Greening the ‘green gold’: An analysis of the contribution of Rainforest Alliance certification in making the Mexican avocado sector more sustainable.

Master’s thesis

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Abstract

Avocados are becoming increasingly popular among consumers. In response to the growing demand, the production of avocado is rapidly expanding. Over one-third of the avocados in the world are cultivated in Mexico, where there are considerable socioeconomic and environmental issues connected to the cultivation of the fruit. Effectively addressing these issues might cause the highly profitable avocado industry to have a positive effect on the socioeconomic development in Mexico. However, there is little research on how this could be achieved. In other sectors, certification standards have shown some promising results in increasing sustainability. While the number of certification standards in the Mexican avocado sector is proliferating, there has been no assessment of how they affect environmental and social outcomes at the farm level. This study sets out to address this research gap by focusing on Rainforest Alliance certification specifically.

This thesis is embedded in wider theoretical debates on certification standards and private governance. Through a theory-based mixed-methods approach in which interviews, a survey, and an extensive literature review were integrated, it was evaluated how adoption and implementation of Rainforest Alliance certification by Mexican avocado producers contributes to more sustainable outcomes at the farm level. The results of this study indicate that the contribution of Rainforest Alliance certification in affecting farm practices related to the sustainability issues differs considerably between producers. Although the Rainforest Alliance-certified producers in this study implement sustainable farm practices, this does not always seem to be the result of Rainforest Alliance certification specifically. Other certification standards also seem to play a role in affecting such farm practices. It was found that most sustainability challenges in the Mexican avocado sector are addressed by the requirements of the Rainforest Alliance certification standard, and therefore seems to have the potential to increase sustainability in the sector. However, adoption of the standard is selective, as only larger, already better-performing producers seem to adopt the standard. To reach its full potential, adoption should be increased by minimising the barriers while enhancing the motivations of producers to adopt certification. It was found that market demand plays a key role in the adoption of certification schemes. Hence, the role buyers and consumers play in impacting production practices should not be underestimated. Moreover, increased partnership between key stakeholders is recommended.

Keywords: *sustainability, private governance, private sustainability standards, agricultural certification standards, Rainforest Alliance, avocado cultivation, Mexico, theory-based evaluation*

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List of Abbreviations

APEAJAL	Asociación de Productores Exportadores de Aguacate de Jalisco.
APEAM	Asociación de Productores y Empacadores Exportadores de Aguacate de México
Global G.A.P	Global Good Agricultural Practices
GRASP	GLOBALG.A.P. Risk Assessment on Social Practice
NAFTA	North American Free Trade Arrangement
NGO	Non-Governmental Organisation
PPE	Protective Personal Equipment
RA	Rainforest Alliance
SAS	Sustainable Agriculture Standard
SMETA	Sedex Members Ethical Trade Audit
SQ	Sub-Question
SRC	Stockholm Resilience Centre
ToC	Theory of Change
US	United States

1. Introduction

1.1 Problem statement

In recent decades, avocados have gained a healthy image and have become known as a 'superfood' (Avocados from Mexico, 2022; Sommaruga & Eldridge, 2020). This has led to an extensive increase in the popularity of this so-called 'green gold', particularly in the more developed parts of the world (Sommaruga & Eldridge, 2020). In response to the increasing demand for avocado, it is the fastest-growing tropical fruit commodity in the world and is predicted to become the most traded tropical fruit by 2030 (OECD & FAO, 2021). Consequently, avocado production is rapidly expanding around the world (De la Vega-Rivera & Merino-Pérez, 2021).

However, there is a dark side to the increasing consumption of this trendy food. More than one-third of the avocados in the world are cultivated in Mexico (FAOSTAT, 2021), in which the growth of the avocado sector has a profound impact on the country and its people (Curry, 2021). While the avocado industry has brought significant economic growth to the avocado-producing regions, the wealth made by the industry is not shared by everyone. The profits that are made in the industry are highly concentrated, which widens already profound inequalities in the country (Denvir et al., 2021; De la Vega-Rivera & Merino-Pérez, 2021).

Furthermore, the lucrativeness of avocado production has led drugs cartels and criminal groups to engage in the avocado industry, which has led to increased violence, extorting of farmers, kidnapping, and even murders (Khan, et al., 2021; Kennedy, 2019; Sommaruga & Eldridge, 2020; De la Vega-Rivera & Merino-Pérez, 2021). Unsustainable avocado cultivation in Mexico can have other adverse impacts on the local population as well, such as diminishing local food security, loss of land and water access, loss of community, health issues due to agrochemical use, and poor working conditions in the orchards. (De la Vega-Rivera & Merino-Pérez, 2021; Curry, 2019; Sommaruga & Eldridge, 2020).

Various researchers have indicated that there are major environmental impacts connected to unsustainable avocado cultivation in Mexico as well, such as deforestation, a loss of biodiversity, land degradation, and water scarcity (Denvir et al., 2021; De la Vega-Rivera & Merino-Pérez, 2021; Curry, 2021; Sommaruga & Eldridge, 2020). How such environmental and socioeconomic impacts interact remains understudied (Denvir et al., 2021).

Thus, while the advantages of the avocado industry are only benefitting a few, the environmental and socioeconomic burdens fall on the shoulders of the entire population in the main avocado-producing regions in Mexico (Denvir et al., 2021; De la Vega-Rivera & Merino-Pérez, 2021). As the production of avocado keeps expanding, there is an urgent need to prevent further adverse socioeconomic and environmental consequences. Yet, there is little research on how to overcome these issues.

Certification standards could potentially provide more sustainable pathways for avocado production, given that they aim to improve environmental and socioeconomic outcomes and have brought some promising results in other sectors, such as the coffee, tea, and cacao sector (De Fries et al., 2017; Meemken, 2020; Oya et al., 2017; Oya et al., 2018). However, very little is currently known about certification concerning avocado cultivation (Denvir et al., 2021).

A certification standard that is increasingly being adopted in the Mexican avocado sector is Rainforest Alliance (RA) certification. The RA aims to protect biodiversity and forests,

mitigate climate change, and improve the livelihoods and rights of rural people (Rainforest Alliance, 2022a). This study sets out to provide more insight into the socioeconomic and environmental sustainability issues in the Mexican avocado sector and seeks to evaluate the contribution of RA certification in addressing these issues at the farm level, contributing to more sustainable outcomes.

1.2 Relevance

Investigating the contribution of agricultural certification schemes towards increased sustainability is of major relevance to the field of Development Studies. Development is increasingly threatened by climate change and resource depletion, underlining the need to ensure sustainable development (Potter et al., 2015). Agriculture plays a vital role in this, as it is responsible for approximately 75 percent of worldwide deforestation. Furthermore, land use, such as agriculture and forestry, is accountable for around one-fourth of anthropogenic greenhouse gasses (Rainforest Alliance, 2020). As agriculture covers approximately half of the world's useable lands and expansion often occurs at the expense of forest areas, sustainable farming practices in agriculture are crucial in realising a more sustainable future (Edwards & Laurence, 2012).

Whether certification schemes achieve their full potential is dependent on whether the intended outcomes are actually realised on the ground. Empirical evidence on the contribution of certification is essential in realising widespread sustainable production practices, given that producers and consumers will only be willing to invest in certified production when they believe it will achieve positive impacts (De Fries et al., 2017). Consequently, it is of great relevance to gain more insight into this. This research will contribute to the broader academic debates on private governance and certification schemes.

Studying the contribution of certification is especially relevant concerning the avocado sector, given the extent of the sustainability challenges connected to avocado cultivation alongside its rapid expansion in production. To realise sustainable development, it is fundamental to minimise these issues and prevent them from happening in other localities (Mondragón & López-Portillo, 2020). However, to date, studies on the role of certification in the avocado sector have been largely absent in academic literature (Denvir et al., 2021). This study seeks to address this research gap.

1.3 Research questions

The objectives of this study are twofold. First, to contribute to an increased understanding of the socioeconomic and environmental sustainability issues in the Mexican avocado sector. And second, to evaluate the contribution of RA certification in addressing these issues at the farm level, contributing to more sustainability. Therefore, the research question that is central in this research is:

'How does the adoption and implementation of the Rainforest Alliance certification standard by avocado growers contribute to more sustainable outcomes at the farm level in the Mexican avocado sector?'

This thesis will make use of the following sub-questions (SQ).

SQ1. ***What are the sustainability issues (socioeconomic and environmental) of avocado cultivation in Mexico?***

To understand how RA certification contributes to more sustainability, it is key to first identify the main sustainability challenges in the sector. The dynamics of the socioeconomic and environmental impacts of avocado cultivation in Mexico are poorly understood. However, understanding these complex dynamics is key when trying to understand avocado production in a broader context (Denvir et al., 2021). Moreover, when evaluating an intervention, understanding the contextual background is key to understanding how an intervention works, given that the contextual setting can influence how the intervention plays out in reality (Khandker et al., 2009; White, 2009).

SQ2. ***How are these sustainability issues addressed in the Theory of Change of the Rainforest Alliance certification program?***

Secondly, this research will provide insight into how these issues are addressed by the RA certification standard. This is visualised in their Theory of Change.

SQ3. ***What are the farm characteristics of the Rainforest Alliance certificate holders and (how) do these differ from other growers?***

To say something about the contribution RA certification makes in increasing sustainability in the Mexican avocado sector, it is crucial to know the reach of the intervention. A certification standard can only contribute to more sustainability when producers adopt the standard. Therefore, the reach of the intervention is a key factor in evaluating the contribution of the standard (Dietz & Auffenberg, 2014).

SQ4. ***What are the barriers and motivations of avocado growers to adopt the Rainforest Alliance certification standard?***

This thesis also sets out to assess why growers do or do not adopt the certification standard, as this can provide insight into its possible selectiveness. Linking the effects of certification standards with barriers and motivations generates more valuable findings (Oya et al., 2017). Furthermore, this information can be used in developing strategies to increase the adoption of the certification standard.

SQ5. ***How did the adoption of the Rainforest Alliance certification standard affect farm practices that are connected to the sustainability issues?***

Next, this thesis will provide three case studies of RA-certified growers, which focus on how the implementation of the RA certification standard has affected changes in farm practices that are connected to the sustainability issues identified in SQ1.

SQ6. ***How does Rainforest Alliance certification differ from other common certifications in the Mexican avocado sector in its verification methods, focus of requirements, and observed effects?***

Lastly, as it turns out, all RA producers have adopted multiple certification standards. In order to study the added value of the RA certification standard, it is necessary to

understand how it differs from other common certification standards. Understanding how a development intervention interacts with other interventions is key to understanding the contribution it makes (Riché, 2013).

1.4 Outline thesis

This thesis is composed of 11 chapters. The following chapter lays out the theoretical framework of the research, in which important concepts, theories, and approaches will be further elaborated upon. Chapter 3 will describe the methodological decisions of this research. The fourth chapter is concerned with the regional framework to provide a contextual background for the thesis. In this chapter, the reader will become familiar with Mexico and its main avocado-producing regions. It will also briefly touch upon some relevant thematic processes in Mexico.

Subsequently, the empirical part of this research follows. Chapter 5 will focus on the main sustainability issues in the Mexican avocado sector. Next, the thesis will go more into depth about the certification scheme. Chapter 6 will analyse how the sustainability issues are addressed by the RA certification standard. Then, Chapter 7 will provide insight into the adoption of the standard, by first describing the characteristics of the RA certificate holders and then going more into detail about the barriers and motivations of avocado producers to adopt the standard. After the reach and perceptions of the certification scheme have become clear, the thesis will go more in-depth into how the RA standard affects farm practices that are connected to the sustainability issues (Chapter 8). The last empirical chapter, Chapter 9, will focus on the multiplicity of certification standards in the Mexican avocado sector.

Chapter 10 will synthesise the findings of the five empirical chapters in relation to the theoretical framework discussed in Chapter 2. It will conclude with recommendations. The final chapter of this thesis will provide a conclusion.

2. Theoretical framework

This chapter will elaborate on important concepts and approaches related to this research topic. First, this chapter will define two concepts that are important in order to understand the remainder of this theoretical framework: sustainability and sustainable development. Next, it will be argued that introducing the concept of translocality into the theoretical framework will be necessary as well. Hereafter, the chapter will focus on the theoretical background - neoliberalism and private sector governance - and how this relates to private sustainability standards and certification schemes. The following section will provide an overview of the debate on certification schemes as a form of private sector governance to realise sustainability objectives. Subsequently, the theory-based approach as applied by this thesis in evaluating certification will be explained. Lastly, this chapter will provide insight into the RA certification scheme and its Theory of Change to explain how the standard aims to contribute to more sustainable outcomes.

2.1 Theories and approaches

2.1.1 Sustainability and sustainable development

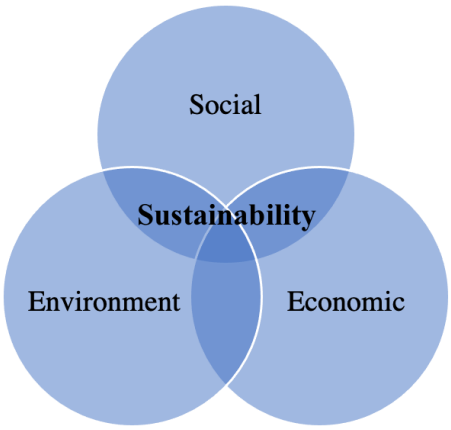
The concept of sustainability increasingly gained attention in the 1970s, during a time in which growth-focused development was central (Purvis et al., 2019). In 1972, limits to growth and economic development were for the first time publicly recognized by the Club of Rome, after which these ideas soon increased in popularity. The Brundtland Commission was especially important for the popularisation of the concept of sustainable development (Purvis et al., 2019), which defined it as: ‘‘Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’’ (World Commission on Environment and Development, 1987, p.42).

Nowadays, sustainable development is mainly operationalised by the Sustainable Development Goals (SDGs) of the United Nations (UN), the successor of the Millennium Development Goals (MDGs). The SDGs are 17 goals, existent of 169 targets, which function as blueprints to increase sustainable development by 2030. They were adopted in 2015 and significantly influence the international development agenda (Gutmann & Gorman, 2022; Potter et al., 2018).

While there is a consensus about the importance of sustainability, what it exactly entails in practical terms has long been debated (Raworth, 2012). The concept is critiqued to be vague, pluralistic, and ambiguous (Glover et al., 2014). The concept can encompass a broad range of things (Blewitt, 2012) and is grounded in various belief and value systems (Glover et al., 2014).

During the 2002 World Summit on Sustainable Development, three pillars of sustainability were recognised: social, economic, and environmental. To integrate and balance these three aspects of sustainability, increased partnership between civil society, international organisations, and national governments was emphasised (United Nations, 2002). The three pillars are presented in Figure 1. This model is also referred to as the triple bottom line framework (Graffy, 2011).

Figure 1.
Three pillars of sustainability.



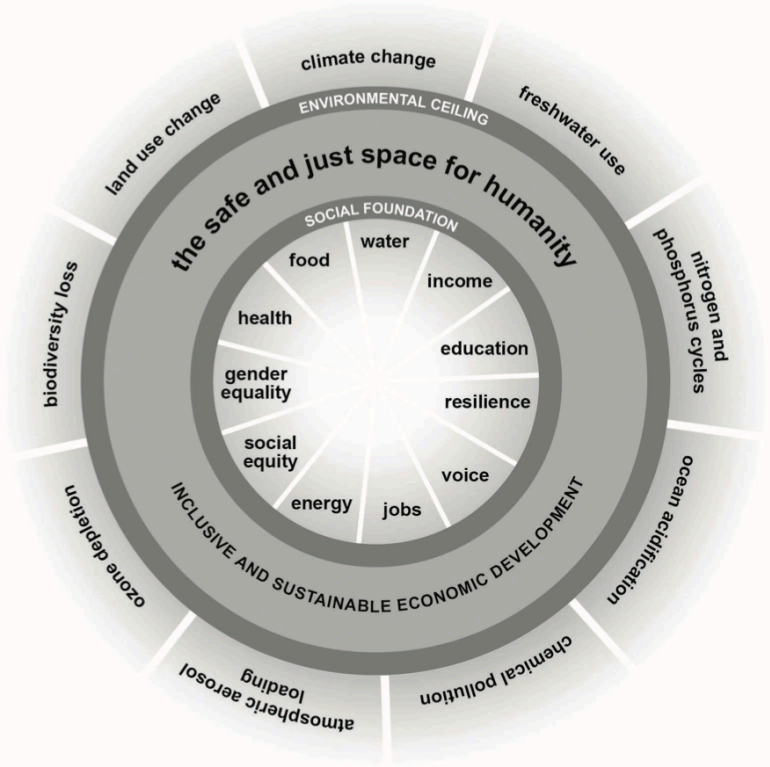
Note: Adapted from Purvis et al. (2019)

The three-pillar model of sustainable development is critiqued, as it does not have a clear theoretical basis. Especially the economic pillar is debated (Purvis et al., 2019). Some scholars view that the combination of economic growth and sustainability is contradictory, while others argue that economic growth is necessary to achieve social and environmental goals (Blewitt, 2012; Purvis et al., 2019). Anthropogenic pressures increasingly impact the climate and its ecosystems (Rockström et al., 2009). Therefore, Holden et al. (2017) reject the three-pillar model and argue that sustainable development should entail limits and constraints (Holden et al., 2017).

Rockström et al. (2009) also propose the idea of limits and that the earth's resources are finite. The scholars have introduced the Planetary Boundaries Framework, in which they have identified 9 planetary boundaries which represent a ''safe operating space for humanity with respect to the functioning of the Earth System'' (Rockström et al., 2009, p.32). When these boundaries are exceeded, irreversible or abrupt environmental changes could be triggered (Rockström et al., 2009).

In response to the Planetary Boundary Framework, economist Kate Raworth developed a 'doughnut model', based on the planetary boundaries and the social priorities recognised by the SDGs (Gutmann & Gorman, 2022; Raworth, 2017; Ross, 2019). The model depicts the nine planetary boundaries (the ecological ceiling) as well as 12 social boundaries (the social foundation)(See Figure 2). Raworth critiques that our economic decisions are still based on last century's economic paradigm, targeting continuous growth. She argues that between the ecological ceiling and social foundation lies the ideal space for humanity to thrive, meeting all social needs within the planet's means (Raworth, 2017; Ross, 2019). With the 'doughnut model', Raworth addresses the interconnectedness of the SDGs and that progress on one SDG influences another (Gutmann & Gorman, 2022).

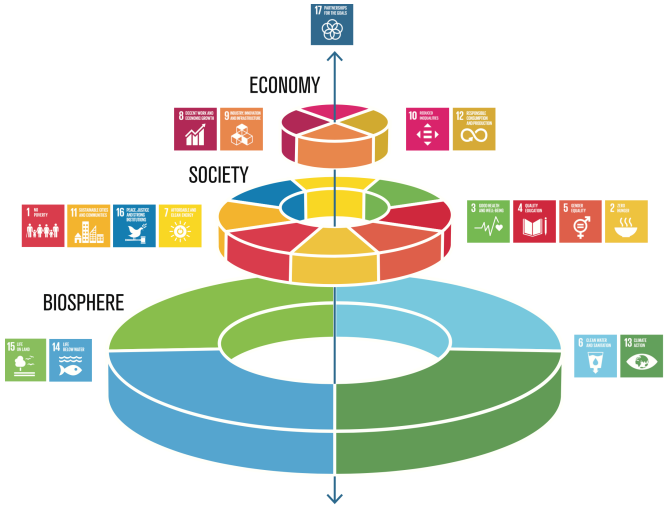
Figure 2.
The doughnut model of social and planetary boundaries.



Note: Reprinted from Raworth (2017).

Another model that is worth mentioning in this regard is the Stockholm Resilience Centre's 'wedding cake model' of the SDGs. The model is based on the critique that the three-pillar model does not recognise the hierarchies of the three sustainability pillars (Kammüller, 2020). In practice, the economic pillar is often prioritised at the expense of the social and environmental pillar, causing the planetary boundaries to be transgressed (Eskelinen, 2021; Kammüller, 2020). As such, the Stockholm Resilience Centre (SRC), a prominent international research centre on sustainability science, developed a newer model of viewing the three-pillar model within the SDGs. In this model, the economy and society are embedded in the biosphere, as depicted in Figure 3 (SRC, 2017). Economical and societal goals cannot be achieved when the environmental goals are not met (when the planetary boundaries are transgressed). As such, the SRC argues that for development interventions to realise long-lasting impacts, it is important to not view the three pillars as separate but to understand their interdependencies (SRC, 2017). The SRC noted that all the SDGs are related to healthy and sustainable food, either directly or indirectly (SRC, 2017). This underlines the importance of sustainable agriculture to achieve sustainable development.

Figure 3.
The wedding cake model of the SDGs.



Note: Reprinted from Stockholm Resilience Centre, 2016. Designed by Azote.

2.1.2 Translocal development

Since the developments in communication technologies and transport since the 20th century, the world has become increasingly interconnected (Murray, 2006). In the context of these globalisation processes, how local development is defined needs to be refined (Zoomers & Van Westen, 2011). Globalisation causes translocal development patterns, meaning that different localities are linked together. As such, what happens in one place has an impact on what happens in other places, either directly or indirectly (Zoomers & Van Westen, 2011). When describing the social and economic functioning of a locality, connections to other localities have become crucial (Van Westen et al., 2021). For some, these translocal patterns provide development opportunities, while for others these patterns may push them further into a disadvantaged position (Zoomers & Van Westen, 2011). Otsuki et al. (2021) argue that such global flows and linkages should become more central in development theories.

Translocality is important in this thesis specifically, given that the avocado industry in Mexico is heavily export-oriented. The high demand for avocados in Europe, North America, and Asia has caused the Mexican avocado sector to expand exponentially, including all its associated impacts (Sommaruga & Eldridge, 2020). The local development opportunities in Mexico offered by the avocado sector are heavily dependent on what is happening in the import countries. This became clear when in February 2022 the United States (US), Mexico's most important import country, banned avocado imports from Mexico, threatening more than 300 thousand jobs (Cota, 2022). Therefore, this thesis will look at development through a translocality lens.

When evaluating an intervention through a translocality lens, it is not only important to look at the impacts of the intervention on the directed population, but also to pay attention to its rippling effect, and the impact it may have on those not included in the intervention. A

change in a particular locality, sector, or theme may have knock-on impacts on others (Otsuki et al., 2021).

2.1.3 Neoliberalism and private sector governance

After decades in which national governments were in charge of regulations and were actively intervening to ensure levels of socioeconomic development, the role of the state became increasingly challenged around the 1970s and the economy was deteriorating (Peet & Hartwick, 2015). Due to processes of globalisation, the nation-state was no longer seen as an ‘‘effective container of economic activity’’ (Murray, 2006, p. 351). Subsequently, a strongly market-driven approach to (economic) development gained popularity; neoliberalism (Potter et al., 2015). Neoliberal ideas underline the reduced role of the state, often referred to as ‘‘the rolling back of the state’’ (Potter et al., 2015, p.103). Neoliberal policies focus on, among other things, trade liberalisation, reducing social welfare systems, encouraging foreign direct investment, deregulation (reducing state control), and privatisation (increasing the role of the private sector) (Peet & Hartwick, 2015; Potter et al., 2015). Following the 1980s, neoliberal ideas became increasingly adopted and a series of neoliberal reforms took place around the world (Peet & Hartwick, 2015). These neoliberal ideas have significantly influenced the policies of major international development institutions, such as the International Monetary Fund and the World Bank (Potter et al., 2015; Peet & Hartwick, 2015). These institutions have considerably promoted economic globalisation, which became used as a development strategy (Peet & Hartwick, 2015).

In line with the above processes, there has been a rise in global governance (Murray, 2006). As the state was retreating, the role of private actors, such as Non-Governmental Organisations (NGOs), businesses, community organisations, and multi-stakeholder groups, became increasingly important (Bull et al., 2004; Knill & Lehmkuhl, 2002). As such, there has been a general shift from government to multistakeholder governance (Lievens, 2015). However, it is important to mention that governance does not *replace* government as national regulatory frameworks often still play an important role (Böstrom et al., 2015). Nevertheless, private sector actors are increasingly seen as key agents in development (Van Westen, 2021).

