundamental new orientation (Kaufmann & Müller, 2009).

Another basic difference is in the concepts which are described as the ‘pillar’ models. In the scientific debate those parts which are named ‘pillars’ are seen as relevant for sustainable development. The model of Carlowitz points out the close relationship between ecological, economic, and social development. Other models include the cultural and institutional development and some models even put the focus on only ecologic matters which is the so-called ‘one-pillar concept’. However, the three-pillar model which focuses equally on the three aspects ecology, economy and society is one of the best-known ones in the scientific discourse (von Hauff & Kleine, 2009).

For this thesis, I use the definition of sustainability developed by the UN World Commission on Environment and Development: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (UNESCO, 2021). Besides being one of the most common quoted definitions of sustainability, this notion builds up on the fact that the earth has resources that are replenishable and can be reproduced at a certain replacement rate at which the system stays in an equilibrium.

This thesis will contribute to shed light on the problems and controversies about a sustainable palm oil production in Colombia considering the social, ecological, and economic dimensions from the three-pillar model of Carlowitz (Purvis et al., 2019). Furthermore, it will outline the chances and risks coming along with the oil palm cultivation in Colombia for different actors such as the local workers, indigenous people, or the afro-descendant minority population whose human rights are being violated by an expansion of the oil palm sector.

1.2. Structure of the study

After having presented the research questions and the sub-research questions respectively in the first chapter, I will outline the methodological and theoretical framework in the second chapter of this thesis. This includes a discussion of the concept of sustainability and the link between political ecology and palm oil production. Furthermore, the second chapter includes theoretical fundaments which are connected to sustainability and finally a description of my methodological approach. Therefore, the second chapter serves as a basis for the following analysis. In the third chapter, I will then briefly picture the context and historical background which includes the armed conflict with the

FARC in Colombia. This chapter is crucial to understand the land conflict in the country which is closely linked to the palm oil production. In the fourth chapter, I will analyze the sustainability, the risks, and the chances of the palm oil production in Colombia which also involves a differentiation of the relevant social actors in the sector such as smallholders, companies, local people, field workers, indigenous peoples and the environment (flora and fauna). Finally, I will look at the methods of resolution and the perspectives for a sustainable production of palm oil in Colombia in chapter five before drawing a conclusion of my analysis in the sixth chapter and answering the proposed research questions from the introduction.

II. Methodological and theoretical framework

To analyze the sustainability of the palm oil sector in Colombia, the term 'sustainability' will be assessed in detail in this chapter. Therefore, a short historical background of the concept of sustainability is necessary. The relevance of the term 'sustainability' and 'sustainable development' with regards to the governance of the rainforest will be illustrated. Afterwards, the partly blurred nature of sustainability in the context of the scientific discourse will be presented.

2.1. The concept of sustainability

The term sustainability has already been used in the 17th century and in the beginning, it has been used preliminary in forestry. Nowadays, it is differentiated mainly between three meanings:

1) an effect which is persistent for a longer time (Bibliographisches Institut GmbH, 2021)
2) a principle of forestry that states that not more wood can be felled than the new wood that can grow back (ibid.)
3) a principle of ecology after which not more can be consumed and used than that amount which can regenerate, grow again, and made be available again in the future (ibid.)

What all three definitions have in common is the overall tendency for persistency (of resources) for a longer time, in other words future generations. Hans Carl von Carlowitz was 1713 the first person to describe the triangle of sustainability that consists of ecologic equilibrium, social equilibrium, and economic equilibrium (Warde, 2011). The approach has found recognition as the 'three pillars of

sustainability' in international discourses today. Therefore, von Carlowitz is known as the creator of the sustainability term in forestry which is still valid today (Grober, 1999).

The roots of modern environmental politics are in the 1960s and 19070s. Due to the publication 'The Limits to Growth' by the Club of Rome 1972, the limited scope of action in environmental politics became visible and the United Nations (UN) began to reconsider the old concept of Carlowitz (Meadows et al., 1972). The actuality of the topic was based on the increasing awareness that natural resources and the environment were (and still are) destroyed and exploited.

The UN World Commission on Environment and Development (WCED) was founded in 1983 and had the Norwegian politician Gro Harlem Brundtland as a chairwoman, the reason why the Commission is also widely known as Brundtland-Commission (WCED, 1987). With the title 'Our common future' the WCED published a report in April 1987 in which it defines sustainable development and for the first time, this report included a general orientation of integrative and sustainable development (Purvis et al., 2019). This definition of the WCED in 1987 was also the basis for many concepts and approaches of sustainability in the following years. The Brundtland-report found a worldwide consent. However, the reason for this overall acceptance and agreement with the report was the low level of concreteness that left high margins for interpretation which has often been criticized in the past. This was the reason why also countries that had politically very controversial approaches and opinions approved the report (von Hauff & Kleine, 2009).

After the publication of the report the United Nations Conference on Environment and Development (UNCED) took place in 1992 in Rio de Janeiro. The goal of the conference was to convert the Brundtland-report into international actions from which the so-called 'Agenda 21' or the 'UN Convention on Biological Diversity' (CBD) resulted (Purvis et al., 2019). The Agenda 21 sets guidelines for the actions of the 21st century and aims for a balance between economic interests and environmental goals (UNCED, 1992). In other words, an equilibrium between ecology and economy is the overall objective. 'Sustainability' in this context means on the one hand economic growth but on the other hand also actions that are compatible with the environment which are a condition for economic growth. To realize its implementation, the 'Local Agenda 21' has been established which focuses on the local instead of the national level. In Chapter 11, the Agenda 21 refers to "combating deforestation" and in part 11.1. it says:

"There are major weaknesses in the policies, methods and mechanisms adopted to support and develop the multiple ecological, economic, social and cultural roles of trees, forests and forest lands."

(UNCED, 1992)

This quote shows that human exploitation and misuse of rainforests is not a new phenomenon but already existed in the past century and that the UN was already conscious about the urgent need for action in this matter.

The Rio Forest Principles of 1992 is another document that was established during the UNCED in Brazil. It includes guidelines for the cultivation, conservation, and sustainable development of all kinds of forests worldwide. However, the Rio Forest Principles are not binding, that means it gives only recommendations to the countries and it emphasizes that every state has the right to use its forests within the scope of their own economic and social development. However, it also calls for a consideration of the global importance of the forests and to ensure a sustainable cultivation of their resources (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ), 2021a). The industrial countries demanded for a binding forest declaration, but it failed due to the resistance of developing countries (Aachener Stiftung Kathy Beys, 2015). For the latter, the forest was not only an important factor of ecological stability but rather an economic factor. Therefore, they were invoking on their sovereignty on their national resources. In further negotiations, the Rio Forest Principles have been concretized with a stronger focus on the interests of the developing and emerging economies.

In 1993, the world forest conference was hold in Jakarta and over 350 people from 33 countries participated in it (Aachener Stiftung Kathy Beys, 2015). The goal of this conference was to create more equal and fairer international trade in order to improve the incomes of the developing and emerging countries and to guarantee that they could invest more in the protection of the environment (Aachener Stiftung Kathy Beys, 2015). Therefore, the wood exporting countries of Southeast Asia demanded from the UN to use an independent commission of experts who should work out a worldwide binding forest declaration.

During the climate summit of 1997 in Kyoto (Japan) the so-called Kyoto-Protocol was signed by 183 countries. It included a reduction of 5% of the CO_2 emissions compared to the amount of 1990 for each year between 2008 and 2012 which was the period of the first commitment (UNFCCC, 2021). The protocol was insofar a milestone in the implementation of the UN climate conventions as it included for the first time legally binding commitments to limit and reduce the CO_2 emissions of industrialized countries. The signatory states accepted different commitments which depend on their economic development. For developing and emerging countries no restrictions were planned because they insisted on an equivalent economic development (UNFCCC, 2021).

In 2000, the UN, the World Bank (WB), the Organization for Economic Cooperation and Development (OECD) and several non-governmental organizations (NGOs) elaborated the Millennium Development Goals (MDGs) that should be reached in 2015 and which were an important step on the way to sustainable development (Purvis et al., 2019). Goal no. 7 is the ensuring of 'environmental sustainability'. This includes the incorporation of these basic principles of sustainable development in the politics and the policy programs of the different states as well as the decrease of the destruction of natural resources, especially deforestation (World Health Organization, 2021). Furthermore, the aim of the MDG no. 7 "ensure environmental sustainability" was also to maintain the biodiversity and avoid a further loss of the world's flora and fauna until 2020 (BMZ, 2021b).

In 2005, the 11th UN climate conference took place in Montreal. During the conference a new mechanism that should give developing countries an incentive to avoid deforestation and therefore CO_2 emissions was proposed. It was just two years later, when the following conference took place in Bali, that the members agreed on summarizing these mechanisms by using the acronym REDD (Reducing Emissions from Deforestation and Forest Degradation). In the following years, the REDD mechanism was further developed and measurements such as the plantation of new trees in order to reforest the forests as well as the sustainable cultivation of forests. The REDD-model is important for the further negotiations in the context of the UN climate convention and the following regulations of the Kyoto Protocol because it is a possible way for reducing CO_2 emissions and instead use the forests as a possible store of carbon. These extended measurements are included in the labelling REDD+. The program includes 65 countries in Africa, Asia-Pacific and Latin America, including Colombia, where currently 65 projects are taking place (Forest Carbon Partnership Facility, 2018).

2.2. Political ecology of palm oil production

Already since the 1970s, scientists, politicians and governments were forced to deal with the impacts and the consequences of the growing pollution of the environment worldwide. Phenomena like soil erosion, water, and air pollution as well as draughts and desertification of certain regions were the results of an accelerating population growth as well as an economic growth and increasing wealth but also 'wrong' development.

The environmental problems were the reason for a development of natural scientific based theories which focused on the causality relation between the humans and the environment. According to the neo-Malthusian theoretical approach of the 1980s, the rapid population growth was the reason for

environmental problems (Watts, 2000). Sustainable development questions the 'catch-up development' of developing countries, that means the process of reaching the same standards as the industrialized countries. This process is marked by social, political, economic, infrastructural and / or demographic events and actions that took a long period of time in today's industrialized countries, are happening in a relatively short period in today's developing countries. The neo-Malthusianists question especially the growth which is needed so that these processes can happen and the western-capitalist impacts on these. Insofar, the pollution and contamination of the flora and fauna has been seen just as an environmental problem while the existing power structures and the impacts of politic-ecologic factors have been ignored. This is the reason why this theoretical approach has been considered as an apolitical idea (Ammering et al., 2008).

Today, research in the field of political ecology is – with regard to the deteriorating conditions of the environment – a central element of the global environmental change research, especially in the global south as the protection and maintenance of natural resources such as water and soil but also biodiversity is of existential importance for the world.

Political Ecology is not a homogenous theory construct instead rather a collective term for studies with different theoretical approaches. Therefore, the term political ecology is a multi- and transdisciplinary approach for analysis that developed as a response to the apolitical theoretical approaches to explain the environmental changes and that gained importance in social sciences and ethnological sciences since the 1980s. Due to its transdisciplinary character, political ecology could also be named as environmental sociology, environmental ecology, or political sciences of the environment (Blaikie, 1999).

In the context of this thesis, I will use the concept of political ecology for the analysis of the Colombian palm oil sector to contribute to a critical understanding of the Colombian palm oil production and its sustainability.

2.3. The three pillars of sustainability

When it comes to the sustainable use of forests for economic growth, the German accountant and mining administrator Hans Carl von Carlowitz is of particular note (Purvis et al., 2019). Already in the 17th century he thought about how to receive an appropriate outcome while not diminishing the natural resources of forests (Purvis et al., 2019). He demanded to use the nature and its resources with care and criticized the overexploitation of the forests which had only short term positive yields

(Carlowitz, 1713). Although early economists such as Malthus, Ricardo or Smith already questioned how far economic and population growth is possible, von Carlowitz is seen as the main creator of the forestal sustainability term since he wrote the 'Sylvicultura oeconomica' in 1713 (Purvis et al., 2019).

However, reviewing the literature it is not possible to clearly find the author who first used the model of the three pillars of sustainability (Purvis et al., 2019). There is disagreement and variation can be found in the literature: Some scholars use circles to describe the three different dimensions of sustainability, others pillars and others three intersecting circles (Purvis et al., 2018). The first scholar who used the three dimensions in the context of 'system goals' and as a model for sustainable development was Barbier in 1987, however, his version was only applicable to developing countries and not industrialized nations (Purvis et al., 2019). In addition to that, the goals developed from Barbier are not the same as from the UN, so there are still uncertainty and doubts about the first source from that the model originates (Purvis et al., 2019).

However, without doubt is that the model of the three pillars of sustainability is an important basis for the following analysis because it defines the three basic pillars that have a stabilizing effect in the long term on sustainability. Those are: The economic security, ecologic equilibrium and social justice. They are going back on the discussions about environmental protection versus economic growth as well as the question about an adequate human development. That means that the three dimensions ecology, economy and society are not a universal structure but did develop over time from the discussions (von Hauff & Kleine, 2009). They are guidelines how the ecologic, economic and social issues should be respected and taken into account in an integrative way when it comes to processes of sustainable development. Therefore, sustainable development can be seen as a 'regulative idea' (Voss, 1997). However, the model got also criticized: Because all three dimensions have to be equally considered, the model isn't useful for finding an operative definition of the sustainability principle. Voss (1997) criticizes for example that the model doesn't define clearly which relationship the dimensions of freedom, economic wealth, social justice and the protection of the environment have between themselves. The reference scale has to be the affected people and their wishes, interests and needs (Voss, 1997). Therefore, the model of the three pillars of sustainability can be seen as a strategy for consensus.

