



CONTRIBUTION OF SHORTER VALUE CHAINS IN AGROFORESTRY PRODUCTS TO A GREEN  
ECONOMY IN THE RIMBA CORRIDOR OF SUMATRA, INDONESIA.

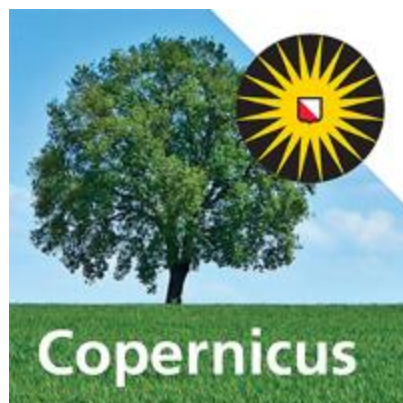
- A STUDY ABOUT THE CINNAMON VALUE CHAIN -

MASTER THESIS BY LISANNE ZOET



# MASTER THESIS

Student	Lisanne Zoet
Student number	5567734
Email address	L.N.Zoet@students.uu.nl
Program	Sustainable Development
Track	International Development
Support	Utrecht University, Faculty of Geosciences Copernicus Institute for Sustainable Development
Supervisors	R. Verburg R.W.Verburg@uu.nl  A.C.W. van Westen A.C.W.vanwesten@uu.nl
Second reader	M. Leung W.H.M. Leung@uu.nl
Host organization	World Wide Fund for Nature Indonesia
Address	Graha Simatupang Tower 2 Unit C Lt 7 <sup>th</sup> -11 <sup>th</sup> Jalan Tahi Bonar Simatupang, Jakarta, Indonesia
Supervisor	Sigid Ariyanto sariyanto.wwf.id
Front page photo	Cinnamon as curled bark in hand. On the background cinnamon before processing.



**Universiteit Utrecht**  
*Faculty of Geosciences*

# SUMMARY

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WF Indonesia is aiming to create a green economy region on Sumatra, Indonesia as a reaction on deforestation by means of the RIMBA corridor. A green economy can be reached by improved livelihood assets, such as income, and improved environmental possibilities, such as improving land fertility. An agroforestry system accomplishes both. However, agroforestry products are not always popular for farmers because of the low prices and long waiting time for harvest. Cinnamon is such an example. With cinnamon, one reason for the low prices is the long value chain with several middlemen making profit and therefore not returning a fair price to the farmer. To create better prices, some companies have started to shorten the value chain while adding value through certification. This research aims to find out whether such a shortened value chain contributes to a green economy by comparing the livelihood assets and inputs of farmers of both value chains while involving several stakeholders. A mixed method approach was used to collect the data by using interviews, surveys, observations, and reviewing documents. Several villages were selected in the province of Jambi, in the districts of Kerinci and Merangin. Findings show that a shortened value chain offers higher cinnamon prices to the farmers through less middlemen and adding value by local processing and organic certification. Furthermore, the amount of knowledge farmers have about the value chain and organic farming is better when connected to a company through a shortened value chain. The government is trying to reach these farmers as well, but since cinnamon farmers are often not part of a farmers cooperative, it is hard to reach them. The key findings show that a shortened cinnamon value chain does not eradicate middlemen, but uses them to become part of the system. Also, farmers use less chemical fertilizers and pesticides when they got training in organic farming. However, not all companies within a shortened value chain give training, which shows that there are also differences within a value chain.

# PREFACE

**B**efore you lies my thesis on the contribution of a shortened cinnamon value chain to a green economy. It is a final product of fieldwork in Indonesia, on the island of Sumatra, and literature research. The research is conducted independently and contributes to the fulfillment of requirements of the Sustainable Development master program at Utrecht University and the RIMBA project of WWF.

Conducting the field research offered new insights in how Indonesian farmers think and the choices they make while living so close to nature with their land as their most valuable asset. This is a great comparison to consumers in the Netherlands. Through this thesis, I hope to inspire readers that even for spices of which we use only small amounts to make our food tastier, there are people on the other side of the world who make their living out of these products. Besides, these products also have a gigantic impact on the environment, and whether you choose to buy organic or non-organic cinnamon truly makes a difference in people's natural assets somewhere else. I also hope to provide recommendations policymakers and stakeholders can use to act differently.

I am very thankful for this trip to Indonesia, the country of my roots. First of all, I am thankful to René Verburg and Guus van Westen, for taking the time to read my drafts, and sending useful insights and feedback, and therefore making my thesis only better. Further I would like to thank all the staff of the WWF RIMBA project, in particular Sigid Ariyanto and Barano Sulistyawan, making this research possible. Special thanks to Pak non (Musnardi Moenir) for being a true key respondent and for the trips to the farmers and the surroundings of Kerinci. Finally, I want to thank my family and friends for the support. This thesis is the result of all of those, who have supported and contributed to it.

Terima kasih,

*May 1<sup>st</sup>, 2017.*

Lisanne Zoet.

*Utrecht, the Netherlands*

# ACRONYMS

IDR	Indonesian Rupiah
KPH	Kesatuan Pemangkuan Hutan
OECD	Organization for Economic Co-operation and Development
SLA	Sustainable Livelihood Analysis
TNKS	Taman Nasional Kerinci Seblat
UN	United Nations
UNDP	United Nations Development Program
VC	Value Chain
VCA	Value Chain Analysis
WWF	World Wide Fund for Nature

# TABLE OF CONTENTS

Summary	4
Preface	5
Acronyms	6
Table of Contents	7
List of figures	9
List of tables	10
1. Introduction	11
1.1 Thesis outline	15
2. Theory	16
2.1 Green economy	17
2.2 Sustainable livelihoods	20
2.3 Agroforestry	23
2.4 Value Chains	25
3. Regional context	31
3.1 Importance of cinnamon	32
3.2 Kerinci Seblat National Park	33
3.3 The cinnamon production	34
3.4 Stakeholders in the cinnamon value chain	36
4. Methodology	38
4.1 Conceptual framework	39
4.2 Explanation conceptual framework	39
4.3 Operationalization	41
4.4 Methods	41
4.5 Data collection	42
4.6 Research site	44
4.7 Respondents	44
4.8 Data analysis	44
4.9 Reliability and validity	45
4.10 Limitations and risks	45
4.11 Ethical considerations	46
5. Results	47
5.1 Completion of cinnamon in an agroforestry system to a green economy	48
5.1.1 Conclusion	51
5.2 Local value chain	52
5.2.1 Regular value chain	52

5.2.2 Shortened value chain	54
5.2.3 Conclusion	56
5.3 Farmers and their livelihoods	57
5.3.1 General household characteristics	57
5.3.2 Natural capital	58
5.3.3 Human capital	66
5.3.4 Physical capital	69
5.3.5 Financial capital	70
5.3.6 Social capital	74
5.4 Policies influences on cinnamon value chain	80
5.4.1 Policies integration in cinnamon value chain	80
5.4.2 National park policies	82
5.4.3 Strategy for green growth	82
5.4.4 Conclusion	83
6. Conclusions	84
7. Discussion	88
7.1 Recommendations	92
8. Bibliography	93
9. Appendices	98
Appendix 1. SPSS Output Anova	98
Appendix 2. Survey example	100
Appendix 3. Complete value chain in Indonesian spices	107
Appendix 4. Cinnamon production process	107
Appendix 5. Concession holder system	109



# LIST OF FIGURES

Figure 1	Map RIMBA corridor all clusters.	12
Figure 2	The research area.	13
Figure 3	OECD Green Growth measurement framework.	17
Figure 4	Green Growth indicator groups and themes.	18
Figure 5	Indicators Green Economy.	19
Figure 6	Sustainable rural livelihoods: a framework for analysis	20
Figure 7	Indicators Sustainable Livelihood Framework.	22
Figure 8	Spatial scales of various ecosystem services provided by agroforestry systems.	23
Figure 9	Indicators of an agroforestry system.	24
Figure 10	Six dimensions of the GVC analysis.	25
Figure 11	Five global value chain governance types.	27
Figure 12	Five categories of upgrading.	27
Figure 13	Model for smallholder inclusion in agro-food chains	29
Figure 14	Indicators of Value Chain Analysis.	29
Figure 15	Global production of cinnamon, 2012-2013	33
Figure 16	Forest encroachment in the research area	33
Figure 17	cinnamon sorted and dried by quality.	34
Figure 18	landslide on the road in Kerinci District.	35
Figure 19	Schematic presentation of the agroforestry and land-use pattern in the research area	35
Figure 20	The value chain of spices	36
Figure 21	Indicative price breakdown of cinnamon	36
Figure 22	The cinnamon value chain in the research area.	37
Figure 23	Conceptual framework.	39
Figure 24	survey with farmers Cassia Co-op.	43
Figure 25	survey with farmers of regular value chain in Merangin.	43
Figure 25	The villages participated in the survey.	44
Figure 26	Cinnamon agroforestry with coffee.	50
Figure 27	Coffee plantation with cinnamon trees	50
Figure 28	House of local collector of Cassia Co-op.	55
Figure 29	Reasons for coffee	59
Figure 30	Reasons for cinnamon	59
Figure 31	Amount of pesticides per group	61
Figure 32	Amount of fertilizers per group	61
Figure 33	Knowledge of farming	66
Figure 34	Knowledge of the supply chain	67
Figure 35	Prices of cinnamon and coffee	72
Figure 36	Expenditure from income	74

# LIST OF TABLES

Table 1	Qualities of cinnamon bark	34
Table 2	operationalization sub questions	41
Table 3	interviews; institute, subjects, amount, and the main interviewee(s).	43
Table 4	Main characteristics value chains	56
Table 5	Anova test with post-hoc Dunnett test for land hectare and amount of lands	58
Table 6	Amount of farmers who own lands	59
Table 7	Anova for amount of crops, household crops, and market crops	60
Table 8	Amount of pesticides and fertilizers per group.	62
Table 9	Use of natural resources per group	63
Table 10	Chi-square test for pesticides and fertilizers	65
Table 11	Amount of farmer households with labor on farming land	68
Table 12	Amount of farmer households with family working on farming land	69
Table 13	Amount of work on farming land	69
Table 14	Anova with post-hoc Dunnett test for income and income % from farming	71
Table 15	Anova with post-hoc Dunnett test for cinnamon price and coffee price	73
Table 16	Farmer organizes with other farmers, four groups compared	75
Table 17	Farmer work together with other farmers,	76
Table 18	square test for pesticides and fertilizers	77
Table 19	Comparison of variables pesticides, fertilizers, soil fertility, and training	78
Table 20	Comparison of variables knowledge value chain, price cinnamon, and income	79

# 1. INTRODUCTION

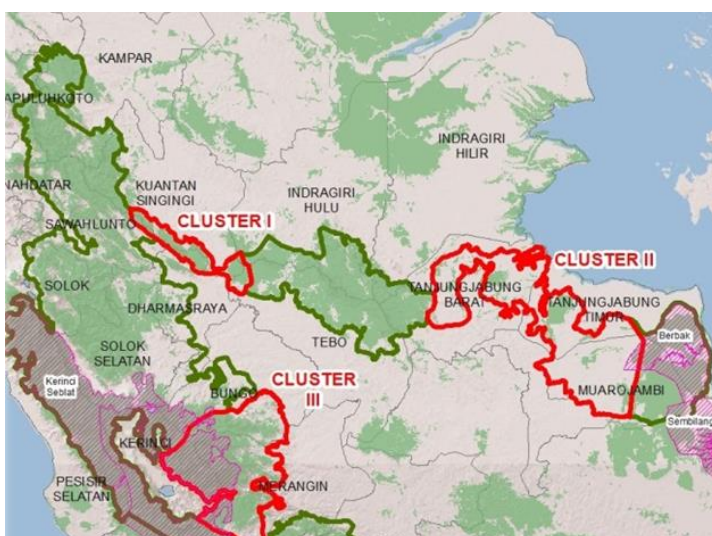




At the moment Indonesia experiences one of the world's highest deforestation rates, second only to Brazil (FAO 2001, 2006a, Hansen et al 2008b, 2009). Besides high biodiversity losses due to deforestation, almost 65 million people (about 27% of the Indonesian population) will lose their livelihood assets if this continues (FWI/GWF 2002). Especially conversion into agriculture and human encroachment has caused such a loss of natural capital that the future options for communities to sustain and grow their livelihoods is seriously threatened and severely degraded. Within Indonesia, Sumatra stands out due to the intensive forest clearings that has resulted in the conversion of 70% of the island's forested area by 2010 (Margono et al., 2012). To counteract further deforestation pressures with the connected biodiversity loss and degradation of environmental services, the Indonesian government has agreed on a plan on green economic development in several conservationist areas at Sumatra, project RIMBA, that should strengthen community livelihoods and enhance forest ecosystem connectivity (WWF TOR, 2016). This should lead to the maintenance of important ecosystem services which will give long term sustainable economic results for the region. The aim of the RIMBA Project is to connect protected areas and production landscapes identified by the Indonesian government as the RIMBA Corridor with the stated objective of improving ecosystem integrity and creating business opportunities resulting from the use of ecological practices in the agriculture and agroforestry sector, supporting the growth of eco-tourism and curbing negative trends of land and environmental overexploitation. Working closely in support of government programs at all levels, and across the main land use sectors, the project aims to restore the natural capital of the region within three investment clusters totaling an area of 1,235,822 hectares, as the basis for a sustainable green economy (WWF TOR, 2016).