Around 1990, private sector actors became increasingly involved in governance arrangements in global value chains (Glasbergen & Schouten, 2015; Ponte & Cheyns, 2013). The rise in private actors was a response to growing concerns about social and environmental issues in global value chains and the inability of governments to address these issues. Due to globalisation processes, consumption and production did no longer occur within the boundaries of a single nation-state. Instead, they are increasingly transnational, scattered, and complex (Bush et al., 2015), reflected by translocality. Additionally, in the light of neoliberalism, the state was retreating - some scholars even argued that there was an ongoing erosion of state sovereignty (Murray, 2006; Oosterveer et al., 2014). Private actors have stepped up to fill this gap (Komives & Jackson, 2014; Ponte & Cheyns, 2013). This is referred to as sustainable supply chain governance (Böstrom et al., 2015; Vermeulen, 2010; Vermeulen & Seuring, 2009).

2.1.3.1 Private sustainability standards

Following increasing sustainability demands, new models of supply chain governance, such as private sustainability standards, have been introduced that aim to achieve sustainable production and business practices (Komives & Jackson, 2014; Ponte & Cheyns, 2013). The rationale behind this form of governance is that, in contrast to government regulation, market principles can be used to achieve more sustainable practices (Glasbergen & Schouten, 2015). As such, private sustainability standards can be seen as a type of neoliberal governance (Lambin & Thorlakson, 2018; Moberg, 2014). In contrast to government-induced standards, private sustainability standards are voluntary (Komives & Jackson, 2014). While private sustainability standards are sometimes referred to as ''a form of governance without government''(Lambin & Thorlakson, 2018, p. 371), a more nuanced approach reveals that private governance does not exist in isolation, but rather interacts with public governance models (Lambin & Thorlakson, 2018). The proliferation of sustainability standards increasingly influences supply chain management (Oya et al., 2017).

Within private sustainability standards, private actors have together defined standards and norms to which supply chain actors must comply in order to produce 'sustainably' (Manning et al., 2012). Most private sustainability standards integrate the three-pillar model of sustainable development (Daviron & Vagneron, 2011). Besides social, environmental, and economic norms, norms related to quality and management and ethical practices are often included (ITC, 2022). An essential part of sustainability standards is the market mechanism as, for sustainability standards to work, there needs to be a demand for sustainably produced products (Komives & Jackson, 2014). Again, this reflects the importance of translocality on this topic.

2.1.3.2 Certification

While 'private sustainability standards' and 'certification' are often used interchangeably, there is a subtle difference between the concepts. Certification is part of sustainability standards (Komives & Jackson, 2014), which is often used as a tool for regulation (Glasbergen & Schouten, 2015). Certification is an approach to ensure that production processes are actually in compliance with the standard (Komives & Jackson, 2014). A certificate demonstrates that a product conforms to a certain standard. Certification can help producers to produce sustainably, and certification labels help buyers to identify commodities that are produced in a sustainable manner (Junior et al., 2016; Komives & Jackson, 2014). Additionally, certification helps in promoting awareness regarding sustainability issues in global value chains (Junior et al., 2016). Certification schemes have been rapidly expanding since the early 1990s. Some of the best-known certification labels are Fairtrade, RA, and Organic (ITC, 2021).

2.1.4 Debate on certification schemes as private sector governance to realise sustainability

Whereas previously, governments were criticised to be unable to address sustainability challenges, it is now increasingly questioned whether the market model is able to fully address these challenges. While some scholars believe that private sector actors can in fact compensate for the diminished state intervention (Knill & Lehmkuhl, 2002), others argue that - for example – short-term profits are often prioritised at the expense of the environment (Wilkinson et al., 2001). As certification schemes can be seen as a type of neoliberal governance (Moberg, 2014),

it begs the question of whether certification schemes are able to successfully address sustainability challenges – as reflected by the main research question of this thesis. As such, this thesis will also contribute to the broader debate on the ability of private sector governance to realise sustainability objectives.

Certification schemes are highly debated in academic literature as their effectiveness remains contested (Haack & Rasche, 2021; Komives & Jackson, 2014). While advocates claim that certification has a high potential to improve environmental, social, and economic outcomes, others remain sceptical of certification schemes and question their developmental relevance (De Fries et al., 2017; Fortin & Richardson, 2013; Glasbergen & Schouten, 2015).

Some sceptics consider certification schemes as a technical fix to social and complex issues, or as a form of greenwashing (De Fries et al., 2017; Fortin & Richardson, 2013). Critics point to the issue that certification claims could be exaggerated, false, difficult to verify, or vague. Furthermore, transparency might be lacking on who is the initiator of a sustainability standard. Sustainability standards address this issue by using multistakeholder initiatives (Komives & Jackson, 2014).

Another concern is in relation to local food security. On the one hand, certification can improve agricultural practices and environmental conditions on the farm and thereby improve crop productivity, contributing to longer-term food availability (Schleifer & Sun, 2020). On the other hand, related to large-scale agricultural commercialisation, it can increase food prices and make it more attractive for food to be exported or used for processing purposes, rather than being used to meet local food needs (Oosterveer et al., 2014). Additionally, certification can stimulate shifting financial and human resources from other crops and livelihood activities toward certified crops (ISEAL, 2019).

Critics also point to the fact that most certification standards have been developed by private sector actors from the global North (De Fries et al., 2017; Glasbergen & Schouten, 2015). Consequently, there is an increasing concern that certification standards predominantly represent the values and priorities of the global North (Glasbergen & Schouten, 2015). Yet, the standards are often adopted in the global South. There is a rising concern that certification schemes do not include southern perspectives and priorities and therefore could undermine the capacity of these countries to pursue their own regulations and interests regarding production practices (De Fries et al., 2017).

There exist many different certification standards, which oftentimes have similar objectives. Yet, they are often competing (Reinecke et al., 2012). The multiplicity of standards is causing confusion among consumers as to what they entail and which label to trust (Junior et al., 2016; Lhemezie et al., 2018; Reinecke et al., 2012). Additionally, the co-existence of standards can put increasing pressure on producers to adopt multiple standards, increasing the costs of compliance. Duplicated implementation, poor coordination, consumer confusion, and high certification costs for producers have led the co-existence of sustainability standards to be criticised. Some scholars perceive the multiplicity of standards as an inefficient way of realising their shared objective to increase sustainability in global value chains. (Junior et al., 2016; Reinecke et al., 2012).

Another important concern is raised regarding the accessibility of private sustainability standards. Sustainability standards only reach a selective minority and do not reach the (vast) majority of producers (Komives & Jackson, 2014). This can limit the ability of these standards to realise systemic change (Glasbergen & Schouten, 2015).

Accessibility concerns arise from the costs of achieving and demonstrating compliance with sustainability standards. Investments might be required and producers must go through an audit process, which are often to be paid by the producers themselves. Thus, complying with sustainability standards involves significant investments. This can be a source of exclusion, as not every producer can make these investments (Komives & Jackson, 2014). There is especially a concern regarding smaller producers (De Fries et al., 2017; Meemken, 2020), as they may need more assets and extension services to comply with a standard while producing small quantities. Consequently, it may not be economically beneficial for them (ISEAL, 2019). Therefore, there exists a risk that only the wealthier, larger, better-off producers can meet the (strict) requirements of private sustainability standards, while others are being excluded from the market (Oosterveer et al., 2014). Furthermore, there is a danger that mainly the producers that are already on track regarding sustainable practices become certified, given that they need fewer investments to comply with the standard (De Fries et al., 2017). This can further marginalise the position of smaller farmers within global value chains (De Fries et al., 2017). Some sustainability standards try to address this issue by the possibility of group certification (Rainforest Alliance, 2020).

However, when producers are able to meet the certification requirements, certification helps to connect producers to markets and improve producers' knowledge, technology use, income, and production (Oosterveer et al., 2014). Furthermore, it also helps to improve management systems (Junior et al., 2016). Various meta-analyses on certification have indicated that certified producers generally receive higher prices and gain higher profits than non-certified producers. Therefore, these producers generally have higher household incomes, which could lead to improved livelihood outcomes (Chiputwa et al., 2014; De Fries et al., 2017; Meemken, 2020; Oya et al., 2018). Certification seems especially successful in the mitigation of environmental issues (De Fries et al., 2019; Denvir et al., 2021). In the long term, certification often leads to higher quality and improved yields (ISEAL, 2019).

Context matters significantly in the effectiveness of certification (Meemken, 2020; Oya et al., 2018). Certification can be particularly beneficial in areas that lack governmental regulation enforcement (Denvir et al., 2021). A key advantage of certification standards is that they transcend national boundaries and can therefore function as a tool in countries that have poor policy implementations (Moser et al., 2013). However, certification cannot fully replace governmental regulation, given that certification only applies to a minor proportion of producers (Denvir et al., 2021). Thus, certification cannot be seen as a panacea for improved environmental, social, and economic outcomes (De Fries et al., 2017).

2.1.5 Evaluating certification standards through theory-based evaluation

As discussed above, the international development agenda is largely based on achieving the SDGs (Potter et al., 2018). Consequently, there is increasing pressure on demonstrating the

effectiveness and results of development interventions (Schwandt et al., 2016). In evaluating development interventions, the field of evaluation studies is important.

Traditional evaluation approaches focus on outcomes and aim to provide an estimate of the impact of the intervention, commonly through experimental or quasi-experimental designs (Salter & Kothari, 2014). However, when solely looking at the impact of an intervention, how these impacts are being achieved stays underexposed, also known as the 'black box problem' (Astbury & Leeuw, 2010, p.364; Patton, 2015). It does not provide any understanding of how the outcomes have been produced (Salter & Kothari, 2014). It is of importance to ''unpack the black box so that the inner components or logic of a program can be inspected'' (Astbury & Leeuw, 2010, p. 364). This is also known as 'white box evaluation' (Astbury & Leeuw, 2010). Pawson & Tilley (1994) especially caution against using quasi-experimental evaluation models in social settings, as these are unable to capture its complexity. Consequently, this makes it difficult to determine whether an outcome is the result of one specific intervention or if it is caused by other interventions, policies, or broader societal changes. This can cause outcomes mistakenly being attributed to the intervention (Kotvojs & Shrimpton, 2007).

White box evaluation can be achieved using a theory-based approach (Astbury & Leeuw, 2010; Salter & Kothari, 2014). Theory-based evaluation does not aim to estimate the exact impact of an intervention but rather aims to provide insight into how an intervention contributes to change, and under which circumstances (IIED, 2017). Theory-based approaches make use of the causal chain of a particular intervention, the Theory of Change (ToC) (ISEAL, 2017). The ToC of an intervention is a good foundation for an evaluation, as the ToC displays a cause-and-effect overview of the intervention (Gertler et a., 2016). The ToC of an intervention maps out how the ''intervention is expected to lead to its intended results'' (IIED, 2017, p.1). In theory-based approaches, a comparison will be made between the outcomes that are described in the ToC and how the intervention is being implemented on the ground. The closer the observed outcomes parallel the outcomes in the ToC, the more likely that the intervention will achieve its intended purpose (Bamberger, 2012). Within the evaluation of private sustainability standards, theory-based approaches are often applied (ISEAL, 2017).

2.1.6 Rainforest Alliance certification

This research will focus on the certification standard of the RA specifically. RA is an international non-governmental and non-profit organisation that aims to create ''a more sustainable world by using social and market forces to protect nature and improve the lives of farmers and forest communities'' (Rainforest Alliance, 2022b, p. 1). The RA uses a multi-stakeholder approach. Actors include companies, civil society organisations, governments, forest communities, and individuals. These actors work together to take climate action, protect biodiversity and forests, and improve the livelihoods and rights of rural people (Rainforest Alliance, 2022a).

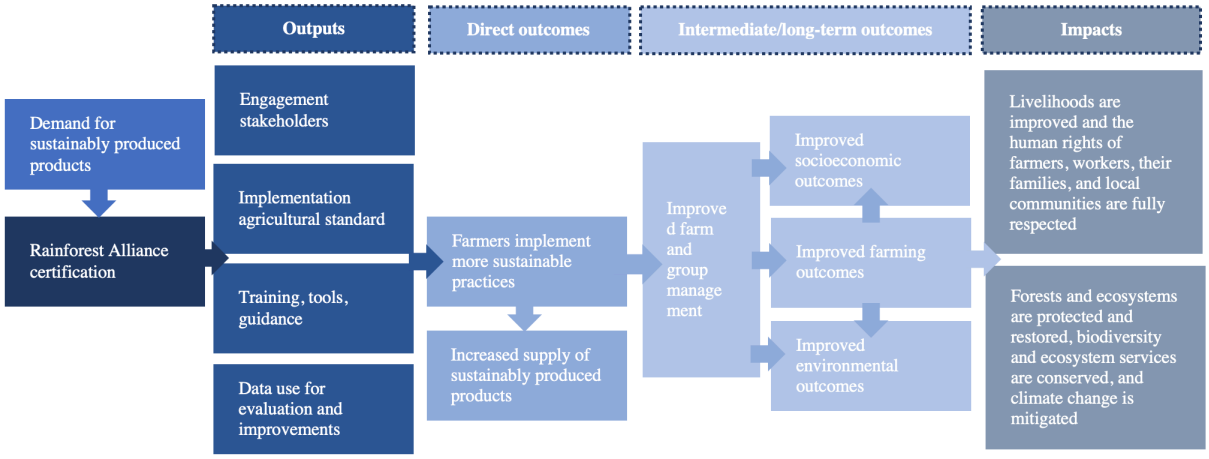
One of the main interventions of the RA is their certification scheme. The RA certification standard is based on the three-pillar model of sustainability (social, economic, and environmental sustainability) (Rainforest Alliance, 2022b). How the RA aims to achieve these levels of sustainability is visualised in their ToC. It illustrates the intended impacts and outcomes of the certification scheme and specifies the methods to achieve them. A simplified version of the ToC on the farm level of the RA is presented in Figure 4, and a more detailed

version of the ToC of the direct and intermediate/long-term outcomes of the certification standard can be found in Appendix A. While the complete ToC of the RA also includes the supply chain level and enabling environment (Rainforest Alliance, 2022c), the focus of this research will be on the farm level. This is the 'core' of the certification programme and most sustainability issues in the sector seem to result from unsustainable farm practices.

The certification of farms happens through auditing by a third party, which checks if the requirements of the Sustainable Agriculture Standard (SAS) are met. The SAS for farm requirements is a ''practical framework for sustainable agriculture'' (Rainforest Alliance, 2020, p. 4). To become certified, farmers must comply with the rules, policies, and requirements of this standard. The indicators in the SAS are connected to the intended outcomes of the certification program, as depicted in the ToC (Rainforest Alliance, 2020). The costs of the audit are to be paid by the farmers and can greatly vary, depending on the location, size, and complexity of the farm (Rainforest Alliance, 2021). Among certified farms, there are yearly unannounced internal inspections and surveillance audits to check if the farms still comply with the standard (Rainforest Alliance, 2020).

Figure 4.

Simplified version of the RA Theory of Change on the farm level.



Note: Adapted from Rainforest Alliance (2021c).

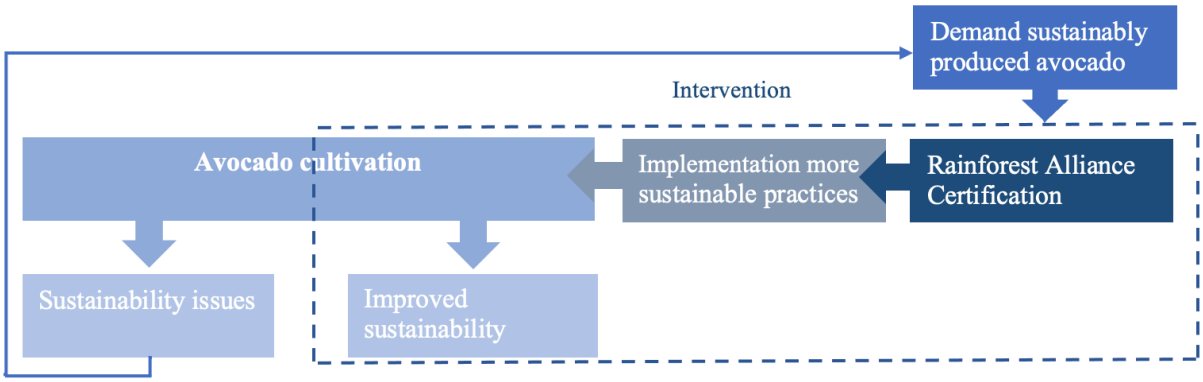
3. Methodology

This chapter will define the research methods used in this study. Due to the COVID-19 pandemic and safety reasons, fieldwork was not possible. This has influenced the scope of the study and the choice of research methods. Section 3.3 will further elaborate on the implications this has for the research.

This chapter will start by explaining a conceptual model of how the intervention that will be evaluated (the RA certification scheme) is expected to play a role in the Mexican avocado sector. Then, the research methods and techniques will be discussed, and the rationale behind them will be further elaborated upon. Subsequently, important variables will be operationalised. The chapter will conclude with the positionality of the researcher and the limitations of this research.

Figure 5.

Conceptual model of the expected contribution of RA certification in the Mexican avocado sector.



This thesis will evaluate the contribution of the RA certification scheme in improving sustainability in the Mexican avocado sector. As illustrated by the model in Figure 5, adoption of the RA certification scheme (SQ3 & SQ4) is expected to address sustainability issues resulting from avocado cultivation (SQ1) through the implementation of more sustainable farm practices (SQ2 & SQ5). The model includes key elements of the ToC of the certification scheme. Although outside the scope of this research, it also includes (for purposes of clarity) the position of market interaction, as for certification to contribute to more sustainability, there must be a demand for sustainably produced products (Dietz & Auffenberg, 2014).

3.1 Research methods and techniques

This study uses a mixed methods approach. Primary as well as secondary data are collected and integrated. Primary data includes informal conversations, a survey, and in-depth and semi-structured interviews. Secondary data includes academic literature and grey literature, such as reports, digital news articles, documentaries, and governmental documents.

3.1.1 Data collection

Informal conversations

To understand how an intervention contributes to change, it is of great relevance to have a clear picture of the landscape in which the intervention is implemented (ISEAL, 2017). Therefore, as one of the first steps, informal conversations with other researchers were used to gain a deeper understanding of the processes and context of the avocado-producing regions in Mexico. Their experiences from their fieldwork were especially valuable in understanding the impact of avocado cultivation on the local population. These insights were valuable, given that it was not possible to go on fieldwork for this research. The conversations were used to lay a foundation for the research design and played an important role in networking, building trust, and sharing contacts and sources. In total, six informal conversations have been conducted.

In-depth interviews

Moreover, in-depth interviews with experts and stakeholders in the Mexican avocado sector were conducted. These interviews were used to gain a greater understanding of the socioeconomic and environmental sustainability impacts of avocado cultivation in Mexico and were used as an addition to the issues documented in the literature to validate these findings. Furthermore, the interviews gave more insight into the avocado supply chain and specific topics related to the expertise of the interviewee. The interview guide can be found in Appendix B. The information obtained from these interviews was used to guide the focus points in the interviews with the avocado producers. Experts and stakeholders were approached by the researcher through 'key informants purposive sampling' (Patton, 2015), in which relevant key informants were selected with great knowledge of the research topic. Additionally, the snowballing method was used to come into contact with other experts and stakeholders. Two expert interviews and two stakeholder interviews were conducted (See Table 1). To keep confidentiality, there will not be further elaborated on the specific function of the experts. The length of the interviews varied between 50 to 80 minutes. The interviews were conducted digitally through Microsoft Teams and the audio was recorded. Additionally, notes were made.

Semi-structured interviews

Semi-structured interviews with RA certificate holders were conducted to gain insight into their farm characteristics and the changes made in their farm practices since adoption of the RA certification standard. Furthermore, the interviews provided insight into the perceptions and experiences of the producers with the RA certification standard and on issues in the sector. The interview guide for the producers can be found in Appendix C. The avocado producers were approached through APEAJAL, an avocado producer organisation in the state of Jalisco. Two interviews with producers were conducted. For each interview, a translator was present. The interviews lasted up to an hour.

Table 1.
Overview interviews.

Participant	Function	Date
P1	Expert 1	April 20, 2022
P2	Avocado producer organisation (stakeholder)	April 22, 2022
P3	Expert 2	April 22, 2022
P4	Avocado producer 1	May 20, 2022
P5	Avocado producer 2	May 23, 2022
P6	Rainforest Alliance Mexico (stakeholder)	June 24, 2022

Survey

It proved to be difficult to find avocado producers willing to be interviewed, due to the sensitivity and mistrust in the industry, the language barrier, the physical barrier, and contextual circumstances, as will be further explained in the limitations (section 3.3). Consequently, it was decided to try to reach more producers through an online survey in Spanish through Qualtrics. An advantage of the survey was that it was anonymous, (partly) accounting for the sensitivity of the topic. A Word version of the online Qualtrics survey is included in Appendix D. The questions that were displayed varied between the producers, depending on the answers they provided to earlier questions, as can be seen in the 'display logic' in Appendix D. The survey was distributed through APEAJAL, RA, and Universidad Vasco de Quiroga in Michoacán. Additionally, the survey was set out through established contacts and snowballing. There were 13 participants in the survey, of which 11 filled it out completely.

Secondary data collection

Besides the collection of primary data (as discussed above) this study made use of secondary data. A literature review provided more insight into the main sustainability issues in the sector. Moreover, literature as well as some quantitative secondary data was used to provide a contextual background. The RA's database was used to identify the farm characteristics of the RA avocado producers.

3.1.2 Data analysis

Verbatim transcripts were made of the interviews in which all identifiable information was removed. An advantage of a verbatim transcript is that it is detailed and that the participants' own words are exactly replicated. This allows for a better understanding of the emic perspective of the participants (Hennink et al., 2020). The transcripts have been coded, in which important concepts, themes, and perceptions in the interviews were captured. For the coding process, Nvivo software was used. Both deductive and inductive codes were developed (Hennink et al., 2020). The transcripts have been reread multiple times and coded until no new codes were developed anymore. The codes were grouped in various code families, which was useful in

making connections between the various interviews and topics discussed within the interviews. The RA SAS for farm requirements (Rainforest Alliance, 2020) has been coded as well, although manually. The document was structurally analysed based on the issues that were identified in SQ1. To compare the various certification standards, their certification documents were analysed and the database of Standards Map of the International Trade Centre was used, which is a rigorous tool to compare international certification standards (StandardsMap, 2022a).

Table 2 provides an overview of the research methods used for each sub-question and the corresponding level of the RA ToC that the sub-question is related to.

Table 2.
Overview of the research methods used per sub-question and the corresponding results level of the RA ToC.

Sub-question	Research methods	Results level ToC
SQ1 What are the sustainability issues (socioeconomic and environmental) of avocado cultivation in Mexico?	Literature review, in-depth expert/stakeholder interviews, survey	Not applicable
SQ2 How are these sustainability issues addressed in the ToC of the RA certification program?	Analysis RA ToC and Sustainable Agriculture Standard	**Inputs**
SQ3 What are the farm characteristics of the RA certificate holders and (how) do these differ from other growers?	In-depth expert/stakeholder interviews, semi-structured interviews with producers, survey, analysis RA database, literature	**Outputs**
SQ4 What are the barriers and motivations of avocado growers to adopt the RA certification standard?	In-depth expert/stakeholder interviews, semi-structured interviews with producers, survey	**Outputs**
SQ5 How did the adoption of the RA certification standard affect farm practices that are connected to the sustainability issues?	Semi-structured interviews with producers, survey	**Direct outcomes**
SQ6 How does RA certification differ from other common certifications in the Mexican avocado sector in its verification methods, focus of requirements, and observed effects?	Analysis certification documents, Standards Map tool, survey, in-depth stakeholder interviews, semi-structured interviews with producers	Not applicable

3.1.3 Rationale behind methodological choices

The original research plan was to conduct a counterfactual impact evaluation, in which RA-certified producers were quantitatively compared with non-certified producers on farm practices that are connected to the sustainability issues in the Mexican avocado sector (such as the amount of water and pesticides used). However, as the research progressed, a counterfactual impact evaluation turned out to be not the best fit for this research.

First of all, the situation regarding certification standards in the Mexican avocado sector is quite complex. There are multiple certification schemes in the Mexican avocado sector, and it is not uncommon for growers to adopt more than one certification standard. Consequently, growers receive similar interventions from various certification standards. The multiplicity of certifications makes it difficult to attribute certain outcomes to one specific certification standard (ISEAL, 2017).

Moreover, it turned out to be difficult to find non-certified farmers, as most avocado growers export their avocados, and the importing countries often require high-quality standards and assurance of good agricultural practices (APEAM, 2022; CBI, 2021). As such, many growers have adopted at least one certification standard. The ones that are not certified are often smaller farmers, which are difficult to reach through digital means.

Furthermore, to conduct a proper counterfactual analysis, it is essential to find a counterfactual that is as similar as possible to the intervention group (Blackman & Rivera, 2010). However, it turned out to be very difficult to come into contact with avocado growers. Therefore, finding a counterfactual group of avocado growers that would be as similar as the RA-certified avocado growers was not attainable.