2.4. 'The Limits to Growth' by the *Club of Rome*'s Project on the Predicament of Mankind

The study 'The Limits to Growth' was about the future of the world's economy and it was published in 1972. The *Club of Rome* ordered the study by Dennis Meadows and the co-authors. The *Club of Rome* is an association of experts from different disciplines and more than 30 countries. It was founded in 1968 in the *Accademia dei Lincei* in Rome (Meadows et al., 1972). The informal organization works for a sustainable future. With the report 'The Limits to Growth' the club reached worldwide attention and controversy but it is seen as the starting point of the critical research on future and environment. Since the publication, it fights for sustainable development and the protection of ecosystems.

The study is based on a computer simulation whereby the authors conducted a system analysis of different scenarios. They used a model of the world to examine in detail five possible future tendencies with a global effect: Increasing industrialization, further population growth, exploitation of natural resource reserves, malnutrition, and the destruction of living space (Meadows et al., 1972). The authors calculated different scenarios with different amounts of natural resource reserves or a different efficiency of agricultural production, birth rate control or environmental protection. The results they found were clear:

1. "If the present growth trends […] continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity." (p. 23)
2. "It is possible to alter these growth trends and to establish a condition of ecological and economic stability that is sustainable far into the future. The state of global equilibrium could be designed so that the basic material needs of each person on earth are satisfied […]." (p. 24)

They also concluded that no combination of solely technical, economic or juridical measurements would affect an essential improvement. Striking was that not even a huge decrease in the pollution of the environment, a perfect control of the birth rates and maximal technologies could avoid a collapse of the system if the productive capital would not stop growing (given unlimited natural resources). New approaches would be necessary to strive for a state of balance and not further growth.

To reach this goal, international collaboration would be indispensable. Furthermore, immediate measurements were necessary to protect the environment, control birth rates and limit the capital growth. Possible technical measurements would be the reuse of waste, the prolonged period of capital

goods and actions to increase the fertility of the soils of agricultural and forestry businesses (Meadows et al., 1972).

The scenarios of a collapse were justified with the dynamics of exponential growth models. However, the authors did not only include scenarios which lead to a catastrophe but also possible scenarios which lead to a state of equilibrium. They were aware of a lack of data which is why they calculated the model with five different amounts of natural resources (with all other values staying the same). In most of the scenarios the natural resources were economically exhausted by 2100. Nevertheless, the authors also made clear that they were not making predictions for the future but rather giving hints on the characteristic behaviors in the world's system.

When the study was published, especially western nations were starting to change their thinking. It came to the development of new technologies, a higher energy sufficiency and a 'qualitative growth' which was more decoupled from economic growth, energy use and environmental pollution. In contrast to the western countries, the countries of the eastern bloc commented on the theories of the authors as 'hostile' and 'negative' (Gerber, 2007).

Until today another point is criticized and the reason why the hole book was discredited: It is the claim that certain natural resources were predicted to be economically exploited in certain years in the 20th century which was proven as wrong (Meadows et al., 1995). Nevertheless, in 2008 Graham Turner published a study where he collected the data from 1970 until 2000 and compared them to the data that the authors of 'The Limits to Growth' used in 1972. He concluded that they were highly conforming with the predictions of the standard scenario, that means the possible collapse of our system in the middle of the 21st century. In 2014, he repeated the study with updated numbers and came to a similar conclusion (Turner, 2008; Turner, 2014).

In 1992, a new version of 'The Limits to Growth' was published. New findings – such as larger reserves of natural resources than expected 20 years ago – and the present development were included in the updated simulations. Nevertheless, the tendency was the same as it was in 1972: Most scenarios ended with a collapse of the system and a crossing of the limits (Meadows et. al., 1995). All in all, 13 scenarios were presented but only three of them led to a state of equilibrium. Measurements that could avoid a collapse of the system were birth control, production control, technologies to limit emissions and erosion and protection of the natural resources. The later those measurements would be implemented, the lower would be the material wellbeing of the people (Meadows et. al., 1995, scenarios 1-13).

The simulations of 1992 were also using more accurate data because the authors of the version of 1972 did know about the greenhouse gases but couldn't overlook the consequences of it. 1992 the human made greenhouses gases could be estimated better and more precise.
In 2004, the authors published a 30-years-update. In most of the scenarios a crossing of the growth limits and a collapse happened latest until 2100. However, also collapses until 2030 were possible if we continue "business as usual" and don't change our consumption and production system drastically, control the birth rates and protect our environment with its limited natural resources. Furthermore, the study of 2004 came to the conclusion that even a rapid change of our energy and environmental standards cannot stop this tendency but only weaken it. Only the simulation of a mixture of a reduction of consumption, control of the population growth, reduction of harmful substances and several other measurements would result in a sustainable society with approximately 8 billion people. In addition to that, the authors of 'The Limits to Growth' update of 2004 described the development between 1972 and 2004 where – among others – the social inequality increased (i.e. 20% of the world's population have 85% of the global GDP), the soil quality decreased (i.e. 40% of the land were overused) and that the 75% of the world's fish were already overfished. Furthermore, they estimate that the ecological footprint has already been surpassed in 1980 and is still being exceeded by around 20% (in 2004).

2.5. Data collection and analysis

This thesis was written under special circumstances of a global pandemic (COVID-19) making it impossible for me to conduct field work. For this reason, my thesis is primarily based on secondary sources. In order to answer my RQs, I will use reports from NGOs such as the FDCL (Research and Documentation Center Chile-Latin America e.V.), RSPO (Roundtable on Sustainable Palm Oil), the CSPO-watch (Certified Sustainable Palm Oil), WWF (the World Wildlife Fund), the IIED (International Institute for Environment and Development), the Öko-Institut e.V. and Ensia which is a "solutions-focused nonprofit media outlet reporting on our changing planet […] published at the University of Minnesota" (Ensia, 2021). Also, I make use of legal case documentation such as contracts and annual reports on progress of the oil palm growers. Furthermore, I will consider also reports and articles of International Organizations such as the OECD or the Food and Agriculture Organization (FAO).

I have also made extensive use of the official websites of NGOs and International Organizations where I found their reports on the topic of palm oil production. Furthermore, from their databanks I

could also obtain both qualitative and quantitative data. For the selection of adequate literature, I used mainly three different qualitative criteria: Transparency, intersubjectivity and reach which are all part of qualitative research. Transparency describes that the research and the results are transparent because all steps of the research are documented and therefore traceable and comprehensible for outsiders. Intersubjectivity is the case when I discuss and reflect the subjective collected data which lead also to a critical reflection for the readers and the range of qualitative research is when a similar approach would lead to similar results. Among other sources, actual reports and journal articles are suitable for a content analysis. They are useful for an investigation over a certain period like the development of ground water quality since the palm oil production increased in a certain area.

The opportunities and risks of palm oil production will partly be analysed by comparing Colombia with other countries such as Indonesia and Malaysia which are both the worldwide leaders in the palm oil sector. The goal of this thesis is preliminary the analysis of the sustainability of the growing palm oil sector in Latin America using Colombia as a case study which includes an assessment of the social and environmental consequences. Possible measurements against the pollution and contamination of the environment will be explored. In addition to that, positive and negative aspects of the impacts on regional planning will be studied. In the end, an evaluation in terms of a best practise scenario to minimize the social-ecological impacts will be made and recommendations will be proposed.

III. Context and historical background

3.1. Properties of oil palms

The *Elaeis guieensis*, or better known as oil palms, have their origin in West Africa and were being cultivated there long before they have been discovered by Europeans the 15th century. The areas in which they are now cultivated have expanded to Southeast Asia and to Latin America. The first harvest of the oil palms takes places approximately three years after planting and after six years the harvest is stable. After around 21 years the number of fruits decreases slowly and new young plants are planted (Knoke & Inkermann, 2015).

The expansion of oil palm plantations from Asia to Africa and Latin America is due to the specific climate, that the plant requires: They need enough water – appropriate are 150 mm of rain per month. However, the terrain where the plants grow, must be a little bit steep so that the water gets not accumulated and can run down. The temperature should ideally be above 15° C and the plant should

get intensive sunlight. Due to these specific conditions which the oil palm tree needs, the tropical rainforest has the perfect properties for the plant to grow (Pastowski, 2007).

A special characteristic of palm oil production is the steady growth of this industry. The worldwide production grew from 1983 to 2021 from approximately 5 million tons to 75 million tons (Statista, 2021; Knoke & Inkermann, 2015). Experts expect the palm oil industry to increase the volume of production to more than 100 million tons in 2030 (Pilorgé, 2020). If this will be realized, more productive species of oil palms must be planted or further 350 000 hectares of land have to be cultivated.

In 2019, palm oil accounted for 36% of the world's most important oils based on plants, followed by soy oil with 28%. The remaining 36% are mainly covered by oils generated from sunflower and rapeseed (Verband der Ölsaatenverarbeitenden Industrie in Deutschland (OVID), 2021). This production is partly due to the specific properties of the oil palm: In comparison to other oil plants such as soy plants or coconut palms, the oil palm needs by far the smallest place to produce the most tons of plant-based oil (Noleppa & Cartsburg, 2016). The search for similar oils that have a high outcome in relation to the area needed to cultivate them, and which are environmentally friendly, is difficult which is why the cultivation of oil palms has such a high growth rate.

One of the most striking developments of the last centuries is the steep career of palm oil cultivation in Latin America. Since 1990, the number of hectares that have been used in order to grow palm oil plantations has more than tripled. This development might be due to the fact that palm oil has unique chemical features which makes it possible to use it in a wide range of different products like cosmetics or hygienic articles such as washing powder, many processed foods such as chocolate or also fuels like diesel. According to different studies, the oils and derivatives of the oil palm can be found in around 50% of our daily consumed goods (Dauvergne, 2018).

3.2. The development of the Colombian palm oil production

The global production of palm oil is still concentrated in two countries: Malaysia and Indonesia. As the following figure (Figure 1) also demonstrates, together 84% of the worldwide production of palm oil comes from these countries. Thailand follows on the third place with 4%, so less than 15 percent of the worlds palm oil production come from outside of Asia (Fatheuer, 2016). With a share of 2% of the world market, Colombia is the leading Latin American palm oil producing country.

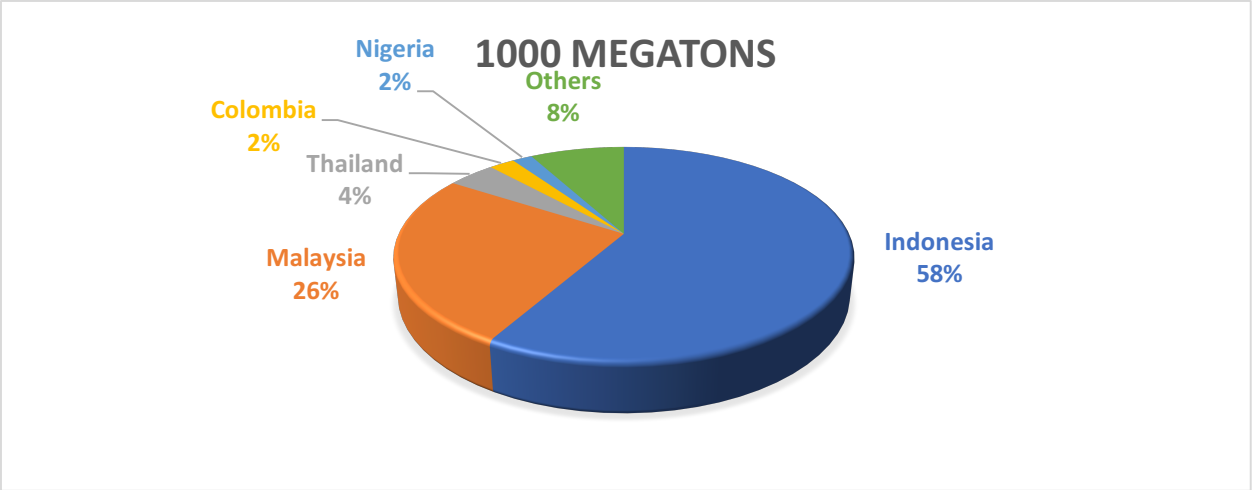

Figure 1. Worldwide production of palm oil in percentage (my own figure based on United States Department for Agriculture, 2021)

With a production of more than 1.500 megatons, Colombia is now the fourth biggest palm oil producing country in the world. However, the history of palm oil production in Colombia is not young and dates back until the 1940s. It only started growing in the 21st century (Fedepalma, 2016).

In 2020, 559.583 hectares of Colombian soil were covered with palm oil plantations (Fedepalma, 2020). As the following figure (Figure 2) illustrates, the majority of them are highly concentrated in certain regions, notably in the *departamentos*[1] of Meta, Magdalena, Santander, Sucre, Casanare and Nariño. Particularly striking while comparing the figure below to the presence of guerilla groups in Colombia is that the regions with a strong presence of illegal armed groups such as the FARC, ELN (Ejército de Liberación Nacional, engl. National Liberation Army) or Bacrim have a strong presence of palm oil plantations (Negret et al., 2019). This is the case for the regions of Meta where the FARC was particularly highly concentrated but also the pacific department of Nariño and Santander in the north of the country.