This thesis will focus on cluster three, one of the three clusters, located in the districts of Merangin and Kerinci in the Jambi Province neighboring the Kerinci National Park in the west (see figure 1). Cluster three covers an area of 555,000 hectares of which an estimated 365,500 hectares is upland natural forest most of which is still in primary condition. The amount of hectare degraded forest is 36,000 including plantations and a further 118,000 hectare lies outside the national forest estate. The large areas of primary and secondary forest continue to provide core habitat for important native species.

**Figure 1** Map RIMBA corridor all 3 clusters (WWF TOR)



The goal of cluster three of the RIMBA project is to reverse deforestation in critical upland watersheds through transformational change for local economic development through agroforestry along the Kerinci and Merangin district border. Agroforestry is a collective name for land use systems where plants such as trees or bamboo are deliberately planted on the same land plot where crops and sometimes livestock are combined. Agroforestry is important for the western part of the Jambi province (see figure 2), used for covering slopes between the village and the forest reserve as protection for landslides (Michon et al, 1986). Agroforestry is promoted as a solution to the development of more sustainable land uses (Michon et al, 1986; Gouyon et al., 1993; Murniati et al., 2001). These systems are often applauded for their biodiversity conservation value, while improving farmers' livelihoods by increasing overall productivity, profitability and sustainability (Atangana et al., 2014 in Jezeer & Verweij, 2015). Dahlquist et al notice that agroforestry practices improve household food security by having a diversified range of crops while improving the quality of the soil (Dahlquist et al., 2007). Research also found that smallholders focusing on mixed agriculture are less dependent on forest resources, not irrelevant for this area close to a national park (Murniati et al., 2001).

Cinnamon trees<sup>1</sup> fit in an agroforestry system since it does not need much labor and is therefore suited to be combined with other more labor intensive crops (Michon et al., 1986). For harvesting cinnamon, only the bark is needed. In some cases, the branches are enough, while in other cases the tree needs to be chopped. In any case, the roots of the cinnamon tree stay in the ground which stabilizes the soil which is crucial in a hilly area where landslides are common while protecting the villages and watersheds (Jose, 2009). The tree trunk can be used as firewood and the leaves for fertilizer. Besides this, cinnamon is often produced organically in this area, since cinnamon grows easily without any pesticides or fertilizer. Also, the EU market demand for cinnamon increases in the coming years which will enhance opportunities for smallholders in this area since more than 85% of the world's cinnamon originates from Kerinci in Jambi, Sumatra (Cassia Coop, 2017).

However, agroforestry products are not always popular for farmers because agroforestry crops do not always have the best prices and need a relative long time to develop a profitable price. Therefore, diverse agroforestry systems compete with profitable and short-term monoculture cash crop (Dahlquist et al., 2007). For cinnamon, one reason for the low prices is the long value chain which includes many intermediates, as spices produced by smallholders are traded by different intermediates at local, national and international levels (Pascale and van Opijnen, 2010, Boomsma and Mangnus, 2011). Due to these long value chains, the profits of smallholders are constrained by weak market linkages between smallholders and exporters since the middlemen also try to make a profit, mostly at the expense of the farmers' profit. Only in the local part of the value chain already are several middlemen active, mostly because farmers are dependent on them for transport for example. Farmers who do not receive a fair price will remain dependent on these middlemen, ending with an increasing amount of farmers changing to cash crops. Changing to other crops, or other sources of income such as off-farm labor or migration to another area could also contribute to farmers' livelihoods. Hence, with these solutions qualities of an agroforestry system might be jeopardized. Also, cinnamon is important for this area's economy and as

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<sup>1</sup> The Indonesian cinnamon, or as the Indonesians call it *kayu manis* [ind.], "sweet wood", or *kulit manis* [ind.], "sweet bark (skin)", is also known as the botanical term *cassia vera*, and part of the *cinnamomum burmannii blum* species (internal communication Cassia Co-op).

protection from landslides. More about the importance of cinnamon will be said in the regional context chapter. To continue agroforestry systems with products such as cinnamon, another solution has been offered. In the province of Jambi, a few companies are aiming to shorten the cinnamon value chain, through cutting out the middlemen and therefore giving the farmer a better price and more empowerment than with a regular value chain. At the same time value is being added by certifying the cinnamon and by processing the cinnamon locally. As a result, the farmer should be more willing to continue with the cinnamon trees while improving their livelihoods assets as well as environmental conditions. These are both indicators of a green economy, which is the aim of the RIMBA corridor.

This research examines the effects of these shortened value chains through comparing farmer households of a shortened value chain with a regular value chain while looking at the livelihood and environmental assets. The shortened value chain is defined as a value chain where the farmers have direct contact to the company which exports the cinnamon. The research problem is, more specific, that agroforestry systems, to contribute to a green economy, are jeopardized by the low prices for agroforestry crops such as cinnamon received by farmers as a result of long value chains. Following from this research problem, this study examines whether a shortened value chain in one of these agroforest products increases the smallholders' livelihoods and environmental practices, and therefore contributes to a green economy effects of a shortened cinnamon value chain.

The societal relevance of this research contributes to the aim of the RIMBA project to enhance forest ecosystem connectivity through an agroforestry system, which improves smallholders' livelihoods through income variation and therefore reduced vulnerability. At the same time tree variation will ensure soil enrichment, increasing soil fertility and soil stabilization which decreases environmental risks, and increases farmers' livelihoods. Because agroforestry systems are jeopardized by the low prices of agroforestry crops such as cinnamon received by farmers, this research focuses on the effect of the value chain of cinnamon, as an agroforestry product. The results are expected to give information about why farmers change to other crops. Furthermore, it is expected to get insights in the differences in farmers' livelihood and environmental assets, when comparing a regular value chain with a shortened value chain.

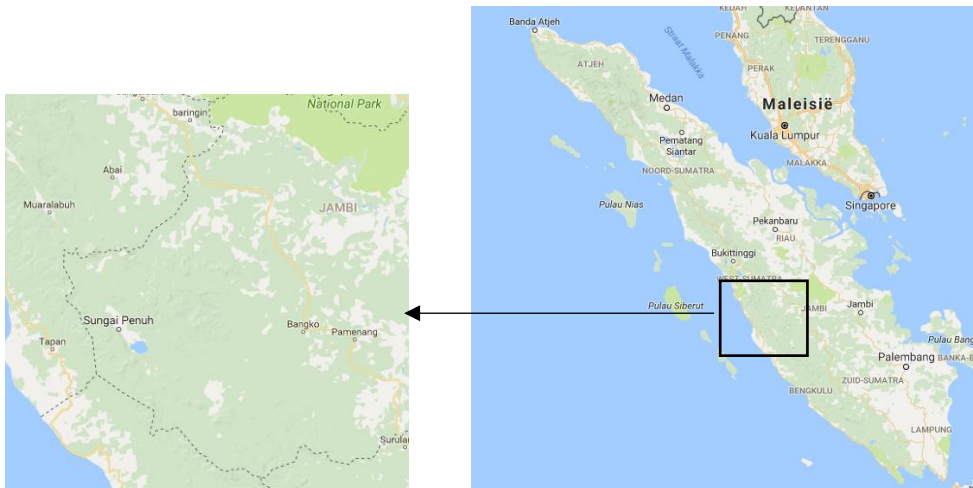
The scientific relevance of this research contributes towards the definition of the Brundtland Report for Sustainable Development. The definition is as following:

*"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland et al., 1987)*

This research contributes to this definition by analyzing to what extent a green economy can be realized by conserving the soil and water conditions of this area for future generations while meeting the needs of the present by maximizing the profits of agroforestry products through a shortened value chain. Further, this study will provide an understanding of the cinnamon value chain in Sumatra, and by what means the value chain can contribute to a green economy. The sustainable livelihood framework is used to measure the differences between the value chains in livelihood assets and environmental assets, both used to measure the contribution to a green economy. Here the assumption is made that improved livelihood assets are coherent with green growth, yet this could assure a tensioned relationship as some literature might say. As current literature focuses on the contribution of agroforestry to a green economy, it is important to find out what makes

farmers stay in producing agroforestry crops. In focusing on a shortened value chain, this is a gap in the literature that this study will contribute to.

**Figure 2** The research area (adjusted from GoogleMaps).



## 1.1 THESIS OUTLINE

The thesis will start with the theoretical chapter, discussing the main concepts and give an overview how the concepts are being examined. This chapter starts with the concept of green economy which is measured by improved livelihood assets, environmental conditions, and policies. These indicators are measured through the sustainable livelihood framework. Agroforestry systems also have impact on both socio-economic as environmental factors. This all can be influenced through the value chain of cinnamon, assessed through the value chain theory. Subsequently more elaborate information on the regional context of the research area and cinnamon is given. Here will be elaborated on the importance of cinnamon for this area. Additionally, the main stakeholders in the value chain will be discussed. After this, in the methodology chapter the research questions and methods are presented. As a continuation, the results are being discussed. In the results chapter will first be discussed on what basis agroforestry systems are considered conducive to a green economy. Once the role of cinnamon in an agroforestry system is understood, and how such a system contributes in develop a green economy, the cinnamon value chain needs to be presented with the different actors. Based on the basis of the cinnamon value chain, it can be noticed how such a value chain can be an obstacle for a green economy. As a response, possible solutions in how to mitigate such obstacles are given through a shortened value chain. To indicate the differences between the regular cinnamon value chain and a shortened cinnamon value chain, livelihood and environmental assets are measured. Finally, policies which influence these assets are evaluated. The results chapter is followed by the conclusions and the discussion.



## 2. THEORY

This chapter focuses on the theoretical concepts used throughout the research and will give a brief explanation and discussion. At the end of each chapter, a list of indicators will be given as a short overview how these concepts are operationalized and measured throughout the research. This chapter starts with the concept of green economy which is measured by improved livelihood assets, environmental conditions, and policies. These indicators are measured through the sustainable livelihood framework. Agroforestry systems also have impact on both socio-economic as environmental factors. This all can be influenced through the value chain of cinnamon, assessed through the value chain theory.



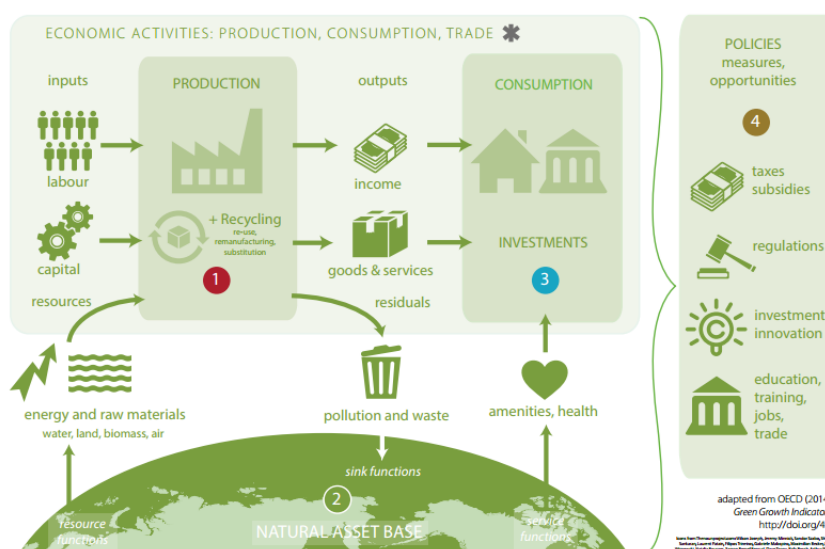


## 2.1 GREEN ECONOMY

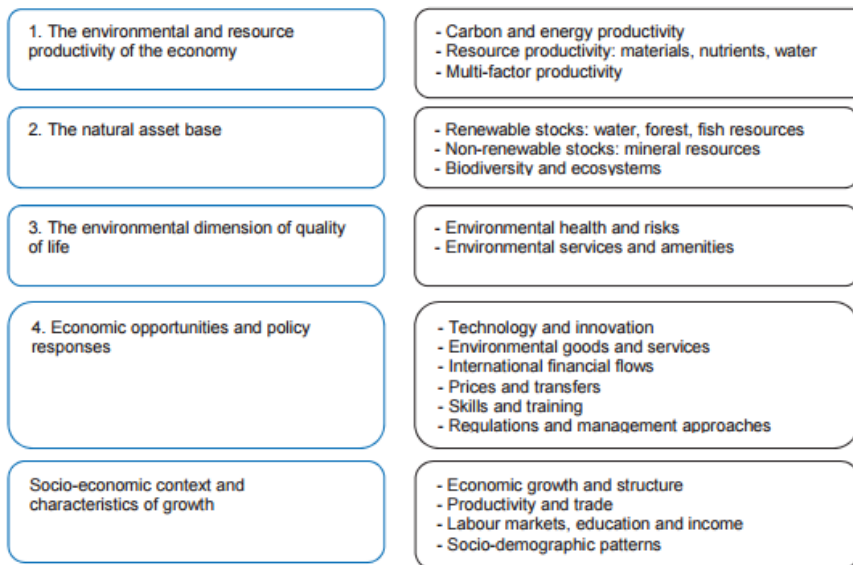
During the final years of the 20<sup>th</sup> century, stabilization of the economic crisis went together with the realization of the effects human activities have had on nature. It was time for a “great transformation”, a new “narrative with an unprecedented turn in our approaches to the social, economic, and environmental dimensions of sustainable development” (IISD, 2012a: 22). The question how to generate economic growth but with least as possible negative effect on the environment converted into the idea of ‘sustainable development’ during the Rio 1993 conference on Environment and Development, and got even broader international attention when the concept of Sustainable Development got a normative goal in 2012, on the conference on Sustainable Development to focus on two themes: a green economy in the context of sustainable development and poverty eradication, and the institutional framework for sustainable development (Bina, 2013). With the current uncertainty of climate change and the recovery of the global economy, governments of mature and emerging economies; many international organizations, including the UN; and actors from civil society and academia have all contributed to build a case for ‘a green economy’, or ‘green growth’, as a way to address both crises (Bina, 2013). The two terms are used often interchangeably, referring to a range of ideas linked to low-carbon development and making growth processes resource-efficient, cleaner and more resilient without necessarily slowing them ((Barbier, 2012 in Bina, 2013; Hallegatte et al., 2011).