Significant benefits of certification schemes that take a longer time to develop may be overlooked in quantitative evaluations (Blackman & Rivera, 2011). The RA-certified growers are all certified quite recently, within the last 4 years (Rainforest Alliance, 2022d). The certification process takes multiple years (Rainforest Alliance, 2020). Therefore, it may be possible that the intended outcomes have not been realised yet, which weakens the meaning of a quantitative comparison between RA producers and non-certified producers. Furthermore, by using quantitative approaches, there is a risk of oversimplifying the reality (Patton, 2015).

Thus, a theory-based approach seemed more fitting for this study. As touched upon in section 2.1.6, to fully comprehend the advantages of an intervention (and for whom), there is a need to go beyond impact evaluations that primarily focus on whether or not an intervention is effective (black-box approaches). Instead, there is a need to know *how* an intervention works (white-box approaches) (Patton, 2015). Theory-based approaches to evaluation are useful in understanding the underlying mechanisms of an intervention (IIED, 2017), and in assessing whether and how an intervention is progressing as intended (Riche, 2013).

There are multiple advantages to using a theory-based approach in evaluation research, and they are especially valuable for evaluating sustainability standards (ISEAL, 2017). A theory-based evaluation approach provides practical relevance for policies, as it gives insight into whether assumptions underlying the ToC are true for specific ‘‘product-geography contexts’’ (ISEAL, 2017, p. 14). A theory-based approach can also help in identifying weak spots in the ToC (ISEAL, 2017). A theory-based approach to evaluation is especially valuable in complex social situations where there can be multiple causes and effects (IIED, 2017). It can help disentangle the role that the certification standard plays in comparison to other interventions (ISEAL, 2017). As such, a theory-based approach is valuable in the context of co-existing certification standards in the Mexican avocado sector.

Thus, it was decided to shift the focus of this research from attribution to contribution. The aim of this research is therefore not to attribute certain outcomes to the RA certification scheme specifically, but rather to describe how the RA certification standard is being implemented and how it contributes to changes in farm practices towards more sustainability.

Within the evaluation of certification schemes, measuring the complete ToC and its corresponding indicators lies outside the scope of many studies. Therefore, it is often decided to focus on a particular subsection or indicators of the ToC (ISEAL, 2017). To make the analysis more useful and efficient, it is advantageous to understand which particular elements of the ToC are of most interest (Hopkins, 2021). Sub-question 1 and 2, which focus on the sustainability issues and how these are addressed by the RA standard, will provide guidance as to which parts of the ToC are of most interest for this study.

This research makes use of a mixed-methods approach, which is very valuable in evaluation studies (Gertler et al., 2016; Khandker et al., 2009). By combining multiple methods, the weaknesses of each singular approach can be overcome, while their strengths are enhanced (Bamberger, 2012). Another advantage of using multiple methods is that it allows adapting to the specific research context. In a mixed methods approach data can be triangulated, which allows for checking cross-data consistency. This strengthens the findings and increases the robustness and credibility of the study (Bryman, 2016; ISEAL, 2017; Patton, 2015). The key focus of this study lies on qualitative approaches. Although this has consequences for the representativeness of the study (the results cannot be generalised), it may provide a deep understanding of how RA certification contributes to change. Additionally, an advantage of qualitative research within evaluation is that it is possible to recognise and understand unforeseen consequences (Patton, 2015).

3.2 Operationalisation of variables

Sustainability issues

Sustainability issues can be defined as issues concerning sustainability (Harrington, 1992). In other words, sustainability issues are problems that threaten sustainability: meeting ‘‘the needs of the present without compromising the ability of future generations to meet their own needs.’’ (World Commission on Environment and Development, 1987, p.42). These include all three dimensions of sustainability: social, economic, and environmental (Montiel & Delgado-Cellabos, 2014; Purvis et al., 2019). In this thesis, sustainability issues specifically refer to the socioeconomic and environmental issues which result from unsustainable avocado cultivation in Mexico as identified in the literature, interviews, and the survey, which will be discussed in greater detail in Chapter 5. These include deforestation, biodiversity loss, land degradation, water scarcity, inequalities, food insecurity, loss of land access, violence and extortion, inequalities, poor working conditions, and health issues. A further explanation of what these sustainability issues refer to in this thesis is presented in Table 3.

Table 3.

Operationalisation of sustainability issues concerning avocado cultivation in Mexico.

Sustainability issue	Operationalisation	Literature
Deforestation	The conversion of forests into avocado trees	Arima et al. (2022); Barsimantov & Antezana (2012); Guerrero et al. (2008); Sáenz-Ceja & Pérez-Salicrup (2021)
Biodiversity loss	Loss of variety of species in Mexico due to avocado cultivation	Arima et al. (2022); Denvir et al. (2021)
Land degradation	Decline in soil fertility, decline in water retention, and acidification of the soils as a result of avocado cultivation	De la Vega-Rivera & Merino-Pérez (2021); Denvir et al. (2021), Sommaruga & Eldridge (2020)
Water scarcity	Reduction in local water availability due to the overexploitation of water sources to cultivate avocados	De la Tejera Hernández et al. (2013); De la Vega-Rivera & Merino-Pérez (2021); Sommaruga & Eldridge (2020)
Inequalities	Inequal distribution of economic profits resulting from avocado cultivation	De la Tejera Hernández et al. (2013); De la Vega-Rivera & Merino-Pérez (2021); Denvir et al. (2021)
Loss of land access	Weakening of access and governance of local communities to lands used for avocado cultivation	De la Vega-Rivera & Merino-Pérez (2021)
Violence and extortion	Increase in violence, extortion, murders, and kidnapping - related to drug cartels and criminal groups engaging in the avocado industry	De la Vega-Rivera & Merino-Pérez, (2021); Kennedy (2019); Khan et al. (2021); Sommaruga & Eldridge (2020)
Food security	Loss in local food availability, diversity, and food self-sufficiency as a result of land conversion from traditional crops into avocado orchards	De la Tejera Hernández et al. (2013); De la Vega-Rivera & Merino-Pérez (2021); Ramírez-Mejía (2022); Sáenz-Ceja & Pérez-Salicrup (2021)
Poor working conditions	Absence of labour rights in the orchards, such as on-site living conditions, maximum working hours, and the use of Personal Protective Equipment (PPE)	De la Vega-Rivera & Merino Pérez (2021)
Health issues	Cancer, intoxication, skin, eye, gastrointestinal problems, and respiratory problems due to excessive agrochemical use in the orchards	20minutos (2015); Curry (2019); De la Vega-Rivera & Merino Pérez (2021); González (2019), Sierra-Diaz et al. (2019)

Farm characteristics

In this study, farm characteristics refer to farm size, number of orchards, location of the orchards, and the number of adopted certifications (See Table 4). The literature review gave insight into the concern that mainly larger farmers get certified (Oosterveer et al., 2014). Moreover, the land size of farmers is an important characteristic in the uptake of certification standards (ISEAL, 2019). Therefore, land size is included as a farm characteristic. In Mexico, orchards smaller than 10 hectares are considered small farms, medium-sized orchards are between 10 and 30 hectares, and large orchards are larger than 30 hectares (CIRAD & HABB, 2019). Characteristics also include the location of the orchards at the state level. Due to confidentiality reasons, more detailed information on the location of the orchards will not be provided. Lastly, farm characteristics can be operationalised by the number of certifications, as producers that already perform better may be the ones that get certified, as they have to make fewer investments to become certified (De Fries et al., 2017).

Table 4.

Operationalisation of farm characteristics.

Farm characteristics
Farm size (small <10, medium 10-30, large >30 hectares)
Number of orchards
Location (on the state level)
Number of adopted certifications standards

Farm practices

The operationalisation of 'farm practices' is based on the indicators of the farm practices that the RA ToC recognises as necessary to achieve the intended intermediate/long-term socioeconomic, farming, and environmental outcomes at the farm level (Figure 4 & Appendix A; direct outcomes: farmers implement more sustainable practices). These indicators are adopted from the SAS and connect to the ToC (Rainforest Alliance, 2020). Due to the scope of this study, only the farm practices that are most related to the existing sustainability issues in the Mexican avocado sector are included in this thesis, which are plant variety, water use, soil practices, fertiliser use, pesticide use, PPE use, wages, working hours, and land use. Table 5 provides an overview of how these components of farm practices are operationalised in this study. The related questions in the interview and survey can be found in Appendix A and B. The two interviews with RA-certified producers will go further into detail about the kind of changes the producers have implemented as a result of RA certification. In this thesis, land use refers to the use of the land before conversion into avocado orchards (divided into 'other crops', 'forestry', 'livestock activities', or 'other') as well as the land tenure of the orchards (divided into 'private', 'communal', or 'ejido').

Table 5.

Components of farm practices.

Farm practices	Operationalisation	Related questions
Plant variety	Changes in the number of other crops, trees, and/or plants in the orchards since certification (more, less, same)	Interview: Q15 Survey: Q14
Water use	Changes in the amount of water used in the orchards since certification (more, less, same)	Interview: Q22 Survey: Q15
Soil practices	Changes in the number of measures taken to improve soil fertility in the orchards since certification (e.g. crop rotation, intercropping, or soil analysis) (more, less, same)	Interview: Q23 Survey: Q16
Fertiliser use	Changes in the amount of fertiliser used in the orchards since certification (more, less, same)	Interview: Q31 Survey: Q17
Pesticide use	Changes in the amount of pesticides used in the orchards since certification (more, less, same)	Interview: Q36 Survey: Q18
PPE use	Changes in the amount of PPE used in the orchards since certification (more, less, same)	Interview: Q40 Survey: Q19
Wages	Changes in the average wage of workers in the orchards since certification (higher, lower, same)	Interview: Q45 Survey: Q21
Working hours	Changes in the average amount of working hours of the workers in the orchards since certification (more, less, same)	Interview: Q48 Survey: Q20

Focus of requirements

In order to evaluate RA certification in comparison to other common certifications in the Mexican avocado sector, it is important to get insight into the sustainability objectives of the various certification standards. These can be divided into four pillars: environment, social, quality, and management and ethics. The environmental pillar includes requirements regarding soil, water, biodiversity, forest, agrochemicals, waste, energy, climate, and animals. The social pillar includes human rights, labour rights, and local communities. Management and ethics include sustainability management, ethics, economic viability, and supply chain responsibilities. The quality pillar includes product quality management and food management systems. This operationalisation is adopted from Standards Map (StandardsMap, 2022a).

Verification methods

Besides the focus of requirements, this study will compare the verification methods of the various standards. This is relevant because it gives insight into the strictness of compliance. In this study, verification methods refer to the type of audit and the notification of field visit audits. The type of audits can be divided into third-party audits, second-party audits, and first-party audits. Among the types of audits, third-party audits are the strictest. These audits are conducted by an independent auditor, which checks if the farm complies with the certification standard (Komives & Jackson, 2014). These auditors have no connection with the farm, which ensures the prevention of any conflicts of interest. Second-party audits are undertaken by an auditor which has a trading relationship with the producer. Lastly, first-party audits refer to self-

compliance and are the least strict. The notification of audits can be either announced (referring to a set date and time of the audit), semi-announced (referring to the audit falling within a certain time window), or unannounced (audits without prior notice). Unannounced audits are the strictest, as these prevent producers from making particular changes on the farm right before the audit (Sedex, 2019a). Unannounced and third-party audits increase the credibility and integrity of certification standards (Giovannuci & Ponte, 2005; Komives & Jackson, 2014).

3.3 Reflection and limitations

It is useful to reflect on the positionality of the researcher and the limitations of the research to better understand the internal and external validity of this research (Whittemore et al., 2001). Given the qualitative nature of this study, the position and background of the researcher are essentially part of the research. As such, it's relevant to reflect on its potential influence on the research (Hennink et al., 2020; Patton, 2015).

In terms of limitations, the research had to be conducted from home because of the COVID-19 pandemic as well as for safety reasons. This brought considerable challenges to the research and determined the scope of the research. First of all, the interviews as well as the surveys had to be conducted virtually. This might have excluded avocado growers without internet connection. Furthermore, during the interviews, the internet connection sometimes failed. Consequently, valuable information could have been lost.

Not only is there physical distance, but there is also a personal distance between the researcher and the participants, especially the growers. The researcher has a different cultural and personal background and no experience in growing avocados and was thus lacking an 'emic' perspective (Hennink et al., 2020). The distinct cultural background of the researcher could have led to incorrect interpretations of the data.

The informal conversations and interviews provided insight into the fact that there exists a lot of mistrust among avocado producers, due to criminality as well as power differences in the supply chain. For these producers, the topic is extremely sensitive, which is why many growers were not willing to talk and/or participate in the research. It was not possible to meet to physically meet the participants, which made it even more difficult to gain trust. Possibly, this issue is (partly) overcome as most participants were approached through APEAJAL, which had already established a good relationship and some level of trust with the producers. On the other hand, the partnership with the RA might have had a negative impact on how the producers perceived the researcher, related to the mistrust and the difficulty some producers experience in distinguishing people from various organisations, government officials from importing countries, and auditors (Expert 2, interview, 2022). To minimise this issue, the role of the researcher was tried to make as clear and transparent as possible.

Another limitation is related to the sampling methods. As the research had to be conducted from distance, the researcher was extremely dependent on data collection through third parties. Although data was collected through as many third parties as possible, the data gathering through these parties might have made the data collection selective. The researcher had little control over the participants that were approached. Using the snowball method further limited a random sample (Parker et al., 2019). This can have affected the research results and might

have resulted in a selection bias. The small sample size is another limitation of this research, caused by external and contextual factors, such as the sensitivity of the industry, home-based research, and events such as the US export ban, criminal processes, and the opening of the US market to avocado producers from Jalisco (one of the main avocado-producing states) during the time of the research, causing them to be extremely busy. Additionally, mainly producers from Jalisco participated in this study. These factors have an impact on the external validity and the representativeness of the study. It is therefore not recommended to generalise the findings of this study.

There is a possibility that producers provided socially desirable answers or had difficulties recalling the changes in farm practices that had been made as a result of certification. Since the data was collected digitally as it was not possible to conduct fieldwork, there was no possibility to verify if the farm practices producers said to have implemented were truly implemented.

Another limitation of this research is the language barrier. Although the researcher actively learned the Spanish language throughout the whole research process, it was not sufficient to conduct interviews in Spanish. Consequently, the interviews had to be conducted in English or with the presence of a translator. While this brings the danger of information getting lost in translation, all the interviews were recorded, which allowed the researcher to slowly listen back to the Spanish parts to understand if things were lost in translation. The presence of the translator might have made the producers less willing to openly talk during the interviews. To minimise the language barrier, all written contact as well as the survey were conducted in Spanish.

In this research, no further distinguishment has been made between the effects of the 'other certifications' (other than RA certification) on farm practices. Although it might have been interesting to study the exact difference of each standard on how it affects changes in farm practices, this was beyond the scope of this research. Moreover, as some producers have had certifications for over 15 years, it would have been difficult for them to recall which standard led to which changes in farm practices, which could have resulted in a recall bias.

Reliability and validity.

It is useful to reflect on the reliability and validity of this study. Reliability refers to the repeatability and consistency of a study. Validity refers to whether the measured concepts really represent what they intend to (Bryman, 2016). To ensure validity and reliability, the data was triangulated. Additionally, different kinds of actors were included in the study to include multiple points of view. Secondary data was carefully selected and the key focus was on peer-reviewed academic articles. Overall, there was a high level of consistency between the different actors and research methods. Furthermore, the interview guides, transcribing and coding process allowed for systematic and consistent collection and analysing of the data, which contributed to the reliability of the study. To ensure validity, variables were carefully operationalised, based on existing literature. Moreover, during the interviews confirming questions were asked. A common issue in qualitative social research is to ensure external validity (whether findings can be generalised) (Bryman, 2016). As discussed above, it is not recommended to generalise the findings of this study as they are context-specific.

4. Regional framework

This chapter will provide the contextual background of Mexico necessary to understand and answer the research questions.

Mexico is a country in North America, bordering the United States, Guatemala, and Belize. It has a population of over 130 million people (CONAPO, 2022). Mexico is among the top five most megadiverse countries in the world. While the country covers just 1,5 percent of the earth's land surface, it represents over 12 percent of global biodiversity (World Bank, 2020). Although Spanish is the official language, there are over 63 indigenous languages in Mexico (Cirjak, 2020).

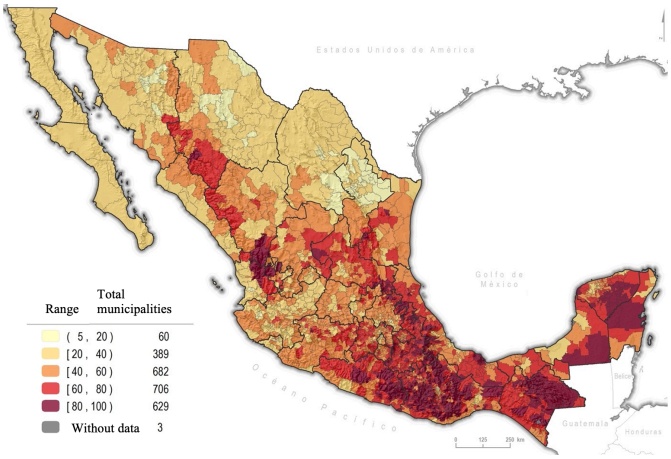
Mexico has a long history of drug production and trafficking (Pansters, 2015). Furthermore, systemic corruption and violence are key challenges in Mexico. Corruption is common among the Mexican police, the judiciary, and politics. Crime, violence, impunity, and corruption undermine the judicial system (Muno et al., 2020). Impunity is the norm in Mexico. Out of all the crimes in Mexico, only 1.3 percent are solved (Human Rights Watch, 2021).

Mexico implemented various neoliberal structural reforms after the economic crisis in the 1980s and 1990s. This allowed Mexico to become among the most trade-oriented emerging economies in the world (Oxford Business Group, 2019). In 1993, together with the United States and Canada, Mexico signed the North American Free Trade Agreement (NAFTA), after which in 1994 trade became easier between the countries (Nápoles, 2017). Mexican's economy is extremely export-oriented, especially towards the U.S. Therefore, it is heavily dependent on the U.S economy (Muno et al., 2020).

While Mexico has made significant economic progress during the last decades, the benefits are extremely uneven distributed, contributing to high disparities between social classes and geographical regions. There are vast differences in poverty between North and South Mexico (see Figure 6). Mexico is among the most unequal countries in the world (Chancel et al., 2022). In some Southern municipalities, up to 80 to 100 percent of the population lives in poverty (CONEVAL, 2022). The highest poverty rates are among indigenous people (CONEVAL, n.d.). Inequality in Mexico is one of the most pressing obstacles to realising increased socioeconomic development (Muno et al., 2020).

Figure 6.

Percentage of the population living in poverty by municipality (2020).



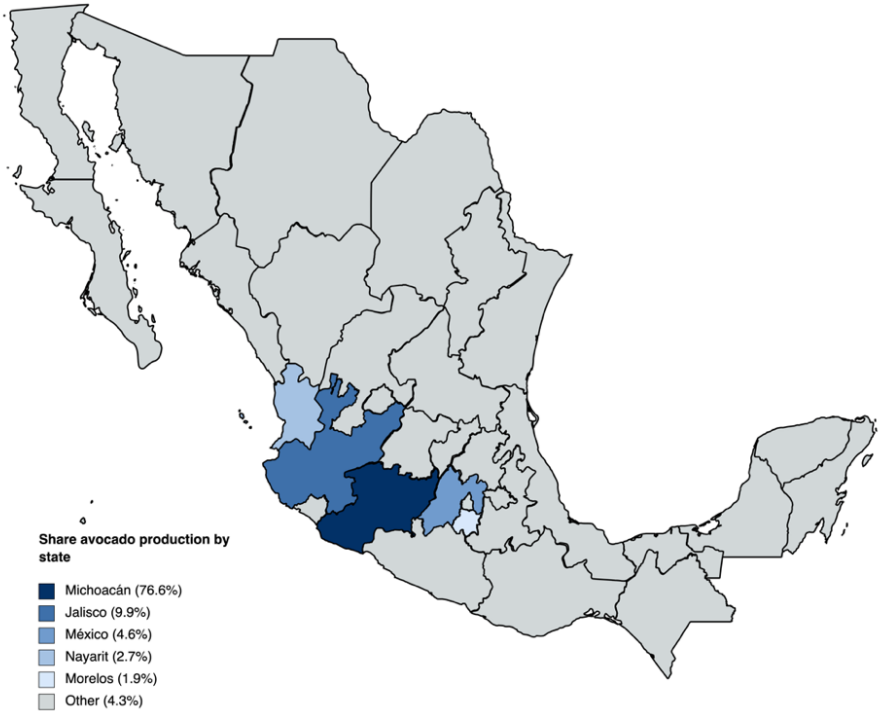
Note: Adapted from CONEVAL (2022).

An important revenue stream for the Mexican economy is the agricultural sector, especially the production of high-value export crops, such as avocados and berries (Oxford Business Group, 2019). The agricultural sector in Mexico includes both smaller, traditional farms as well as large export-oriented agribusiness farms. Whereas the large growers generally have greatly invested in technologies to boost the production of high-value crops, the development of smaller farms is stagnating (Oxford Business Group, 2019).

One of the most important high-value export crops in Mexico is avocado. The avocado industry provides 70 thousand jobs directly, and 300 thousand jobs indirectly (Alarcón-Cháires, 2020). The industry consists of many avocado producers of various sizes. However, in general, large-scale avocado production is in hands of a few. These are often large transnational agribusiness which have their own packing and export companies (De la Vega-Rivera & Merino-Pérez, 2021; Espinoza et al., 2009). The avocado-producing states and their corresponding share in total avocado production in Mexico are presented in Figure 7. As presented, most avocados are cultivated in the states of Michoacán and Jalisco, which will therefore be the main focus of this research (although not limiting to these states). These states are both largely agricultural (Denvir et al., 2021). An overview of the Mexican avocado supply chain is depicted in Figure 8. Chapter 5 will further elaborate on important processes within the Mexican avocado sector and section 7.1 on the characteristics of avocado producers in Mexico.

Figure 7.

Avocado-producing regions in Mexico.



Note: The data on avocado production is obtained from USDA (2021).

Figure 8.
Mexican avocado supply chain.

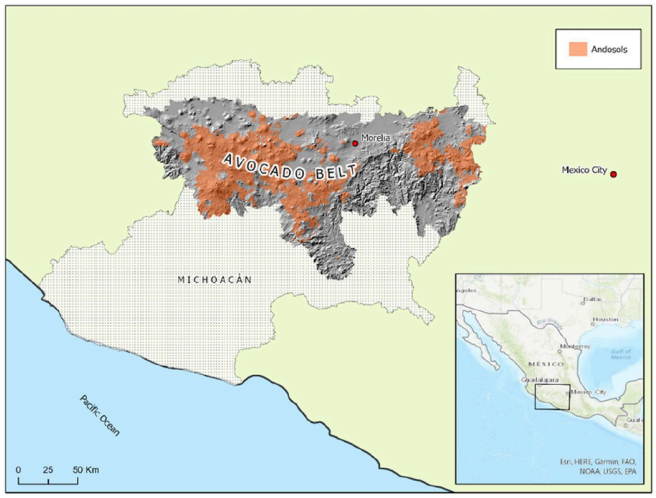
Note. Adapted from Cho et. al (2021).

Avocado cultivation in Michoacán

As depicted in Figure 7, Michoacán is the largest avocado-producing state in Mexico, accounting for 77 percent of Mexican's total avocado production (USDA, 2021). There are more than 42000 avocado orchards in the state, taking up 338,500 acres of land in 39 municipalities (APEAM, 2021). Michoacán has many smaller growers. Approximately 60 percent of the avocado growers have less than 10 hectares of land (CIRAD & HABB, 2019).

Most avocados in Michoacán are produced in the 'avocado belt', crossing Michoacán from West to East (see Figure 9)(Aguilera-Montañez & Salazar-Garcia, 1991). This area has ideal biophysical characteristics to grow avocados (Arima et al., 2022). The avocado belt is dominated by volcanic soils, as it is located within the Trans-Mexican Volcanic belt. These soils are optimal for avocado production (Aguilera-Montañez & Salazar-Garcia, 1991). In comparison to the rest of the state, the avocado belt has higher precipitation and lower temperatures. Therefore, it is characterised by temperate forest types, such as pine and oak forests. The area has higher elevations in comparison to the rest of Michoacán (Arima et al., 2022).