[1] Colombia is divided into 33 *departamentos* which is the name for the administrative districts in Colombia.

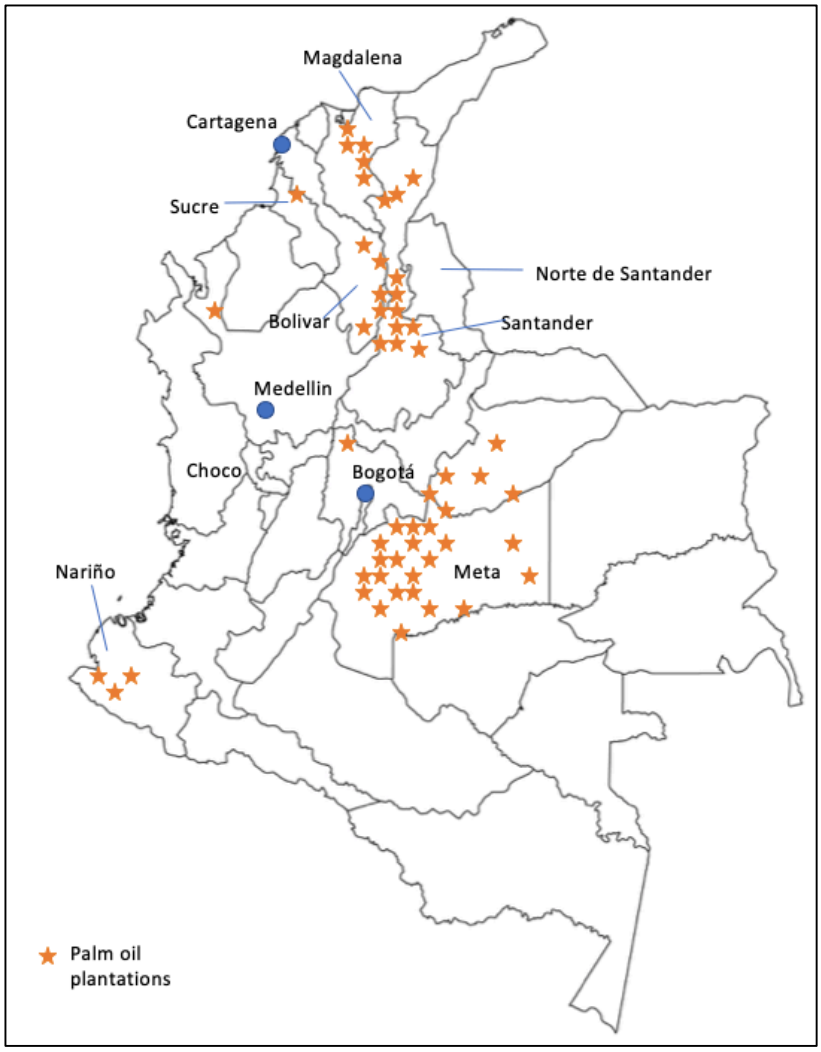

Figure 2. Illustration of palm oil plantations in Colombia (my own figure based on Fedepalma, 2020)

In Colombia, there are around 5,000 palm oil businesses registered from which 4,200 are small or medium scale farmers (Fatheuer, 2016). Nevertheless, around 70% of the Colombian palm oil plantations are in the hand of companies that are larger than 200 hectares. The number of members in the so-called 'Allianza System' increased significantly (Martínez, 2013). The 'Allianza System' is a contract farming system with a close collaboration between the farmer and the buyer where they agree on a certain amount to be produced and a fixed price for that amount. Therefore, the farmer does not have to fear to sell his products under the price or to not find a buyer (Spektrum, 2001).

Other than Ecuador, Colombia has a clearly formulated national policy concerning agrofuels and a special program for biodiesel: The *Programa Nacional de Biodiesel* which came into effect in 2008 and planned a mixture of 5%. The program contributed to a consolidation of the biodiesel production and 2013 the adding of palm oil to produce biodiesel was already 9,2% (Fedepalma, 2014).

In 2015, Colombia produced and consumed 583 million of liters of biodiesel. That means that most of Colombian palm oil production is used nationally in the domestic market which is supported by a biodiesel program. The government promotes this program not only as a part of the national development policy and an aid for a modern agricultural sector but also in connection to national climate goals (Fatheuer, 2016).

In the same year, the government introduced the *Plan Siembra* (engl. the Sowing-Plan) which should give a clear perspective to agricultural development in Colombia. In this plan, the agricultural sector has a key role in the economy of the country. The plan presumes that there are vast lands which can be used for the expansion of the agriculture. According to the government, Colombia has a potential land of 44,5 million hectares of which so far only 7,2 million hectares are used. The enormous rest of the land is either not used for agriculture or is a pasture ground. Due to the small share of permanent crops in Colombia, the agroindustry, the government, and the FAO see a huge potential for the future in those lands. The FAO lists Colombia for example as one of the five countries that have worldwide the biggest potential to use their lands for the expansion of fields for food production (Álvarez, 2015).

From the perspective of the government the expansion of fields for palm oil production is a chance and not a risk. They plan to use another 150,000 hectares for oil palm plantations as they are targeting a key role of palm oil in the development of Colombia. This positive view on palm oil and also its potential for the country expresses the agricultural minister Iragorri: “This country has a future. But without palm oil it will not be the same future.” (Álvarez, 2015). However, not all Colombians see the palm oil production in such an enthusiastic way. An example for a different view on oil palm plantations are several indigenous groups and social organizations. In this context, the history of Colombia plays a very important role because the extension of cultivable lands was often in conflict zones from which the original inhabitants had been driven off. An example for this practice is the region of Mapiripán where 1997 paramilitaries killed more than 30 people cruelly and 1300 inhabitants had to flee. The case has been documented in detail because it went in front of the Interamerican court.

The region where is also Mapiripán located – the *departamento* Meta – has been declared as a new region for agricultural projects which is the reason why it is increasingly being planted with oil palms. Solely one company, Poligrow, owns nowadays 70,000 hectares of the conflict areas and is therefore being accused of profiting from the displacements. A report of the Dutch NGO *Somo* concludes that the largescale cultivation of oil palms legalizes displacements and reinforces an undemocratic and unequal development (Somo, 2015).

In Colombia, the expansion of palm oil is closely connected to the history of conflicts and

displacements. The biggest palm oil producing companies in Colombia today are Oleoflores with an area of 55,000 hectares, followed by Indupalma with 10,000 hectares and Daabon with an area of the same size (Potter, 2020). They are known for forming so-called 'strategic alliances' with smallholders who own land nearby their plantations. These alliances were mainly formed between 1998 and 2008 and the smallholders were often beneficiaries of the Colombian land reform. The owners of the large companies persuaded them to plant oil palms on their land and sell the harvest to them which allowed the national leading companies in the palm oil business to grow their land for palm oil plantations for more than double. In return for dedicating their land to the plantation of oil palms and selling their fruits to large-scale enterprises, the smallholders received technical assistance, seeds of a good quality and financial support for the times when the harvest was not productive. For forming these strategic alliances, many companies got government subsidies and tax exemptions (Potter, 2020). The alliances were formed after the Indonesian example (Potter, 2020).

Size (ha)	Properties 1997-8		Properties 2011		Area of palm oil 1997-8		Area of palm oil 2011	
	Number	**Per cent**	**Number**	**Per cent**	**Area (ha)**	**Per cent**	**Area (ha)**	**Per cent**
> 5	1617	58.7	662	12.5	2217	1.5	1858	0.5
5 > 20	544	19.8	3104	58.4	3284	2.2	30,029	7.7
20 > 500	451	16.4	1391	26.2	45,554	30.7	134,959	34.5
500 > 2000	118	4.3	128	2.4	48,789	32.9	120,870	30.9
<2000	23	0.8	29	0.5	48,515	32.7	103,471	26.5
Total	2753	100	5314	100	148,359	100	391,187	100

Table 1. Distribution of Colombian palm oil plantations in regard to number and area (my own table based on Potter, 2020)

The table above (Table 1) shows the development of the Colombian palm oil production in terms of the numbers of properties and their sizes in 1997-8 and 2011. It is important to mention that the census of the palm oil plantations in the table above from 1997-8 was before most of the strategic alliances were formed which is the reason for the large number of small-scale farmers (> 5) in 1997-8 that decreased significantly until 2011 when the strategic alliances were already common. The large-scale plantations in Colombia have land of more than 2000 hectares which is still small in comparison to

Indonesian or Malaysian large-scale plantations and their number did not increase a lot from 1997-8 to 2011. However, what did change significantly is the size of the plantations in the hole country. They have more than doubled in hectares and were already covering an area of 391,187 hectares in 2011. Nevertheless, in the same year more than 70% of all palm oil properties were still smaller than 20 hectares. According to the RSPO small-scale farmers are those who own plantations below 50 hectares. Although this number appears to be huge for Colombian standards, that would make 83% in terms of their properties to a small-scale farmer and 13% in terms of the size of their land (Potter, 2020).

3.3. The armed conflict in Colombia

Colombia was in a state of civil war from 1964 until a peace treaty was signed in 2016. The armed conflict took place between the largest and oldest guerrilla group on the entire Latin American continent, the FARC-EP, or also just FARC for *Fuerzas Armadas Revolucionarias de Colombia - Ejército del Pueblo* (Spanish; engl.: 'Revolutionary Armed Forces Colombia-People's Army'), and the Colombian government has the country shaped like no other event since its independence from Spain in 1810 and the breakup of Greater Colombia in 1830, which consisted of today's countries Ecuador, Panama, Colombia and Venezuela as well as parts of Peru and Guyana (König, 2008).
There are several factors that are normally favorable for the formation of states, such as large deposits of valuable raw materials, a democratic form of government and the absence of a traditional indigenous social class. Although some of these factors are the case for Colombia – such as the existence of precious raw materials –, they are affected negatively by the difficult financial situation of the country and complex geographical conditions, which in turn favored the formation of rebel groups such as the FARC (Büttner, 2004).

Over a period of many decades, the South American country was ranked number one in international statistics among the countries with the highest death rate per 100,000 inhabitants and at the same time had one of the lowest and most inconsistent clearing up rates for violent crimes and violations of human rights worldwide (Kurtenbach, 2006; Büttner, 2004). After several decades of internal violence and terror, which resulted in over four million refugees, a peace agreement has now been signed. This has made Colombia a popular example of overcoming state terrorism, paramilitarism and guerrilla groups towards democracy and peace (Schreiber, 2010).

"After 52 years, no peace agreement can satisfy all parties in detail. But this agreement represents an important step forward on Colombia's path to a just and lasting peace."

(U.S. Secretary of State John Kerry according to Zeit Online, 2016)

As John Kerry, US Secretary of State, who was one of the first to comment on the 2016 peace agreement, has already stated, November 24, 2016 is an important day for Colombia. It will go down as a historic event in the history of the country because this date lays the foundation for a stable and lasting peace in a country that has been torn by war for decades (Cantor & Olasolo, 2018; Zeit Online, 2016). On this day, the peace treaty between the Colombian government, represented by the ex-president Juan Manuel Santos, and the FARC, represented by the then leader Rodrigo Londoño, was signed by both sides. The resulting ceasefire formally ended the armed conflict.

3.4. Historical background of the FARC

The emergence of the FARC goes back to the violent clashes between 1948 and 1953 (Zelik, 2009). This epoch is historically also called *la violencia* and describes the armed conflict between the supporters of the conservative and liberal parties in Colombia, triggered by the murder of the Colombian liberal politician Jorge Eliécer Gaitán in 1948 (ibid.). In the following years, independent and armed enclaves of supporters of both parties were formed throughout the country and after the military *Operación Soberanía* (Spanish; engl.: 'Operation Sovereignty') on May 18, 1964 the guerrilla organization *Bloque Sur* (Spanish; engl.: 'Southern Block') was founded (Fischer, 2005). They had the goal of devoting itself to the interests of the small-scale farmers and the rural population. The main concerns included a claim for agrarian reform and the elimination of the social injustices within the existing system, which was characterized by a concentration of affluent goods, while most Colombians lived in poor living conditions. Two years later, the *Bloque Sur* was renamed *Fuerzas Armadas Revolucionarias de Colombia* (FARC) (Hörtner, 2013; Zelik, 2009).

Fast forwarding through 55 years of armed conflict, the Colombian government signed a peace accord with the FARC in 2016 (Amnesty International, 2018). The peace treaty includes the agreement that the guerrilla organization will be transformed into a political party and receive five seats in the Senate and five seats in the House of Representatives for the next two legislative periods (Acuerdo Final, 2016, Art. 2). In addition, the relatives of the approximately 260,000 victims and the approximately seven million internally displaced people are to be financially compensated (Acuerdo Final, 2016, Art. 5). Furthermore, the peace treaty stipulates that the ex-fighters should hand over all weapons and

come together in so-called demobilization zones to receive integrative preparation for life in society (Acuerdo Final, 2016, Art. 3).

The peace agreement has largely led to peace in Colombia, but the causes of the armed conflict still exist. Above all, this includes the large gap between rich and poor in the country's population, which has existed since colonial times. The division of the country into a wealthy upper class and the number of Colombians living on the subsistence level even increased in the years before the peace agreement was signed (Diaz et al., 2013). Another factor that contributes to dissatisfaction with the current situation is the lack of opportunities for political participation in Colombia, which affects a considerable part of the population (ibid.).