Many approaches to sustainable development and wellbeing have evolved since then, reflecting different concerns and priorities. Essentially a green economy entails investing in cleaner energy, investing in natural resource efficient technologies and products, sustainable use of natural resources, repair and maintenance of natural ecosystems, and enabling policy settings, including the regulatory environment, taxation and subsidies (Cadogan-Cowper & Johnson, 2011). For this research, the definition of the OECD will be used, stating that green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies (OECD, 2012). To measure this, the OECD developed a framework including the indicators that need to be measured when aiming to create a green economy. The framework is presented in figure 3, while the indicators have been adjusted in figure 4, where it has been marked which of these indicators is measured by this study. These are mostly the socio-economic indicators, measured through the sustainable livelihood framework. The environmental conditions and assets is in this study measured by the farmers’ interpretation.

**Figure 3** OECD Green Growth measurement framework (OECD, 2012).



**Figure 4** Green Growth indicator groups and themes (adjusted from OECD, 2011).



Undeterred by the framework and indicators proposed, quantitative indicators for measuring green growth are still being developed (OECD, 2012) and the OECD has not developed indicators for the agricultural sector that can monitor green growth (OECD, 2014). However, certain farm management approaches and policy actions are seen as a relevant movement towards a green economy. The farm management approaches typically include soil and water conservation, organic farming, integrated pest management, biotechnology, and precision agriculture (OECD, 2016). When focusing on agroforestry, soil and water conservation and organic farming apply and will therefore be indicators for green economy for this research.

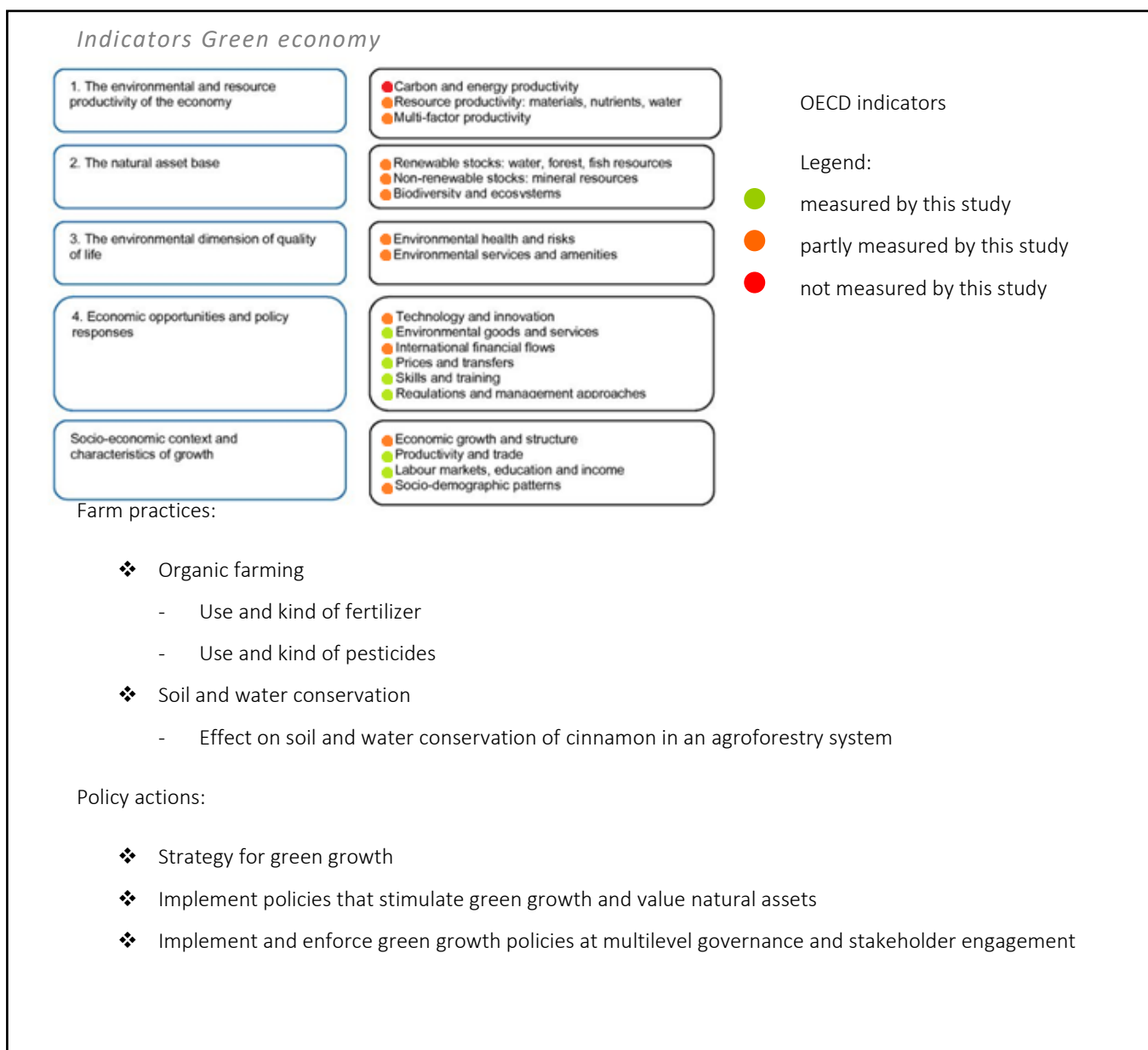
For policy actions, OECD shows steps to guide developing country policy makers as they explore and pursue green policies. At first, policy makers should establish leadership, a vision and strategies for green growth which are critical to mainstream green growth objectives into existing development plans and policies, and to build support for national policy priorities in partnership with public, private and civil society stakeholders (OECD, 2012). This involves integrating green growth considerations into existing planning processes, such as national development plans and budgetary systems. Strategic environmental assessment and public environmental expenditure reviews are two policy instruments that have proven useful in integrating green growth into development, infrastructure and budgetary planning processes.

Secondly, they should design, reform and implement policies that stimulate green growth and value natural assets and align incentives with green growth policy goals. Relevant policy instruments which could be of use for this are taxes, pricing instruments, and mechanisms that value natural assets such as subsidies for organic agriculture, regulations, standards and information policies such as certification of sustainable production or a set of cross-cutting policies to stimulate green growth in a systemic way through integrating policies (OECD, 2012).

Thirdly, strengthen governance, develop capacity and human resources, for learning and sound decision making to monitor at all levels of government, implement and enforce green growth policies effectively. Mechanisms are also needed for broad multilevel governance and stakeholder engagement, education and raising awareness, compliance and enforcement capacity, and monitoring and assessment (OECD, 2012).

The OECD shows six policy tools to integrate the environment into economic decision making. One of these six is standards and certification of sustainable production. According to the OECD (2012), this policy tool can contribute to green growth when goods and services that are certified as having been produced in a way that sustains natural assets can increase in market value and market share, which can benefit participating producers, improve environmental practices and help maintain the long- term sustainability of natural assets. To make this a success, it should be ensured that certification programs address local differences in conditions, that smallholder farmers can access and benefit from the certification schemes and that these schemes can be used by informal economy producers, and foster demand of certified products while retaining the appropriate degree of rigor in the standards and assessment. The inclusion of smallholders into this process is discussed at the theory of the value chain. The value chain could help towards a green economy through fostering international markets for green goods and services but also by promoting green technology innovation through co-operation and strengthen green finance and investment (OECD, 2012). Integrating of green growth considerations into policy decisions through policy instruments can be measured and will also be part of the sustainable livelihood framework and value chain approach. Since the Indonesian government agreed to the green economy plan for the RIMBA corridor, the expectations are that this is considered in policies.

**Figure 5** Indicators Green Economy.



## 2.2 SUSTAINABLE LIVELIHOODS

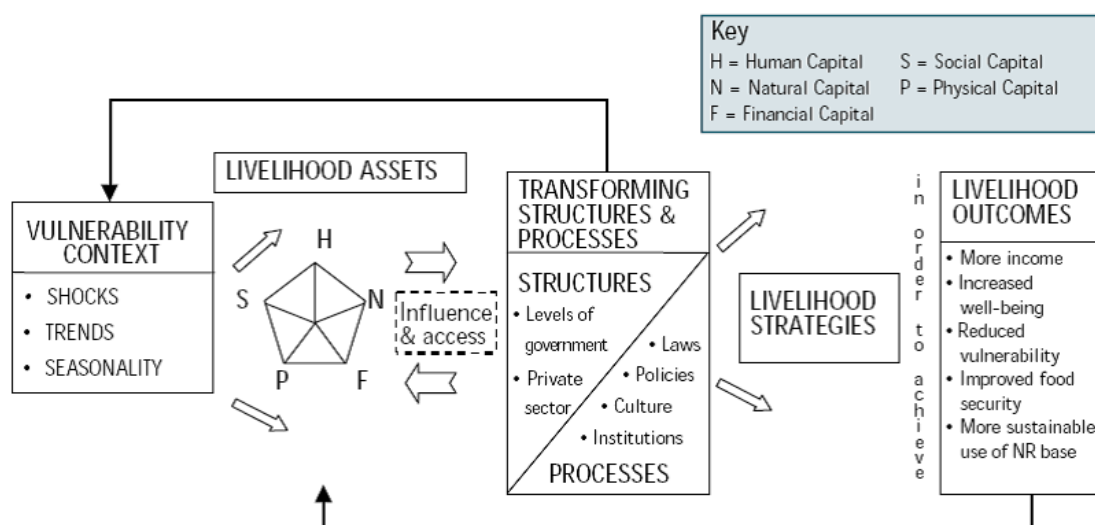
As described in the previous paragraph, green growth can improve the resilience of developing economies by reducing the risk of negative shocks to growth from resource bottlenecks or imbalances in natural systems. It can open up new sources of income and tax revenues, employment and opportunity from innovation and the emergence of green goods, services and markets. It should contribute to more resilient livelihoods, disaster-proof infrastructure and wider access to energy supply and public transport (OECD: 7). Resilient livelihoods are

*“A livelihood comprises people, their capabilities and their means of living, including food, income and assets”*  
(Chambers and Conway, 1991: 1).

Tangible assets are resources and stores, while intangible assets are claims and access. A livelihood is environmentally sustainable when it maintains or enhances local and global assets on which livelihood depend, and has net beneficial effect on other livelihoods. A livelihood is socially sustainable if it can cope with and recover from stress and shocks, and provide for future generations (Chambers and Conway 1991). However, any definition of livelihood sustainability, according to Krantz (2001), has to include the ability to avoid, or more usually to withstand and recover from, stresses and shocks. The United Nations stated that sustainable livelihoods could serve as an integrating factor that allows policies to address ‘development, sustainable resource management, and poverty eradication simultaneously’ (Krantz, 2001). When working towards a green economy, the assets in sustainable livelihoods are increasingly seen as enabling transformation across generations and a ‘new’ approach to understanding rural life.

Scoones (1998) describes a framework for analyzing sustainable livelihoods (figure 6). The framework shows how, in different contexts, sustainable livelihoods are achieved through access to a range of livelihood resources which are combined in the pursuit of different livelihood strategies (agricultural intensification or extensification, livelihood diversification and migration).

**Figure 6** Sustainable rural livelihoods: a framework for analysis (Scoones, 1998).



The ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have, also called 'capital' people have, which must be combined to create livelihoods (Chambers and Conway 1992). Identifying what combinations of 'capitals' are used for different livelihood strategy combinations is a key step in the process of analysis. As seen in figure 6, there are five types of these capitals: natural capital (the natural resource stocks and environmental services and resources), financial capital (the capital base such as cash, credit/debt, savings, and other economic assets), physical capital (infrastructure, production equipment and technologies), human capital (skills, knowledge, ability to work and good health), and social capital (networks, social claims, social relations, affiliations, associations). In this study, farmers of a shortened value chain and a regular value chain are compared on their livelihood and environmental assets through these capitals. The expectations are that the farmers of a shortened value chain will have more assets than a regular value chain as a result of more contact with the company, more knowledge about the prices and better prices because of less middlemen, certification and local production.