Figure 9.
Avocado Belt Michoacán.



Note: Reprinted from Arima et al. (2022).

After the implementation of NAFTA, the United States (US) markets gradually opened to the Mexican avocado. This considerably drove up the scale of avocado cultivation and was the main driver of rapid avocado expansion in Michoacán (De la Vega-Rivera & Merino-Pérez, 2021; Kennedy, 2019). Nowadays, one-fifth of the jobs in Michoacán are related to avocado production (Kennedy, 2019). Expected is that in the coming years exports to other global markets will increase (USDA, 2021). Avocado export is accountable for almost 60 percent of Michoacán's agricultural GDP (Alarcón-Cháires, 2020).

Until recently, Michoacán has long been the only Mexican state that was allowed to export its avocados to the US, as the US requires the avocados to be pest-free. For 27 years, Michoacán was the only state that had phytosanitary certification (APEAM, 2022; Denvir et al., 2021). As the state had this monopoly of exporting to the US, avocado export became mostly focused on the US market.

Michoacán has long been connected to drug production and trafficking and has considerable issues with organised crime (Curry, 2019). Zamora, a city located within the avocado belt, was recently declared the most violent city in the world (Dalby et al., 2022). The increasing scarcity of land combined with the violence and extortion of avocado farmers and workers has led to many of them leaving the main avocado-producing state Michoacán and starting new avocado orchards in the neighbouring states (De la Vega-Rivera & Merino-Pérez, 2021). This has led to further expansion of avocado cultivation into other states, such as Jalisco.

Avocado cultivation in Jalisco

Jalisco is the fastest-growing and second-largest avocado-growing state in Mexico (Mondragón, M. & López-Portillo, 2020; USDA, 2021). There are around 3100 avocado growers in the state. Although Jalisco has avocado growers with lands of all sizes, producers generally have larger lands than in Michoacán, with 10 hectares or more. Half of the total avocado land in Jalisco belongs to just 15 to 20 producers (USDA, 2021). In contrast to Michoacán, avocados are not traditionally grown in Jalisco. However, Jalisco's climate is very suitable for avocado cultivation (Imbert, 2016). The production system in Jalisco is generally higher tech than in Michoacán (CIRAD & HAB, 2019).

Between 2000 and 2018, avocado production in Jalisco increased by more than 3000% (COCONI, 2019). Since June 2022, Jalisco is also allowed to export avocados to the US, which may further increase rapid avocado expansion in this state (AGF, 2021; Denvir et al., 2021; Mondragón & López-Portillo, 2020). Before, avocados from Jalisco were exported to 29 nations, mainly to Canada, Europe, and Japan (Avocado producer organisation, interview, 2022).

5. Sustainability issues in the Mexican avocado sector

This chapter will discuss the socioeconomic and environmental sustainability impacts of avocado cultivation in Mexico, and key areas of concern will be indicated. As such, this chapter aims to answer the first sub-question. Issues recognised in the literature will be integrated with those recognised by avocado producers, experts, and key stakeholders. Therefore, this chapter includes perceptions from multiple points of view.

5.1 Environmental impacts

Deforestation and biodiversity loss

In Mexico, land used for avocado cultivation is rapidly expanding (De la Vega-Rivera & Merino-Pérez, 2021). There is a rapid change in land characteristics (land cover change) in the avocado-producing regions as a consequence of the conversion of native pine-oak forests into avocado orchards (Barsimantov & Antezana, 2012).

Various geographical studies have researched land cover change connected to avocado cultivation in Mexican's main avocado-producing state, Michoacán. One of the key findings of the studies is that the expansion of avocado cultivation is a main driver of deforestation in the state (Arima et al, 2022; Barsimantov & Antezana, 2012; Guerrero et al., 2008; Sáenz-Ceja & Pérez-Salicrup, 2021). To make way for avocado cultivation, between 14800 and 19800 acres are deforested in Michoacán every year (Global Forest Watch, 2019). Also in Jalisco, Mexican's fastest-growing avocado-producing state, rapid deforestation is observed, which is concentrated in the avocado-producing region of the state (Mondragón & López-Portillo, 2020).

The rapid expansion of avocado orchards at the expense of forest areas can be explained when comparing the profitability of traditional forest production to the profitability of avocado production. Profits from avocado cultivation can be up to 31 times higher than profits from forest production (De la Vega-Rivera & Merino-Pérez, 2021). The lucrativeness of the industry leads to increasing illegal land conversion, in which forested lands are illegally converted into avocado orchards (Sommaruga & Eldridge, 2020). Forests are intentionally set on fire to be replaced by avocado orchards (Sáenz-Ceja & Pérez-Salicrup, 2021). Another factor aggravating deforestation is the demand for wood that is needed for the packaging of avocados (De la Tejera Hernández et al., 2013).

Deforestation leads to a loss of ecosystem services, such as hydrological regulation, biodiversity, and carbon sequestration. While avocados grow on trees, these trees have a significantly lower carbon storage capacity and biodiversity value than native pine-oak trees (Arima et al., 2022; Denvir et al., 2021). The expansion of agriculture in forest areas is a key threat to biodiversity and a main driver of the extinction of species (De la Tejera Hernández et al., 2013; Edwards & Laurance, 2012). Avocado orchards are extending into protected areas, such as the Monarch Butterfly Biosphere Reserve in Michoacán, which is an important habitat for millions of migrating monarch butterflies (Denvir er al., 2021; Sáenz-Ceja & Pérez-Salicrup, 2021).

Furthermore, deforestation has negative impacts on the many forest-dependent communities in Mexico. More than 60 percent of Mexican forests are defined as commons and collectively owned by communities (De la Vega-Rivera & Merino-Pérez, 2021). The livelihoods of these communities are closely related to the forests (Barsimantov & Antezana,

2012). Illegal conversion from forests to agricultural land is creating frustrations among local residents, as it is said to have an impact on rising temperatures, forest fires, flooding, and a lack of water (Curry, 2019). The experts, stakeholders, and producers all recognised deforestation as a main environmental issue.

> ''*So the biggest and the main concern from the ecological perspective is deforestation*.'' - Expert 2, interview, 2022

Land degradation

Avocados are usually grown in a monoculture. Cultivating crops in a monoculture can lead to soil degradation and decreased biodiversity (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). Whereas forests are playing an important role in water retention in soils, monocultures tend to lower water retention. This is causing increased runoff (Denvir et al., 2021). In Jalisco as well as in Michoacán, avocado cultivation has been linked to floods (Mondragón & López-Portillo, 2020; Expert 1, interview, 2022). Furthermore, monocultures are highly reliant on irrigation systems and require a high usage of agrochemicals, which leads to water scarcity and pollution of waters and soils (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). Estimates suggest that in the avocado-producing region in Michoacán, annually approximately 900,000 tonnes of fungicides, 450,000 litres of insecticides, and 30,000 tonnes of fertilisers are used (Alarcón-Cháires, 2020; Espinoza et al., 2009). These accumulate in the soil, resulting in acidification of the soil (Meta-Política, 2019; Sáenz-Ceja & Pérez-Salicrup, 2021). Another issue with the excessive use of agrochemicals is that it impacts the pollinators in the orchards (De la Tejera Hernández et al., 2013; Sáenz-Ceja & Pérez-Salicrup, 2021).

> ''*We really need the pollinators to work in our orchards to get avocado. So when we are fighting some plagues, we are also, well, we are many times are also affecting the pollinators*.''- Avocado producer organisation, interview, 2022

As a result of the ever-increasing demand for avocados, there is an increasing scarcity of lands with ideal biophysical characteristics to grow avocados. Therefore, avocado will increasingly be cultivated on less suitable lands. This makes the crop more vulnerable, which may lead to even more dependency on pesticides, fertilizer, and irrigation. This will further adversely impact the ecosystem (Arima et al., 2022).

Water scarcity

The cultivation of avocados requires a substantial amount of water. Thus, the water footprint of avocados is significant (Sommaruga & Eldridge, 2020). There is overexploitation of water sources, such as groundwater and springs, which is resulting in a reduction in water availability (De la Tejera Hernández et al., 2013). This is problematic, given that already one-fourth of the Mexican population has limited access to drinking water (Monroy-Torres et al., 2021). Water scarcity is creating inequalities in access to water and rising tensions among the local population surrounding the avocado orchards (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). Moreover, it leads to an increase in the price of water (Khan et al., 2021).

Water shortages lead to significant physical and economic stress and have negative impacts on food production (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). As a result of water scarcity, illegal water wells have been reported (Denvir et al., 2021).

As discussed above, avocado expansion is projected to occur in areas with lower precipitation, which further increases the need for irrigation and the demand for water (Arima et al., 2022). Reduced water availability is also linked to deforestation (Denvir et al., 2021), given that the evapotranspiration of avocado trees is significantly higher than those of native trees (De la Tejera Hernández et al., 2013).

> ''*I've been to communities where they don't have running water, but then they do have irrigation for the avocado orchards. So, you know, they, the people who lived in this village I went to, they had to get their water tank at in, like every in a month or so, and show up with storage tanks. There's no running water there, and obviously that's expensive. And it also has issues in terms of intra-communal issues.*'' - Expert 1, interview, 2022

5.2 Socioeconomic impacts

There are also concerns related to the socioeconomic impacts of avocado cultivation in Mexico (De la Vega-Rivera & Merino-Pérez, 2021). These concerns are closely related to the environmental impacts of unsustainable avocado cultivation.

Inequalities

The avocado industry has led to deep societal changes in the avocado-producing regions (Curry, 2019). Compared to traditional crops, such as maize and wheat, avocado cultivation greatly increases profits per hectare, which can further explain the rapid expansion of avocado cultivation (Guerrero et al., 2008). Due to their high profitability, avocados are also known as 'green gold' (*oro verde*) (De la Tejera Hernández et al., 2013; Sommaruga & Eldridge, 2020).

In purely economic terms, avocado cultivation has significantly contributed to economic development. The avocado industry has brought substantial economic growth to the avocado-producing regions and has created more than 370 thousand direct and indirect jobs (Alarcón-Cháires, 2020; Denvir et al., 2020). This is supported by the interviews. One of the stakeholders mentioned about Jalisco:

> ''*I see a bigger economy, I see more people and in general there are more opportunities for people here.*'' - Avocado producer organisation, interview, 2022

Originally, the main avocado-producing state, Michoacán, has high levels of emigration to the US (Denvir et al., 2020). Due to increased employment, people now have an incentive to stay (Expert 2, interview, 2022). When looking at the emigration numbers from Michoacán, it becomes clear that the numbers have been reducing over the years (CONAPO, 2022). This is illustrated by the following quote:

> *''If you look deep into the emigration trends from this area, in particular, from the Meseta Purépecha[1], they have reduced, they are staying in Michoacan and that is something that, in the whole 20th century, never happened to Michoacán before. Never. Michoacán is a sending state. Michoacán exports everything. Food, and migrants as well. And for the first time in the Sierra Purépecha, since the beginning of the 20th century, Michoacanos are staying in Michoacán. That is positive. No one wants to see their kids go to another country to speak another language they are not familiar with, to change the culture, everything. And it's a risky adventure to migrate to the US, most of them did it illegally so it was risky, and it's nice to keep your family and your traditions and stay home. So that is positive.''* – Expert 2, interview, 2022

While increased economic growth, higher employment rates, and reduced out-migration are important positive impacts, the wealth made by the industry is not shared by everyone. How the profits from the industry are distributed limits further socioeconomic benefits (Denvir et al., 2020).

Avocado trees need to grow for a minimum of four years before the first harvest can take place and it takes ten years for avocado orchards to become fully productive. Therefore, the cultivation of avocados demands high upfront investments (De la Vega-Rivera & Merino-Pérez, 2021). Consequently, large-scale avocado production is concentrated among a few (those with enough financial assets), mainly large transnational agribusiness (De la Vega-Rivera & Merino-Pérez, 2021, Espinoza et al., 2009). Therefore, the profits are strongly concentrated, deepening existing inequalities (De la Tejera Hernández et al., 2013; Denvir et al., 2021; De la Vega-Rivera & Merino-Pérez, 2021).

Despite the avocado industry has led to a vast increase in employment opportunities, there are considerable inequalities within the supply chain. There are growing differences between those who own the avocado orchards (the producers) and those who work in the industry as cutters, packers, and exporters. Those involved in growing, packing, and exporting gain vastly more out of the trade. In contrast, labourers cutting the avocados, while the wages are decent, earn significantly less in comparison to the gains made elsewhere in the supply chain (Curry, 2019). Experts viewed the large, transnational packing and export companies as being the most powerful actors in the supply chain (Expert 1, interview, 2022; Expert 2, interview, 2022). While smaller growers have little power over the price they receive for their avocado, larger producers, who also have their own packing and exporting facilities, are better able to directly bargain about the price with retailers (Expert 2, interview, 2022). Smaller growers feel they do not have much to say about the price they receive for their avocado as well as the standards they must comply with to export. This is creating tensions in the supply chain, which is reflected by incidents where growers have gone on strike to fight for a better price for their avocados (Fain, 2018; Expert 1, interview, 2022).

There are also inequalities between those producing avocados for the domestic market and those exporting avocados. Sánchez et al. (2018) have analysed the competitiveness and costs of avocado cultivation in Michoacán and indicated that the profits for exporting avocado

[1] The Meseta Purépecha is the main avocado producing region in Michoacán.

are significantly higher than for producing avocado for the domestic market (Sánchez et al., 2018). Sánchez et al. (2018) indicated that smallholder farmers producing for the domestic market do not even always obtain economic profits, but solely cover their production costs.

The inequalities within the industry have a profound social impact on the communities in the avocado-producing regions (Curry, 2019; De la Vega-Rivera & Merino-Pérez, 2021). For example, in the avocado-producing capital of the world, Tancítaro, feelings of fragmentation, inequality, loss of community, and changes in values and culture in the community have been documented (Curry, 2019).

> ''*You start getting social tensions in the community, which revolve around who has avocados and who doesn't have avocados, or how that has kind of played out in the social setting of the town over the years. So, there has been a massive kind of growth in disparity in wealth between those who own the land and those who work the land. And that has generated a lot of social tension*.'' – Expert 1, interview, 2022

Land access

Avocado cultivation has significantly transformed the traditional agricultural and peasant culture of some indigenous people and communities in Michoacán (De la Vega-Rivera & Merino-Pérez, 2021; Ramírez-Mejía et al., 2022). More than half (52%) of the Mexican land is under a community-based tenure form, mainly under the *ejidos* (Landmark, 2021). Ejido is a form of communal land tenure in Mexico (Jones & Ward, 2002). Historically it was not possible for outsiders to buy and own ejido land. However, since 1992, more in line with neoliberal ideas, it is legally possible for ejido lands to be converted into private land tenure forms. After ejido lands are converted into private property, it is possible for outsiders to buy the lands (Barnes, 2009).

Avocado trees are now being planted on previously forested lands and communal lands, which can weaken access and governance of local communities regarding these lands. The conversion of lands threatens access to natural resources, on which the livelihoods of indigenous and forest-dependent communities are dependent (De la Vega-Rivera & Merino-Pérez, 2021). This can lead to food insecurity, a loss of livelihoods connected to these lands, and erosion of communal institutions and community cohesion. These impacts are greater within communities that are weakly organized and connected (De la Vega-Rivera & Merino-Pérez, 2021). Various scholars indicated that the intensification of avocado nurtures land dispossession and land grabs (De la Vega-Rivera & Merino-Pérez, 2021; Gasparello, 2021; Urrieta, 2016). In San Miguel Nocutzepo, a town (*pueblo*) in the avocado belt in Michoacán, *ejidatarios*[2] have said to be continuously coerced and pressured into selling their ejidos to wealthy avocado exporters (Urrieta, 2013).

One expert mentioned that while some *ejidatarios* indeed moved out of the Mesteta Purepécha, this was not the dominant trend, and many *ejidatarios* sold mainly their communal property but kept other parts of their ejidos to live there (Expert 2, interview, 2022). Many of these *ejidatarios* now have become labourers in the orchards on the lands they formally own or previously owned (Expert 2, interview, 2022; De la Vega-Rivera & Merino-Pérez, 2021). While

[2] An *ejidatario* is a member of an ejido

De La Vega-Rivera and Merino-Pérez (2021) view this as a negative impact, the expert mentioned:

> *''Most of them are going to tell you; I am better now than I was three decades ago. … And they tell me, well these ejidatarios before the avocado production, they were, and that is true, they are right, they were living day by day. You know, like because of the corn they grew, by selling guitars, and by selling masks made of wood. And by selling their crates, but that was not big money. That was not like, a good living situation. Now they are working in the avocado industry. They are paid like month by month and they receive their cheque. I think if we focus on what is going on today, yeah probably, it's not the worst situation for them.''* - Expert 2, interview, 2022

This view is supported by Riedemann and Huacuja (2003). The authors argue that, in general terms, avocado cultivation has benefitted *ejidatarios* and communal farmers, as they have been able to improve their living conditions. Besides the work in the orchards, avocado cultivation offers a considerable number of jobs in the packing houses and transport facilities and most jobs are reasonably paid (Expert 2, interview, 2022; Avocado producer organisation, interview, 2022). Nevertheless, the authors also argue that the benefits have been uneven and that ejidatarios that grow avocado themselves, receive low prices and face competition issues with international traders and large producers (Riedemann & Huacuja, 2003).

Violence and extortion

The growth of the avocado industry is connected to the increase in organised crime in Michoacán. Michoacán has long been connected to drug production and trafficking (Curry, 2019). The high profitability of avocado production has led drugs cartels and criminal groups to engage in the avocado industry, which has led to increased violence, extorting of farmers, kidnapping, and murders (Khan, et al., 2021; Kennedy, 2019; Sommaruga & Eldridge, 2020; De la Vega-Rivera & Merino-Pérez, 2021).

By posing taxes on avocado producers per hectare used for avocado cultivation, the avocado industry became an important revenue stream for cartels (Curry, 2019). Cartels also extorted avocado growers in other ways. Some avocado producers and their families have been kidnapped, disappeared, forced to flee, or killed. In turn, cartels have taken over their lands and revenues, or have asked for extortion fees (Curry, 2019; Kennedy, 2019). The lucrativeness of the avocado business has also made it attractive for money laundering (De la Vega-Rivera & Merino-Pérez, 2021; P1). In Michoacán, prominent people in organised crime are said to own extensive avocado orchards (Expert 1, interview 2022; RA, interview, 2022). Additionally, De la Vega-Rivera and Merino-Pérez (2021) found in their study that farmers deciding to convert their lands to avocado orchards request loans from people who are linked to organised crime, which can lead to extortions and displacement.

Producers as well as experts and stakeholders mentioned organised crime as an important issue in the Mexican avocado sector. Both stakeholders mentioned that the presence of organised crime in the avocado industry is not (yet) a problem in Jalisco:

> ‘‘*Unfortunately in Michoacán and other parts in Mexico there is a big issue with the organised crime. Here in Jalisco, we are, I believe we are, like, safe. We don't have that kind of activities of the organised crime. But I don't know, maybe this could change in the future. I hope not, but nowadays we are fine with this topic.*’’ - Avocado producer organisation, interview, 2022

Food security

The increasing export-focused monoculture production poses questions regarding regional food security (Sommaruga & Eldridge, 2020). As confirmed in the interviews, as the production of avocados can bring a significant amount of profit in comparison to other crops, many lands used to cultivate traditional subsistence crops, like wheat, beans, and maize, are replaced with avocado trees (De la Tejera Hernández et al., 2013; Ramírez-Mejía, 2022; Sáenz-Ceja & Pérez-Salicrup, 2021). These traditional crops are of great importance for the basic diet of the population (De la Tejera Hernández et al., 2013; Orozco-Ramírez et al., 2017). The replacement of these crops with avocado trees diminishes food self-sufficiency (Alarcón-Cháires, 2020). Local food prices may rise as a result of diminished regional food diversity and availability, meaning food has to come from further (De la Vega-Rivera & Merino-Pérez, 2021).

Due to the export focus of the avocado, the price of the fruit has increased locally (Rubí-Arriaga et al., 2019). The price of avocado has become high for lower-income households and its price per kilo is about twice as high as beans (Mayett-Moreno & López Oglesby, 2018). This is related to lower consumption of avocados among lower-income households (Rubí-Arriaga et al., 2019).

> ‘‘*The people who don't have orchards or friends with orchards, or, you know, just general in Mexico, eat far less avocado I would say or, it's far less available for ordinary people. I mean, obviously wealthier people will still be able to afford it, or willing to pay that, but for ordinary people it's less affordable for sure.*’’ - Expert 1, interview, 2022

Moreover, food insecurity is also related to water shortages and a loss of land access (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). This is problematic since already more than half of Mexican households are food insecure (Monroy-Torrez et. al, 2021).

While multiple scholars mention food insecurity as an issue, research on the exact impact of avocado cultivation on food security is lacking. Therefore, more research is needed regarding this topic.

Working conditions and health issues

Although job creation is a positive side of the industry, the working conditions can be tough. As avocados are a delicate fruit, they are harvested manually, and labour is required all year long (Denvir et al., 2021). Agricultural workers can be in a precarious situation since labour rights are not always respected in the orchards (De la Vega-Rivera & Merino Pérez, 2021). Working unions do not seem to play a significant role.

''Just imagine the amount of avocados that they have to harvest, so they bring a lot of people and they contract a lot of people during the season to start picking avocados up and as far we saw, we know these companies and big farms, they are hiring people and they are giving them housing, but for example in a house that it was built for maybe four or five people. They are putting up to 10 or 15 people in those houses.'' - RA, interview 2022

The work of cutting avocados from the trees is physically demanding. The workers who cut the fruit are often paid a piece-rate. To overcome stress and physical pain, some cutters take methamphetamine and become addicted to drugs (Curry, 2021).

Furthermore, the high usage of pesticides forms a threat to the health of the workers (De la Vega-Rivera & Merino Pérez, 2021). González (2019) indicated that workers working with agrochemicals are not always well informed about the dangers of it and do not always wear Personal Protective Equipment (PPE). Consequently, health issues (such as intoxication, skin, eye, and respiratory problems, and other diseases) are common among the workers (De la Vega-Rivera & Merino Pérez, 2021; González, 2019). Except in the case of acute intoxications, workers often have to pay for their own medical expenses for issues that occur as a result of exposure to pesticides (González, 2019).

Besides the health issues for the workers, the massive use of agrochemicals that are used to ensure the productivity of avocado trees also causes significant health issues for the residents in the main avocado-producing regions (Curry, 2019).

The agrochemicals used in the avocado orchards find their way into groundwater as well as surface water, such as rivers, which contaminate the water that is consumed by the population (De la Tejera Hernández et al., 2013; González, 2019; Sáenz-Ceja & Pérez-Salicrup, 2021).

Additionally, fumes of pesticides are inhaled by workers and the local population surrounding the avocado orchards (González, 2019). Another issue with the use of agrochemicals on avocado trees is that the wood of these trees is often used for heating and cooking, which releases toxic fumes and cause respiratory as well as environmental issues (Curry, 2019). Recent research found pesticides in the urine of children in two avocado-producing communities in Jalisco. Exposure to pesticides in children is linked to impairment of mental development, neurocognitive problems, and cancer at a young age (Sierra-Diaz et al., 2019).

Various researchers have pointed out the high levels of cancer in the avocado-producing regions, which could be a result of the high use of pesticides (Curry, 2019; 20minutos, 2015; Sierra-Diaz et al., 2019). Other research has found problems with hormonal imbalances and fatigue in the main avocado-producing region in Michoacan; Uruapan (20minutos, 2015).