3.5. Position of palm oil production within the conflict

Colombia presents a special case in the worldwide palm oil production in comparison to other countries. This is due to the armed conflict with the FARC who fought for a land reform. As explained in the chapter before, they occupied land in remote areas such as the jungle. If the government decides now the sell land to oil palm companies, they decrease the risk that the unused land in the jungle will be occupied by rebel groups such as the FARC, the ELN or also paramilitary groups. An example for these practices and the connection between palm oil and the land conflict in Colombia can be found in the region of Norte de Santander where the area of Catatumbu and Tibú is located. The people in this region were strongly affected by the conflict between paramilitaries and the guerillas (Potter, 2020). With military force the small-scale farmers and peasants in the area were displaced by the paramilitaries. With over 5 million people Colombia is one of the countries with the highest number of displaced people due to an armed conflict worldwide. However, they did not occupy the land afterwards but instead just wanted to weaken the guerilla groups and their sympathizers who grew coca on the lands (Potter, 2020). This had the consequence that the cleared land was unoccupied and other parties moved on it. These land purchases were illegal and clearly against the Colombian law, in addition to that the land was bought at a price far below the market standard (Vargas and Uribe, 2017). This case in Norte de Santander was known and even supported by the local government. The acquired lands were used then for the agricultural industry of Murgos Oleoflores, a Colombian palm oil company.

Another example comes from the central Colombian department Meta. The region is already known to be home for the FARC guerillas during the time of the armed conflict because it has a high proportion of jungle and remote areas which are low populated and difficult to access. Therefore, it

was not difficult for former paramilitaries to occupy the land which belongs to the government to plant oil palms, which clear evidence proves. They used the plantations of oil palms to financially hide their profits from drug traffic. After 2005, they sold it to palm oil producing companies (Díaz Moreno, 2016). A study of Maher (2015) showed that in the southern villages of Meta such as Puerto Rico, Vista Hermosa or Puerto Concordia, the growth of the villages went along with high rates of displacement of the inhabitants and high levels of violence. These facts led to the conclusion that there was a direct connection between the growing of oil palms and displacement of the people (Maher, 2015).

These practices are evidence of 'catch-up development' actions. That means that processes are taking place which are implemented with the aim to reach the same standards and economic power as the industrialized countries. These processes are marked by social, political, economic, infrastructural and / or demographic events and actions that took a long time in today's industrialized countries but are happening in a short period in today's developing countries. The impacts of these processes are often questionable in terms of their sustainability because frequently the implementing parties are focusing only on their short-term effects rather than the long-term consequences these actions have. Instead of seeing these events such as displacement and the illegal occupation of land only as social problems, the impacts of politic-ecologic factors and existing power-structures have also to be considered (see chapter II).

3.6. Relevant social actors

Several foreign governments were insisting that before importing crude palm oil from Colombia, the oil must be certified as coming from a sustainable production (Potter, 2020). In the past few years, there has been a big effort to persuade European countries which are importing palm oil from Colombia that there are no records of deforestation in Colombia due to oil palm plantations (Potter, 2020) as Jens Mesa Dishington, the Executive President of Fedepalma says: "In regard to what has been already planted, we can strongly state that palm oil corps in Colombia have predominantly avoided deforestation […]" (FAO, 2018).

However, not only foreign governments are involved in the palm oil business in Colombia by supporting Colombian exports, also the national government plays a huge role in the palm oil production processes which is not always beneficial for the minorities in Colombia. The people in the affected areas are often peasants, indigenous peoples or Afro-Colombians (Marin-Burgos, 2014). Though the government granted them the access and rights over the lands that their ancestors owned

and despite the implementation of development policies for the rural parts where these minorities live, socio-economical conflicts arose from conflicts over these territories. In this context, the palm oil production plays an important role. The government has a key role when it comes to the expansion of palm oil production and oil palm plantations (Marin-Burgos, 2014). The stimulating policies of the government for the agricultural sector in Colombia were beneficial for palm oil companies (Aguilera, 2002). However, not all governments had the same beneficial impacts for the agricultural sector in Colombia because the government under Álvaro Uribe, who was the president between 2002 and 2010, was especially beneficial for them (Marin-Burgos, 2014).

Nevertheless, to understand the agricultural practices and policies and the reason for their implementation, it is important to look at the historical background of the Colombian agriculture sector. The agrarian history is marked by an unequal land distribution which means that there is a high concentration of land in the hands of only a few (Fajardo, 2009). These characteristics are due to the colonialism by the Spaniards (Reyes Posada, 2009). Since the colonial times there were on the one side the small-scale farmers and on the other side capitalistic large-scale companies (Machado, 1998).

In comparison to small-scale agriculture and the peasants, the large-scale agriculture received notably more support by the government which goes back until the 1960s (Aguilera, 2002). As oil palms were seen as a promising and productive crop with potential high yields for the national consumption as well as for exportation, it can be viewed as one sort of capitalist agriculture which received governmental credit resources (Forero-Álvarez, 2002). Other forms of governmental support were financial and technological incentives as well as promotion campaigns of the capitalist agricultural model and permissions to plant on the most fertile lands (Machado, 1998). For this thesis, I resume the definition of Jan Douwe van der Ploeg (2008) of capitalist agriculture where the "production is geared towards […] profit maximization" (p. 2).

Despite that, not only international actors influence the palm oil industry in Colombia. There are many other relevant social actors that impact the business. First, there are the unions formed by the workers. Currently, there are 29 of those unions in Colombia who represent a collective of 6595 workers (list of them in appendix). Secondly, there are the companies who are the owners of palm oil plantations and the factories where the fruits are extracted. They must be separated basically into two groups: The newer companies who were involved into drug-trafficking activities and had bonds with paramilitary groups which contributed to their financial resources and on the other hand the older and long-established employers (Vlaminck, 2019). Especially the latter had a positive influence on the development of the workers' labor rights because since 2015 they practiced negotiations with their

employees with the aim to improve the relationship between the employees, the management and the company owners. Two companies which have been notably working on improving their management style are the companies Palmera y Extractora Monterrey S.A. and Palmas de Cesar. However, these companies still obtain resistance from other companies in the same business. Most companies are still characterized by their hostile feelings towards the trade unions because of the history and the violent disputes with them. Another reason for the lacking engagement of the companies in improving the social dialogue with the unions and the workers is not based on the historical background but rather the association of many factory and plantation owners that the social dialogue goes along with higher costs and less productivity. Although this is only the perception of the company owners and not proven with any facts, it is still a persistent prejudice. Indeed, the empirical data show different effects than higher costs and a decrease in productivity. In fact, the social dialogue and increased formalization – that means the process of change from an informal job to a formal job by obtaining a permanent or long-term work contract – had positive influences on the regions where the workers lived. With that positive change of employment, the employees had more financial security and were able to take loans and therefore the economy in the regions where they lived and worked flourished (Vlaminck, 2019).

Further social actors involved in the Colombian palm oil industry are companies or agencies that mediate temporary jobs. Examples of such agencies in Colombia is SAS (*Sociedad por Acciones Simplificada*). Another agency which plays an important role in the palm oil sector is Fedepalma (La Federación Nacional de Cultivadores de Palma de Aceite), the national federation of palm oil cultivators. In interviews, they expressed their support for further labor flexibility. That means that they do not push towards long-term or permanent working contracts and job-security for the workers, instead they support in a way the subcontracting of workers and even stated their favor towards a new law that should allow hiring people on an hourly basis (Vlaminck, 2019). Furthermore, representatives of Fedepalma reasoned that the "responsibility for social dialogue lay with their members" and that despite the nature of their organization which would make them to the "natural social partner for [a] sector-wide social dialogue" (Vlaminck, 2019, p. 32). In addition to that, they argued that the diverse nature of the palm oil sector makes a sector-wide dialogue not beneficial in their opinion.

However, not all companies which are a member of Fedepalma, have the same opinion on the topic of job-security and further labor flexibility in the sector. An example for implementing beneficial practices for their employees are again Palmas de Cesar and Palmera y Extractora Monterrey S.A. (Vlaminck, 2019).

Hourly paid jobs do not only have a negative impact for the workers and their job-security but also for the companies providing them. The reason is that the work is done in a poor quality if the workers have to fulfill certain quotas to get their wage. This is particularly the case for the process of pollinating which is a hard part of the work on the plantations.

A further important actor that influences the Colombian palm oil industry is the Ministry of Labor. Their impacts for the workers has been both – positive and negative so far. On the one hand, they are trying to make labor more flexible and therefore do not support the workers striving for long-term contracts. On the other hand, however, they worked for certain legal regulations in favor of the workers. An example for that is the Decent Work Pact that was signed in 2018. Nevertheless, workers fear that the pact will be another example of promoting the Ministry's image in the population and just a 'paper-commitment' instead of really making a change to the working conditions in the sector (Vlaminck, 2019).

Also, the US-American government plays a role in the Colombian palm oil sector. By providing help, for example by the United States Agency for International Development (USAID). This is intended to fight coca cultivation which is also a reason why the Colombian government fosters the cultivation of oil palms: To avoid the cultivation of coca plants. In fact, 20% from the hole USAID budget that Colombia receives is invested into the oil palm projects. However, as long as there is not a significant financial advantage as well as a significant decrease of the environmental problems that are connected to palm oil plantations, the farmers do not have the necessary incentives to initiate a change from coca cultivation to oil palm cultivation (Leech, 2009).

IV. Analysis of the risks and opportunities of palm oil production

4.1. Impacts of palm oil production in Colombia

Due to the past of Colombia and the armed conflict with the FARC and guerilla groups, palm oil production resulted in a set of particular impacts on the country. The steady growth of the industry during the last years did not only create new jobs for the people in the villages that are close to oil palm fields and the plants, but it did also contribute to something less obvious in Colombia: Peace. The CSPO-watch considered the palm oil cultivation in Colombia "as a tool for peace" (CSPO Watch, 2021). They argue that thanks to the palm oil production in Colombia, even the peasants, who were facing exclusion and injustice from the government before, were included now in the government's

"plans for development" (CSPO Watch, 2021). However, there is also an opposite point of view, presented in a case study published by Maher (2015). He argues that palm oil was a technique of war and that a civil war can encourage international trade and "facilitate central processes of economic development" (Maher, 2015, p. 2). In this context, the violent displacement processes connected to palm oil were used to enable an entry in the global palm oil sector. Nevertheless, he also points out that most literature on civil wars concludes that internal violent disputes negatively affect international trade (ibid.).

It is estimated that 16% of all Colombians are working in the agriculture and that there are still many millions of hectares of land available that could be used for plantations and growing food. Having this potential, Colombia is one of the countries worldwide that have great opportunities to turn into a producer and exporter of food and biofuels that are produced sustainably. However, this potential, which Colombia has theoretically, must be seen in a critical way when considering the study of the *Club of Rome* 'The Limits to Growth'. As mentioned before, the study provides the evidence that until the end of the 21st century the current system will most likely collapse "if the present growth trends […] continue unchanged" (Meadows et al. 1972, p. 23). In order to avoid this scenario, natural resources such as the rain forests which are in danger due to deforestation have to be protected (Meadows et al., 1972).

Nevertheless, the cultivation of oil palms is significantly bringing peace and stability to the rural areas and municipalities. Studies conducted by the Colombian government were proving that the income per capita increased by around 30% in the regions where palm oil plantations were in comparison to before the oil palms were grown there (CSPO Watch, 2021). Therefore, palm oil cultivation can be seen as one factor that contributed to social equality and to maintain peace and stability in the rural areas of Colombia. However, with the past conflict in Colombia which was also due to unequal distribution of lands, there is a risk that a new sort of conflict will develop after the peace agreement was signed in 2016. Due to the peace treaty, the Colombian peasants who escaped from the guerillas and FARC that occupied their lands, are now slowly coming back to their villages and origins which they had to leave because of the armed conflict. The not-for-profit group Proforest which works for a sustainable managing of natural resources, described the situation as follows: "A company comes into [an] […] area and buys […] land […] from villager A. The company is not aware that villager A is actually selling land that belonged to villagers B and C who have fled the country because of the conflict. Now that peace is available, maybe villager B and C or their children are coming back to the area and are claiming those lands are theirs. What can the company do? In their opinion, they have

paid for the lands. […]" (CSPO Watch, 2021). According to CSPO, this is what occurred with the Italian-Spanish company Poligrow, however, the local people interviewed from the Colombian human-rights non-profit organization La Agencia de Investigación Ambiental (EIA), Justicia y Paz, reported that a lawyer of Poligrow came together with guerillas and gave the peasants two hours to leave their legally owned lands (CSPO Watch, 2021; Comisión Justicia y Paz, 2015). This is a clear contradiction which is also one of the reasons why the RSPO started investigating the case of Poligrow. Nevertheless, the multinational company announced that they are willing to return the lands to the people who are claiming to be their owners but they are also announcing that this act may not be sufficient to prevent further conflicts of land grabbing (CSPO Watch, 2021).