Central in the framework is the analysis of formal and informal organizational and institutional factors that influence sustainable livelihood outcomes (Scoones 1998). These factors determine the context in which the assets can be used. Such a context consists of vulnerabilities, processes and structures. Vulnerability encompasses shocks like illnesses, disasters or conflicts but also seasonalities like changing prices and shifting labor opportunities and trends like population growth. The structures are the institutions that support or constrain a producers' livelihood such as service providers, governmental bodies, or rural markets. The processes are the laws and regulations which can give producer rights, or on the contrary limit them because of bureaucracy. Secure long-term access with policies which recognize local rights and provide support can be an attractive incentive for communities to adopt conservation practices such as agroforestry. Even where forests are degraded, local communities, with secure tenure rights can rehabilitate unproductive lands into more productive and sustainable systems (Suyanto et al, 2005). Yet, Suyanto et al. (2005) state that improving sustainable land management cannot rely on an authoritarian approach because when farmers were forcefully evicted, efforts at forest protection were not successful. When there was no government intervention, and consequently farmers felt that they had more secure land rights, rehabilitation of degraded land inside state forest land took place. Therefore Suyanto et al. (2005) state that a partnership approach in protection and sustainable management of forest land involving local communities and other stakeholders is probably the best. In this study, policies for a green economy are discussed, which also influence livelihood assets.

Within the sustainable livelihoods framework (figure 6), three broad clusters of livelihood strategies are identified. These are 'agricultural intensification/extensification', 'livelihood diversification' and 'migration'. People can choose to gain more of their livelihood from agriculture through processes of intensification, extensification or you diversify to a range of off-farm income earning activities, or you move away and seek a livelihood elsewhere, either temporarily or permanently. Livelihood diversification includes both on- and off-farm activities which are undertaken to generate income additional to that from the main household agricultural activities, to spread risk. Agroforestry can be a way to diversify on-farm livelihoods and thereby also diversify the incomes of smallholders.

**Figure 7** Indicators Sustainable Livelihood Framework.

*Indicators Sustainable Livelihood Framework*

Capitals:

- ❖ Natural capital
  - Land
  - input
- ❖ Human capital
  - Labor
  - Knowledge and education
  - training
- ❖ Physical capital
  - Production methods (use of machines)
  - transport
- ❖ Financial capital
  - Prices of crops
  - Income of farm or outside farm
  - expenses
- ❖ Social capital
  - Working together with other farmers
  - Relations (family/ friends/ village)
  - Part of farmer cooperatives

Organizational and institutional factors:

- ❖ Local governments and organizations integrating in the value chain through policies

## 2.3 AGROFORESTRY SYSTEMS

In order to protect the vital forest functions important for the sustainability of their livelihoods, local people in Kerinci have used their accumulated knowledge of the forest environment to develop agro-ecosystems, which largely substitute for the environmental and socio-economic benefits, usually associated with the natural forest (Burgers, 2004). Agroforestry is increasingly recognized as a sustainable land-management option and promising approach to natural resource management that combines goals of sustainable agricultural development for farmers and providing a number of ecosystem services and environmental benefits (Jose, 2009). Because of the high diversity of crops and their functions, and the organic way of farming, hydrological functions and a certain degree of biodiversity is being protected, while the incorporation of species with a high economic value and edible products also offers an option to create resilient and sustainable livelihood (Burgers, 2004). As a result, agroforests have a high degree of biological as well as economic stability and sustainability. Garrity et al. (2001) mentioned that diversified farming system significantly reduced household reliance on national park resources, which is interesting since cinnamon in Kerinci is used as a crop in the bufferzone of the national park. They estimate that annually about 700 fewer trees are cut from the national park than would have been the case if all farmer households were dependent on only one crop. The expectation for this study is that farmers with more livelihood and environmental assets, will be less likely to start with forest encroachment.

Attempts have been made to quantify environmental benefits of agroforestry but so far not much has been found in the literature (Jose, 2009). The integration of trees, agricultural crops, and/or animals into an agroforestry system has the potential to enhance soil fertility, reduce erosion, improve water quality, enhance biodiversity, increase aesthetics, and sequester carbon (Jose, 2009). It has been well recognized that these services and benefits provided by agroforestry practices occur over a range of spatial and temporal scales, as can be seen in figure 8. Therefore, in this study, only the local services at the farm level will be taken into account, which are shown in figure 8. These will be tested by farmer interpretations. Finally, according to Burgers (2004), it is the opportunities at the household level, and the functions of the agro-ecosystems that largely define to what extent these systems are able to achieve environmental stability, biodiversity protection and livelihood resilience, and in the end contribute to a green economy.

**Figure 8** Spatial scales of various ecosystem services provided by agroforestry systems (Izac 2003 in Jose, 2009).

Ecosystem Services	Spatial Scale		
	Farm/Local	Landscape/Regional	Global
Net Primary Production			
Pest Control			
Pollination/Seed Dispersal			
Soil Enrichment			
Soil Stabilization/Erosion Control			
Clean Water			
Flood Mitigation			
Clean Air			
Carbon Sequestration			
Biodiversity			
Aesthetics/Cultural			

**Figure 9** Indicators of an agroforestry system.

*Indicators Agroforestry system*

Environmental benefits:

- ❖ Input
  - Amount and kind of pesticides
  - Amount and kind of fertilizers
- ❖ Output:
  - Soil fertility
  - Erosion control

Economical benefits:

- ❖ Output
  - Amount of crops
  - Prices of crops



## 2.4 VALUE CHAIN

Since the 1970s, developing countries have become increasingly dependent on export-oriented production systems under this term of 'globalization'.

*"If globalization in the productive sphere implies functional integration between internationally dispersed activities, then the value-chain perspective is an effective means of conceptualizing the forms that this integration takes". (Gereffi, 2001: 2)*

When looking at the value chain, a range of activities are important to acknowledge, including the governance of the chains. To study global value chains there are several approaches such as, global commodity chain and filiere analysis. However, the concept of filière is criticized for not taking into account changes in commodity- and knowledge flows or changes in involved actors. In addition, the filière approach does not follow a specific framework, while the global value chain approach does (Raikes et al., 2000). Therefore the global value chain (GVC) approach fits best the aim of this research.

### The global value chain approach

The GVC approach consists of six dimensions which are divided in global (top-down) and local elements (bottom-up). These six dimensions are: (1) an input-output structure, which describes the process of transforming raw materials into final products; (2) the geographic scope, to explain how the industry is globally dispersed and in what countries the different GVC activities are carried out; (3) a governance structure, which explains how the value chain is controlled by firms. The local dimensions are: (4) upgrading, which describes the dynamic movement within the value chain by examining how producers shift between different stages of the chain and how value can be added to the product (Gereffi, 1999 and Humphrey & Schmidt 2002); (5) an institutional context in which the industry value chain is embedded in local economic and social elements (Gereffi, 1999); and (6) industry stakeholders, which describes how the different local actors of the value chain interact to achieve industry upgrading (Gereffi and Fernandez-Stark, 2016). These six dimensions will be further explained.

**Figure 10** Six dimensions of the GVC analysis (Gereffi and Fernandez-Stark, 2016).



### 1. Input-Output Structure

A chain represents the entire input-output process that brings a product or service from initial conception to the consumer's hands. The input-output structure is typically represented as a set of value chain boxes connected by arrows that show the flows of tangible and intangible goods and services, which are critical to mapping the value added at different stages in the chain (Gereffi and Fernandez-Stark, 2016). In this study, the input-output structure of the cinnamon value chain is measured through the sustainable livelihood framework by comparing the input and output of the cinnamon production between four groups of cinnamon farmers, of which two are part of the regular value chain and two groups are part of the shortened value chain. The expectation is that farmers of a shortened value chain use less input such as labor and pesticides or fertilizers, while getting more output because the added value of organic cinnamon.

### 2. Geographic Scope

Within the value chain, different activities are usually carried out in different parts of the world but it could also be that businesses try to achieve regionalization and improve the local economy (Gereffi and Fernandez-Stark, 2016). The geographic scope for this study is only national, from the farmer until the port where the cinnamon is being exported.

### 3. Governance

The governance analysis shows how a chain is controlled and coordinated when certain actors in the chain have more power than others Gereffi (1994: 97) defined governance as *“authority and power relationships that determine how financial, material and human resources are allocated and flow within a chain.”* With this the analysis of formal and informal organizational and institutional factors of the sustainable livelihood framework is being elaborated by governance structures within the value chain. Five governance structures have been identified by Gereffi et al. (2005) showed in figure 11. It is however important to note that in reality these governance structures might overlap within one value chain.

1. *Markets*. Market governance involves transactions that are relatively simple. Information on product specifications is easily transmitted, and suppliers can make products with minimal input from buyers. The central governance mechanism is the price

2. *Modular value chains*. Modular governance occurs when complex transactions are relatively easy to codify. Linkages (or relationships) are more substantial than in simple markets because of the high volume of information flowing across the inter-firm link. Information technology and standards for exchanging information are both key to the functioning of modular governance.

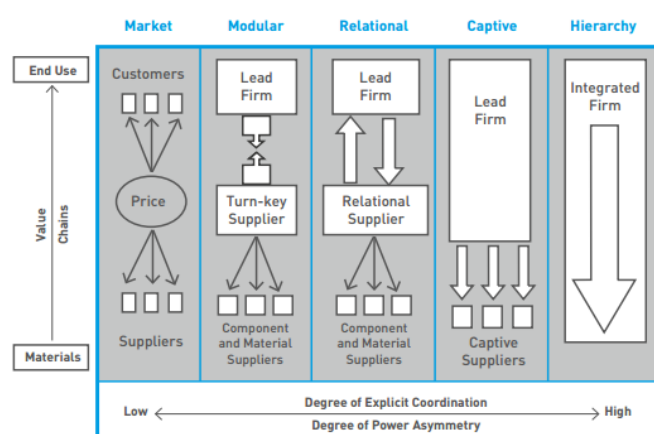
3. *Relational value chains*. Relational governance occurs when buyers and sellers rely on complex information that is not easily transmitted or learned. This results in frequent interactions and knowledge sharing between parties. Such linkages require trust and generate mutual reliance, which are regulated through reputation, social and spatial proximity, family and ethnic ties, and the like. Despite mutual dependence, lead firms still specify what is needed, and thus have the ability to exert some level of control over suppliers. Yet relational linkages take time to build, so the costs and difficulties required to switch to a new partner tend to be high.

4. *Captive value chains*. Captive governance includes small suppliers who are dependent on one or a few buyers that often wield a great deal of power. Such networks feature a high degree of monitoring and control by the lead firm. The power asymmetry in captive networks forces suppliers to link to their buyer under conditions set by, and often specific to, that

particular buyer, leading to thick ties and high switching costs for both parties. Ethical leadership is important to ensure suppliers receive fair treatment and an equitable share of the market price.

5. *Hierarchy*. Hierarchical governance describes chains characterized by vertical integration and managerial control within lead firms that develop and manufacture products in-house. This usually occurs when product specifications cannot be codified, products are complex, or highly competent suppliers cannot be found. (Gereffi et al., 2005).

**Figure 11** Five global value chain governance types (Gereffi et al., 2005).



#### 4. Upgrading

Value to the cinnamon production can be added through economic upgrading, which is defined by Gereffi as firms, countries or regions moving to higher value activities in GVCs in order to increase the benefits from participating in global production (Gereffi et al., 2005). Such upgrading could be the increase of security, profits, value, or capabilities. Fernandez-Stark et al. (2011) show five ways of upgrading. In this study, the local processing of the cinnamon by the companies of the shortened value chains is a form of process upgrading. Adding value through certification is a way of product upgrading which is also used by both companies in the shortened value chain.

**Figure 12** Five categories of upgrading (Fernandez-Stark et al., 2011).

Upgrading Trajectory	Example
Entry into the value chain	Switching from subsistence agriculture to production of fruits, vegetables or honey for sale in national or global markets
Process upgrading	Introduction of traceability and administrative measures; installation of irrigation systems and/or greenhouses, or new planting or harvesting techniques
Product upgrading	Production of higher value products, such as organic fruits and vegetables; often requires costly certification
Functional upgrading	Processing produce in addition to cultivation
Chain upgrading	Expansion from production into agro-tourism industry

#### 5. Local Institutional Context

The local institutional framework identifies how local, national and international conditions and policies shape a country's participation in each stage of the value chain (Gereffi, 1995). GVCs are embedded within local economic, social and

institutional dynamics. This will already be covered by the livelihood framework, as well as the relations between the key stakeholders as pointed out by point 6.