''*Cancer as well because of the pesticides, cause when they spray it, you know, you can taste it in the air.*'' - Expert 1, interview, 2022

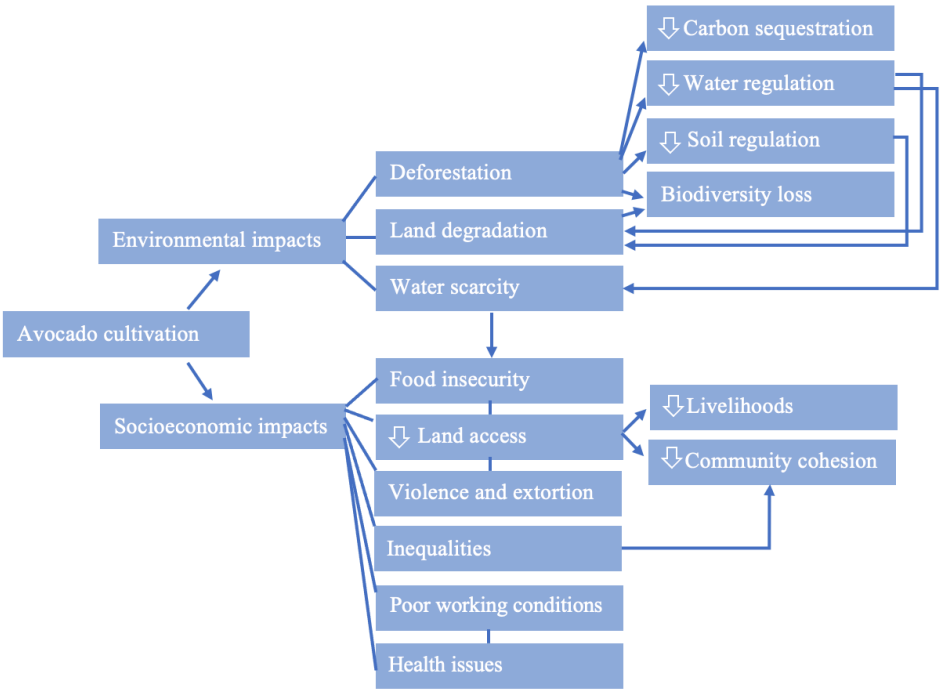
Even the use of organic products can cause health issues, such as gastrointestinal problems, as explained by one of the experts:

''*Even what counts as organic is, you know, is not great either. … There's certain times when they fertilize the orchards with horse manure and that causes, you know, clouds and clouds of flies and that has health implications for a lot of people as well. Like gastroenteritis and all these kinds of salmonella. Yeah, it's pretty grim*.''
- Expert 1, interview, 2022

5.3 Conclusion

Concluding, unsustainable avocado cultivation is creating a conflictive situation in the avocado-producing regions in Mexico. While issues like deforestation, water scarcity, and inequalities are broader issues in Mexico, unsustainable avocado cultivation significantly aggravates them. The main socioeconomic and environmental sustainability concerns are summarized in Figure 10. While the profits from avocado cultivation are strongly concentrated, the negative impacts are felt throughout the whole region and negatively impact smallholder farmers, farm workers, and local communities (Denvir et al., 2021; De la Vega-Rivera & Merino-Pérez, 2021).

Figure 10.
Key areas of concern in the Mexican avocado sector.



Note: Based on Curry (2021), De la Vega-Rivera & Merino-Pérez (2021), Denvir et al. (2021), Edwards & Laurance (2012), and Sommaruga & Eldridge (2020).

6. Sustainability issues and Rainforest Alliance certification

This chapter will provide insight into how the sustainability issues of unsustainable avocado cultivation in Mexico, as discussed in the previous chapter and depicted in Figure 10, are addressed in the Theory of Change (ToC) of the RA. Therefore, this chapter aims to answer the second sub-question.

As discussed earlier, the outcomes in the ToC (Figure 4) of the certification program are connected to the indicators in the RA SAS for farm requirements (Rainforest Alliance, 2020). The indicators in this document make the outcomes in the ToC measurable. Therefore, in this chapter, the SAS will be carefully examined in relation to the sustainability issues. A more detailed version of the ToC of the direct and intermediate/long-term outcomes of the certification standard can be found in Appendix A.

Deforestation and biodiversity loss

As discussed in the previous chapter, avocado cultivation is linked to deforestation and biodiversity loss (Arima et al, 2022; Barsimantov & Antezana, 2012; De la Tejera Hernández et al., 2013; Edwards & Laurance, 2012; Guerrero et al., 2008; Mondragón & López-Portillo, 2020). The RA SAS has a clear requirement that producers cannot produce agricultural commodities on previously forested lands. Natural ecosystems, such as forests, may not be converted into land for other uses, including agricultural production. Furthermore, remnant forest trees on RA-certified farms that do not pose any hazard to infrastructure or people need to be maintained. Another requirement is that no production takes place in protected areas, except when this is allowed according to the national law (Rainforest Alliance, 2020). This could prevent the issue that avocado cultivation is expanding into protected areas, such as the Monarch Butterfly Reserve in Michoacán (Sáenz-Ceja & Pérez-Salicrup, 2021). These requirements are also connected to a reduction in biodiversity loss resulting from avocado cultivation. The SAS also has specific indicators to fight biodiversity loss, which are focused on the protection of threatened plants and animals (Rainforest Alliance, 2020).

Although the standard addresses issues of deforestation and biodiversity loss, land conversion from forests to agricultural lands is only prohibited for lands that have been forests after 2014. Therefore, RA-certified farms can still be connected to forest clearing that happened before 2014. That being said, the requirements ensure that certified farms will not engage in new deforestation.

Land degradation

Important causes for land degradation in the Mexican avocado sector are monoculture farming and the excessive use of agrochemicals. In turn, this negatively impacts biodiversity and leads to water pollution and health issues (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). The SAS has a clause for planting and rotation. This includes that new plantings should take into account, among other things, intercropping and diversification. A mandatory improvement that must be implemented after 3 years of certification, is the implementation of measures to improve soil health and prevent diseases and pests. These measures can include crop rotation, intercropping, or fallowing of land. Furthermore, farmers

are required to implement measures to conserve and improve the fertility of their soil. This includes conducting soil assessments and using organic fertiliser where possible (Rainforest Alliance, 2020). These measures could play an important role in improving soil fertility and diminishing dependency on agrochemical use, and thereby could be helpful in reducing land degradation.

Water scarcity

Avocado cultivation in Mexico is leading to water scarcity and inequalities in access to water (De la Vega-Rivera & Merino-Pérez, 2021; Denvir et al., 2021; Sommaruga & Eldridge, 2020). There are also concerns regarding illegal water wells (Denvir et al., 2021). The SAS has a clause on water management and conservation. Producers are required to use water efficiently. Additionally, producers need a permit or license for withdrawing groundwater or surface water and need to comply with the law for withdrawing this water (Rainforest Alliance, 2020). These requirements could counter the use of illegal water wells. As a self-selected improvement, producers can harvest rainwater for irrigation (Rainforest Alliance, 2020). This could reduce the need and competition for other water sources.

While the requirements of the SAS could help producers to use water legally and more efficiently, this obviously does not take away the fact that avocados are water-intensive crops, and a significant amount of water will be needed for large-scale avocado cultivation. Especially in the case of large farms, this could still pose an issue of water scarcity when no harvested rainwater is used for irrigation purposes.

Inequalities and land access

The main cause of the inequalities related to the avocado sector is that not everyone has enough resources for cultivating and exporting avocados. Therefore, there is a vast difference between those who are able to export and benefit from the industry, and those who do not benefit from the industry and solely feel the negative consequences (Denvir et al., 2021; De la Vega-Rivera & Merino-Pérez, 2021). While the SAS does not have a specific requirement connected to this issue, the standard does require that the rights of communities should be respected and that after three years of certification, producers should engage with and identify the interests of communities that might be affected by the operations of the farm (Rainforest Alliance, 2020). These requirements might also counter the loss of land access communities can face as a result of land conversion into avocado orchards. Additionally, producers should have legal land rights and informed consent is needed in case the producer carries out activities that weaken the resource and land rights of the local population.

While the standard indirectly addresses the issue of inequality, there are costs involved in the process of becoming certified, which could further increase inequalities between those that are able to pay these costs and those who are not (Komives & Jackson, 2014; Oosterveer et al., 2014).

Violence and extortion

Avocado cultivation in Mexico is related to violence and extortion (Curry, 2019; De la Vega-Rivera & Merino-Pérez, 2021; Kennedy, 2019; Khan, et al., 2021; Sommaruga & Eldridge, 2020). Rainforest Alliance certification does not address violence and extortion in its standard.

This is not surprising, given that the prevalence of violence and extortion is very context specific for the Mexican avocado sector.

Food insecurity

Food insecurity is related to a loss of land access for communities and water scarcity (De la Vega-Rivera & Merino-Pérez, 2021; Sommaruga & Eldridge, 2020). As discussed above, the RA certification standard has clear requirements regarding the loss of land rights for the local population and water scarcity is addressed by requiring efficient water use (Rainforest Alliance, 2020).

Furthermore, the RA standard aims for the total remuneration of farmers and farm workers to be towards the living wage (Rainforest Alliance, 2020). Higher incomes are related to less food insecurity (Mayett-Moreno & López-Oglesby, 2018). Thus, farmers and farm workers might experience fewer financial barriers to buying food and may therefore be less prone to food insecurity resulting from monetary shortages. However, a price premium is not always guaranteed, and prices are dependent on market fluctuations (Schleifer & Sun, 2020).

Another factor that threatens food security is that lands for traditional crops are being converted into avocado orchards (Sommaruga & Eldridge, 2020). While the certification standard requires that forests cannot be converted into agricultural lands, it does not provide any regulations as to what agricultural land was used before (Rainforest Alliance, 2020). Thus, RA-certified farms could be connected to land conversion from traditional crops into avocado orchards, and thereby potentially contribute to regional food insecurity.

Moreover, certification might drive up food prices (Oosterveer et al., 2014), making it more expensive for the local population (Mayett-Moreno & López-Oglesby, 2018). Additionally, certification can make it more attractive to export food, rather than being used to meet local food needs (Oosterveer et al., 2014).

Health issues and poor working conditions

The extensive use of agrochemicals forms a risk to farmers, farm workers, and the local population, and is related to health issues in Mexico (Curry, 2019; González, 2019; 20minutos, 2015; Sierra-Diaz et al., 2019). The RA certification standard aims to reduce the health and environmental risks of pesticide use. The standard requires strict integrated pest and agrochemicals management, which includes monitoring, intervention, and prevention measures (Rainforest Alliance, 2020).

To prevent and control pests, non-chemical methods should be used in the first place. Only when necessary, agrochemicals may be used, which have the highest selectiveness and lowest toxicity. No agrochemicals may be used that are not registered in the country, prohibited by the law, or that are on the RA List of Obsolete Pesticides or List of Prohibited Pesticides (Rainforest Alliance, 2020).

González (2019) indicated that workers working with agrochemicals are not always well informed about the dangers of it and do not always wear Personal Protective Equipment (PPE). RA certification requires that farm workers receive training and are skilled in agrochemical application. The use of PPE is required during the application of agrochemicals and should be offered free of charge (Rainforest Alliance, 2020). This may take away any convenience and/or financial barriers of farm workers to wearing PPE. The standard requires that PPE and

agrochemicals should be stored in a manner that minimises risks to human as well as environmental health. Additionally, measures should be taken to avoid contamination of waters and natural ecosystems by agrochemicals (Rainforest Alliance, 2020).

The RA certification standard has numerous other requirements regarding working conditions and labour rights as well. This includes a maximum of 8 working hours per day and 48 working hours per week, safe working conditions, minimum wages, contracts, freedom of collective bargaining and association, and measures against forced labour and harassment in the workplace (Rainforest Alliance, 2020).

These requirements ensure good working conditions and counteract the violation of labour rights. Moreover, the requirements could be helpful in minimising excessive and inappropriate agrochemical use and its risks to human and environmental health. Nevertheless, especially large farms might still require a significant amount of agrochemicals, which may still pose some issues to environmental and human health.

Conclusion

This chapter aimed to provide an answer to how the sustainability issues are addressed by the RA standard (SQ2). Most sustainability issues of avocado cultivation in Mexico are addressed by the RA SAS indicators. Most notably addressed are land degradation, land access, and working conditions. Other sustainability issues of avocado cultivation in Mexico are also addressed by the RA standard, but to varying degrees. Among them are deforestation and biodiversity loss, water scarcity, health issues, food insecurity, and inequality. The issue of violence and extortion in the avocado cultivation sector in Mexico is not addressed by the RA standard, most likely because this issue is not as prevalent in other cultivation sectors.

7. Adoption of the standard

This chapter will focus on the adoption of the RA standard. First, a description of avocado producers in Mexico will be provided. Next, the characteristics of RA-certified avocado producers will be discussed and compared to the characteristics of avocado growers in general, relating to sub-question 3. This will clarify how inclusive RA certification is in the Mexican avocado sector. The second part of this chapter will elaborate on the barriers and motivations of producers to adopt a certification standard, relating to sub-question 4.

7.1 Characteristics of producers.

Characteristics of avocado producers in general.

As argued in the interviews, the profile of Mexican avocado producers is extremely diverse. Some producers solely have 3 production hectares, whereas others can have hundreds of hectares. Most avocado producers in Mexico have between 5 and 10 hectares (Escobar et al., 2019), although there is a difference between Michoacán and Jalisco. In Michoacán, more than 60 percent of the producers are small-scale producers (<10 hectares), of which one-fourth has less than 3 hectares. Large-scale producers (> 30 hectares) only represent 9 percent. Although producers in Jalisco greatly vary in size, producers generally have larger lands than in Michoacán, with over 10 hectares (CIRAD & HABB, 2019). In Jalisco, half of all the land used for avocado cultivation belongs to just 15 to 20 producers (USDA, 2021). Mostly, producers solely cultivate avocados in the orchards (Expert 2, interview, 2022).

The interviews further provided insight into the fact that most exporting growers have adopted at least 1 certification standard, as importing countries require it. Larger producers have oftentimes adopted multiple certification standards. However, there are also many avocado growers which have not implemented any certification standard. In general, these are smaller farmers.

Characteristics of RA producers.

Currently, there are 11 RA-certified avocado producers in Mexico. Ten of them are located in the state of Jalisco, and one is in Veracruz. All RA-certified farms in Jalisco became certified quite recently, within the last 4 years. Except for the producer in Veracruz, the producers only cultivate avocados in the orchards (Rainforest Alliance, 2022d), similar to most avocado producers in Mexico.

Mainly larger producers are RA-certified, and they can have multiple farms. These farms can be both RA-certified and non-RA-certified. The total amount of RA-certified hectares per producer varies in size from 53 to 640 hectares (Rainforest Alliance, 2022d). The total land size of a producer may be even larger, as they can also have farms that are not RA-certified. Hence, RA producers can all be considered as large-scale producers (>30 hectares). Within the Mexican avocado sector, RA-certified producers are among the largest producers, having a considerably larger land size in comparison to many other, non-RA-certified avocado producers. As discussed above, most avocado producers in Mexico have between 5 and 10 hectares (Escobar et al., 2019).

''It's mainly larger farmers that have this certification [RA]. Because we are facing here a disadvantage. If we could say it. A disadvantage for smaller farmers. Smaller farmers generally don't have as much money as larger farmers, and they usually don't have as much technical support as bigger farmers.'' - Avocado producer organisation, interview, 2022.

Like many other large avocado exporting producers, all RA producers have adopted multiple certification standards. Some of them can have up to 15 or 20 other certifications (RA, interview, 2022).

Characteristics of the producers in the study population.

Table 6 shows the characteristics of the producers that filled out the survey as well as the producers interviewed. There were 13 producers that (partly) filled out the survey. Five of them had no certification and 8 of them had multiple certifications. Although the results are not generalisable due to the small sample size, the characteristics of these producers confirm the interviewee's statements that mainly the larger producers get (RA) certified. It also suggests that the larger the producers, the more standards they adopt. This was also pointed out in the stakeholder interviews. Interestingly, all the producers that are certified have Global G.A.P. certification. This certification standard is commonly required by import countries (CBI, 2021). In this sample, no differences were found between the number of certifications and the education level of the producers.

Table 6.

Farm characteristics of the study population.

Certifications	Number of orchards	Total land size (hectares)	Location orchard(s)
	Survey		
None	1	2	Jalisco
None	1	5.4	Jalisco
None	1	9	Jalisco
None	1	15	Jalisco
None	2	26	Jalisco
Global G.A.P., SENASICA	1	17	Jalisco
Global G.A.P., SENASICA	4	50	Jalisco
Global G.A.P., SMETA	1	60	Jalisco
Global G.A.P., SRRC	4	100	Jalisco
Global G.A.P., GRASP, RA	18	950	Jalisco
Global G.A.P., GRASP, SMETA, Organic	35	1000	Jalisco
Global G.A.P., GRASP, SRRC	24	1200	Jalisco, Michoacán
Global G.A.P., GRASP, SMETA, Organic	135	1300	Jalisco
	Interviews		
Global G.A.P., SMETA, RA, SENASICA, Primus GFS, HACCP	13	1300	Jalisco
Global G.A.P., GRASP, SMETA, RA	+/- 10	1000+	Jalisco, Michoacán

7.2 Barriers and motivations of avocado growers to adopt a certification standard

Motivations

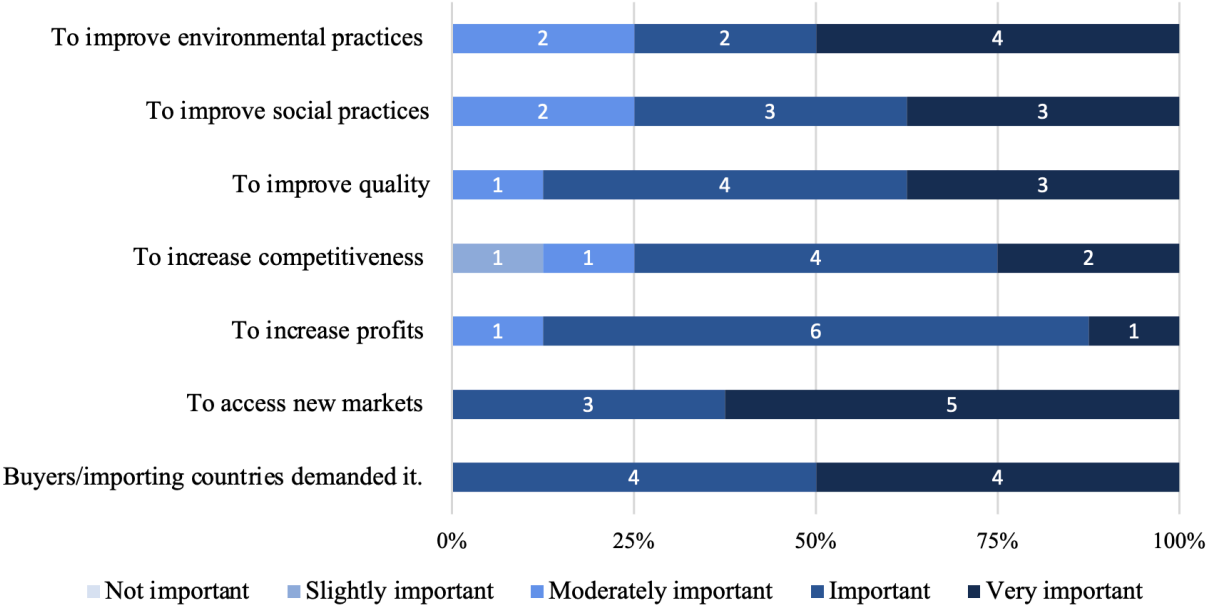
Avocado growers can have various motivations to adopt a certification standard. In the survey, participants were asked to rate the importance of reasons why they adopted a certification standard on a scale from not important to very important (n=8). The outcomes are presented in Figure 11. The white numbers demonstrate how many producers selected the response option.

The survey data suggests that all the reasons were of importance in deciding to adopt a certification standard, although some were recognised as more important than others. Other reasons for adopting a certification standard that were stated were process control, continuous improvement, being a leading company in the production of avocados, producing with a view

to business sustainability, producing responsibly, and viewing it as the right thing to do for the planet, fruit, and customers.

Figure 11.

Motivations to adopt a certification standard.



Note. Answers on Q5: How important were the following reasons for you in deciding to adopt the certification standard(s)?

The producers in this study recognised 'accessing new markets' and 'because buyers/importing countries demanded it' as the most important reasons for adopting a certification standard. The survey data supports what is being said in the interviews. All experts and stakeholders stated the market incentive as a key motivator for most avocado growers to adopt a certification standard, as it adds more value to their product. A certification standard is also often required to export avocados, given that importing countries require (high) quality standards (APEAM, 2021; CBI, 2021). For the RA producers, the reason why they adopted the RA certification standard is because:

> ''*Well, because first of all, it gives us more opening to the European market. And well, now that we are going to be also exporting to the US, it will also give us more exposure in the American market. That's why. … We will become more attractive with that certification for well, for the American market and the European market also*.'' - Producer 1, interview, 2022.

> *''They [Producer 2] have a client in Europe and they suggested to them that it will be good if they have an environmental and social certification, and that's why they got Rainforest Alliance certification.''* - Translator of producer 2, interview, 2022.

However, the market incentive is not the only reason why producers adopt the RA certification standard. Other important drivers for adopting the certification standard are to improve the social and environmental practices in the orchards, as supported by the following quotes:

> ''*The environment, it's very important for us because the avocado production depends on it. We have to maintain a certain range of temperatures. We also need water from the rain. And the forests, they help us with these topics. So we are aware we need to develop our industry in a sustainable way. And we are really interested in certifications that can validate the practices that the producers and packing houses are doing in this topic, sustainability*.'' - Avocado producer organisation, interview, 2022

> *''Being more competitive and being more also, well, we are a company that we care about the environment, we care about our people, so that's why it was also attractive for us*.''- Producer 1, interview, 2022.

> ''*The social and environmental responsibility of our company's mission. Apart from the commitment to produce quality avocados*.'' - RA producer, survey [translated]

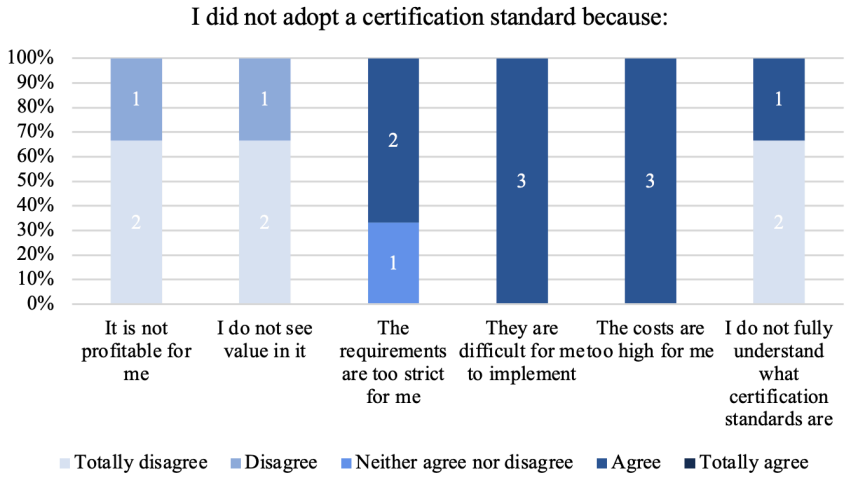
One of the experts mentioned that some producers view getting certified as something they 'have' to do. Some growers can view it as invasive when the auditors come to their lands to check the requirements (often made by people from other countries), probably caused by historical, social, and cultural factors. Especially the less educated growers do not always understand the process of certification and can perceive this 'invasion' and adoption of a certification standard as 'the price they have to pay' to export their avocados (Expert 2, interview, 2022).

Barriers

There were 3 producers that completed the survey and did not adopt any certification standard. These producers were asked about their reasons for not adopting a certification standard (See Figure 12).

Figure 12.

Barriers to adopt a certification standard.



The experts and stakeholders stated that the costs of becoming certified could be a barrier for growers to adopt a certification standard. This is supported by the survey data, as all 3 producers agreed that the reason for not implementing a certification standard is because the costs are too high for them. One producer further specified to have a lack of capital for basic infrastructure.

All experts and stakeholders expressed concerns regarding the disadvantaged position of smaller farmers, as they have fewer assets and may therefore be less able to fulfil all the requirements of a certification standard. The survey data supports this, as the three non-certified producers are among the smallest producers in the study population (see Table 6). All of them agreed that the certification standards being difficult for them to implement was a reason for not adopting any certification standard. Additionally, 2 producers agreed that the requirements are too strict for them, and the other producer neither agreed nor disagreed that this was a reason for not implementing a certification standard. The interviews provided more insight into a possible reason for the certification being too strict for some producers.