Fedepalma is the national organization that supports the oil palm growing small-holders in the defense of their interests and in reaching competition with the oligarchic nature of the palm oil industry which transforms the communities that receive them (Fedepalma, 2021). The federation is working together with the RSPO in order to achieve that half of all the Colombian palm oil production will be certified in 2021. By doing this, Fedepalma wants to prove that the industry is trying to be as sustainable as possible and willing to show their production procedures transparently. This aim is one intent to improve the sustainability of the Colombian palm oil sector and which could – if implemented nationwide without exceptions – be one step towards an equilibrium where "the basic material needs of each person on earth are satisfied" in order to prevent a collapse of the system as predicted in the study 'The Limits to Growth' (Meadows et al., 1972, p. 24).

The co-director of the branch for Latin America of Proforest says about this goal that: "For once, the people have a chance to speak. Before, there was no place to complain. They could complain to the government or to the company but in some of these places, the company is the government. Now the people complain to the RSPO and ask for help." (CSPO Watch, 2021).

The SPOTT program is a Sustainable Policy Transparency Toolkit which is an online platform that supports best practice implementations and a sustainable production. Besides timber, natural rubber and pulp, they also assess and rank the world's palm oil companies according to their dedication to sustainability and best practices in terms of environment, social and governance (ESG). In the process of ranking, each company included in the analysis receives a certain score which indicates their transparency concerning the ESG risks (SPOTT, 2021). With the Colombian private company Daabon Group being on the second place and a score of 89,8% (SPOTT, 2021), the importance and also the success that international certifications achieved already in guiding the companies towards a sustainable production, can be seen (CSPO Watch, 2021). Together with the RSPO-certification and the REDD program (see chapter II), these mechanisms can be classified as technical measurements

which contribute to a qualitative growth rather than an economic growth and an ecologic equilibrium, as described by Carlowitz and his three-pillar model of sustainability (see chapter II).

Furthermore, with Colombia being the biggest producer of palm oil in Latin America, it has a high potential for becoming the "source of green biofuels" (CSPO Watch, 2021). Studies have shown that the country has enough capacities to meet their own needs in terms of food and biofuel and in addition to that would be able to produce in excess and export it to other countries. By doing so, Colombia has the potential to reduce greenhouse gases up to 83% (Sarmiento-Ardila et al., 2016).

4.1.1. Small holders

A study of 2010 conducted by Fedepalma which compared the wage of small-scale oil palm farmers to the average national income, found out that the farmers earned significantly more than people who worked for the state. Furthermore, there was also a positive difference for small-scale farmers who decided to plant oil palms in comparison to other crops because they earned per year 16,200 USD for having a land of 10 hectares and two family members. In comparison to that, farmers who planted rice for example earned only 11,760 USD annually given the same size of land and family members. In comparison to that, employees with a formal job in Colombia earned averagely 6,490 USD and workers in an informal job earned only 5,184 USD annually. Although the difference might be seen as small compared to other business sectors and countries, the palm oil sector contributes with the higher wages in comparison to other crop plantations to a social equilibrium in Colombia and therefore to one of the three pillars of the sustainability model described by Carlowitz (see chapter II).

However, the incomes, that the farmers of small-scale oil palm plantations earned, differed also in terms of their region in Colombia (notably east, north or west). These differences were not small because some farmers in the center of the country who had a strategic alliance with a large-scale enterprise did not even earn enough to meet their daily needs which forced them to borrow money or employ also their children on their fields for work (Seeboldt & Salinas Abdala, 2010). The small-scale landowners also often faced displacement throughout the hole country. Several studies found a direct connection between new oil palm plantations and the displacement of people (Marin Burgos, 2014).

In the palm oil sector, there are different land ownership systems and possibilities for smallholders to sell the harvest from their cultivated lands. Frist of all, there are (independent) farmers who are connected to local agents to whom they will sell their produced palm oil. However, in this

relationship, it is often the case that the agent sells the palm oil to a local trader at much higher price than he initially bought it from the farmer. Therefore, this option is for the farmers not as beneficial as for the local agent. Then there is a second option for smallholders to sell the harvested fruits of their oil palms. However, this is mostly only applicable for small-scale farmers who have at least a land of 10 hectares or more. They are directly connected to the local traders or even factories which makes them even less independent than the farmer of the first model who depends on the local agent to sell his harvest. However, the problem with this model is that the small-scale farmer does not have to fulfill any forest management standards or doesn't have to follow fair-trade norms because he is not bound to the rules and regulations of a certain company. This circumstance does it make easy for them to practice deforestation and use fire to clear their lands without fearing any consequences (Glenday et al., 2015). The third possible model of cooperation for small-holders is the collective of several farmers or 'farmer-managed cooperatives' which are linked directly with the factories and trade with them. In this model, there are higher chances that the standards are met because they factories observe if the farmers fulfill the requirements that are prescribed by the international certifications (Glenday et al., 2015). The fourth model of cooperation for small-scale farmers are those who decide to take on a loan from a company and borrow money in order to start palm oil cultivation on their land. In return for the loan from the company, the farmers are obligated to sell their harvest to them (Glenday et al., 2015). The fifth and last model of landownership is a leasing model. That means that the company rents the land from the legal owner (the small-scale farmer) and cultivates their land in return for a dividend. In this case, the farmer is treated as a shareholder (Glenday et al., 2015).

The description of the before mentioned models shows that the farmers are – at least in some of the described models – quite independent and free to choose if they want to rent their land to a company, to become a member of a farmer-managed cooperative or sell their harvest directly to a local agent who then sells it in turn to a local factory. However, this independency goes along with disadvantages for the sustainability. The farmers do not get trained and supervised by the companies nor do they receive any support, instead they are responsible to buy their own seeds and to acquire the necessary knowledge. As a consequence, they often have only limited knowledge about the most sustainable agricultural practices. Due to a limited support from the government, they often buy cheap seeds which have a lower quality which then lead to a smaller harvest. As they are less concerned about the sustainability, they also do not hesitate to burn forest to make place for new plantations of palm oils (Suhada et al., 2018). These practices take the need for sustainability to a new level.

Another problem that is associated with palm oil cultivation are the low wages for the workers. Though, small-scale farmers can earn with palm oil more income than with other crops, the profits

are still lower than planting coca. This is partly due to the necessary time period it takes oil palms to grow their first fruits in comparison to coca plants. The latter grows very fast whereas oil palm have their first fruits after three years and their highest productivity after 6 years. Furthermore, it is easy to process the coca plants into a paste for example while the processing of oil palm fruits is not possible for small-scale farmers, instead they need to sell it to local agents at a low price where they are faced with losses in that trade relation. In addition to that, also the transportation costs for coca are much lower because the harvest is light and small whereas oil palm fruits are heavy and big and need special trucks for transportation. The overall financial difference is also huge: For a one-year coca cultivation the small-scale farmers can earn up to US$ 6,300 while they would earn only US$ 2,400 if they planted oil palms for the duration of one year. All these factors are contributing to that in sum coca plantation is more profitable for small-scale farmers in comparison to oil palm cultivation. Therefore, if the market price for oil palm fruits doesn't increase and if the companies do not pay a fair wage to the small-scale farmers, the effort of governmental support and foreign help such as USAID will not contribute significantly to a decrease of coca production, neither help to achieve no. 7 of the MDGs (WOLA, 2008).

4.1.2. Local people and workers

Displaced people is an often-reported consequence of palm oil production. Especially in the surroundings of palm oil plantations of big companies, local people often suffer from displacement. Evidence for that does not only exist in central Colombia but also the north. In the so-called *zona bananera* and Ciénaga in the department Magdalena at the Caribbean coast, banana plantations existed before oil palms were cultivated. However, then more and more banana plantations were replaced with palm oil monocultures and people faced displacement because of fights. Therefore, even more oil palms could be planted on the cleared lands (Goerbertus, 2008).

In addition to case studies, there exist a high amount of statistical studies as well that prove the causal relationship between palm oil plantations and displacement of people. Palacios (2012) compared the different rates of displacement between the plantation of legal plants such as the oil palms for example and the plantations of illegal crops such as coca plants. Both plantations required a different level of labor and he found that there was a connection between the labor intensity and the likeliness of displacement: Displacement was more probable to happen in an area with plantations that did not require a high labor intensity such as oil palms (Potter, 2020).

Studies that were conducted five years later by Hurtado et. al (2017) also found a causal relationship between displacement and oil palm plantations in the region of Magdalena. They came to the

conclusion that the palm oil production caused an increase in forced displacement. Reasons for the displacements vary and go back to the technology used, to the prices on the international market in combination with subsidies provided by the Colombian government. In addition to that, paramilitary activity in the region also played a beneficial role for forced displacement of the local population (Hurtado et al. 2017).

Castiblanco et al. conducted a study in 2015 concerning oil palm plantations and their social-economic impacts for the local people. They compared regions with oil palm fields with such that did not have oil palm plantations in their surroundings. The impacts were measured in three different years, namely 2000, 2005 and 2009. The result of their study shows that though the people working on oil palm plantations did earn a higher income on average it did not ensure that the hole region had more equally distributed incomes and that poverty in the region was reduced. Instead they found a relationship between violence and a highly-concentrated land which in turn did not foster an equal distribution of income and diminishing of poverty in the areas (Castiblanco et al., 2015). This evidence would suggest that – other than indicated in the study of 2010 by Fedepalma – the palm oil sector does not necessarily contribute to social equality and equilibrium respectively as Carlowitz described as one condition to reach sustainability (see chapter II).

However, not only local people and land owners suffer from negative consequences of palm oil production. Also, interviewed field workers report negative impacts on their health (Ebus, 2017). They say that almost no one of the workers reaches the normal age for retirement because all have to retire earlier due to health issues from the hard and physical work on the oil palm plantations. The difficult tasks of cutting the fruits from the trees, slice them and lift piles of palm fruits are harming the shoulders and the back of the workers. Often, they start at a very early age. An interviewed worker in Magdalena Medio, central Colombia, says that he started working at the age of 20 and that just 28 years later he could not continue the hard work. If the workers decide to do an office job for the company then they have to face a reduction in their wage.

But the work inside the plants is not less hard. The temperatures inside the factories where the fruits are extracted rise until 42 degrees. Furthermore, the machinery and engines are outdated – up to 55 years as workers reported. They refer to the old building as a ticking time-bomb and accidents are not an exception. However, the company did not yet improve the risky situation and working conditions of their employees. Despite what previous studies showed – that the payment of small-scale farmers who decide to enter a strategic alliance is more than the average employee in Colombia is paid – the interview partners who work at the plant report that the income they earn does not even suffice to enable two children an education. That is why workers decide to follow an informal occupation after

the work at the plant and sell food or clothing for example. In addition to that, the palm oil plantations and plants are often in remote areas in central Colombia which makes it necessary to import food from other parts of the country because all the surrounding areas are covered with oil palm trees. Though, there are quotas for the workers which enables them to earn slightly more than the minimum wage if they harvest more than 1,600 kg per day (Ebus, 2017).

Nevertheless, the workers are not only faced with the hard work on the plantations but also have to fear their lives if they decide to get engaged in labor unions because the experience from the past shows that several members of palm oil unions have been killed (Ebus, 2017).

The palm oil sector in Colombia has also to be distinguished according to the form of the contract that the workers have because there are not only formal employees instead there is a wide range of different forms of employment which have all different implications for the labor rights of the workers. In 2016, the Ministry of Labor and Fedepalma collected data about the degree of formalization in the palm oil industry in Colombia. According to their survey, 82, 4% of the workers had a formal job in the industry which is higher than one may expect. This is the reason why it is important to look closer to their definition of a 'formal' work. After their perception, basically every worker who possesses a contract can be seen as a formal employee. This definition is problematic because not every contract is of the same nature and not every contract would secure the workers also from work accidents, insure them a social security or pension (Alfonso, 2018). The first national survey about direct employment in Colombia conducted in 2018 showed that the mayor types of a working contract are: Provision of service, work or labor (24%), an undetermined working contract (21%) and a determined working contract (19%) (Alfonso, 2018). Furthermore, there is no differentiation given between standard and non-standard forms of employment, instead just formal and informal employment. The definition for informal employment given by the International Labor Organization (ILO) is the following: "Work that lacks social and legal protections and employment benefits […]" (2015) whereas non-standard employment is defined as "different employment arrangements that deviate from standard employment. They include temporary employment; part-time and on-call work; temporary agency work and other multiparty employment relationships; as well as disguised employment and dependent self-employment." (ILO, 2021). If using the definition of the ILO for the survey data, only 20,7% of the workers in the palm oil sector fall in the category of standard formal employment with a permanent contract and work-related advantages – in comparison to 82,4% as Fedepalma and the Ministry of Labor stated. Sticking to the definition of the ILO means that almost 80% of the workers in the palm oil industry have a non-standard or informal form of employment (Vlaminck, 2019). Taking the survey data from 2016, the non-standard or

informal forms of employment include also those employees that have a contract for a fixed period of time (19.3%) and those who are hired by so-called *temporalis* which are temporary service companies (Vlaminck, 2019).

Informal jobs are defined as all forms of employment that are "in law or in practice, not subject to national labor legislation, income taxation, social protection or entitlement to certain employment benefits (advance-notice of dismissal, severance pay, paid annual or sick leave etc.)" (Hussmanns, 2004). Taking the data of 2016 of the palm oil sector in Colombia means that 24% of the workers are hired under service provision schemes, 4% are family, owners or also partners with an income, 4% are workers of CTAs (*Cooperativas de Trabajo Asosiado)* and SAS (*Sociedad por Acciones Simplificada*). If they are workers of CTAs it means that they are legally not viewed as workers and therefore the labor rights do not apply to them whereas the workers of SAS often hold a short-term contract which is the reason why labor rights normally apply to them (Vlaminck, 2019). Furthermore, day-workers (13%) and family, partners or owners without fixed salaries (5%) are part of the informal palm oil sector in Colombia (Vlaminck, 2019).