## 6. Stakeholders Analysis

It is important to consider how relations between these actors are governed at the local level and which institutions are in a position to drive change. Thus, this type of analysis is critical to identify the key players in the value chain. For this study, it should be noticed that the regular value chain has more chain linkages than the shortened value chain, which is characterized by only one company. The company has contact with farmers as well as exporters. One or two middlemen can be part of this process, yet contracted by the company.

### Smallholder inclusion in the value chain

In both value chains, farmer households try to include into the value chain. The insertion of smallholders in national, regional and global agriculture value chains has important consequences for poverty alleviation in rural areas of developing countries due to their potential to increase incomes and create employment and therefore adds to the sustainability of their livelihoods (Weinberger & Lumpkin, 2007 in Gereffi and Fernandez-Stark, 2016). However, the majority of smallholders in developing countries face a series of constraints that often limit their ability to participate competitively in these chains, and there has been considerable concern that these producers are being excluded from important growth opportunities. Fernandez-Stark et al. (2012) show a model of four major constraints were identified that limit the competitiveness of small- and medium-sized producers and their entry into value chains. (1) Access to market; (2) access to training; (3) collaboration and cooperative building; and (4) access to finance. Figure 13 shows these four constraints.

First, access to market is relevant to inclusion in value chains for smallholders. In the context of this model, it refers specifically to the presence of value chain linkages between producers and buyers and how they can be established.

Second, while smallholders work at the farm from their childhood, specific training is often required to improve productivity and product quality. Such training can include introducing of new technologies and plant varieties, how to comply with food safety and other certification requirements, but also how the value chain works (Fernandez-Stark et al., 2012).

Third, building coordination and collaboration building occurs at two levels. First, horizontal coordination amongst producers facilitates the formation of producer groups or associations, to reach economies of scale to be able to compete in the marketplace, but also to provide opportunities to add value to their product, such as upgrading. Second, vertical coordination and collaboration involves interactions with other actors of the chain to establish linkages, find synergies and share information in order to improve the performance of the chain as a whole. Chain stakeholders include all the actors that play a role in the development of the industry.

Finally, entry into the value chain requires certain investments to cover infrastructure, equipment and obtaining certifications. Small producers, however, often face liquidity and credit constraints and have no access to formal finance channels, both of which limit their potential to make the required investments (Fernandez-Stark et al., 2012).

According to Henderson et al. (2002, in Fernandez-Stark et al., 2012) the concept of VCA is however limited in the sense that 'it is bounded by the firm or interfirm network and pays no attention to issues of corporate power, the

institutional contexts of – and influences upon – firm-based activities, or to the territorial arrangements in which the chains are embedded.’ Therefore, in this study, the VCA is combined with the livelihood analysis. This way, the effect of the value on the socio-economic situation of the farmer households is understood. Also, policy decisions regarding the value chain has been discussed in the final results chapter.

**Figure 13** Model for smallholder inclusion in agro-food chains (Fernandez-Stark et al., 2016).



**Figure 14** Indicators of Value Chain Analysis.

### *Indicators Value chain analysis*

#### Input-Output structure

- ❖ Input (part of SLA):
  - Amount and kind of pesticides
  - Amount and kind of fertilizers
  - Land
  - Labor

#### Geographic Scope:

- ❖ Sumatra: Farmer (Kerinci, Merangin in Jambi province – port (Padang)

#### Governance:

- ❖ Market links
  - Local collectors
  - Companies
  - Contracts
  - Price differences between different chains

#### Upgrading:

- ❖ Entry into the value chain
  - Farmers of a regular value chain compared to farmers of a shorter value chain
- ❖ Process upgrading
  - Adding of value to environment through agroforestry system
  - Product upgrading Adding of value through certification

#### Local institutional context (Part of SLA):

- ❖ Policies

#### Stakeholders analysis:

- ❖ Identify stakeholders
  - Companies, ngo's, government, farmers
- ❖ Identify relation between stakeholders

### *Indicators Inclusion of smallholders in Global Value Chain*

#### Smallholder inclusion bottlenecks

- ❖ Access to market:
  - Linkages local collectors, farmers and company
- ❖ Access to training
  - Training from government or company in organic farming or the value chain
- ❖ Collaboration & coordination
  - Horizontal coordination (farmer cooperatives) + (adding value: organic/ certification)
  - Vertical coordination (information sharing between farmers, collectors, companies)
- ❖ Access to finance
  - Access to bank accounts, or certifications

### 3. THE REGIONAL CONTEXT

This chapter describes the regional context of the Jambi province, the districts of Kerinci and Merangin. Also will be elaborated on the importance of cinnamon on economic and environmental subjects for this area and the main stakeholders in the value chain will be discussed. This chapter will therefore contribute to a better understanding of the research problem.



### 3.1 IMPORTANCE OF CINNAMON

Cinnamon in central Sumatra has been an important spice for centuries. Indonesia is the leading country in exporting cinnamon (figure 15). Cinnamon is one of the most important spices sold in U.S. and European markets and the demand is still growing. In 2015, Indonesia exported an amount of \$104.1 million of cinnamon, which is 22.1% of the world market (International Trade centre, 2016). 95% of Indonesian cinnamon (38,000 tons) originates from Kerinci and immediate surroundings such as Merangin. Kerinci faces very little competition from other countries in cinnamon production because of the special geographical conditions of this area. This is because the slopes of the Kerinci high valley, which are especially adapted for the plantation of cinnamon trees that grow well at an altitude between 800 to 1,500 meters. As a result, 85% of the world trade volume originates from Kerinci.

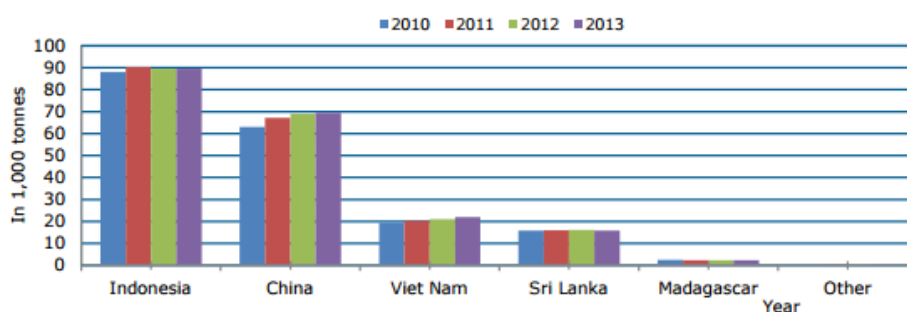
Under Dutch colonial rule, two major steps were taken in the 1920s. First by the construction of infrastructure; constructing roads and thereby opening the valley to outer markets and ports, essentially linking the area to the western coast of the island and to the port of Padang. Second, by protecting the forests of Kerinci, which is still a protected area. The Kerinci Seblat National Park is occupying 59% of the District territory, that's 14 847 km<sup>2</sup>, is currently known as the largest Indonesian National Park. Some of the National park is also countering the borders of the Merangin district.

In 2011 cinnamon is harvested by approximately 15,000 daily workers (farmers) in an estimated area of 150.000 ha. In total, including daily workers, farmers, wholesale-collectors and family members, it is estimated that 70,000 people in Kerinci depend directly on cinnamon business (Cassia Co-op, 2013). At different times, waves of immigrants originating from more populated areas of the island, but also from neighboring Java, have been taking parts in the clearance of the forest, to transform it into agricultural lands. Agricultural productions have evolved from national markets and products (rice, vegetables, fruits) to more export oriented crops, mainly commercial tree crops (rubber, coffee, cinnamon). In the district of Merangin, there have been no conflicts over land so far, but the amount of immigrating people is increasing which concerns land issues. Conflicts in Kerinci about land issues have occurred in the past (Neneng Susanti, KPH). The main reason is that immigrants from other islands are coming to this area to start with doing agriculture, encroaching into the state forest or the Kerinci Seblat National Park, threatening agroforestry systems by conversion to agriculture. One reason for this, is the population increase in the Merangin district, Jambi of 31% in the decade to 2010 (Cassia Co-op, 2012a). High rates of spontaneous economic in-migration of smallholders engaged in rubber, palm oil, cinnamon, coffee and coconut production, as well as mining of gold and iron ore. The rapid rate of population growth has led to uncertainty in land and resource access, social tensions and high levels of poverty, especially among new settlers (source).

If the profit of agroforestry products, such as cinnamon, increases through a shortened value chain, this might have a positive effect on the forest encroachment. As a result of agroforests, several crops can be grown in-between trees. Therefore one land can increase farmer households' livelihood by having varied income from crops and improved soil fertility. Subsequently, farmers are less deprived to convert new forest into agricultural land. Farmers who possess tree crops which grow again naturally, such as cinnamon trees, are also less likely to burn the land because with burning the land they are destroying the roots.



**Figure 15** Global production of cinnamon, 2012-2013 (CBI market information database).



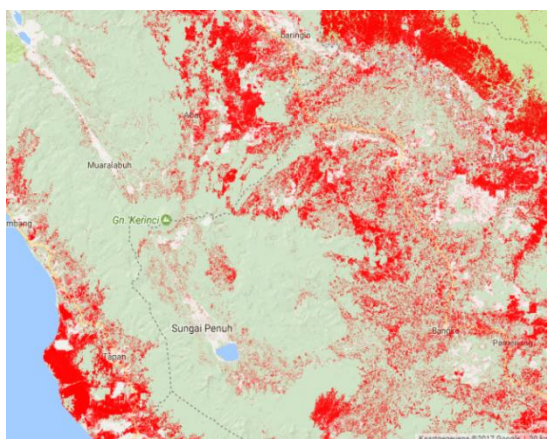
### 3.2 KERINCI SEBLAT NATIONAL PARK

As mentioned in the introduction, the Kerinci Seblat National Park [*Taman Nasional Kerinci Seblat*], (TNKS) is part of the Jambi province, and borders to the research area as can be seen in the right picture of figure 16. Some of the villages participated in this research are close to this national park, and therefore necessary to acknowledge since the park is vital for agricultural activities because of the preservation of a great amount of biodiversity and water catchment area.

Today, limitation of land availability and development of larger plantations focusing on export crops are stressing the National Park boundaries (Cassia Co-op, 2012a). As a result, people start farming seasonal crops such as potato, hot pepper, cabbage, tomatoes within the borders of the national park. In addition, farmers use the area of the national park for planting cinnamon trees. It is legal to plant these once, but since the quality of the cinnamon after the first harvest is decreasing, people start planting new trees to sustain their profit. It is considered average to lose 30% to 40% of the trees that won't grow again, and to remain 100% of the original cinnamon trees, replanting is needed (Cassia Co-op, 2012a). The TNKS inspectors cannot control how often farmers replant the cinnamon trees. To prevent further encroachment of the national park, this has been put into legislation but enforcement has not been sufficient so far. In the results chapter about possibilities and barriers, information from interviews with the staff of TNKS will elaborate on this. Though the center of the national park remains untouched, from figure 16 it can be noticed that forest encroachment at the border of the national park (the purple area on the right figure) is happening. When the right picture is compared with the left, it can be observed that the national park buffer zone, which is also the forest encroachment area, falls within the research area.

Legend  
 Loss

**Figure 16** Forest encroachment in the research area (adapted from Earth Engine).



### 3.3 THE CINNAMON PRODUCTION

The production of cinnamon starts with planting seeds. After this a time period of 7 years is needed for the cinnamon to be exploitable. Yet to reach a certain amount of cinnamon and amount of quality, the cinnamon tree needs to be at least 15 years old. However, the amount of cinnamon bark that can be obtained from one single tree varies with age. After the harvest, the cinnamon is brought back to the house and sometimes a warehouse. Then it is time for the final steps of drying and cleaning. Once dried, a cinnamon tree between 6-8 years of age can produce 7 kilograms. From 8 years old, every year adds about 7 kilograms of dry weight cinnamon bark (Cassia Co-op, 2012a). Because of the long waiting time, cinnamon functions primarily as a savings account. Therefore, is often some leeway in terms of when farmers sell. Thus, years with high cinnamon prices will witness greater cinnamon sales.

However, not only will the amount of cinnamon increase with the years. Also, the quality of the cinnamon is determined by the age of the tree, just like the part of the tree from where the bark is taken, and the time of harvesting (Cassia Co-op, 2012a). In general farmers mentioned that it is better to wait for the older trees to get a better quality of cinnamon. Farmers, local middlemen and collectors and the local market make a distinction into three different qualities for cinnamon bark; KA, KB, and KC (Burgers, 2004). Yet, exporters make a distinction of the 7 qualities in the table below, with the criteria used for making these distinctions.