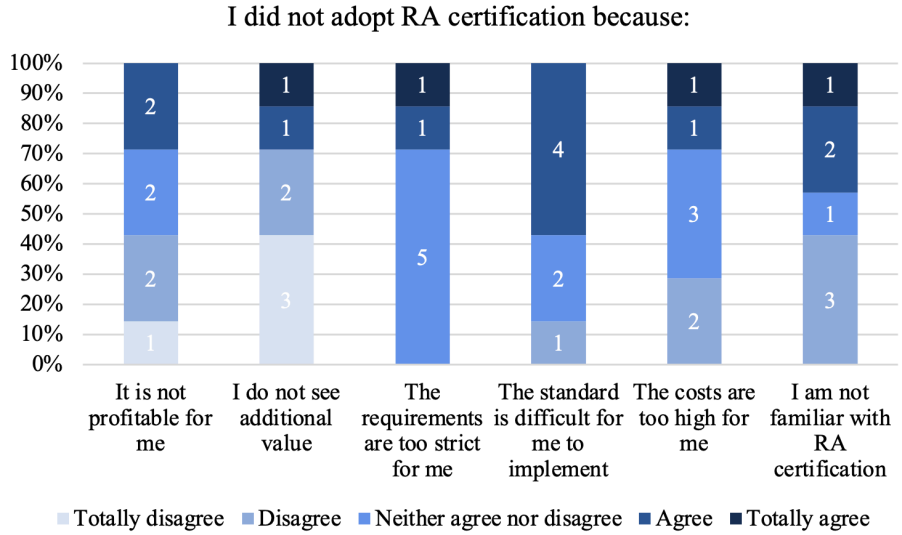
One producer agreed to not completely understand what certification standards are and further specified to experience difficulties in understanding certification standards. The other producers totally disagreed with this statement and are thus familiar with how the standards work.

Not seeing any value in the certification standard and the certification standard not being profitable for them were not reasons for the three producers to not implement a certification standard. Thus, these producers do see value in certification standards.

There were 7 participants that adopted certification standards, but not the RA certification standard (n=7). Figure 13 provides insight into why they did not adopt the RA certification standard.

Figure 13.

Barriers to RA certification



The standard being difficult to implement for the producers was the most important reason for not implementing RA certification (M=3.43). The interviews as well as open questions in the survey provided more insight into the specific difficulties producers face in implementing the RA standard. In 2020, the RA introduced its new certification standard. The new requirements are difficult to meet for some growers. Specifically challenging for producers within this new standard is that it requires their suppliers and stakeholders also to comply with the standard, even when they are not certified themselves. It can be difficult for producers to train their suppliers and stakeholders. Producers also viewed building all the tools for implementation of the standard as challenging within adopting RA certification.

For 3 producers, another reason for not adopting RA certification was because they are not familiar with the standard. One producer further elaborated to not know the requirements of the standard.

Not seeing the added value of the RA certification was the least important reason of these 7 producers for not adopting the certification (M=2.29), although it was still an important reason for 2 producers. Thus, while the non-certified producers all saw value in adopting a certification standard (See Figure 12), this was not always the case for producers with other certifications regarding RA certification. This could be explained by the fact that these producers have already adopted other certifications. This is supported by the interview with the RA:

> ''*We went to see some farms and some places in where they were processing avocados and whatever. And being honest, they didn't show any interest. They were not interested in our certification because they said, okay, we have like 15 different certifications ... So they say, we are not seeing the added value from this.*'' - RA, interview, 2022.

A barrier to RA certification, as recognised in the survey as well as in the stakeholder and producer interviews, is that while the certification costs are to be paid by the growers themselves, they do not receive a higher price for their RA-certified avocado. In this regard, the

incentive to adopt a certification standard in order to sell avocados for a higher price does not account for RA certification.

> ''*A challenge for the certification companies is to assure a better pay for the certified product. Because if this doesn't happen, there are no incentives for the producers and the packing houses to get these certifications*.'' - Producer 2, interview, 2022.

This could explain why some producers in the survey stated that adopting RA certification is not profitable for them. One of the producers elaborated on the reason for not adopting RA certification:

> ''*The market demands high-cost certifications without paying a price premium for the product. It is a barrier to entry.*'' - Producer, survey [translated]

The market demand for RA certification is also a barrier to its implementation. Jalisco recently got approval to export to the US and expects the first containers of avocados to be shipped in mid-July, which is likely to have an impact on the adoption of the certification standard. When Jalisco was prohibited to send their avocados to the US, the state mainly exported to countries which ask for high-quality avocados and proof of good social and environmental practices. In contrast, the US does not have such strict requirements. Additionally, producers receive a higher price for exporting to the US market and avocados can be shipped to the US within 12 hours, whereas shipment to Europe takes around several weeks. Consequently, many producers may shift their production towards the US market. The RA perceived this as a threat to the adoption of RA certification, as the US market does not (yet) require this kind of standard:

> *''The United States market has opened for them. So they're just like hesitating whether to invest in our certification or not, because if they're going to be selling their avocados to The States, it doesn't matter if it's certified or not. … We have to acknowledge that not only RA certification, but also all certifications are market driven. If the markets are not demanding these kind of certifications, producers, companies, they are not going to become certificated just because a good will. So they need to have a specific market that is asking for these kind of certifications*.'' - RA, interview, 2022.

Chapter 8. Effect RA certification on farm practices.

A crucial part of how RA certification intends to contribute to increased sustainability is through the implementation of more sustainable farm practices (ToC level; direct outcomes: farmers implement more sustainable practices, see Figure 4). This chapter includes three case studies of RA-certified avocado producers which will clarify how the implementation of RA certification has affected such farm practices that are most related to the sustainability issues in the sector. Thus, this chapter will answer the fifth sub-question, based on semi-structured interviews with two RA-certified avocado producers (producers 1 and 2) and one survey response (producer 3). Therefore, as mentioned in the methodology, the findings of this chapter are not generalisable. As the data for producer 3 was collected through a survey, it provides less detail than for the other producers.

Characteristics

Producer 1 has approximately 1300 hectares, divided by 13 avocado orchards. This producer has six certification standards: RA, Global GAP, SMETA, SENASICA, Primus GFS, and HACCP. The Rainforest Alliance certification has been implemented for 3 years, and the other certifications have been implemented for over 15 years.

Like producer 1, producer 2 has multiple orchards around 100 hectares each. Producer 2 has over 1000 hectares in total. This producer has 4 certifications: RA (since 2020), Global GAP (since 2015), GRASP (since 2018), and SMETA (since 2017).

Producer 3 has 18 orchards with a total amount of 950 hectares. Besides RA certification, the producer is certified by Global G.A.P. and GRASP.

Table 7 provides an overview of the changes made in farm practices after the implementation of the RA certification standard, which will be further elaborated upon below.

Table 7.

Overview of changes in farm practices since RA certification.

Farm practices	Producer 1	Producer 2	Producer 3
Plant variety	Same	Same	More
Water use	Same	Same	Less
Soil practices	Same	Same	More
Fertilizer use	Same	Less	Less
Pesticide use	Same	More	Less
PPE use	Same	Same	Less
Wages	Same	Same	Higher
Working hours	Same	Same	Same

Plant variety

The three producers only cultivate avocados in the orchards. However, they all have other plants and/or trees in the orchards as well. As can be seen in Table 7, like producer 1, the number of plants and trees in the orchards of producer 2 did not change after having implemented the RA certification. However, before the RA certification, their orchards already had ecological buffer

zones. These areas are used to conserve natural ecosystems and protect pollinators and other animals and plants. Due to the RA certification, more effort is put into protecting these areas. Similarly, the adoption of the RA certification has led producer 3 to make changes in their environmental conservation practices. In contrast to the other producers, producer 3 did implement changes regarding plant variety. They have fewer avocado trees and more other plants, trees, or crops in the orchards compared to before getting RA certified.

Water use

Producer 1 uses various measures to lower water use, such as the collection of rainwater for irrigation purposes and the use of drip irrigation. However, these measures are not the result of RA certification and were already in place before certification. While producer 2 also did not implement changes in the use of water since RA certification, this will change soon. After three years of being RA certified, producers are required to implement various Mandatory Improvements (Rainforest Alliance, 2020). As such, producer 2 is currently working on a water management plan to reduce water use. Before they got RA certified, there were already various measures in place to lower water use. Examples are the documentation of water use, using efficient irrigation systems, and watering the orchards only at night or early in the morning to avoid rapid evaporation. During the rainy season, which lasts about 4 months, irrigation systems are not used. Producer 3 had to make changes in water use to obtain RA certification. Less water is used compared to before RA certification. As the data from producer 3 was obtained through a survey, there was no possibility to further elaborate on this.

Soil practices and fertiliser use

To improve the soil fertility in the orchards, producer 1 applies both organic and chemical fertilisers. No changes in soil practices have been made since they got RA certified. In contrast, producer 2 believes that RA certification has helped them to improve the soil fertility in their orchards, given that the RA standard includes a list of prohibited fertilisers. Adopting RA certification has led them to use better quality chemical fertilisers and more organic fertilisers in the orchards. Additionally, the fertilisers are applied more specifically as a result of RA certification. Before the implementation of the standard, producer 2 already had some measures to improve soil fertility, such as conducting soil analysis in order to only apply nutrients to the soil that are lacking. Furthermore, when avocado trees are pruned, this is integrated into the soils. This helps to preserve the soil humidity and increases soil nutrients. Producer 3 uses more practices to increase soil fertility compared to before the orchards became RA certified.

Pesticide use

Producer 1 said to use pesticides in low portion, given that Global G.A.P. certification requires low pesticide use. Unlike producer 1, producer 2 had to make changes regarding pesticide use to become RA certified. Similar to the use of fertilisers, the RA certification standard prohibits the use of certain pesticides. Implementing the standard has led the producer to change from harsh pesticides to more environmentally friendly pesticides. Interestingly, these pesticides have to be applied more frequently compared to the harsher pesticides. They also had to implement some changes to avoid contamination by pesticides in non-treated areas. Producer 3

also made changes with regards to pesticide use. Less pesticides are being used as compared to before the orchards became RA certified.

Personal protective equipment use

Given that other certification standards, such as Global G.A.P. and SMETA, ask for similar requirements regarding PPE as the RA standard, producers 1 and 2 did not implement any changes in PPE as a result of RA certification. All the protection tools are used in their orchards. Additionally, the workers in the orchards of producer 2 must get their blood tested every month, in order to determine the grade of possible contamination by pesticides. Producer 3 indicated to have made changes to PPE use to become RA certified. Interestingly, this producer indicated to use fewer PPE compared to before RA certification. Nevertheless, as discussed in Chapter 6, the standard has strict requirements regarding the use of PPE. Possible explanations for this finding could be that less, but more effective PPE is used or it could be an error in filling out the survey.

Working conditions

Before the adoption of the RA standard, producer 1 already complied with its requirements regarding working conditions. To ensure good working conditions, they have contracts, toilets, canteens, and protective equipment in all the orchards. Producer 2 complied with most requirements regarding workers as well before they implemented the RA certification. Before they adopted the RA certification, the company already had a program in place for good working conditions and fair wages, because the other certifications required it. All the workers in the orchards have a permanent contract and are paid above the minimum wage. The company also provides social security services to their workers, such as medical services, food tickets, and savings to buy a house. They also already had a committee for worker representation. However, the RA certification has led them to create two more committees, focused on equal gender opportunities and forest labour. Producer 3 indicated that to have made changes in working conditions to obtain the RA certification. The salary of the workers in the orchards is higher compared to before certification. However, the working hours stayed similar.

Land use

For all producers, before their lands were used to cultivate avocados, it was used for other agricultural crops, such as corn and sugar cane. For producer 1, these lands were private as well as communal lands. The orchards of producer 2 are private lands and most of them are rented. They do not rent lands from *ejidatarios*. The land tenure of the orchards of producer 3 are private property. None of the producers had orchards that were previously forested and are therefore not likely to be related to deforestation. Nevertheless, all producers had orchards that were converted from land used for subsistence crops into avocado orchards, which questions its impact on local food security.

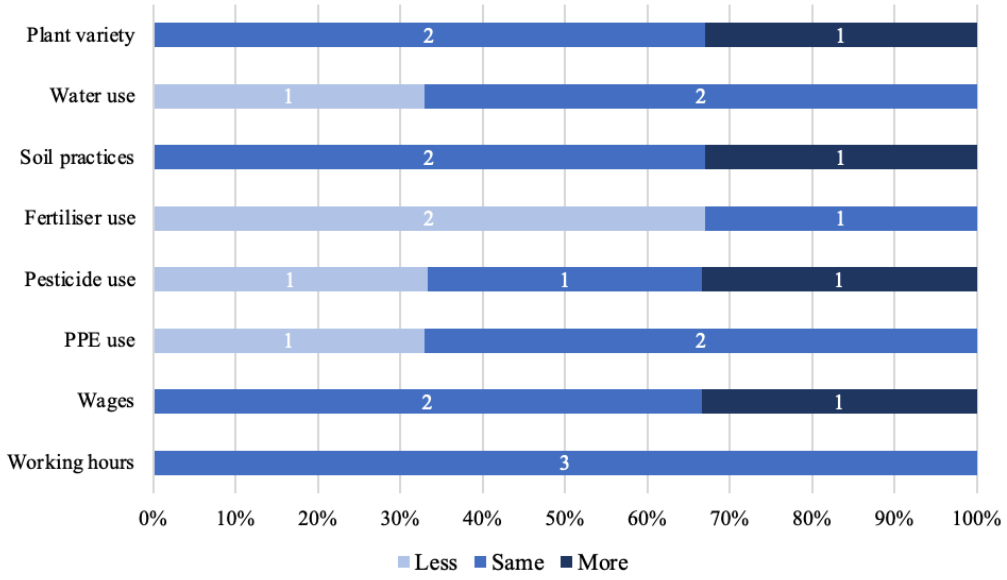
Concluding, the case studies suggest that the contribution of RA certification toward more sustainable farm practices can differ considerably between various producers. While producer 1 already complied with all the RA requirements and therefore did not implement any changes

in farm practices, producer 3 implemented changes in all farm practices. Figure 14 shows how the farm practices of these producers changed after adopting RA certification.

Interestingly, the adoption of other certification standards led producers 1 and 2 to already comply with (most) RA requirements, as the other standards have similar requirements. While these producers implement sustainable farm practices, this does not always seem to be a result of RA certification specifically. This suggests that these producers were already performing well on sustainability challenges before adopting RA certification. This indicates that for producers already having many other certifications with similar requirements, the RA standard in itself may not contribute to more sustainable farm outcomes that much. For these producers, the standard may serve more as another validation that they do well, rather than the standard actually contributing to any changes. Nevertheless, for others, the standard can considerably contribute to the implementation of more sustainable farm practices, as is aimed for in the ToC. As other certification standards seem to affect farm practices as well, the next chapter moves on to broadly compare the RA certification with other common certification standards in the sector.

Figure 14.

Changes in farm practices RA-certified producers.



Chapter 9. Multiplicity of certification standards

Understanding how a development intervention interacts with other interventions is key to understanding the contribution it makes (Riché, 2013). Therefore, this chapter will focus on the various common certification standards in the Mexican avocado sector. While comparing all the requirements of every standard lies outside the scope of this study, it will shed light on the main focus of requirements of the four most important international private sustainability standards and into how these standards together differ in how they affect farm practices compared to RA certification. As such, it sets out to answer the last sub-question, which focuses on the comparison between RA and other certification standards.

9.1 Standards and their focus of requirements

In the Mexican avocado sector, certifications that are internationally recognised are the most important, given that the sector is mainly export-oriented (Avocado producer organisation, interview, 2022). Besides the RA certification, other common international private sustainability standards in the Mexican avocado sector are Global G.A.P., GRASP, and SMETA. These standards have often become a precondition for importing avocados into Europe (CBI, 2021).

Global Good Agricultural Practices (Global G.A.P) certification is most commonly applied and includes various requirements to ensure farming practices that are safe and environmentally and socially friendly (GlobalG.A.P., 2022a).

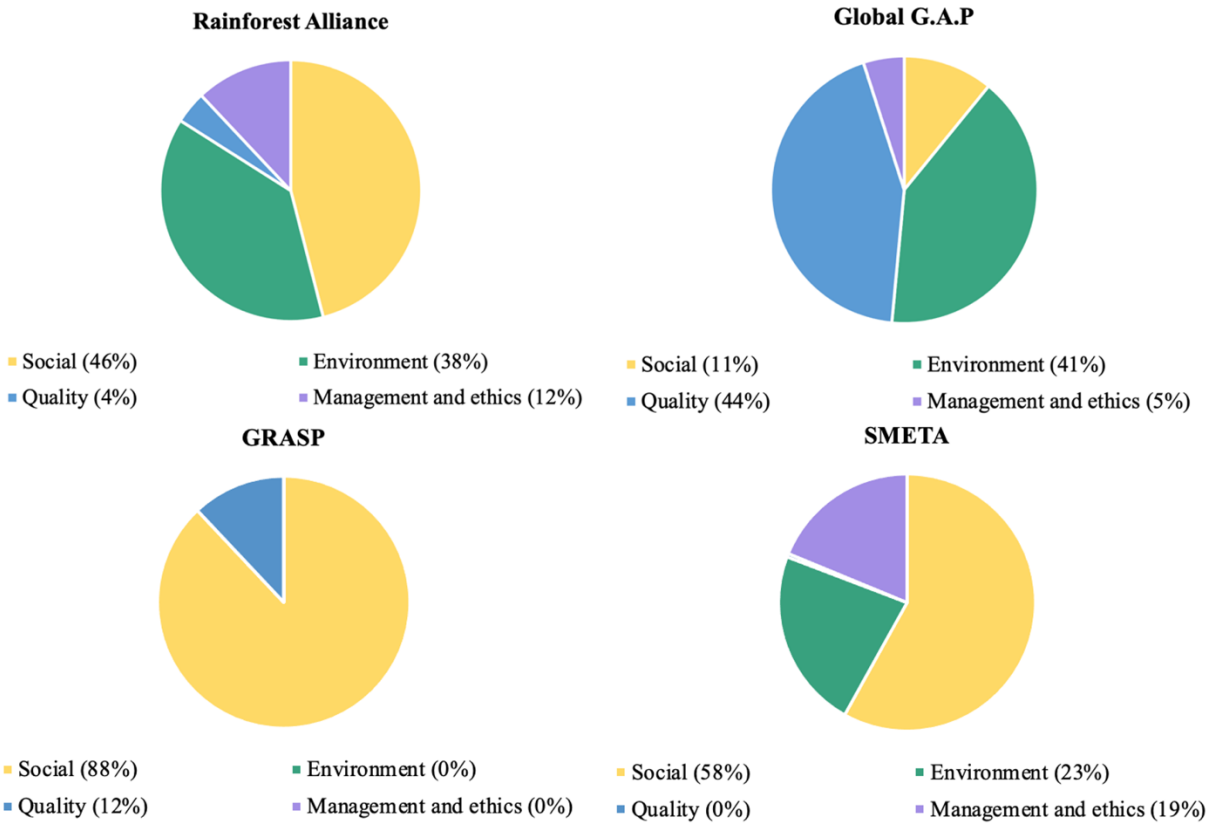
Global G.A.P. Risk Assessment on Social Practice (GRASP) is also commonly applied. GRASP is an add-on to Global G.A.P certification. GRASP focuses on social and labour management at the farm level (GlobalG.A.P., 2022b). The requirements are based on their four key topics: ‘‘workers’ voice, human and labour rights information, human and labour rights indicators, and child and young workers protection’’ (GlobalG.A.P., 2022b, p.1).

Sedex Members Ethical Trade Audit (SMETA) is a ‘‘social auditing methodology, enabling businesses to assess their sites and suppliers to understand working conditions in their supply chain.’’ (Sedex, 2022, p.1). Producers can choose to adopt either the two-pillar audit or the four-pillar audit. The two-pillar audit is mandatory and focuses on health and safety as well as labour standards. In addition, the four-pillar audit focuses on business ethics and the environment (Sedex, 2019a). The standard helps in recognising good working conditions (Sedex, 2022). SMETA is one of the most widely utilized social auditing tools in the world (Eurofins, 2022).

The standards have similar objectives, but their focus differs slightly. Differences in the focus of requirements between the common certifications are shown in Figure 15. While RA certification mostly focuses on the social aspect, Global G.A.P. focuses mostly on the quality of crops as well as environmental indicators. Both GRASP and SMETA are mainly focused on the social aspect, but SMETA also focuses on the environment and management and ethics (StandardsMap, 2022b).

Figure 15.

Focus of requirements of Rainforest Alliance, Global G.A.P, SMETA (4-pillar), and GRASP certification.



Note: Adapted from StandardsMap (2022b). Measured by Standards Map through detailed and reviewed comparison of the indicators of the various standards on every pillar (more detailed information on the indicators included within these pillars are discussed in the methodology section of this thesis).

9.2 Verification methods

The verification methods of the standards are quite similar. For RA, Global G.A.P., and GRASP the certification of farms happens through auditing by a third party, which checks if the requirements of the standard are met (Rainforest Alliance, 2021; StandardsMap, 2022b). The field visit audits for all standards can be unscheduled (Sedex, 2019a; StandardsMap, 2022b). For SMETA, the verification methods are dependent on the specific circumstances in the supply chain as well as the outcome of the risk assessment, which is conducted at the start of the certification process (Sedex, 2019b). Based on this, either announced, semi-announced, unannounced audits, or a combination of audits are conducted and the audits can be conducted through either a first-party, second-party or a third party (Sedex, 2019a). Thus, depending on the risk level, the verification methods of SMETA can be less strict than those of RA, Global G.A.P. and GRASP.

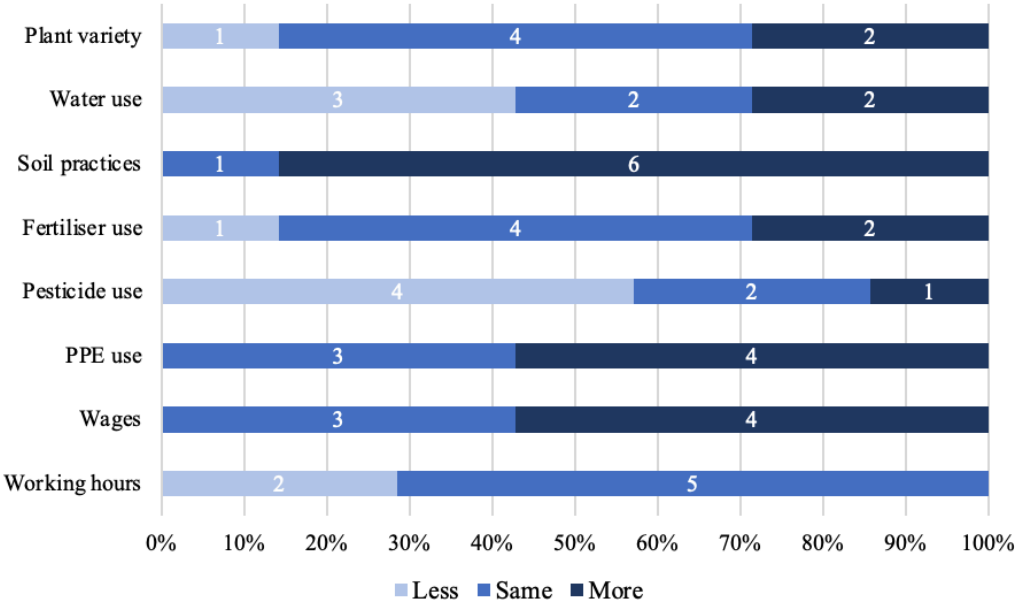
9.3 Observed effects of other certifications on changes in farm practices.

Seven producers filled out the survey which adopted multiple certification standards, but not RA certification. Figure 16 shows how the farm practices of these producers changed after they implemented the certification standards (Global G.A.P., GRASP, SMETA, SENASICA,

SRRC, Organic). Once again, as mentioned in the methodology, due to the small sample size results should be seen as indicative.

Figure 16.

Changes in farm practices non-RA-certified producers.



The farm practice that most notably changed after certification for these producers is the use of more soil practices, such as intercropping, crop rotation, and soil analysis (6). The number of working hours changed the least after certification and stayed similar for 5 producers. This was also the case for the RA-certified producers, as the working hours stayed similar for all three producers after the implementation of RA certification (See Figure 14).

For 5 non-RA certified producers the working conditions in the orchards changed after certification, such as more use of PPE (4), higher wages (4), and fewer working hours (2). Overall, the working conditions changed more after certification for these producers compared to the RA-certified producers in this study, in which only one producer made changes in working conditions. While the RA-certified producers implemented little change in the use of PPE due to the standard, the other certifications caused some producers to use more PPE. However, this does not necessarily indicate that in general RA certification has a smaller effect on PPE use than the other certifications. The interviews with RA producers demonstrated that these producers already complied with the PPE requirements because other certifications (Global G.A.P and SMETA), which were implemented before RA certification, required it as well.

Interesting is that two producers started using more water after they got certified. However, these producers also got more avocado trees since they got certified, which could be an explanation for the extra water use. These producers stated that they did not have to make any changes in water use to become certified. As such, the use of more water is not likely to be related to certification. Similarly, one producer applies more pesticides since certification but stated to not make any changes in pesticide use to obtain the certification. This producer also has more avocado trees compared to before certification, possibly explaining the increase in pesticide use.