If one would include the non-standard forms of employment to the standard forms of employment, this would result in 63% of the workers in the palm oil industry who follow a formal work. However, an analysis of the social security practices brings to light even worse numbers. In the collected data that the Colombian Ministry of Labour collected 2016 only 9,654 employees in the palm oil sector had contracts – either unlimited or limited for a fixed time period – that protected them in the case of accidents or illnesses due to work. In comparison to that only 167 of the workers that do not have a contract, are considered as independent or are outsourced and have a similar protection for work-related accidents. As the survey collected data from 170,794 workers in the Colombian palm oil industry, only 6% have an insurance in the case of illnesses and accidents that happen at work. This extremely low number of employees that have an insurance is even more problematic, if one considers the increasing amount of accidents that happened at work between 2009 and 2018 (Vlaminck, 2019).

"*Hecha la ley, hecha la trampa*" (Spanish; engl.: 'Done the law, done the trap') is a phrase that many Colombians use to describe the legal situation concerning labor rights in Colombia. Using this phrase is a metaphor for laws which have flaws and hidden intentions. The Colombian workforce perceives certain laws as if they were made to protect them but in fact they just serve the elite to accumulate more wealth. That this perception is not completely exaggerated becomes apparent in certain regulations concerning labor flexibility (Vlaminck, 2019). Despite that, the Colombian constitution grants every employee the right to social security, an adequate income and other fundamental labor rights (Vlaminck, 2019).

As there is no national social dialogue on the working conditions and the labor rights in the Colombian palm oil sector, this part of the thesis is based on analysis at the company's level. The violence against unions was always high in Colombia but nevertheless they were always present. The peak of violence against unions was in the 1990s. Despite the violence, the union members had to face, there was also a constant struggle for being accepted because many petitions that the unions organized, were cancelled or left without an answer. The only measurement which would result in serious negotiations were long strikes of the workers or lock-outs (Centro National de Memoria Histórica, 2019). Due to these actions, the following negotiations where mostly in a competitive and hostile climate where one side tried to win over the other. In Colombia, the Collective Bargaining Agreements (CBAs) are applicable for only a small share of all employees in the palm oil industry because the bargaining is mainly between the workers and the company and so far no cases have been known where bargaining took place with the owners of small-scale plantations or subcontracting companies.

Concerning the engagement in bargaining processes through trade unions, lacking transparency is a key driver for unsuccessful negotiations and workers to not obtain an increase in their wage or better working conditions. In this context, the prejudice that palm oil is cheap to buy plays an important role. The argument that the low price on the world market makes it impossible for palm oil companies to pay a higher wage to their employees is only partly true. It is indeed the case that many Colombian companies sell the palm oil to Acepalma which is the biggest company in Colombia that sells the nationally produced palm oil on the world market and exports it abroad. However, Acepalma sells the oil for a much higher price to importing countries. In addition to that, what many workers do not know, is the fact that many company owners are also shareholders of Acepalma. This means that while their companies and extraction factories are making financial losses because of the low prices to which they sell the oil to Acepalma or similar exporting companies, the owners are actually profiting because of their shares in Acepalma. These practices – that a few people profit at the cost of many – is not an exemption only for the Colombian palm oil business but can also be found in the banana production (Vlaminck, 2019).

4.1.3. The environment

Colombia's environment and nature counts to one of the most biodiverse worldwide. It is for that reason that many ecologists are concerned with the implications that the palm oil plantations have on the environment. Especially when the plantations are monocultures the impacts are severe.

Deforestation is probably the most well-known impact of palm oil plantations worldwide. International environmental and biodiversity organizations criticize that huge fields of rainforest have to be cleared in order to grow oil palms there. This is often done illegally by peasants and without a permit or consent from the national government. Despite that, Jens Mesa Dishington, the executive president of Fedepalma says that "in regard to what has already been planted, we [Fedepalma] can strongly state that palm oil crops in Colombia have predominantly avoided deforestation, as shown by studies conducted by international universities." (FAO, 2018).

Due to deforestation, many animals lose their natural habitat and even those who survive are at risk because for the oil palm cultivators they present a pest (WOLA, 2008). The chemical products which are then used to eliminate them additionally harm the Colombian biodiversity and – once they find their way to the ground through rain – pollute the ground water which has negative impacts for the local communities and animals. In addition to that, they are also not beneficial for the workers health who often breath them. As documentaries have shown, workers are either not supplied with safety equipment such as masks or decide not wear them because if they would do so they need more time to fulfill their work which has negative impacts on the quotas they have to reach (Comisión Justicia y Paz, 2015).

"We are about to eat the rainforest, in fact in a very unsustainable way."

(Claude Marin, general director of the WWF International)

Although this quotation refers to Indonesia, it shows the tendency of the development of the palm oil industry worldwide due to an increase in demand (Zeit Online, 2015).

Because most palm oil plantations are monocultures – that means only oil palms are grown there and not a diversity of different crops – the topsoil is especially vulnerable to storms. This leads to erosion of the soil and to pollution of waterways. Especially marginal parts of the population such as Afro-Colombian or indigenous communities are affected from this because they are lacking of water aqueducts so their water supply gets polluted or dries out because of the surrounding palm oil plantations. In addition to soil erosion, the cultivation of oil palms can also harm the Colombian biodiversity because it is not a native palm tree, instead – as outlined before – it originates on the African continent.

Also, the local governments advertised palm oil as a sustainable alternative to normal fuel but studies proved that the production of biodiesel has not any positive impacts on climate change. In addition to that, it takes decades until the advantages from producing bio fuel equal out the consequences of deforestation for the climate, in other words overweigh the benefits of processing carbon dioxide in the same amount of time if the forests would not have been cleared.

The above-mentioned impacts show that the consequences of palm oil cultivation do not comply with the Rio Forest Principles which provide guideline for cultivation, conservation and sustainable development of all kinds of forests worldwide. Furthermore, the actual practices in the Colombian palm oil sector do not contribute to an economic equilibrium as described in the three-pillar model of sustainability by Carlowitz because the outcome is not reached by not diminishing natural resources, instead the nature is exploited to achieve short term yields. Therefore, the analysis of the environmental consequences shows that one of the three basic pillars that have a stabilizing effect in the long term on sustainability – notably ecologic equilibrium (besides social justice and economic security) – is far from being achieved.

Concerning the 'Limits to Growth' study by Meadows et al. (1972), the conclusion is the same. The current situation on the palm oil plantations and the environmental impacts of those are in line with the given hints on the characteristic behaviors in the world's system and the predicted exhaustion of natural resources by 2100 (see chapter II). Possible measurements such as technologies to limit emissions and erosion as well as to protect the natural resources are currently not implemented sufficiently in Colombia in order to prevent a collapse of the system. Therefore, "the state of global equilibrium that could be designed so that the basic material needs of each person on earth are satisfied […]" is currently far from being reached (Meadows et al., 1972, p. 24).

4.1.4. Indigenous peoples

According to the International Work Group for Indigenous Affairs (IWGIA), the indigenous population in Colombia is estimated at 1,500,000 people which is equal to 3.4 % of the total population (IWGIA, 2021). Out of these, 57% live in protected reserves. The main ethnic groups in Colombia are the Wayuu with around 380,000 members and the Zenú with roughly 307,000 members, followed by the Nasa (243,000) and Pastos (163,000) (IWGIA, 2021). Together they make up for more than half of the indigenous population. Concerning their geographical distribution, it can be observed that the *departamentos* with the highest number of indigenous people are Nariño, Cauca,

La Guajira and Córdoba (IWGIA, 2021).

Poligrow Ltd. is a Spanish-Italian owned company which owns plantations in Mapiripán in the *departamento* Meta and which is also a member of the RSPO. In 2015, the Environmental Investigation Agency (EIA) published in collaboration with the *Comisión Justicia y Paz* a video with the title "Entre el agua y el aceite de Palma" (Spanish; engl.: 'Between water and Palm Oil') in which it documents the devastating consequences which the activities of Poligrow Ltd. had in the Mapiripán area. In 2015, paramilitaries who were connected to Poligrow Ltd. and supposedly sent by them, came in the area and gave the locals three hours to leave their house if they would not want to be killed, William Aljure, a local of Mapiripán, reports in the documentary (Comisión Justicia y Paz, 2015). Just shortly after he was displaced, Poligrow Ltd. started to sow seeds of oil palms. Other locals also witness that many people have been displaced by these illegal practices. Abilio Peña from the *Comisión Intereclesial de Justicia y Paz*, confirms these practices: Paramilitaries and lawyers of Poligrow Ltd. came to the land owners telling them that they don't have the right to reclaim their lands and if they do so, they will be killed (Comisión Justicia y Paz, 2015). It is a clear violation of the human rights law, the American Convention on Human Rights (*Convención Americana sobre Derechos Humanos*) and the political constitution of Colombia.

Poligrow operates now in this area where the inhabitants have been displaced from their lands. Also, indigenous people report that they have been influenced negatively by the activities of Poligrow. Gloria Rodríguez, a woman from the tribe of the Sikuani, tells that the plantation of oil palms in the area harms the ground water quality and therefore also affects their agriculture. She accuses the company to harm the environment in the region around Mapiripán but still the company tells the indigenous people to protect the environment (Comisión Justicia y Paz, 2015). In addition to that, the company installed signs which prohibit the indigenous people from fishing in the area and cutting trees for the construction of their houses. Even going to former sacred places is not possible for them anymore (Potter, 2020). Benjamín Aguilera, an indigenous man from the Jiw, reports also that since Poligrow came into the area and started sowing oil palm seeds, they have not enough water supply for themselves and for fishing. Furthermore, he says that they (the indigenous people) have been there first and they have protected the environment, everything was healthy before the palm oil companies came (Comisión Justicia y Paz, 2015). Now, the trees dry out which are part of the fragile ecosystem. The small rivers with the so-called *morichales,* the native palm trees, are home to many animals and flow until the Rio Guaviare and the river Orinoco in Venezuela. William Aljure says that even the animals, who are irrational living beings in comparison to ration living beings like the humans, protect

these water sources because they know that their life depends from them. Also, the *llaneros*, the native people of the area, know that though they act in a rational way. But then the multinational companies come and act even worse than irrational (Comisión Justicia y Paz, 2015).

The Humboldt Institute conducted a study in the area which confirms the claims of the indigenous peoples. They came to the conclusion that if the oil palm monocultures continue the expansion the inhabitants are at risk to be without water. Furthermore, also the treatment of the oil palms such as fumigation and the development of limescale because of the high acidity of the soil affects the environment. Despite that, also fertilizers contribute to the contamination of the ground water as well as the water of the *morichales* which is one of the greatest impacts of the plantations in the area, according to Abilio Peña from the *Comisión Intereclesial de Justicia y Paz.* In the context of water contamination, the company was also accused to dampen waste water illegal in the water sources of the *morichales* and the forests as well to use clean water from the surrounding area illegally for their fields (Potter, 2020). This evidence suggests that the practices of Poligrow are not at all in the sense of the Agenda 21 which has the goal of an equilibrium between ecology and economy. Sustainability in this context is not reached, the practices rather show a case of 'catch-up development' of developing countries. That means a process of reaching the same standard as industrialized countries by social, political, economic, infrastructural and / or demographic events and actions that took a long period of time in today's industrialized countries but are happening in a relatively short time period in today's developing countries (see chapter II).

The interest of Poligrow in the area started in 2008 and they sowed the oil palm seeds in 2010, 2011, 2012 and in 2015 the inhabitants felt already the first impacts of the close palm oil plantations. Locals say that they don't want to imagine how severe the consequences will be in five or ten years (Comisión Justicia y Paz, 2015). Studies show that Poligrow and affiliates obtained more than 79,000 hectares of land in the Mapiripán area even though indigenous people from the Jiw and Sikuani claim that part of these lands is their property.

People like land activists were even threatened to be killed by paramilitary members that are linked with Poligrow (Potter, 2020). This example of the Italian-Spanish company Poligrow Ltd. shows a bundle of negative impacts of palm oil cultivation of the local communities and the environment: The contamination of ground water, wetlands and forests, the illegal acquirement of properties that belong to the indigenous people such as the Jiw and Sikuani and the illicit use of natural resources from which they are dependent (Potter, 2020).

Even though the director of Poligrow had been accused in front of the court, the charge against him had to be dropped because of lacking evidence (Potter, 2020). This fact shows that even though that

the basic human rights of indigenous people are violated clearly and therefore the company also acted against the Colombian constitution, the owners are not hold accountable for their illegal actions. Instead, the Poligrow even signed a voluntary claim on 'zero deforestation' in 2017 (Potter, 2020).