**Table 1** Qualities of cinnamon bark (Nurdjannah, 1992 in Burgers, 2004).

Quality	Part of outer bark scraped off	Origin of bark	Colour	Taste
Vera AA	Fully scraped and smooth	Branch, diameter 5-15 mm	Yellow-orange	Rather spicy
Vera A	Fully scraped and clean	Branch	Yellow-orange	Rather spicy
Vera b	Not so clean	Twigs	Dark orange	Not very spicy
Vera C	Quite large part, not scraped	Branch/trunk/twigs	Rather black	Not very spicy
KA	Clean	Branch/trunk	Brown	Spicy
KB	Less clean	Branch/trunk	Dark brown	Spicy
KC	Quite large part, not scraped	Trunk/twigs	Rather black	Not so spicy

**Figure 17** cinnamon sorted and dried by quality.



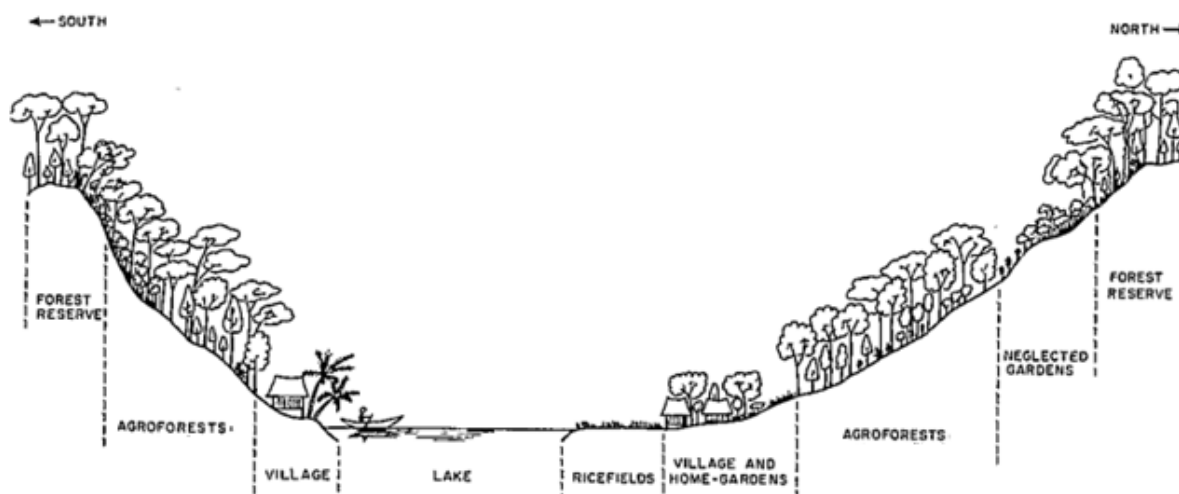
When the prices of the cinnamon are not comparable anymore with the costs incurred for the cost of logging, farmers will consider to stop with cinnamon production and move to crops which give harvest sooner and for a better price such as coffee (Burgers, 2004). Interest of farmers to maintain cinnamon trees has decreased significantly during the last 20 years. Statistics of Jambi show that less cinnamon is produced in the last 10 years in both Kerinci and Merangin (BPS, 2017).

Farmers moving away from cinnamon could have extensive changes for the global cinnamon price since this part in Sumatra is one of the greatest cinnamon producers, as explained before. At the same time, it could also have extensive changes for the agroforestry system and the environment. The main agroforestry system consists of the tree gardens located on the slopes, between the villages and the forest reserve (Mary & Bompard, 1986). Therefore, cinnamon trees are used for covering slopes between the village and the forest reserve as can be seen in figure 19, landslides could happen more easily (see figure 18). To keep farmers continuing with the cinnamon production, the solution of shortening the value chain has been offered since this is one reason for the relative low cinnamon prices. To understand the practical concept of the cinnamon value chain and its stakeholders, a more detailed explanation will follow below.

**Figure 18** landslide on the road in Kerinci District.



**Figure 19** Schematic presentation of the agroforestry and land-use pattern in the research area (Mary & Bompard, 1986).

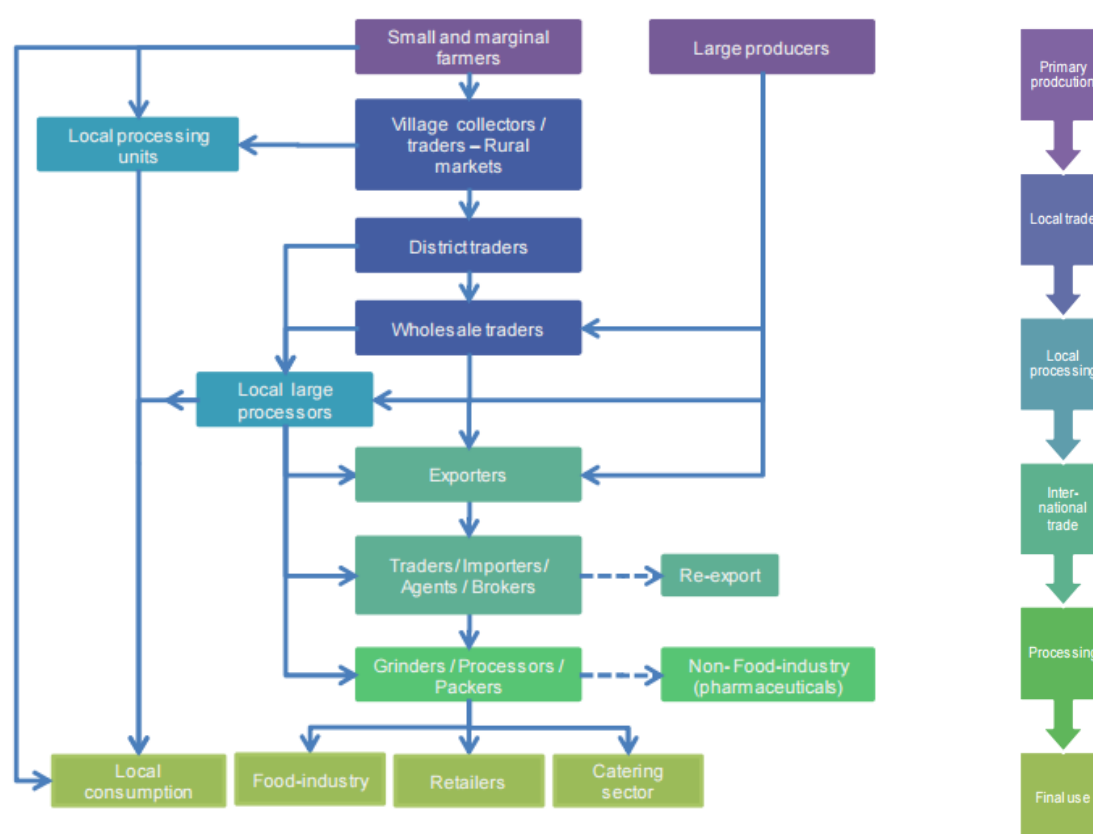


### 3.4 THE STAKEHOLDERS IN THE CINNAMON VALUE CHAIN

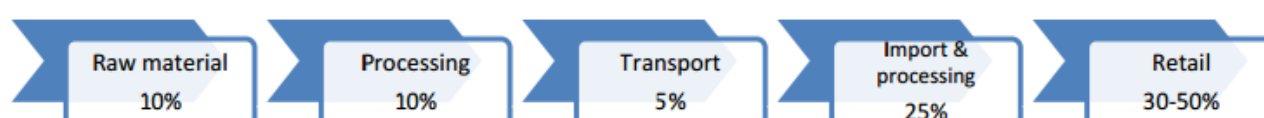
In general, a value chain for spices looks like the figure below (figure 20), with both small and large producers.

The value chain starts at the point where the product is being sold by the farmer. In a regular value chain, the product is sold to village collectors, then collectors of the district, and then wholesale traders who will export the product. With a shortened value chain, discussed before as a solution to low prices received by the farmer, the farmer can sell his product straight to the company which is also a local processing unit. Here, the product is already processed when in the local area. In this way, more value is added before exported. This is important because, as can be seen in figure 21, around 25% of the price located in the processing. By doing this locally, the profit will stay in the local economy. Another difference between the two value chains is that in a regular way, there are in general three collector or traders before the product is being exported, and even more before the final consumer. With the shortened value chain, the company to which the farmer sells the product, is also the exporter, and sometimes the same until the consumer.

**Figure 20** The value chain of spices (Pascale & van Opijnen, 2010).



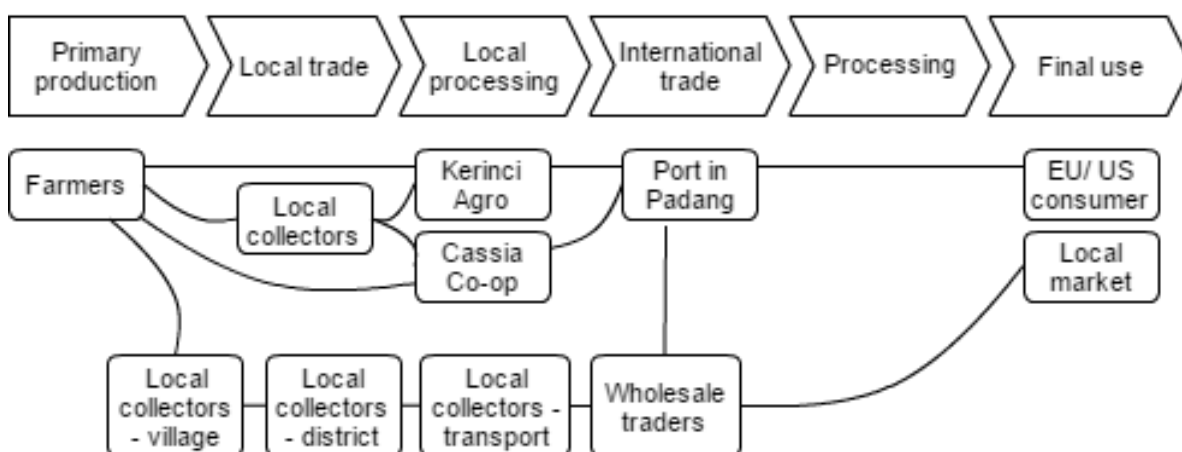
**Figure 21** Indicative price breakdown of cinnamon (CBI Market Information Database)



In the scope of this research, the local value chain is examined only until the port in Padang to study the effect of the local value chain on the smallholder' livelihood. For the regular value chain, the farmer sells the cinnamon to a local collector in the village, who sells it to another local collector for the district. This local collector is collecting from several villages. After that, there is a local collector who transports the cinnamon to the final wholesaler. The wholesaler is the exporter. For the shortened value chain, two companies are being reviewed. Both companies process the cinnamon locally. These processing steps will be more elaborated on in appendix 4. They also both certify organic cinnamon farmers. Organic markets are also smaller than the mainstream market, which does not provide enough room for a multitude of players. In addition, all operators along the value chain for organic certified products must be certified as well and because the value chain must be more transparent, the certified chains are usually shorter (CBI market information database). In the results chapter where the differences in livelihood assets between the two chains is measured, farmers of the two companies Cassia Co-op and Kerinci Agro are two groups in the shortened value chain. As for the regular value chain, also two groups are being compared. These are farmers who are still producing cinnamon and farmers who are changing to coffee. This last group is interesting because, as mentioned before, horticulture commodities are in general more profitable than cinnamon, and can also be harvested faster. Because of this, an increasing amount of farmers are shifting from cinnamon to horticulture. Some farmers have already switched to growing coffee, cocoa, cloves and rubber instead. At this moment, coffee is a cherished crop to take in the place of cinnamon. Because these farmers stopped believing in cinnamon, they are changing their cinnamon fields completely into coffee plantations. As this behavior is seen at almost all farmers with a regular value chain, it raises questions to see how the livelihoods of farmers who are changing are developing. As such, farmers who are changing to coffee constitute one of the groups participated in the livelihood analysis. These four groups are in the research spread over two places, Kerinci and Merangin. The villages in Merangin are part of the RIMBA project, while the villages in Kerinci are not. This will be further explained in the methodology chapter.

Finally, some stakeholders influence the value chain or famers' livelihood assets, but are not visible in figure 22. These are external factors, such as local and national institutions such as organizations and local governments. Also the government could implement policies, influencing companies or farmers.