One producer had less plant variety compared to before the adoption of the certification standards. A possible explanation for this is that certification can make the selling of the certified crop more profitable, making it more attractive to focus all resources on the certified crop in comparison to other crops or ecological conservation. This producer has Global G.A.P. and SRRC certification (a quality-focused governmental food-safety certification focused on the reduction of contamination hazards (Gobierno de México, 2021)). A closer look into the requirements of Global G.A.P. reveals that its standard has fewer requirements regarding biodiversity conservation compared to RA certification (15 vs. 32 requirements) (StandardsMap, 2022b). For the RA-certified producers, the plant variety was similar (2) or more (1) since certification (see Figure 14). This indicates that RA certification has stricter requirements regarding biodiversity than Global G.A.P., potentially having a greater effect on plant diversity in the orchards.

Regarding land use, non-RA producers with other certifications were asked what the use of the land was before conversion into avocado orchards (n=7). It was stated 8 times that the lands were previously used to grow other crops, 2 times that the lands were used for livestock activities, and 2 times that the lands were previously forested. The producers from which (some of) the orchards were previously forested have the following certifications: Global G.A.P., GRASP, SMETA, Organic, and SENASICA. This indicates that producers with these certifications could potentially be linked to the issue of deforestation, although the sample size is too small to draw any substantive conclusions. Regarding land tenure of the orchards, private property was selected 9 times and ejido was selected 3 times. In contrast, none of the orchards of the RA producers in this study are ejido property. While avocado cultivation on ejidos can sometimes lead to reduced land access of the *ejidatarios*, this is not always the case and sometimes it can even improve their living conditions, as explained in Chapter 5.

The results of this chapter pointed out that each standard has a specific focus. No outstanding differences in strictness of adopting the various certification standard were observed. The results indicate that, overall, the adoption of other certification standards contributes to changes in farm practices that are connected to the sustainability issues in the Mexican avocado sector. This suggests that together, these certifications seem to contribute to more sustainability at the farm level, although the extent of the contribution remains unclear, as well as the contribution of each individual standard.

10. Discussion and recommendations

This chapter will synthesise the findings of this research and connect them to the theoretical framework. Next, recommendations will be provided for certification organisations and important stakeholders. Moreover, implications for further research will be discussed.

10.1 Discussion

Sustainability issues

In Mexico, the rapidly expanding avocado sector has the potential to contribute to increased socioeconomic development in Mexico, as it leads to considerable job creation and capital flows (Denvir et al., 2021). However, Denvir et al. (2021) pointed out that inequalities limit broader socioeconomic benefits. This highlights the argument of Otsuki et al. (2021) relating to translocality that ‘‘livelihood opportunities are to a large extent determined by translocal relations, one’s embeddedness in development corridors and development chains and the ability of local people and institutions to engage with these external forces in such a way that they can reap the benefits.’’(Otsuki et al., 2021, p.240).

This study brought forward that there are considerable sustainability challenges within the Mexican avocado sector, threatening the safe operating space of humanity, as reflected in the planetary boundary framework of Rockström et al. (2009) and the doughnut model of Raworth (2017). Socioeconomic and environmental issues linked to unsustainable avocado cultivation are deforestation, land degradation, water scarcity, biodiversity loss, food insecurity, loss of land access, violence and extortion, inequalities, poor working conditions, and health issues. This indicates that, in general terms, economic gains seem to be prioritised at the expense of social and environmental determinants. As argued by many authors, to realise sustainability, the social, economic, and environmental pillars of sustainability should not be seen as trade-offs (Eskelinen, 2021; Kammüller, 2020; SRC, 2017). Rather, they should be seen as interdependent (SRC, 2017).

RA certification integrates the three pillars of sustainability. By analysing how the sustainability issues in the sector are addressed by the RA ToC and its corresponding indicators, it was found that the issues are partly or fully addressed by the requirements of the certification standard, except for violence and extortion.

Violence and extortion within the avocado sector are related to organised crime. Organised crime is a broader deeply rooted societal issue in the country. A strong and effective response from the authorities is lacking and there is extremely high impunity for crimes in Mexico (Human Rights Watch, 2021; Muno et al., 2020). Hence, it will be a tough challenge for a tool like certification to deal with. Nevertheless, RA Mexico stated that they are currently debating on ways to deal with these issues, for example by applying robust due diligence to farms before the certification process.

The issue of food insecurity is only indirectly addressed by the RA certification standard. Earlier studies found that the expansion of avocado cultivation coincides with a reduction in cultivation of local subsistence crops, such as wheat, maize, and beans (De la Tejera Hernández et al., 2013; Ramírez-Mejía, 2022; Sáenz-Ceja & Pérez-Salicrup, 2021). The exact impact of avocado cultivation on food security remains understudied. The results of this study indicate that RA producers can be linked to land conversion from traditional crops into

avocado orchards. As argued by Oosterveer et al. (2014), the displacement of local food production for export crops can threaten local food security. However, studying the exact impact of avocado cultivation and certification on food security was beyond the scope of this research; future research should focus on this topic specifically.

Adoption of the standard

The literature raised concerns regarding the accessibility of private sustainability standards (Komives & Jackson, 2014). This study found that only large-scale avocado producers have adopted the RA certification standard. The findings also indicated a general trend in which the number of adopted certification standards increased as the land size of producers increased. As holding certification standards provides certain market advantages (Komives & Jackson, 2014), it might become even more difficult for smaller producers to compete with larger ones. This finding is consistent with earlier studies, in which smaller producers are found to be pushed further into a disadvantaged position in a landscape of certification standards (De Fries et al., 2017; Meemken, 2020; ISEAL, 2019). These concerns also exist within the Mexican avocado sector.

The results of this study point out that a selective minority of avocado producers adopt the RA certification. As such, the majority of the producers might not be reached by the RA, which limits large-scale change (Dietz & Auffenberg, 2014; Glasbergen & Schouten, 2015; Komives & Jackson, 2014). The literature recognised this as a general concern regarding private governance. Much production continues to take place outside of the private governance regime (Mayer & Gereffi, 2010).

Although previous research indicated formal education of producers as an important determinant in the adoption of certification standards (Quartey et al., 2021), this study found no indicative relationship between education level and the number of adopted standards. Nevertheless, this could be also due to the fact that data was gathered through digital means, thereby only reaching a certain type of producers.

Barriers and motivations

This study further clarified the barriers that avocado producers experience in adopting certification standards in general as well as barriers to RA certification specifically. The costs of certification and difficulty in implementing the standard were important barriers for the producers in this study to adopt (RA) certification. This is reflected by earlier studies that also found the costs of certification (Komives & Jackson 2014; Oosterveer et al., 2014; Oya et al., 2017) and difficulty meeting the requirements of certification standards (De Fries et al., 2017; Meemken, 2020; ISEAL, 2019) to be a source of exclusion. Other barriers that were recognised in this study were unfamiliarity with the standards and requirements, and the requirements being too strict. For the RA standard specifically, for some producers adoption of the standard not being profitable for them, limited demand, and not seeing the added value of the standard were other barriers.

Implementation of RA certification not being profitable for some producers could be related to the challenge that buyers are not paying more for RA-certified avocados (although they sometimes require the avocados to be RA certified). As such, the costs for the certification process fall on the shoulders of the producers. This is a source of exclusion for smaller

producers not being able to pay these costs. Additionally, it was found to give farmers less incentive to adopt the standard. These findings are consistent with those of Furumo et al. (2019) and Quarty et al., (2021) who found that a price premium is a key motivation of farmers to adopt a certification standard.

Producers not seeing the added value of the RA standard relates to the fact that many producers have adopted other certification standards as well, oftentimes with similar objectives and requirements. Moreover, also related to the barrier of limited demand, the recent opening of the state of Jalisco for exporting avocados to the US could be connected to this finding, as the US market does not (yet) pay much interest in this kind of certification. Consequently, producers are doubting whether it is worth it to invest in the certification standard.

This underlines the market incentive as an essential motivation for producers to adopt a certification standard, supporting earlier studies on certification schemes (Junior et al., 2016; Komives & Jackson, 2014; Oya et al., 2017) and reflecting the importance of translocality. Producers in this study recognised increasing competitiveness, increasing profits, accessing new markets, and buyers requiring certification standards as motivations to adopt a standard. Other motivations were process control, producing responsibly, improving social and environmental practices, and improving quality.

> ''*If the market asks for this certification, every kind of farmer, big farmer, medium farmer, or small farmer, will have the interest to get the certification because that will be the avocado that the packing houses are asking for, you know. So yeah, the markets have a lot of power here. A lot, a lot of power.*'' - Avocado organisation, interview, 2022.

Implementation of RA certification standard

This thesis found that the contribution of RA certification towards implementing more sustainable farm practices greatly varies between producers, contributing to considerable changes for some and none for others. Preceding adoption of other certification standards with similar requirements can lead to producers already complying with the requirements of the RA standard. Although such producers implement sustainable farm practices, this does not always seem to be the result of RA certification specifically. These findings support the concern raised within the debate on certification schemes that producers that are already on track regarding sustainable practices are the ones becoming certified (De Fries et al., 2017).

Multiplicity standards

This study has broadly touched upon the differences between the most common standards: RA, Global G.A.P., GRASP, and SMETA. Each standard has a slightly different focus of requirements (social, environmental, quality, or management and ethics), although the requirements seem to overlap. There seems to be no remarkable difference between the strictness of adopting these standards. Some producers with other certifications (Global G.A.P., GRASP, SMETA, Organic, and SENASICA) were connected to forest conversion, whereas none of the RA producers converted forests into avocado orchards. This could potentially mean that the RA standard protects better against deforestation, which is also one of the key objectives of the RA. However, to make a valuable claim about this, a larger sample size is required.

Although comparing the effect of each individual sustainability standard on changes in farm practices lied outside the scope of this study, it did provide some insight into the changes made to the farm practices after adopting the various certifications (Global G.A.P., GRASP, SMETA, SENASICA, SRRC, and Organic). The explorative findings suggest that non-RA-certified producers also make important changes in farm practices connected to the sustainability challenges after the implementation of other certifications. The precise contribution of each standard towards the implementation of more sustainable farm practices provides ground for further research.

The co-existence of various certification standards in the Mexican avocado sector was recognised as challenging, as the adoption of numerous certifications takes considerable effort and assets from producers. Producers with multiple certifications may have many unexpected audits and the standards are not always easy for them to understand. Moreover, as discussed above, producers may not see the added value of certain certification standards. As stated in the literature, the existence of various standards is also confusing to consumers (Lhemezie et al., 2018; Reinecke et al., 2012) and reduces credibility (Lhemezie et al., 2018).

Private governance

As discussed, certification standards can be understood as a form of private sector governance (Lambin & Thorlakson, 2018; Moberg, 2014). Consequently, this thesis aimed to contribute to the broader academic debate on the ability of private sector governance to realise sustainability objectives.

While some scholars argue that private sector governance is unable to successfully address sustainability challenges (Knill & Lehmkuhl, 2002), the findings of this research seem to suggest that private sector governance in the context of the RA certification standard has the potential to increase sustainability. However, as briefly touched upon above, some limitations inherent to private sector governance could be witnessed.

One of the limitations is related to the multiplicity of private sustainability standards. The proliferation of these standards can be related to the competitiveness that is inherent to private governance models (Mayer & Gereffi, 2010). Additionally, the question remains if private sector governance on its own can effectively address issues such as violence, extortion, and organised crime within the avocado sector, being part of complex and deeply rooted societal issues. Another limitation of private sector governance that was mentioned, is that much of the avocado production continues to take place outside of the private governance regime, as especially small farmers are not reached. This underlines how private actors are more limited in their capacity to ensure broad compliance to standards, as opposed to the better position of governments in this regard (Mayer & Gereffi, 2010).

However, private sector governance does not need to stand alone. As argued by Mayer & Gereffi (2010, p.20) ‘‘Although private regulation may be an important element of economic governance, it cannot and should not stand alone’’. The synergy between certification organisations and governments may lead to more progress as well as effective and stable results (Mayer & Gereffi, 2010).

10.2 Recommendations

Enhance inclusion and adoption

For a supply chain to be truly sustainable, inequalities within the supply chain must be confronted, to make sustainable production feasible for every producer (Jimenez, 2022). Therefore, continuous efforts are needed to include smallholder producers.

In practice, however, the standard is mostly adopted by larger producers, already performing better on sustainability challenges. It is particularly important that an organisation like RA is aware that the selectiveness of certification might contribute to increasing inequalities, pushing smaller farmers further into a disadvantaged position. Certification organisations should be sensitive to such potential unintended spill-over effects of their certification standard. As stated by the SDGs, to realise sustainable development 'no one must be left behind' (UN, 2015, p.7). Moreover, it is important that the standard is also adopted by producers with unsustainable farm practices, rather than only targeting those that are already on track. Taken together, it is key to enhance the inclusion of the certification standard.

To enhance inclusion, barriers to becoming certified should be minimised. The costs are a major barrier to certification, being relatively higher for smaller producers than for larger ones. With other commodities, RA Mexico has successfully realised minimising costs for smallholder producers by connecting them as suppliers to large importing companies and shifting the costs for certification from the grower to the companies. This mechanism could potentially take away the financial barriers to adopting the RA standard in the avocado sector as well. Additionally, the new 2020 standard includes the Sustainability Differential and Sustainability Investment. This is an extra price buyers must pay, which goes directly to the grower and should be used for implementation and continued adoption of the standard. While it is not exactly a profit, it does help in covering the costs of the implementation of the standard for producers and may therefore provide a solution for the financial barrier. Currently, the new standard is still in the transition phase (Rainforest Alliance, 2020b).

Increase knowledge among producers and consumers

Knowledge is another barrier to adopting certification. This study suggested that not every producer (fully) understands what certifications standards are and what the requirements entail. Underlying mechanisms of certification standards (often made by outsiders from the global North) and the necessity of audits may not be entirely clear to some producers, therefore viewing them as invasive. It is key to promote knowledge on certification in an understandable way. Furthermore, this study indicated that a barrier for producers is the difficulty in implementing the standards. As such, avocado producer organisations such as APEAJAL and APEAM could help producers to implement the standards. Moreover, producers should be involved in standard setting and decision-making, as they have key insights into the challenges to be faced. While some experts mentioned that producers have little power in the supply chain and the standards they must comply with to export their avocados, this could provide more voice to the producers.

> ''*This certification [RA] in avocado is completely new. And we are working with the certification company to teach them that the avocado is a different product than for instance coffee. You know, for almost all coffee has a Rainforest Alliance label. … In this commodity this certification is totally new, so that's why we have to work in partnership with the certification company to teach them how this commodity, how this product, how this produce works. So yeah, so the same rules that probably is applied to coffee cultivation is different to avocado. That's why we have to work in partnership, so that they can understand the avocado industry*.'' - Producer 1, interview, 2022

Moreover, increasing awareness of sustainable avocado cultivation among producers is of great importance, as this may help in underlining and understanding the necessity to produce more sustainably. Avocado cultivation is highly dependent on the perfect ecological circumstances. The environmental issues that it currently causes - such as land degradation, loss of biodiversity, and the loss of beneficial fauna for avocado production - threaten the cultivation of avocado in the long run (De la Tejera Hernández et al., 2013; Espinosa et al., 2009). Thus, producers have a vested interest in more sustainable avocado cultivation. Increasing awareness might contribute to an increased willingness among producers to invest in sustainable avocado cultivation. Besides certification companies, avocado producer organisations may be an important stakeholder in increasing awareness among producers.

> ''*The environment, it's very important for us because the avocado production depends on it. We have to maintain a certain range of temperatures. We also need water from the rain. And the forests, they help us with these topics. So we are aware we need to develop our industry in a sustainable way. And we are really interested in certifications that can validate the practices that the producers and packing houses are doing in this topic, sustainability*.'' - Avocado producer organisation, interview, 2022.

Besides increasing awareness among producers, consumer awareness of (un)sustainable avocado cultivation should be increased. The market demand plays an essential role in the uptake of certification standards (Junior et al., 2016; Oya et al., 2017). Awareness of sustainability issues can push consumers to opt for more sustainably produced commodities (Junior et al., 2016), and may thus increase the demand for sustainably produced avocados. This may also result in consumers' willingness to pay more for sustainable avocados, bringing the potential to ensure a price premium for producers selling certified avocados. This is supported by a recent study which found that consumer awareness of sustainability issues in the sector is low, while increased knowledge on such issues considerably contributes to the willingness of consumers to buy and pay more for sustainably produced avocados (Link, 2019). Increasing the demand for certified avocados would incentivise the adoption of certification standards among producers (Denvir et al, 2021). As such, Junior et al. (2016) stated that the effectiveness of certification standards is directly related to consumer interest regarding certified products. With more experienced certified products, such as cacao and coffee, we have seen increasing certification over time. This pressures other companies to sell sustainably produced

commodities as well (Jiménez, 2022). Taken together, there is a significant role for the consumer part of the supply chain. Once again, this emphasises the importance of translocality.

> *''Actually, you as an import market for avocado have a big power for how the things are done here in the orchards in Mexico. I believe when you purchase or buy something, you are not only buying a product, you are also voting of the way that product is produced, so that's very important too.''* - Avocado producer organisation, interview, 2022

Increased partnership

Lastly, partnerships and collaboration should be increased. Exploring how public governmental actors could become (more) involved to compensate for limitations in the capacity of private sustainability standards (i.e. improving regulation through legislation or fighting organised crime) might be an interesting direction to investigate (of course, the corruption in the Mexican governmental sector is something to be taken into consideration). Moreover, collaboration between the different certification companies is recommended, as the multiplicity of certification standards in the sector is demanding for producers and might be confusing for both producers and consumers. It is recommended to look for ways to combine – for example – certain standards or auditing processes.

> ''*I think that there's like, not only with the RA certification, but with all with all these other certifications, the added value that we are bringing it is very little and maybe RA certification, it is bringing some specific added value and global gap is bringing another one and organic is bringing another one, but I think that our producers and farmers are very tired of having 3, 5, 10, 15 different certifications. They just want to have one in where they can face all the different challenges that they have.*'' – RA, interview, 2022

Although it remains understudied how avocado cultivation, certification, and food security interact, the RA should be sensitive to the conversion of cultivation of traditional crops into avocado crops and the impact this might have on local food availability.

Implications for further research

Despite the small sample, this study offers valuable insights into certification within the Mexican avocado sector and provides a basis for further research. As in every research, there were limitations to this study, as discussed in greater detail in Chapter 3.3.

Due to the scope of this study, studying the complete RA ToC and its corresponding indicators was not feasible. Additionally, only direct outcomes of the RA ToC were evaluated. Future research could focus more on studying the complete ToC and the intermediate/long-term outcomes and impacts of the certification standard. To make a valuable claim about this, a large, random sample size and applying a robust counterfactual method and theory-based approach are recommended.

Future research should go into more in detail about the specific contribution of each standard towards more sustainability in the Mexican avocado sector. Additionally, further

investigations could go more in-depth into how the sustainability issues are addressed by the other certification standards. To overcome the barrier of not seeing the added value of the RA standard, its added value should also be further researched so it can be promoted among producers.

Lastly, as discussed above, more research is needed on how avocado expansion, certification, and food security interact.

11. Conclusion

This study underlined the importance of increasing sustainability in the Mexican avocado sector. This study is one of the first comprehensive evaluations of the contribution of certification in the avocado sector. The objectives of this thesis were twofold. First, to contribute to an increased understanding of the sustainability issues in the Mexican avocado sector. And second, to evaluate the contribution of RA certification in addressing these issues. The research question central in this thesis was: *How does the adoption and implementation of the Rainforest Alliance certification standard by avocado growers contribute to more sustainable outcomes at the farm level in the Mexican avocado sector?*

Through an extensive literature study, a survey, and interviews with experts, stakeholders, and producers, this study set out to answer the research question. First, this study has shown that there are considerable socioeconomic and environmental issues connected to unsustainable avocado cultivation. The contribution of RA certification in affecting farm practices related to these issues varies considerably between producers. Although the RA-certified producers in this study implement sustainable farm practices, this does not always seem to be the result of RA certification specifically. Other certification standards also seem to play a role in affecting such farm practices. Most sustainability issues in the sector are partly or fully addressed by the requirements of the RA certification standard (except for violence and extortion – which is an exceptional problem in the sector). Therefore, the certification scheme has the potential to contribute to more sustainability in the avocado sector. Nevertheless, its uptake is rather low and seems to be selective, mainly targeting larger producers that are already on track regarding sustainable practices. This limits the standard to achieve its full potential. Therefore, it is recommended to enhance inclusion and adoption of the standard by minimising the barriers and enhancing the motivations to adopt certification. Barriers producers experience to adopting certification are the costs, difficulty in implementing the standard, unfamiliarity with the standard, and strict requirements. For RA certification specifically, a barrier is limited market demand and producers might find adoption not profitable or might not see the added value of the standard. Motivations of producers to adopt a standard are increasing competitiveness and profits, access to new markets, buyers requiring standards, process control, and improving the quality of avocados as well as social and environmental practices in the orchards. Due to the increased interconnectedness between localities as a result of globalisation processes and the key role the market plays in the adoption of standards, the influence import countries have on production practices in the orchards should not be underestimated. More effort can be put into improving knowledge on (un)sustainable avocado cultivation and certification in producing as well as consuming countries. It is also recommended to increase partnerships between key stakeholders, such as different certification organisations, avocado producer organisations, public actors, and producers.

Thus, how the RA certification scheme contributes to more sustainable outcomes at the farm level differs considerably between producers, depending on the preceding adoption of similar standards. Among those not producing (fully) sustainably yet, it has great potential to increase sustainable outcomes. Effectively addressing the sustainability challenges might cause the

highly profitable industry to have a positive effect on the socioeconomic development in Mexico (Denvir et al., 2021). The findings of this study showed that certification could play an important role in this.

The findings of this study contribute in various ways to our understanding of certification in the avocado sector and lay the groundwork for further research herein. The importance of improving sustainability in the avocado sector is not limited to Mexico. Given that avocado production is rapidly expanding across the world, insights from this study should be used to guide sustainable avocado cultivation and prevent similar issues from happening in other localities.

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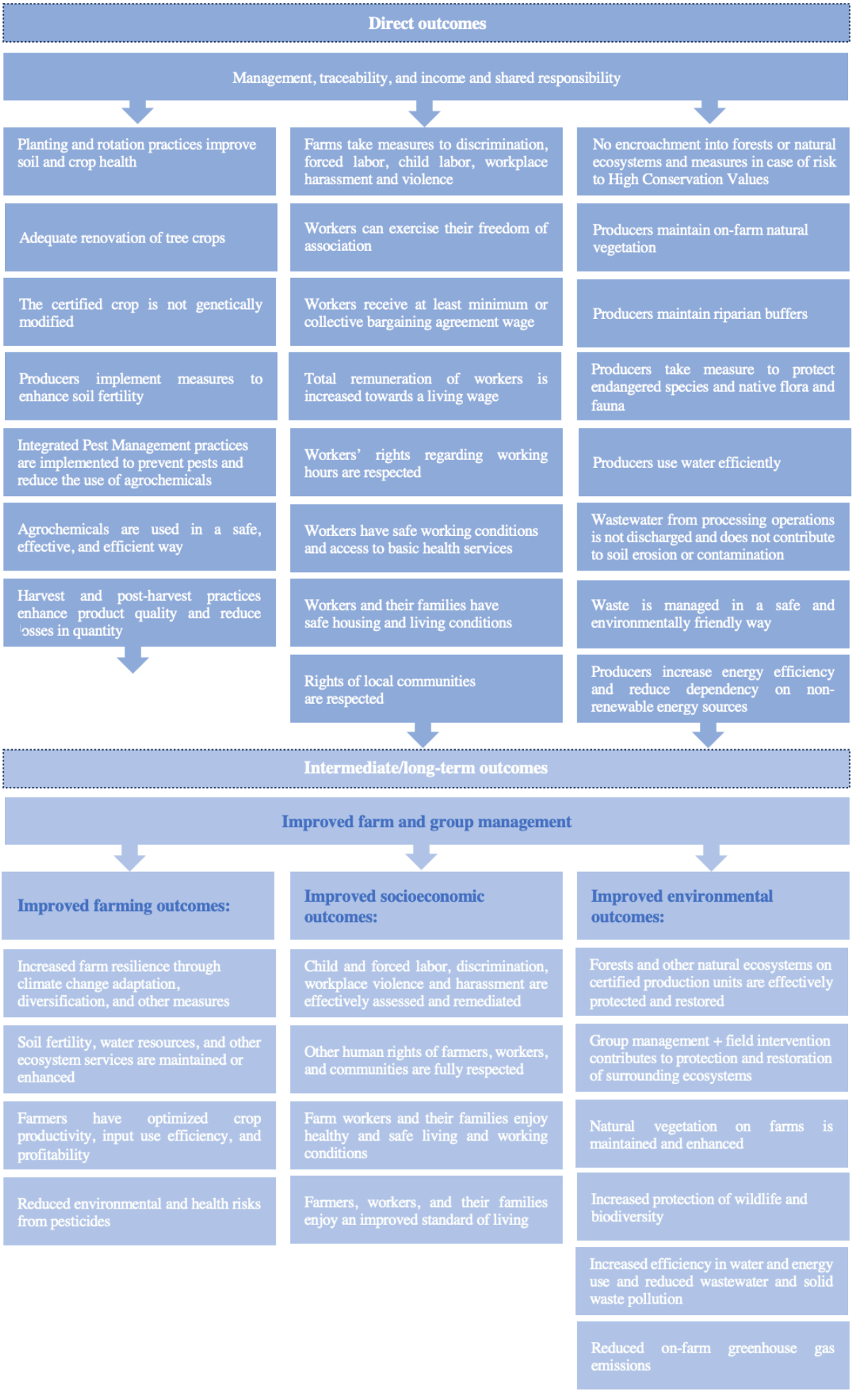
Appendices

Appendix A: RA ToC direct and intermediate/long-term outcomes

Detailed version of the Theory of Change of the direct and intermediate/long-term outcomes of the Rainforest Alliance certification program.