4.1.5. The Afro-descendent population

Many palm oil plantations in Colombia are located on the Pacific side of the country where the Afro-Colombian population makes up a high proportion of the overall population. For this reason, they are also the majority of the plantation workers and small-scale farmers. The villages where they live are located next to the Mira River which is close to the border with Ecuador. Traditionally, they have a council for their community and own small areas of lands where they plant food to meet their own daily needs. Since the corporation Tumaco Agribusiness Development, which is funded by the USAID, offered funds through the Colombian government to the farmers in the area of the Mira River, the local farmers started growing oil palms. A representative of the community reports that the corporation told them that the paying back of the oil palms will be productive and give them a lot of profit which is the reason why paying back the loans will not be a problem for the farmers. In addition to that, they were granted a period of three years to pay back their loans to the government as it takes normally three years for the new planted oil palms to grow the first fruits. However, what initially sounded like a good deal to the farmers, ended up with a one-sided dependence for them because the oil palms got a sickness called blight which left the peasants without an income for that period. The result was that they had to take another loan from the government and were able to plant again only oil palms because the government would not support the plantations of other seeds. As a consequence, the *campesinos* got even more in dept. This case is an example of the government only supporting and promoting the cultivation of oil palms which goes along with an expense of planting crops to grow food for the own consumption of the farmers. Hence, at the same time the government is indirectly influencing the independency of the Afro-Colombian communities because they do not have the control anymore over what they want to grow on their own lands and what not. If they want to have a government loan, they are obligated to grow oil palms. This is also one of the reasons why many Afro-Colombians – actually 80% according to the United Nations High Commission for Human Rights (UNHCHR) – live below the poverty line although they are in the palm oil business which the government promotes to be profitable for the participating farmers (Leech, 2009).

As most of the Afro-Colombians who are involved in the palm oil industry and grow oil palms of their fields is due to the fact that they are often small-scale farmers. That means they are obligated to

sell the fruits they harvest to the large-scale companies which also have the control over the market price. The representatives of the Afro-Colombian community report they "govern the price" and "work with each other to pay the price they want […] to the small producer" (Leech, 2009, p. 32).

On the one hand, there are special associations that were founded for the small-scale farmers, to provide them with technical help in the cultivation process, to support them with obtaining a loan from the government and to provide help in how to negotiate a higher price for their harvested fruits. On the other hand, the perception of the Afro-Colombian *campesinos* that are a member in those associations is quite different. They have the impression that these associations are weakening the sovereignty of the Afro-Colombian peasants over the lands they own and that the associations are an attempt to remove their communities from their lands in order to create palm oil plantations there. Especially the departments Chocó and Nariño, which are close to the pacific coast, are affected from these practices (Leech, 2009).

But not only the Afro-Colombian small-scale farmers who own land are affected from negative impacts that came along with the palm oil business. Also the Afro-Colombians who work on the plantations or in the extraction plants do not have many options to fight for their goals. Workers from the department Nariño report that they had to fear being fired if they tried to form unions with other employees. In addition to that, the palm oil companies increased the level of difficulty that the workers had to face by decreasing the labor costs. They did that by fostering the creation of worker cooperatives which would enable the plantation owners to outsource work and therefore further decrease their labor costs because the workers are self-employed as they are a member of the cooperatives. As social securities lie in the responsibilities of the cooperatives, the workers themselves are responsible for it. Even Fedepalma, the national federation of palm oil cultivators, supports these practices of the palm oil companies because according to them unionizing has led to an increase in salary in addition to additional payments and an improvement of the working conditions. This in turn "affected productivity and discipline at work" while increasing the costs for the companies "to unsustainable levels" so that "some companies almost [reached] […] the point of bankruptcy" (Leech, 2009, p. 33). For these reasons, Fedepalma is in favor of creating cooperatives (Leech, 2009). The cooperatives in turn made it possible to pay workers only 47,000 Colombian pesos for almost two weeks of work which results in not even 2$ per day. Workers accuse this being a form of neoliberalism which is strategically used by the companies to "make […] the poor poorer and the rich richer" (Leech, 2009, p. 33).

An example for the Afro-descendent population of Colombia who suffered from a violation of their human rights due to the palm oil business is the case of the lower Atrato river in the department of

Chocó. The special characteristic of the case is that it took place already before the 'boom' of the palm oil cultivation on the Latin American continent. It was in 1996 when the land of the Afro-Colombian community was invaded and taken illegally. Different than from the Mapiripán case, almost no violence happened while the land was cleared. However, the land was clearly robbed because according to the Law 70 of 1993, it was unalienable to Afro-descendent Colombians (Oslender, 2007; Grajales, 2013; Ballvé, 2013). Though this case of land grabbing from the Afro-Colombian people of the Atrato river happened already in 1996, it was just 2007 when the scandal was discovered (Potter, 2020).

Another example for illegal land acquirement from Afro-Colombians was the case in María la Baja in the *departamento* Bolivar. It happened between 1999 and 2002 when the large displacements happened and 56 massacres similar to the one in Mapiripán took place (Castro, 2016). The land was attractive because of its irrigation system and the potential for high yields from oil palm plantations. Although, the owners of the land were the official beneficiaries of former land reforms, they were forced to sell their lands because they had debts from former rice harvests that were not lucrative. The recipient was the company Murgos Oleoflores, the largest palm oil company in Colombia which entered the before mentioned alliances with the small-scale farmers (Centro Nacional de Memoria Histórica, 2010). A common characteristic which the inhabitants of María la Baja share with other small-scale farmers who decided to enter a strategic alliance is that they had not enough food and water to meet their daily needs and low incomes at the same time (Centro Nacional de Memoria Histórica, 2010). However, studies showed that though the small-scale farmers offered their land to Murgos Oleoflores for a strategic alliance, they lived still in fear from paramilitary groups (Ojeda et al., 2015).

Also, Afro-Colombians are regularly subject to human right abuses (Washington Office on Latin America, 2008). In Curvaradó, a community in the pacific department of Chocó, paramilitaries killed an Afro-Colombian leader of the organization Justice and Peace because of his engagement against palm oil cultivation projects in the area. The organization is known for their fight against illegal land grabbing and displacement of people by paramilitaries and palm oil companies. The incident that happened in 2005 was not the first and the last incident where Afro-Colombians were victims of deadly attacks. In the community of Tumaco in Nariño, several Afro-Colombian leaders were killed when they fought against the settling of palm oil companies in their area. Others were intimidated by threats so that they were forced to sell their lands at a very low price which was also less than the normal market price. This process took place despite the law 70 eligible for black communities because the local people in power did not recognize it as a case of displacement. If the activists were

not killed, they were threatened in order to intimidate them and stop their engagement against the plans for palm oil plantations on their territories (Washington Office on Latin America, 2008).

Another case of displacement of Afro-Colombians can be found in the community of Regidor in the department Bolivar. In 2004, several thousands of land owners were displaced from their lands there in order to clear the land for palm oil cultivation. Summed up, more than 16,000 hectares of land have been involved in that displacement case which is now occupied by six different palm oil companies. Often, the Afro-Colombians face since their displacement a life in extreme poverty and with food insecurity (Washington Office on Latin America, 2008). The food insecurity is due to the nature of the palm oil plantations. Because the palm oil plantations are often monocultures and need huge areas of lands in order to grow, the farmers do not grow food crops on their lands anymore which in turn leads to shortages in the food supply. This is exactly what happened in the Afro-Colombian communities of Maria la Baja and Córdoba in the department of Bolívar where the small-scale farmers dedicated their lands solely to oil palms and face food insecurity because they do not grow food crops anymore and earn not enough wages from selling the palm fruits to the companies.

Activists are facing a steady risk. Especially in the department Magdalena Medio there have been many cases where activists in palm oil trade unions have been killed. Mostly paramilitary forces are accused of these violent acts which do not only include assassinations but also forced displacement of the land owners and local residents as well as disappearances of people. In the Magdalena Medio region is also the small community of Puerto Wilches located where already 14 members of a trade union were killed (Washington Office on Latin America, 2008).

The Law 70 for Black Communities is a law in Colombia that was created to ensure that the communities of Afro-Colombians were consulted before any economic projects were realized in their communities and on their land. However, the law is not always respected by the government, as for example by the government of the former Colombian president Álvaro Uribe. He was one of the presidents in favor of the expansion of the Colombian palm oil production and expressed very clearly that the representatives of the Afro-Colombian communities should not leave the meeting with palm oil companies and government authorities before a consent was found. According to the Washington Office on Latin America he said that the Afro-Colombian representatives were “forbidden to leave the office and should be locked up in there until they reach an agreement. It needs to be handled this way […]” (WOLA, 2008).

V. Analysis: Sustainable Alternatives?

Substitute palm oil and the problem is solved? Unfortunately, the solution to the problematic is not that simple. As analyzed before, the impacts of palm oil plantations in Colombia are numerous and do not only affect the environment but also the local people, small-holders who own land or minorities such as indigenous people or Afro-Colombians. The analysis shows that there are currently many practices in the palm oil sector that are not in the sense of the sustainability concept because they focus mainly on short-term profits rather than on persistency and long-term effects. The impacts on the environment as well as for the workers are not in line with goal no. 7 of the MDGs, neither with the Rio Forest Principles or the Agenda 21 because the reaching of an equilibrium between ecology and economy is far from being attained. As the analysis of the impacts of the palm oil cultivation in Colombia shows (see chapter IV) implementations are rather a form of 'catch-up development' because the process of reaching the same standards as in industrialized countries happens in a short period of time. However, there are also alternatives for palm oil which I will look at closer in this chapter.

First, there is the possibility to replace palm oil with other oils such as sunflower oil, soy oil, coconut oil or oil from rapeseeds which can be grown in Europe. Other oil types which are less common but can be still considered are jojoba oil or jatropha oil (Noleppa & Cartsburg, 2016). These oils (especially sunflower and rapeseed oil) could be also produced in Europe which would imply that the working conditions for the workers would probably be better than in Malaysia, Indonesia, Thailand and Colombia – today's leading production countries of palm oil – because the worker's rights are legally better protected in Europe. The workers would earn a higher income, be obligated to wear safety equipment such as face masks when they use chemical products such as fertilizers and in addition to that they would have regulated working hours. Furthermore, they might not live with the fear of being assassinated if they decide to get engaged in labor unions. Besides the working conditions also the flora and fauna would benefit if the palm oil production would be switched to sunflower or rapeseed oil production because of the "potential to widen regionally existing narrow crop rotations" without the risk of provoking a social conflict (Noleppa & Cartsburg, 2016).

However, the enumerated substitute oils for palm oil have at least one of the following characteristics which makes them less favorable for large-scale production: Either they are more expensive than palm oil, their technical applicability is poor and / or their acceptance is lower (Noleppa & Cartsburg, 2016). This leads to the problem that palm oil is even in those areas almost not substituted where it would be technically possible without any problems (May-Tobin et al., 2012).

The substitution of palm oil will be separately discussed concerning its different fields of use. First,

I will start with the use of palm oil in the food industry. Concerning margarine, it is clearly possible to substitute palm oil in this area because almost all other oils can be used instead of palm oil in this product. However, those substitutions are not realized which may have financial reasons or because of a different taste for the consumers even if technically it would be possible (Noleppa & Cartsburg, 2016). Similar substitutions would be possible for products such as ice cream or different types of bread and bakery products because there exist already several recipes that are based on other plant-based oils.

Nevertheless, not all food products have this high potential for substitution. The chemical properties of palm oil – namely the higher melting temperature in comparison to cacao butter – cause the higher resistance of chocolate products in higher temperatures (MPOC, 2007). Furthermore, other plant based oils have often be hardened before using them in the food production and in this hardening process trans fats develop which have the reputation to be potentially harmful for the consumer's health. This property of other plant-based oils reduces their applicability in other aliments (May-Tobin et al., 2012). An exemption from that is only coconut oil which does not need to be hardened until a temperature of 25°C and has similar characteristics as palm oil (Frühschütz, 2014). However, coconut oil has an even higher proportion of saturated fats than palm oil (May-Tobin et al., 2012). The before mentioned jojoba oil and jatropha oil are two other technical possibilities for substitutes, however, they are hardly eatable and therefore difficult to use in the food industry (Noleppa & Cartsburg, 2016). Other oils which can be extracted from microorganisms such as algaes for example are not yet sufficiently scientifically explored which is the reason why they are only rarely or not at all in the commercial production (May-Tobin et al., 2012).

The same is the case for the production of animal feed. Here, mainly rapeseed oil, soy oil and sunflower oil can replace palm oil but in general, all kinds of plant-based oils can replace it except castor bean oil (Normenkommission für Einzelfuttermittel, 2012; DTV, 2015).

Not as easy as in the food production are the substitution possibilities in industrial products. For the production of soaps for example, the palmitin acid which is extracted from palm oils is important. This acid can be replaced by stearin acid for instance which can be found in many plant-based oils and animal fats. However, the possible alternatives for palm oil in soaps which can be produced in Europe are technically not adequate for the large-scale production of surfactants (Noleppa & Cartsburg, 2016).

Also in surfactant and lauric oil production for laundry detergents, cleaning agents or toiletries coconut oil is the only plant-based alternative (May-Tobin et al., 2012). Other non plant-based substitutes are only synthetically produced silicones, paraffins and ethenes which are however not

used a lot (Fachagentur für Nachwachsende Rohstoffe, 2014).

Also for plastic materials there exist possibilities for substitutes, although the scientific research is still in the beginning in this area but it becomes apparent that oils extracted from soy, rapeseed or sunflower could be adequate substitutes (Fessl, 2015; Fachagentur für Nachwachsende Rohstoffe, 2014; Luther, 2014).