**Figure 22** The cinnamon value chain in the research area.





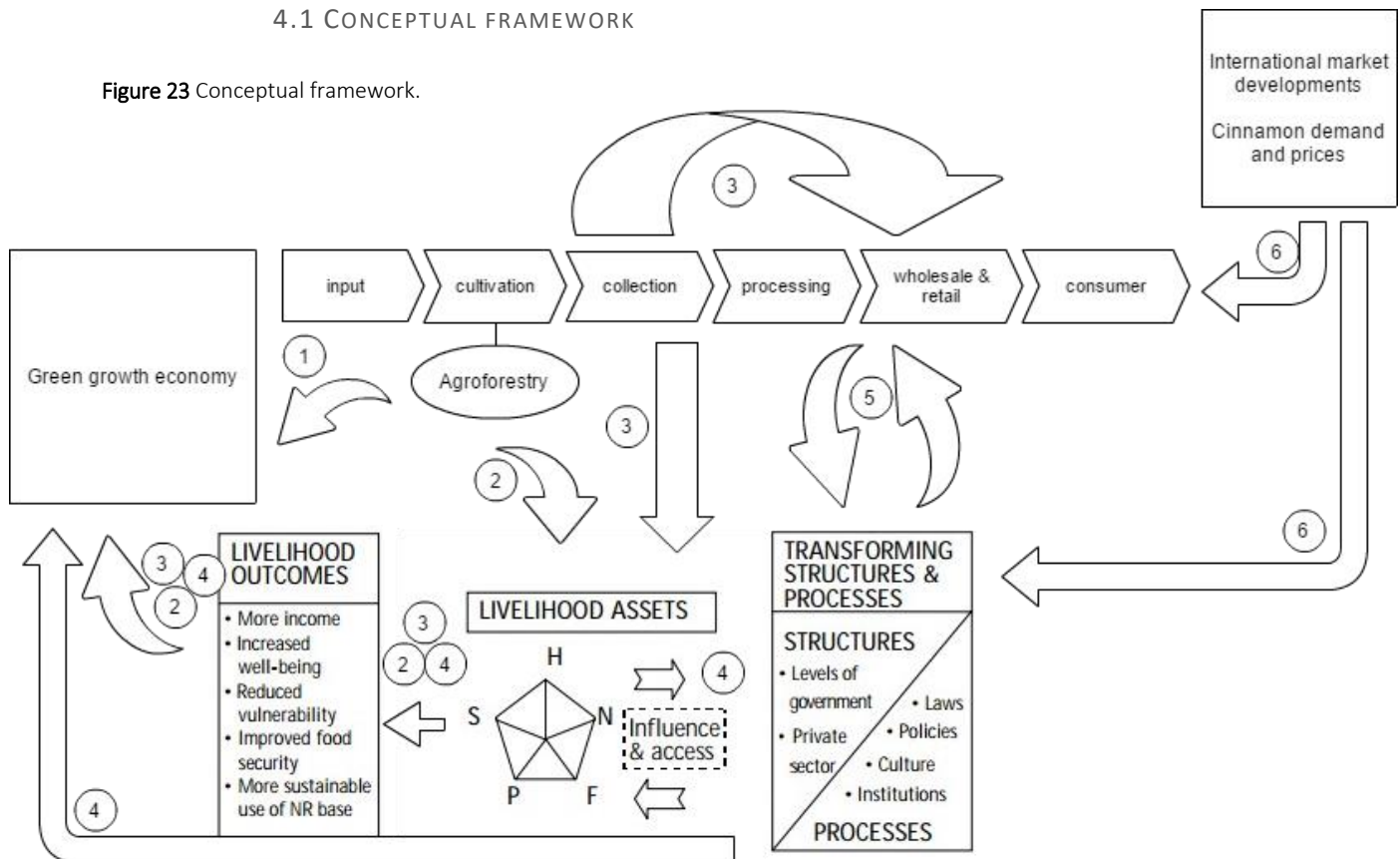
## 4. METHODOLOGY

This chapter describes how the research has been approached and which methods have been used to meet the research objective. First, the conceptual framework shows how the theoretical concepts are used in the research, then it is being discussed how these concepts were measured, which methods are used, and how data was collected and analyzed. Finally, the reliability, validity, and the main research limitations of the research are being discussed.



#### 4.1 CONCEPTUAL FRAMEWORK

Figure 23 Conceptual framework.



#### 4.2 EXPLANATION OF CONCEPTUAL FRAMEWORK

As a result of the aim of the RIMBA corridor and the societal and scientific relevance described before, the aim of this research is to analyze to what extent a green economy can be developed through the use of a shortened value chain in cinnamon as an agroforestry product. Developed from the theoretical concepts, the conceptual framework as presented in figure 22 is further explained below.

1. An agroforestry product such as cinnamon can contribute to developing a green economy by withholding the agricultural land from monoculture and by using trees which are good for the soil and biodiversity. Also a low input of especially chemical pesticides and fertilizers contribute to green growth.
2. Such an agroforestry system could also enhance farmers' livelihood assets by having income from different crops and not just one specific crop. Therefore the farmers are not dependent on the demand for one crop but can increase their chances. Increased livelihood assets are also an indicator for a green economy and therefore an agroforestry system contributes to green growth.
3. Yet, as mentioned in the regional context chapter, farmers in this area are choosing crops mainly based on the best economic value. Sometimes, the crops with the best economic value are not the most 'sustainable' crops, for example not agroforestry fitting crops or crops which need chemical inputs to grow. To attract farmers to continue with cinnamon, some companies started with a shortened value chain. By shortening the value chain, farmers are supposed to have more direct contact with the company (wholesale & retail).

This could result in a better price for the farmers, because less profit is disappearing in the pockets of middlemen. The price is also increased by the value added by means of product upgrading such as certification and local processing (because the two companies used in this research are certifying and processing the organic cinnamon in the area). This all could result in increased livelihood assets.

4. However, the livelihood capitals of farmer households are not only a result of the farming method (agroforestry or monoculture) or the value chain (and thereby the profit). The livelihood assets are also dependent on the access to the market, training, finance, or farmer cooperative. The access to these possibilities is being influenced by structures and processes, including the formal and informal organizational and institutional factors constitute actions of organizations, governments, or companies. These institutions can also directly affect the capitals and thereby influence the vulnerability of the farmers' livelihoods by changes in prices or policies. Finally, these institutions with their changing structures and processes can also have a direct influence on a green economy by installing policies with a positive effect on green growth.
5. These structures and processes also have influence on companies and value chains through policies or economic instruments such as taxes and subsidies which could pressure farmers and companies in the direction of organic agriculture. At the same time, companies or organizations could use these structures and processes to create a positive business climate.
6. The international public arena can influence these structures and processes, including the formal and informal organizational and institutional factors constitute actions of organizations, governments, or companies are also determined by decisions. Also the international market has influence on policies, but also prices.

As a result of the research problem and the insights of the conceptual framework, and the earlier mentioned social and scientific relevance, the research question is as following:

*To what extent does shortening the value chain of agroforestry commodities, more specific cinnamon, contribute to a green economy?*

To answer this research question the following sub-questions are being asked:

- On what basis are agroforestry systems considered to be conducive to a green economy?
- How do different actors shape the cinnamon value chain?
- How is the cinnamon value chain an obstacle for a green economy and what can be done about it?
- What is the difference in livelihood and environmental assets between farmers of a regular and a shortened cinnamon value chain?
- How do policies influence the contribution of a shortened cinnamon value chain to a green economy?

Throughout this research question, the following hypothesis will be tested:

HA: Shorter value chain contributes to a green economy

H1: Shorter value chain does not contribute to a green economy



### 4.3 OPERATIONALIZATION

In the theoretical chapter it already has been clarified which indicators have been assigned to each of the concepts, and how the concepts are being measured. In this paragraph will be elaborated on this at the level of the sub questions. For each of the sub questions the level of analysis, methods, analysis or framework, and indicators defined. All questions are partly analyzed on community level and therefore the data of the several questions can be related to each other.

**Table 2** operationalization sub questions.

Research sub question	Level of analysis	Methods	Analysis/ framework	indicators
1	household/ community	survey/ interview	sustainable livelihood analysis	input/output amount/ diversity crops economic benefits environmental benefits
2	company/ household/ community	interview/ company documents	value chain analysis/ document analysis	input / output market links/ relations contracts
3	household/ community	survey	sustainable livelihood analysis	social, financial, human, physical, natural capital input/output
4	community/ company government/ organizations	interview/ policy documents	value chain analysis/ document analysis	policies value chain governance
5	community/ company government/ organizations	interview/ policy documents	value chain analysis/ document analysis	policies value chain governance

### 4.4 METHODS

The methodological approach is explorative using a mixed-methods design whereby quantitative as well as qualitative methods are combined. The quantitative data has been collected by virtue of questions asked in the survey, used for the capitals of the livelihood framework. The qualitative data has also been collected through the surveys, but also at the hand of interviews. A mixed-methods design recognizes the importance of traditional quantitative and qualitative research but also offers a powerful third paradigm choice that often will provide the most informative, complete, balanced, and useful research results (Johnson et al., 2007). Therefore a mixed methods approach is complementary by which qualitative data can be substituted by numbers and figures and the results will have a higher validity. At the same time, quantitative data can be substituted by data gained from interviews. Besides, for this research both qualitative and quantitative data was needed for answering the research questions and for performing the sustainable livelihoods framework and the value chain analysis. Both kinds of data were collected at the same time, meaning the time of research, June 2016.

#### 4.5 DATA COLLECTION

The data used for this research was mainly primary, and partly secondary data, semi-structured interviews, and surveys. The main data sources were the four farmer groups, several local governmental departments, several Dutch organizations, local organizations, the company directors and staff and WWF.

The data collection started in the Netherlands with literature research about the main concepts of green economy, sustainable livelihoods, value chains and agroforestry. Connections were made at the company Cassia Co-op where an interview took place with the sales manager for the Netherlands. Also interviews were held with the Sustainable Spices Initiative (SSI), Sustainable Trade Initiative (IDH) and Rainforest Alliance. Starting with interviews in the Netherlands before the official fieldwork, created a forehanded glimpse on the value chain of organic cinnamon, and the role of the main stakeholders.

The next step was collecting data at the WWF office in Jambi while attending meetings and conducting exploratory interviews regarding the concepts of green economy and agroforestry with the staff. Being at the WWF office of the RIMBA project in Jambi made it possible to understand the governance structures in the context of the local economy and the relations between the villages, organizations and companies. Some additional literature research about the concepts also took place at the office to prepare the survey questions. In Kerinci, the key respondent Musnardi Moenir, living in the city Sungai Penuh, has guided through the cinnamon stakeholders in the area. Here, interviews with the local directors of the companies Cassia Co-op and Kerinci Agro and surveys with their farmers. For the survey, farmers were approached by visiting villages with cinnamon farmers. This way of a nonrandom selection has been chosen as a consequence of the Ramadan [*Ind.: Idul Fitri*]. Because of the Ramadan a focus group with the farmers was not possible. To collect information about the farmers' livelihoods and environmental practices a survey has been conducted in four different groups of farmers. A total of 20 farmers per group were selected based on the criteria. This way specific characteristics or discrepancies in livelihood sustainability can be measured between the groups. The survey consisted of quantitative and qualitative questions. In addition to the survey, interviews were held at local governmental departments in the city of Sungai Penuh and Merangin. These semi-structured interviews were held with the staff of the national park [*Ind.: Taman Nasional Kerinci Seblat (TNKS)*], the staff of the local government department about forestry [*Ind.: Kesatuan Pengelolaan Hutan (KPH)*], WWF, trade department [*Ind.: departemen perdagangan*] and agriculture/ forestry department [*Ind.: departemen kehutanan*]. The amount of interviews, with the main topics being discussed and the main interviewee of each institute or authority are being presented in table 3.

The surveys required information about the five capitals, among which the livelihood and environmental assets, and support from government are measured. The complete survey can be found in appendix 2.

Finally, participatory observation was done at the villages during the survey and while talking to farmers. This was useful to measure differences in livelihoods and sustainable practices of farming.

Staying in the research area helped to collect information about further ideas and practices of the farmers. Back in the Netherlands a follow-up interview was hold with the local director of Cassia Co-op. As he was staying with the founding member of Cassia Co-op, some questions were asked to him as well. Some final qualitative data was being collected through company documents and policy documents.

**Table 3** interviews; institute, subjects, amount, and the main interviewee(s).

Institute	Subject	Amount of interviews	Main interviewee
Rainforest Alliance	Shortened value chains, cinnamon, agroforestry	1	Martine Willems
IDH/ SSI	Shortened value chains, cinnamon, agroforestry	1	Lizzy van der Wal
Cassia Co-op	Farmers, the value chain, agroforestry, company cinnamon	7	Adrian Akhza, Steven Koelewijn
Kerinci Agro	Farmers, the value chain, agroforestry, company cinnamon	5	Hengki Putra
WWF	RIMBA, sustainable agriculture, relations between stakeholders, cinnamon, agroforestry	12	Doda Nugroho, Angga Putra, Sigid Ariyanto, Dudi Rufendi, Pietra Widiadi, Musnardi Moenir
Kerinci trade and forestry department	RIMBA, sustainable agriculture, relations between stakeholders	4	Several employees
Merangin trade and forestry department	RIMBA, sustainable agriculture, relations between stakeholders	4	Several employees
KPH	Survey villages, TNKS, green growth, RIMBA, agroforestry	3	Neneng Susanti, Sabaruddin
TNKS	Survey villages, TNKS, green growth, RIMBA, agroforestry	3	Several employees

**figure 24** survey with farmers Cassia Co-op.



**figure 25** survey with farmers of regular value chain in Merangin.

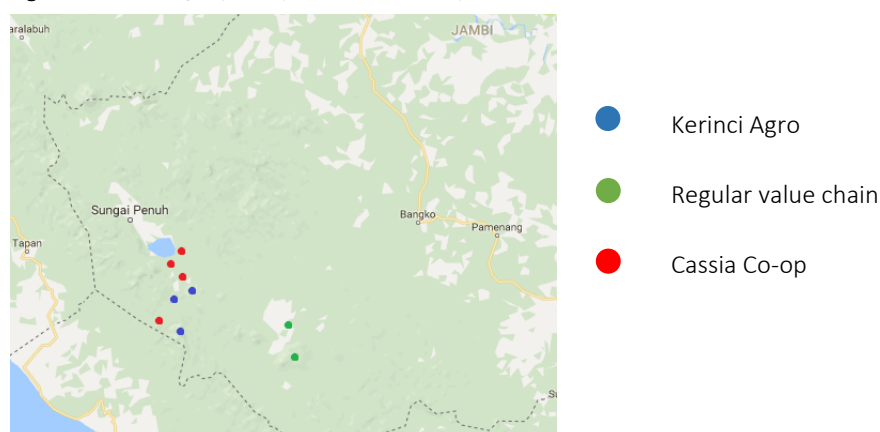


#### 4.6 RESEARCH SITE SELECTION

The site selected for this research builds upon several reasons. To start with, the Kerinci and Merangin district are the districts with the most cinnamon production of Sumatra. Within Kerinci, a great area is being covered by the forest, which could give interesting results regarding agroforestry.