Direct outcomes
Management, traceability, and income and shared responsibility
Planting and rotation practices improve soil and crop health
Adequate renovation of tree crops
The certified crop is not genetically modified
Producers implement measures to enhance soil fertility
Integrated Pest Management practices are implemented to prevent pests and reduce the use of agrochemicals
Agrochemicals are used in a safe, effective, and efficient way
Harvest and post-harvest practices enhance product quality and reduce losses in quantity
Farms take measures to discrimination, forced labor, child labor, workplace harassment and violence
Workers can exercise their freedom of association
Workers receive at least minimum or collective bargaining agreement wage
Total remuneration of workers is increased towards a living wage
Workers' rights regarding working hours are respected
Workers have safe working conditions and access to basic health services
Workers and their families have safe housing and living conditions
Rights of local communities are respected
No encroachment into forests or natural ecosystems and measures in case of risk to High Conservation Values
Producers maintain on-farm natural vegetation
Producers maintain riparian buffers
Producers take measure to protect endangered species and native flora and fauna
Producers use water efficiently
Wastewater from processing operations is not discharged and does not contribute to soil erosion or contamination
Waste is managed in a safe and environmentally friendly way
Producers increase energy efficiency and reduce dependency on non-renewable energy sources
Intermediate/long-term outcomes
Improved farm and group management
Improved farming outcomes:
Increased farm resilience through climate change adaptation, diversification, and other measures
Soil fertility, water resources, and other ecosystem services are maintained or enhanced
Farmers have optimized crop productivity, input use efficiency, and profitability
Reduced environmental and health risks from pesticides
Improved socioeconomic outcomes:
Child and forced labor, discrimination, workplace violence and harassment are effectively assessed and remediated
Other human rights of farmers, workers, and communities are fully respected
Farm workers and their families enjoy healthy and safe living and working conditions
Farmers, workers, and their families enjoy an improved standard of living
Improved environmental outcomes:
Forests and other natural ecosystems on certified production units are effectively protected and restored
Group management + field intervention contributes to protection and restoration of surrounding ecosystems
Natural vegetation on farms is maintained and enhanced
Increased protection of wildlife and biodiversity
Increased efficiency in water and energy use and reduced wastewater and solid waste pollution
Reduced on-farm greenhouse gas emissions

Appendix B: Interview guide experts

My name is Anne Kuipers and I am a student of the master International Development Studies at Utrecht University in the Netherlands. I am conducting this research for my master's thesis.

The research is about socioeconomic and environmental sustainability impacts of avocado cultivation in Mexico and the contribution of Rainforest Alliance certification in making the sector more sustainable. The aim of this research is to get more insight into sustainable avocado cultivation.

The Rainforest Alliance helps me in facilitating this research and the final report and recommendations will be shared with the Rainforest Alliance. However, I do not work for the Rainforest Alliance and I do not represent the organisation.

The results of this research will be written down in a report, which will be uploaded in the Utrecht University thesis repository and will be made accessible to people that are interested. Everything that you tell me in this interview is confidential. This means that your name will not be disclosed and connected to any of the information you tell me. It will not be possible for others to trace answers back to you. The duration of the interview will be around 60 minutes. This interview is voluntary and you are free to stop the interview at any time and for any reason. It would be helpful for me to record the audio of this interview so that I can accurately remember what is being said exactly. This audio will not be shared with anyone and will be deleted once the research is completed. Do you agree if I record the audio of this interview? Are you willing to participate in the interview? Lastly, do you have any concerns or questions?

1. What do you think are the most pressing issues in the Mexican avocado sector?
    Probe: Illegal avocado cultivation, deforestation, land degradation, water scarcity, loss of biodiversity, flash floods, food insecurity, loss of land access, loss of livelihoods, loss of community cohesion, violence and extortion, poor working conditions, health issues, inequalities

2. In your experience, what are the socioeconomic impacts of avocado cultivation in Mexico?
    Probe: Food insecurity, loss of land access, loss of livelihoods, loss of community cohesion, violence and extortion, employment opportunities, poor working conditions, inequalities, health issues, water access

3. In your experience, what are the environmental impacts of avocado cultivation in Mexico?
    Probe: Deforestation, land degradation, water scarcity, loss of biodiversity, flash floods

4. Which actors do you think are the most powerful in the avocado supply chain?
    Probe: Growers, packers/processors, exporters, importers, retailers, consumers

5. What are the characteristics of the average avocado grower in Mexico?

Probe: Difference national/international market, land size, certifications, other crops, education level, gender, income diversification

6. What are major changes in recent years in the avocado sector/region?

Probe: Policies, exports, competition other countries, expansion

7. According to you, what changes would need to be made to the Mexican avocado sector to become more sustainable?

Probe: Why, how, by whom, certifications, policies, farming practices, community initiatives

8. What is your opinion about the role that certification can play in making the Mexican avocado sector more sustainable?

Probe: Possibilities, risks, specific certificates (e.g. Global G.A.P, Rainforest Alliance, Orgánico, GRASP, SMETA), advantages and disadvantages

9. How do you picture the future of avocado cultivation in Mexico?

Thank you for participating in this interview.

Appendix C: Interview guide RA-certified avocado producers

1. Introduction

My name is Anne Kuipers and I am a student of the master International Development Studies at Utrecht University in the Netherlands. I am conducting this research for my master's thesis.

The research is about socioeconomic and environmental impacts of avocado cultivation in Mexico and the contribution of Rainforest Alliance certification in making the sector more sustainable. The aim of this research is to get more insight in sustainable avocado cultivation.

The Rainforest Alliance helps me in facilitating this research and the final report and recommendations will be shared with the Rainforest Alliance. However, I do not work for the Rainforest Alliance and I do not represent the organisation. I am also not working for any other organisation. The identity and location of farms surveyed will not be disclosed in the report, nor to Rainforest Alliance or to auditing firms. This interview is for research purposes only.

The results of this research will be written down in a report, which will be uploaded in the Utrecht University thesis repository and will be made accessible to people that are interested. Everything that you tell me in this interview is confidential. This means that your name and the name of your farm will not be shared with anyone and will not be used in the research. It will not be possible for others to trace answers back to you and your farm. The duration of the interview will be around 60 minutes. This interview is voluntary and you are free to stop the interview at any time and for any reason. It would be helpful for me to record the audio of this interview, so that I can accurately remember what is being said exactly. This audio will not be shared with anyone and will be deleted once the research is completed. Do you agree if I record the audio of this interview? Are you willing to participate in the interview? Lastly, do you have any concerns or questions?

2. Background information

Position in farm:

Probe: Owner, manager

Size farm (in hectares):

Production hectares (avocado):

3. Opening questions

1. How long have you been an avocado producer?
2. Why did you become an avocado producer?
3. What did you do before cultivating avocados?

   Probe: For how long
4. Do you have any other certification(s) next to the Rainforest Alliance certification?

   Probe: Which, since when, why
5. How did you learn about the Rainforest Alliance certification?

4. Key questions

Perceptions

6. Why did you choose to adopt the Rainforest Alliance certification standard?

    Probe: Improve market access, improve environmental practices, increase competitiveness, higher profits, external pressures (by whom? e.g. packing houses, exporters, farm organisations, retailers, consumers).

7. In your experience, what are the benefits of having a Rainforest Alliance certificate?

    Probe: Improved market access, better farming practices, higher yields, increased competitiveness, higher profits

8. In your experience, what are the challenges of implementing the Rainforest Alliance Sustainable Agriculture Standard?

    Probe: Costs, specific parts of the Sustainable Agriculture Standard, understanding the standard why, how overcome

9. What kind of changes did you have to make to your farm operations to become Rainforest Alliance certified?

    Probe: E.g. changes in administration, pruning, conservation, water management, safety, waste management, agrochemical use, working conditions, etc.

10. **In case the farmer also has other certification(s):** What kind of changes did you have to make to your farm operations to adopt the other certification standard(s)?

    Probe: How differ from RA, additional changes to adopt RA

11. **In case the farmer also has other certification(s):** What is your opinion about the Rainforest Alliance certification in comparison to the other certification(s) that you have adopted?

Plant variety

13. Do you cultivate other crops than avocado?

    Probe: Which, how many

14: Are there other trees or plants than avocado trees on your farm?

    Probe: Which, how many

15. Do you have more, less, or the same number of different plants, trees, and crops on your farm compared to before your farm became RA certified?

    Probe: Why, which

16. Do you have more, less, or the same amount of avocado trees compared to before your farm became RA certified?

Water use

17. Did you implement any changes in farm practices regarding the use of water since you became RA certified?

    Probe: What kind of changes, how, why

18. Do you use irrigation for cultivating avocados?

19. Do you record the amount of water used for irrigation?

20. Do you use any measures to lower water use?

    Probe: How?

21. Where does the water used for cultivating avocados on your farm come from?

Probe: Groundwater, water wells, harvested rainwater, difference before RA certified

22. Do you use more, less, or the same amount of water for cultivating avocados compared to before your farm became RA certified?

Probe: Compared to changes in production (expansion or contraction)

Soil

23. Did you implement any changes in farm practices regarding the soils of your farm since you became RA certified?

Probe: What kind of changes, how, why

24. Do you conduct soil assessments?

25. Do you notice any problems in soil fertility on your farm?

26. Do you implement any measures to improve soil fertility?

Probe: How, crop rotation, intercropping, fertilizer

27. Do you think that the soil fertility of your farm has improved, stayed similar, or became worse compared to before your farm became RA certified?

Probe: In how far result of RA certification

Fertilizer use

28. Do you apply fertilizer on your farm?

If yes:

29. Did you implement any changes in farm practices regarding the use of fertilizer since you became RA certified?

Probe: What kind of changes, how, why

30. What kind of fertilizer do you apply on your farm?

Probe: Organic, chemical

31. Do you use more, less, or the same amount of fertilizer compared to before your farm became RA certified?

Pesticide use

32. Do you apply pesticides on your farm?

Probe: For which pests

If yes:

33. Did you implement any changes in farm practices regarding the use of pesticides since you became RA certified?

Probe: What kind of changes, how, why

34. Is the personnel trained in applying pesticides?

Probe: How

35. How are pesticides stored?

36. Do you apply more, less, or the same amount of pesticides compared to before your farm became RA certified?

Personal protective equipment (PPE) use

37. Is PPE being used during the application of agrochemicals?

Probe: What kind

If yes:

38. Did you implement any changes regarding the use of PPE since you became RA certified?
    Probe: What kind of changes, how, why
39. How can workers get access to PPE?
    Probe: Bring themselves, offered by company, offered free of charge
40. Is more, less, or the same amount of PPE used compared to before your farm became RA certified?

Workers

41. Did you implement any changes related to workers, working conditions, contracts and/or wages since you became RA certified?
    Probe: What kind of changes, how, why
42. Can you tell me a bit about the workers on your farm?
    Probe: How many, contracted, subcontracted, permanent, seasonal, temporary, day-labourers, via labour provider, friends, family members

Wages

43. In what way are your workers being paid?
    Probe: By piece-rate, by working hours, per day
44. What is the average wage workers receive on your farm for one hour/day of work or for cutting one kg avocado?
    Probe: Difference between functions
45. Is the average wage workers receive on your farm more, less, or the same compared to before your farm became RA certified?

Working hours

46. How many hours a day do workers on your farm work on average?
    Probe: Depending on season
47. How many days a week do workers on your farm work on average?
48. Did the average working hours of workers on your farm become more, less, or stayed the same compared to before your farm became RA certified?

Land rights

49. What was the land used before you started cultivating avocados?
    Probe: Ejido, agricultural land, forest, how long ago

Supply chain relations

50. For how many pesos do you generally sell one kg of avocados?
    Probe: Depending on season, quality, time of year, market-changes
51. How is the price you get for your avocado set?
    Probe: By whom, opinion on price-setting mechanism and price, what influences the price, impact certification(s) on price
52. Are the avocados of your farm exported?
    Probe: To where

53. Which actors do you think are the most powerful in the avocado supply chain?
    Probe: Growers, packers/processors, exporters, importers, retailers, consumers, why, where are most profits being made
54. How important is it for your buyers that your avocados are certified?
    Probe: Which aspects of certification (quality, social, environmental, management and ethics), specific certification standards (Global G.A.P., GRASP, Rainforest Alliance, SMETA, etc.)
55. What is the most important factor for buyers to buy avocado?
    Probe: Price, quality, sustainability, good social practices, good environmental practices, certification

5. Closing questions

56. In your experience, what are the major challenges of the avocado sector in Mexico?
    Probe: Power differences in supply chain, price-setting mechanisms, climate change, competition other counties, deforestation, land degradation, water scarcity, land scarcity, health issues, violence and extortion, inequalities

57. What changes would you like to see in the avocado supply chain and the sector?

58. How do you picture the future of your farm?
    Probe: Size, profitability, markets

59. Is there anything you would like to add?

Thank you for participating in this interview.

Appendix D: Survey

Encuesta aguacate

Hola,

Gracias por su interés en esta investigación. Sus opiniones y experiencias son de gran importancia.

Me llamo Anne Kuipers y soy estudiante del máster Estudios de Desarrollo Internacional de la Universidad de Utrecht, en los Países Bajos. Para mi tesis de maestría, estoy realizando una investigación sobre los impactos socioeconómicos y ambientales del cultivo del aguacate en México y la contribución de la certificación de Rainforest Alliance para hacer el sector más sostenible. El objetivo de esta investigación es conocer el cultivo sostenible del aguacate en México.

Completar esta encuesta le llevará aproximadamente de 3 a 5 minutos. La encuesta es anónima, lo que significa que no se obtienen datos de identificación y no será posible rastrear las respuestas hasta usted y su(s) huerta(s) y/o empresa.

Los resultados finales, anónimos, de esta investigación serán escritos en un informe que se resguardará en el repositorio de tesis de la Universidad de Utrecht y se pondrá a disposición de las personas interesadas. Es importante señalar que no trabajo para Rainforest Alliance ni para ninguna otra organización. La encuesta se realizará únicamente con fines de investigación.

La participación en esta investigación es voluntaria, lo que significa que puede retirar su participación en cualquier momento y por cualquier motivo.

Si tiene alguna pregunta, puede ponerse en contacto conmigo en a.kuipers1@students.uu.nl

- ○ Acepto participar en esta investigación

Q1 ¿Cuántas huerta(s) tiene y cuál es su tamaño?

- ○ Número de huerta(s) _____
- ○ Tamaño total de las huertas (en hectáreas) _____

Q2 ¿Dónde su ubican su(s) huerta(s) de aguacate? (son posibles varias respuestas)

- [ ] Jalisco
- [ ] Michoacán
- [ ] Estado de México
- [ ] Nayarit
- [ ] Morelos
- [ ] Guerrero
- [ ] Otras: _____

Page Break

Q3 ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP, Rainforest Alliance, Orgánico, u otras)

- ○ No
- ○ Sí

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q4 ¿Qué norma(s) de certificación ha adoptado? ¿Desde cuándo? (son posibles varias respuestas)

- ☐ Global G.A.P., desde _____
- ☐ GRASP, desde _____
- ☐ SMETA, desde _____
- ☐ Rainforest Alliance, desde _____
- ☐ Orgánico, desde _____
- ☐ Otros, a saber, desde: _____

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q5 ¿Qué importancia tuvieron para usted las siguientes razones a la hora de decidirse a adoptar la(s) norma(s) de certificación?

	Nada importante	Ligeramente importante	Moderadamente importante	Importante	Muy importante
Para mejorar las prácticas medioambientales	○	○	○	○	○
Para mejorar las prácticas sociales (por ejemplo, las condiciones de trabajo)	○	○	○	○	○
Para mejorar la calidad	○	○	○	○	○
Para aumentar la competitividad	○	○	○	○	○
Para aumentar las ganancias	○	○	○	○	○
Para acessar neuvos mercados	○	○	○	○	○
Porque los compradores/países importadores lo exigían	○	○	○	○	○

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q6 ¿Hay alguna otra razón por la que haya adoptado la(s) norma(s) de certificación?

○ No

○ Sí, por qué: _____

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

And ¿Qué norma(s) de certificación ha adoptado? ¿Desde cuándo? (son posibles varias respuestas) != Rainforest Alliance, desde = not selected

Q7 Seleccione que tan de acuerdo está sobre las siguientes razones para no adoptar la norma de certificación de Rainforest Alliance.

No he adoptado la norma de certificación de Rainforest Alliance porque:

	Totalmente en desacuerdo	Desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Totalmente de acuerdo
No conozco la norma de Rainforest Alliance	○	○	○	○	○
Los costos son demasiado elevados para mí	○	○	○	○	○
La norma me resulta difícil de aplicar	○	○	○	○	○
Los requisitos son demasiado estrictos para mí	○	○	○	○	○
No le veo valor adicional	○	○	○	○	○
No es rentable para mí	○	○	○	○	○

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

And ¿Qué norma(s) de certificación ha adoptado? ¿Desde cuándo? (son posibles varias respuestas) != Rainforest Alliance, desde = not selected

Q8 ¿Hay alguna otra razón por la que no haya adoptado la norma de certificación de Rainforest Alliance?

- ○ No
- ○ Sí, por qué: _____

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = No

Q9 Seleccione que tan de acuerdo está sobre las siguientes razones para no adoptar una norma de certificación.

No he adoptado una norma de certificación porque:

	Totalmente en desacuerdo	Desacuerdo	Ni de acuerdo ni en desacuerdo	De acuerdo	Totalmente de acuerdo
No entiendo bien qué son las normas de certificación	○	○	○	○	○
Los costos son demasiado elevados para mí	○	○	○	○	○
Me resultan difíciles de aplicar	○	○	○	○	○
Los requisitos	○	○	○	○	○

son demasiado estrictos para mí					
No le veo valor	○	○	○	○	○
No es rentable para mí	○	○	○	○	○

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = No

Q10 ¿Hay alguna otra razón por la que no haya adoptado una norma de certificación?

○ No

○ Sí, por qué: _____

Page Break

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

And ¿Qué norma(s) de certificación ha adoptado? ¿Desde cuándo? (son posibles varias respuestas) != Rainforest Alliance, desde = not selected

Q11 Qué prácticas de manejo Ud. ha cambiado para obtener la(s) certificación(es)? (son posibles varias respuestas)

- [ ] No tuve que cambiar nada / Ya cumplía con los requisitos
- [ ] Cambios en el uso del agua
- [ ] Cambios en las condiciones de trabajo
- [ ] Cambios en la cantidad de árboles y/o plantas diferentes en el huerto
- [ ] Cambios en las prácticas del suelo (por ejemplo cultivos intercalados, rotación de cultivos, análisis de suelo)
- [ ] Cambios en el uso de fertilizantes
- [ ] Cambios en el uso de plaguicidas
- [ ] Cambios en el uso de los equipos de protección
- [ ] Llevar registros de ciertas actividades
- [ ] Practicas de conservación ambiental
- [ ] Otras: _____

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

And ¿Qué norma(s) de certificación ha adoptado? ¿Desde cuándo? (son posibles varias respuestas) = Rainforest Alliance, desde

Q12 Qué prácticas de manejo Ud. ha cambiado para obtener la certificación de Rainforest Alliance? (son posibles varias respuestas)

- ☐ No tuve que cambiar nada / Ya cumplía con los requisitos
- ☐ Cambios en el uso del agua
- ☐ Cambios en las condiciones de trabajo
- ☐ Cambios en la cantidad de árboles y/o plantas diferentes en el huerto
- ☐ Cambios en las prácticas del suelo (por ejemplo cultivos intercalados, rotación de cultivos, análisis de suelo)
- ☐ Cambios en el uso de fertilizantes
- ☐ Cambios en el uso de plaguicidas
- ☐ Cambios en el uso de los equipos de protección
- ☐ Llevar registros de ciertas actividades
- ☐ Practicas de conservación ambiental
- ☐ Otras: _____

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

And ¿Qué norma(s) de certificación ha adoptado? ¿Desde cuándo? (son posibles varias respuestas) = Rainforest Alliance, desde

Las siguientes preguntas se refieren específicamente a la <u>certificación de Rainforest Alliance</u>

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q13 ¿Hay más, menos o iqual cantidad de árboles de aguacate en la(s) huerta(s) en comparación con antes de que la(s) huerta(s) se certificara?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q14 Además de los árboles de aguacate, ¿hay más, menos o iqual número de plantas, árboles y cultivos diferentes en la(s) huerta(s) en comparación con antes de que la(s) huerta(s) se certificara?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q15 ¿Utiliza más, menos o iqual cantidad de agua para el cultivo de aguacates en comparación con la que utilizaba antes de que la(s) huerta(s) obtuvieran la certificación?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q16 ¿Utiliza más, menos o igual cantidad de medidas para mejorar la fertilidad del suelo en la(s) huerta(s) en comparación con antes de que la(s) huerta(s) obtuvieran la certificación?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q17 ¿Utiliza más, menos o igual cantidad de fertilizante que antes de que la(s) huerta(s) obtuvieran la certificación?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q18 ¿Aplica más, menos o igual cantidad de plaguicidas que antes de la certificación de la(s) huertas?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q19 ¿Utiliza más, menos o igual cantidad de equipos de protección cuando aplica productos agroquímicos en comparación con los que utilizaba antes de que la(s) huerta(s) obtuvieran la certificación?

- ○ Más
- ○ Menos
- ○ Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q20 ¿La jornada de trabajo promedio de los trabajadores de la huerta ha cambiado en comparación con antes de que la(s) huerta(s) obtuvieran la certificación?

- ○ Se ha vuelto más larga (más horas)
- ○ Se ha reducido (menos horas)
- ○ Sigue Igual

Display This Question:

If ¿Ha adoptado alguna norma de certificación en la(s) huerta(s)? (Por ejemplo; Global G.A.P., GRASP... = Sí

Q21 ¿El salario promedio que reciben los trabajadores en la(s) huerta(s) es más alto, más bajo o igual que antes de la certificación de la(s) huerta(s)?

- ○ Más alto
- ○ Más bajo
- ○ Igual

Page Break

Q22 ¿Qué uso tenía el suelo de la huerta antes de convertirse al cultivo de aguacate? (son posibles varias respuestas)

- [ ] Otros cultivos (por ejemplo maíz, trigo, bayas u otros)
- [ ] Forestal
- [ ] Actividades pecuarias
- [ ] No sé
- [ ] Otras: _____

Q23 ¿Qué tipo de propiedad tiene(n) su(s) huerta(s)?

- [ ] Propiedad privada
- [ ] Propiedad ejidal
- [ ] Propiedad comunal
- [ ] No sé

Q24 Según su experiencia, ¿cuáles son los principales retos del sector del aguacate en México?

_____

_____

_____

_____

Q25 ¿Cuál es su posición en la huerta/empresa?

_____

Q26 ¿Cuál es su nivel de educación?

- ○ Educación Basica
- ○ Educación Média Superior
- ○ Educación Superior
- ○ No he ido a la escuela
- ○ Prefiero no decir
- ○ Otras: _____

Q27 ¿Hay algo que le gustaría añadir?

- ○ No
- ○ Sí: _____

End of Block: Default Question Block