When it comes to biomass fuels, the options for substitutes are quite different: In this area, also other plant-based oils could be used as long as they have enough saturated fatty acids (Neste Oil, 2013). However, the actual situation and especially the perspectives for the future look different. Besides palm oil only animal fats and used fats receive attention in the production process of bio fuels of the type HVO (Neste Oil, 2014). Used fats are those plant-based oils that have been used already and the so-called 'Palm Fatty Acid Distillates' (PFAD) which are a by-product of the palm oil extraction (Neste Oil, 2014). In 2014, 38% of the bio fuel of the type HVO have been produced with native palm oil and already 62% have been produced using the before mentioned substitutes, according to the market leaders (Neste Oil, 2014).

Fossil oils would be another option for substituting palm oil, however, for this analysis it will not be considered because of issues with its sustainability though it would be technically – partly – possible (Noleppa & Cartsburg, 2016).

To conclude, the technical possibilities for substituting palm oil by other plant-based oils are the following: In the food industry, it can be replaced in many cases with rapeseed oil, sunflower oil, soy oil and coconut oil (except the production of chocolate where coconut oil is the only possible substitute). Concerning the production of food for animals, rapeseed oil is the best substitute, however, sunflower and soy oil can also play an important role. For many industrial products only coconut oil is an adequate substitute. Concerning the biologically based plastic production, other plant-based oils that could be used to a certain extent are soy oil, rapeseed oil and sunflower oil. Palm oils used in the production of energy and heat can be replaced eventually with rapeseed oil, followed by soy oil and sunflower oil. In the context of bio fuels on HVO basis, the situation is different. Here, mostly plant-based used fats are possible candidates for substitution. These oils don't have to be extracted from agricultural natural resources but instead they have been used already once for example as fat for frying or technical oil. That means that – in comparison to the other possible substitutes presented before – they are the only ones that do not need an additional need of resources (Noleppa & Cartsburg, 2016).

Although, these outlooks on the possibilities to substitute palm oil seem very promising, there are

also disadvantages of it. The main problems are not the financial benefits of palm oil – that it is cheaper to produce than its alternatives – but instead the place it needs to produce an equivalent amount of other plant-based oils. According to the WWF, 1,4 hectares would be needed in order to produce an equal outcome of oil with other plants (Noleppa & Cartsburg, 2016). This additional need of area is because no other plant can produce as high yields as the oil palm does. Rapeseed, sunflower and coconut oil produce on average ca. 0,7 tons of oil per hectare and soy even less. In comparison to that, the yield of oil palms is 3,3 tons per hectare. In addition to that, the CO_2 emissions would rise if palm oil would be substituted completely by other plant-based oils. Another factor are the working conditions for the employees. If the global production of palm oil would shift to the cultivation of rapeseed, sunflower, soy or coconut, the poor working conditions of the employees would not improve but rather shift to another business sector (Noleppa & Cartsburg, 2016).

Another option which is not yet sufficiently scientifically explored but which has the potential to be a sustainable alternative is the *acrocomia aculeata* – a South American palm species which has similar fruits as the African oil palm, the *Elaeis guieensis*. Its biggest advantage is the property that the plant grows not only in hot and tropical regions along the equator but also in dry and subtropical areas reaching from Florida to Argentina. Another positive property is the fact that the *acrocomia aculeata* seems to have a high resistance concerning the necessary weather conditions. It can stand temperatures until -5°C for a short time, needs an amount of 1,000 to 2,500 millimeters of rain and can tolerate even fire and drought up to six months. An important feature of the acrocomia palm is the ability to grow on low fertile soils such as a sandy ground (Poetsch et al., 2012).

For these reasons, the *acrocomia aculeata* could help to satisfy the worldwide hunger for palm oil without the deforestation of tropical rain forest. Scientists predict that it could serve as a substitute especially in the food industry but can be used also in animal feeds, fibre or medicine without competing "with rainforest or fertile land" (Poetsch et al., 2012, p. 42). As the plant promises "great potential as a sustainable source for vegetable oils and provides opportunities for both smallholders and investors on less fertile crop- and grassland in sub[…]tropical regions with limited rainfall" further studies and research is needed to explore its viability (Poetsch et al., 2012, p. 41).

5.1. Certifications for Sustainable Palm Oil

Certifications are one possible solution to make palm oil production worldwide more sustainable because they help to convey transparency to the consumers and they ensure that certain standards of production and working conditions are maintained. One of those certifications is issued by the RSPO.

It is a Non-Profit-Organization that has been founded in 2004. They have their headquarter in Kuala Lumpur, Malaysia. The RSPO brings all the different actors in the palm oil industry together: Palm oil farmers, traders of palm oil, manufacturers of processed goods for consumption, tradesmen, investors such as banks as well as NGOs. Today they have more than 4,000 members of different parts of the supply chain. Their main goal is to discuss and implement standards that ensure a sustainable production of palm oil worldwide (Roundtable on Sustainable Palm Oil, 2021).

If these standards are applied properly, the produced palm oil obtains the CSPO certificate, that means it is certified as palm oil produced under sustainable conditions. Having this certificate and these standards should help decreasing the (negative) socio-ecologic effects of oil palm plantations. Furthermore, they also aim to monitor and assess the impacts of palm oil production on the local communities where it is grown and harvested as well as the environment. Besides the different actors involved in the supply chain of palm oil, the RSPO also intends to engage governments and consumers (Roundtable on Sustainable Palm Oil, 2021).

The Forest Stewardship Council (FSC) is another possibility for certification. It is a label that was created in 1993 and that can be found on a wide range of products such as a book, carton or even toilet rolls. The basis of the FSC-certification are uniform and transparent standards and its aim is to promote an environmental sustainable, socially beneficial and economically supportable cultivation of the forests worldwide. They were founded in order to meet the needs of today's generation without endangering the future's generations (FSC, 2021). Concerning the social benefits, FSC believes that the forest management helps the local population as well as the hole society to have a share in its long-term benefits. In addition to that, the FSC creates incentives for the local population to maintain the forest resources and to follow long-term plans for forest cultivation. Also, the FSC works for the prevention that the financial profits are not based on the costs of the forest resources, the ecosystem or the local communities (FSC, 2021).

When the FSC decided three years after its founding to certify – based on a set of standards and criteria that have to be fulfilled – a sustainable forest management, they received many critics from international NGOs and also local communities because their certificate would support the negative impacts that some plantations had for the local population.

Another mechanism to help reducing the negative consequences of the palm oil production in Colombia is *Visión Amazonía*, a project which the Colombian Ministry of Environment and Sustainable Development started in 2015. However, the results until now are not as desired and experts write that the project "made little progress in terms of reducing deforestation or changing the drivers of deforestation and land grabbing in the Amazon region." (Lang, 2020).

VI. Conclusion

The objective of this thesis was to contribute to a critical understanding of the sustainability of the Colombian palm oil sector and the social and environmental consequences that come along with the palm oil cultivation in Colombia, the fourth biggest producer of palm oil worldwide. The analysis has shown the controversial matters in regard of this agricultural sector. As the Colombian president said at the World Economic Forum in 2020, "the greatest […] challenge of our time is climate change. […] So if we really want to […] contain the effects of climate change, we need to protect the tropical forests." (Lang, 2020). The impacts on the environment in Colombia show that there is still a long way to go. As the analysis has demonstrated, the tropical rainforest is deforested in order to clear the land for palm oil cultivations. Furthermore, the use of fertilizers and pesticides pollutes not only the ground water but also the local flora and fauna. Also, the workers' health is affected by the chemicals because they are often not supplied with safety masks or even if they are the employees often decide to not to wear them because they need more time then to fulfill their work which has negative impacts on the quotas they have to reach (Comisión Justicia y Paz, 2015). Another environmental risk that comes along with palm oil plantations is the soil erosion due to the monocultures. These consequences and impacts of the palm oil production in Colombia prove that the importance of the pillar 'ecologic equilibrium' of the three-pillar model of Carlowitz (see chapter II) is not considered because the practices in the Colombian palm oil sector focus rather on the short-term yields instead of the long-term outcomes.

Nevertheless, not only the environment faces (negative) impacts from the palm oil cultivation. According to the three-pillar model of Carlowitz, also the social and economic dimension play an important role when it comes to the evaluation of the sustainability of the palm oil sector in Colombia. Social impacts are for example the creation of jobs. Many people in the rural areas depend on the palm oil sector as it creates a regular source of income for them. However, vulnerable minorities such as indigenous peoples or the afro-descendant population in Colombia faced displacement and land grabbing. Palm oil has been used as a way to push those minorities out of their land, especially at the coast. Indigenous people and afro-descendants can be seen as the losers of the palm oil production in Colombia whereas the largescale companies which illegally obtained land, such as Poligrow Ltd., as the winners. Furthermore, workers are often not secured against accidents at work and due to the hard and physical work, they are forced to stop working before they reach the age for retirement. For these reasons, also the pillar 'social justice' is not respected sufficiently.

Concerning the political ecology aspect in the Colombian palm oil sector, it can be concluded that the present actions resemble rather practices of the 'catch-up development' instead of sustainable

development because the process of reaching the same standards as the industrialized countries is happening in a relatively short time in Colombia while they took a long time in today's more economically developed countries.

Nevertheless, there have been several efforts been made in order to make the palm oil production not only in Colombia but worldwide more sustainable in the sense of the adapted definition of the UN World Commission on Environment and Development: "[…] [to meet] the needs of the present without compromising the ability of future generations to meet their own needs." As the analysis has shown, the REDD program is one example but also certifications such as the CSPO have been implemented to minimize the negative impacts of palm oil production for the local people and the environment. They can be seen as a sign of success, however, these programs are only one side of the possible measurements that can be taken. On the other side, we as consumers can contribute our part to avoid the negative impacts of the palm oil production that were revealed in the analysis by making sustainable choices. First of all, when it comes to the food industry that uses palm oil, the consumers can pay attention to buy RSPO-certified products or products with equivalent certifications. The combination with a BIO-certificate promises an even lower impact on the environment as bio-palm oil is produced without using pesticides for example.

There is a need for severe changes in the consumption and production patterns that are necessary if we want to meet the target temperature of the Paris Agreement. Just as in other areas of life, consumers can influence with their buying habits the suppliers and the production. As many 'luxury goods' such as chocolate, pizza and other processed foods which are consumed in industrialized countries for example, contain palm oil, the consumers in those countries could save up to 50% of the actual palm oil consumption if they change their amount of biofuel consumption in combination with the change in food consumption.

But not only the consumers can contribute to a more sustainable use of palm oil and therefore reduce the negative impacts that the palm oil cultivation has on the environment, the workers and small holders in the producing countries. The companies and suppliers to the companies that use palm oil also play a key role in this process. They should change towards 100% certified and segregated palm oil in the future and show more transparency concerning their products because often it is not clearly marked that a product contains palm oil – especially if it is 'hidden' as a derivate of palm oil such as Sodium Lauryl Sulfoacetate or Cetyl Palmitate (Rainforest Action Network, 2021). For more sustainability, producers should also use predominantly plant-based oils that can be produced locally.

Furthermore, the politics also play a huge role because it is still characterized by a lack of transparency. They should enforce an abandonment of bio fuels produced with palm oil and focus on

a reduction of the energy consumption.

However, the overall conclusion of this thesis is that sooner or later there will always be boundaries that studies such as 'The Limits to Growth' pointed out, that we have to face. One boundary is for example that the cultivation of equivalent plant-based oils would require even more soil (Noleppa & Cartsburg, 2016). The natural resources are limited if we don't consume them in a sustainable way and "if the present growth trends […] continue unchanged, the limits to growth on this planet will be reached sometime within the next hundred years." (Meadows et al., 1972, p. 23). As this thesis points out in the political ecology chapter (see chapter II), a collapse of the system will be highly probable if we do not change our focus from a quantitative growth towards a qualitative growth. Therefore, there is no alternative for it: The cultivation of oil palms worldwide must be made even more sustainable for the environment as well as socially, without exceptions (Noleppa & Cartsburg, 2016). But we do not only have to improve the cultivation practices worldwide but also the consumption pattern, especially in industrialized countries.

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Appendix

Table 1. Trade Unions in the Colombian palm oil industry (Vlaminck, 2019)

	2012	2018
Sinaltragrasco	507	507
Sindiacegrasas	58	58
Sintragradinsa	45	45
Sindicato de Trabajadores de Grasas Vegetales S.A. (Gravetal)	620	620
Sintragracetales	306	306
Sintraceitales	710	710
Sintraprogal	317	317
Sintraimagra-Cumaral		78
Sintraimagra-San Carlos de Guaroa	112	287
Sintragraco	60	500
Sintraproaceites-San Alberto	260	276
Sintraproaceites-El Copey	327	362
Sintraproaceites-Sabana de Torres		55
Sintraproaceites-La Gloria		50
Sindicato de Trabajadores de la Fábrica de Grasas y Productos Quimicos Grascol Ltda.	35	35
Sindicato de Trabajadores de Palmeras del Llano S.A.	35	35
Sintratercerizados	35	0
Sintragradesa		35
UGTTA		35
Sintraingro-Ciénaga	330	330

Sintraingro-Puerto Wilches	220	328
Sintrainagro-Minas	149	360
Sintrainagro-San Alberto		540
Sintrapalmas-Puerto Wilches	117	117
Sintrapalmas-San Alberto	117	117
Sintrapalmas-Barrancabermeja		90
Sintrapalmas-Sabana de Torres		19
Sindiunipalma	500	500
Sintrapaloriente	35	35

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