Further, these districts are part of cluster 3 of the RIMBA project which aim is the aim of this research. WWF selected specific villages to contribute to the program of both agroforestry and micro hydro. For this research has been chosen to do research in a mix of villages (partially covered by the WWF program, partially not). The villages in Kerinci which participated in the survey are not part of this program, the villages in Merangin are part of the program of WWF. There has been chosen for this selection since the main objective of agroforestry is not only reforestation of the watershed, but also increasing the economic situation in villages and by looking at the same villages as the WWF program, the results might have been biased by the specific characteristics on which WWF has chosen these villages.

**Figure 25** The villages participated in the survey.



#### 4.7 THE RESPONDENTS

The respondents who participated in the survey are all farmers. These farmers however belong to four different groups with each a different value chain as described at the data collection. Of each group 20 farmer households participated in the survey. Therefore, a total of 80 farmer households participated in the survey. Most of the survey questions have been asked to all 80 households. Yet, some information only meant for cinnamon farmers have been asked to 3 of the 4 groups and therefore 60 farmers. The questions about coffee have been asked only to the group who is changing to coffee, and therefore asked to 20 farmer households. Unfortunately not all farmers were motivated to fill in all survey questions, therefore the amount of participants is noted at every variable when explained at the livelihood analysis chapter.

#### 4.8 DATA ANALYSIS

The data collected with the surveys at the farmers about livelihood capitals, market access, crop diversity has been to compare four groups of farmers in the two districts of Kerinci and Merangin to see if a shorter value chain has any effect on these factors and whether the sustainability of the livelihoods have effect on indicators which measure a green economy. For these surveys 20 farmers the quantitative data was analyzed with IMB SPSS Statistics and Microsoft Excel.

The analytical tools that are used include one-way Anova tests for continuous variables with post-hoc Dunnett tests and chi-square tests for nominal and ordinal variables. of each group have been selected. There has been chosen for Anova test to test the significance difference of the variables and the means between the three groups is interesting to this research. This has been tested through a post-hoc Dunnett's test since it is the only multiple comparison that allows to test means against a control mean (Field, 2013: 556). The chi-square test was chosen to show the differences in answers between the nominal variables between the four groups.

#### 4.9 RELIABILITY AND VALIDITY

Reliability in this study is accounted for by partly using statistical tests. Some of these tests can be repeated and may give the same outcomes due to use of data which is not likely subject to change. However most of the quantitative data is subject to change considering data such as main crops, prices, main expenses. These are specific for the timeframe in which the data was collected and unique for this research area. The livelihoods are also in constant change by reason of the change of policies, the institutional context or business. For the qualitative data, the same questions have been asked to all four groups of farmers and the institutions in both areas have had the same questions. This data, required from open questions and interviews, has been given in a specific context, subject to interpretation. This could therefore have effect on the reliability of the research.

Concerning validity, no general conclusions can be done from the research as both quantitative as qualitative data are from specific villages in the districts of Kerinci and Merangin, because this data is time and place specific.

#### 4.10 LIMITATIONS AND RISKS

The main limitations to this research is the language and cultural barrier since it is not the native language and culture of the researcher and therefore might cause a wrong interpretation. Though the researcher could speak some Bahasa Indonesia, the general language in Indonesia, most farmers only spoke Sumatran or other local languages. Therefore, for the interviews an independent interpreter has contributed. Also with visiting the villages for the surveys an independent interpreter has accompanied the researcher for explaining the questions showing the villages where the selected farmers live. Though the use of an interpreter has led to successful interviews, this also adds an extra layer of interpretation.

Also, consideration should be taken that the researcher is a white, Western female which might have impact on outcomes of my research. The researcher's appearance also caused some attention which at some points led to difficulties for the research since foreigners are not much seen in this part of Sumatra. This could also have influenced data results, giving different result than when a local from this area had asked the questions.

Another limitation is the time and therefore the amount of farmers that participated. The research took place in only two months and without funding, financial resources were enough only for this amount of time. Thereby, it has been a logistical challenge to reach farmers, as public transportation systems were not always adequate for the purpose of reaching remote places in a short time which made the researcher mostly dependent on the hospitality of local people and key respondents. Besides this, difficulties also occurred in finding farmers willing to participate in the survey and to

motivate respondents to fill in the survey completely. Further, the sampling method is a limitation to this research since farmers were selected by availability to join the survey while approaching the village unannounced. Therefore the data could be biased since farmers might have been missed being not home or available at the moment of the survey. Lastly, some of the survey questions might have been difficult for participants to disclose, such as income or personal opinions and experiences. Since this is sensitive data, these answers might be biased. To gain the most reliable data a strong effort has been made to emphasize the independence of this research and the anonymity of the participants.

#### 4.11 ETHICAL CONSIDERATIONS

The interviewees will be given a form of consent where is explained what will happen to the information they give. The researcher will also explain to the stakeholders the purpose of the research, what my research is about and why in this specific area. The farmers have joined the survey on a voluntary basis. Contact information has been collected from the interviewees at the local government departments, the company Cassia Co-op and WWF, and therefore a first version of this research will also be sent to them whether they disagree with some data or data results.



## 5. RESULTS

This part shows the results while answering the research questions. This chapter start with establishing the basis on which agroforestry systems are considered conducive to a green economy. Once the role of cinnamon in an agroforestry system is understood, and how such a system contributes in develop a green economy is established, the cinnamon value chain is presented with its different actors. On the basis of the cinnamon value chain, it can be noticed how such a value chain can be an obstacle for a green economy. As a response, possible solutions on how to mitigate such obstacles are given through a shortened value chain. To indicate the differences between the regular cinnamon value chain and a shortened cinnamon value chain, livelihood and environmental assets are measured. Finally, policies which influence these assets are evaluated. The results chapter is being followed by the conclusions and the discussion. The key findings show that a shortened cinnamon value chain does not eradicate middlemen, but uses them to become part of the system. Also, farmers use less chemical fertilizers and pesticides when they got training in organic farming. However, not all companies within a shortened value chain give training, which shows that there are also differences within a value chain.



## 5.1 THE COMPLETION OF CINNAMON IN AN AGROFORESTRY SYSTEM TO A GREEN ECONOMY

This chapter aims to answer the sub question ‘On what basis are agroforestry systems considered to be conducive to a green economy?’, by discussing the indicators of an agroforestry system which include economic as well as the environmental benefits of the cinnamon tree and how these effects can contribute to a green economy. First, the benefits of an agroforestry system in general will be elaborated upon, followed by looking at cinnamon in an agroforestry system more specific. Finally, the combination of cinnamon and coffee will be discussed as an integrated agroforestry system. The results in this chapter are from interviews and survey results.

On the ecological side, agroforestry is important for the western part of the Jambi province, used for covering slopes between the village and the forest with a diversified root system and stabilized soil covered by grass and trees. This is essential to avoid disastrous landslides, and maintain soil fertility on slopes. Farmers in the survey mentioned that when they have the chance, they would like to start with more tree crops such as surian, jengkol, shorea, bamboo or avocado. The main reason for these trees is that they stabilize the soil and keeping the soil fertile while no chemical pesticides or fertilizer is used. At the same time the farmers can sell the harvest from these trees. 47 farmers (n=50) in the survey have indicated that they are willing to do more agroforestry for the quality of the soil if they have the possibility. As one farmer of Cassia Co-op clarified,

*“I learned what qualities tree crops have for the soil. If I have some more money I can invest, I would like to plant some more trees, especially surian trees, around the slopes at the river. I feel like the river, our village’s source of irrigation, can be protected this way because the trees prevent erosion and landslides” (Farmer, Cassia Co-op).*

From the economic side, an agroforestry system has positive effect on a farmers’ livelihood because of the use of multiple crops. For an efficient agroforestry system with cinnamon in this area, short-term crops should be introduced one to five years after the cinnamon harvest. This way, these crops can use the required sunlight to grow because the land is still clear before the shoots emerge from the stumps of the cinnamon trees. This time is the most labor intensive since some time must be spent clearing grass and weeds. Planting short-term crops in this time period, the agroforestry system could support farmers to develop horticultural commodities. Based on observations of the soil and climatic conditions in this area, commodities suitable for intercropping are tubers such as yams, and horticultural commodities such as potatoes, tomatoes and chilies for which there is access to local markets (Cassia Co-op, 2012b). When the cinnamon trees are between six and ten years old, crops could be cultivated which require little sunlight. When the cinnamon reaches six years, stumps have grown into trees. The land is often left unmanaged even though it could still be intercropped with tubers and rhizomes (Cassia Co-op, 2012b). When talking to some farmers it seemed that farmers with a regular value chain are mostly following their neighbors example of crops. Farmers of Cassia Co-op seem to be more informed about which crops fit well in the agroforestry system compared to farmers of Kerinci Agro or the regular value chain.

According to Cassia Co-op (2012b), farmers in general lack the capacity to manage their cinnamon gardens in an integrated and sustainable way as an agroforestry system, which means that the gardens are used only for growing cinnamon and not for developing other commodities. From the survey results it is noticeable that farmers choose to farm certain crops mostly based on economic reasons. However, when economic reasons are seen as most important to the farmer, one might ask what this means for the environmental qualities. Such as profit are seen as most important for the farmer, environmental qualities might be neglected. As has been said by a Dudi Rufendi, member of the RIMBA project, WWF,

*“Cinnamon trees have deep roots and are therefore useful for soil conservation. Yet, farmers can make disastrous decisions when it comes to disappointing prices. So what is happening sometimes, is that farmers are frustrated by the prices of cinnamon and completely want to change to another commodity. When farmers only have cinnamon trees on a plot, and all cinnamon trees are being cut out at once, it could have disastrous effect on the soil” (Dudi Rufendi, WWF).*

Also the use of inputs such as pesticides and fertilizers for their cinnamon trees is important since an agroforest can acquire the best environmental conditions when the crops are produced organically (Dudi Rufendi, WWF). However, after replanting when the cinnamon trees are cut, the farmers grow horticultural commodities such as chilies, potatoes and other crops until the cinnamon trees have reached the age of six years old. During that time, the farmers cultivate horticultural commodities and secondary crops very intensively, using high dosage chemical fertilizers and chemical pesticides. Yet, the input costs and labor requirements for cinnamon are generally very low. Not all farmers are aware of this or acknowledge this, especially farmers who are not aware of the benefits of an agroforest, and want to reach maturity of the crops faster by using chemicals. From the survey results it can be noticed that mostly farmers which did not receive required training are using chemicals. As explained by Neneng Susanti, staff member of KPH,

*“Farmers who are practicing agroforestry systems, already do this for centuries. Agroforestry systems are ancient systems used in this area, but chemical pesticides and fertilizers are not. When some crops do not grow well, the farmers are facile with using these chemicals. Yet this discourages the positive effect of agroforestry on biodiversity” (Neneng Susanti, KPH).*

When looking at the differences between the two value chains, the two companies with the shortened value chains are certifying their farmers which produce organic cinnamon. This way, value is being added to the cinnamon, and therefore might result in a better price. Once changed to organic cinnamon while using the audit rules of Rainforest Alliance has observable effect, as one of the farmers of Cassia Co-op indicated,

*“I joined Cassia co-op two years ago. Before we managed our land using slash-and-burn techniques and herbicides which turned out not to be good for the soil. As a result, the land became increasingly barren and unproductive. After Cassia co-op trained us how to farm organically using organic fertilizers, I saw the structure of the soil recovering. From this lesson I learned that changing from slash-and-burn activities to organic way of farming leads to higher soil fertility” (farmer, Cassia Co-op).*

Despite the positive effect of cinnamon in an agroforestry system, there are some issues which could restrain farmers to start doing agroforestry. As Neneng Susanti, KPH, mentioned,

*“Time, input, and land are the major restraints on farmers who want to start agroforestry plots. First, they have to know which trees can be combined and how they can complement each other according to the time till harvest. Second, the farmers need to know the positive effect of an agroforestry system and how they complement this. By farming organically for example. Third, a farmer needs a big land for agroforestry, which is for many farmers not affordable”. (Neneng Susanti, KPH).*

Besides these factors mentioned by Neneng Susanti, there are other issues restraining some farmers from doing agroforestry, especially with cinnamon trees. As a farmer leader in Merangin mentioned:

*“Given the amount of time required for cinnamon trees to reach maturity, farmers have recently been more interested in other, faster yielding agroforestry rotations such as coffee. Especially in Merangin farmers do not have the capital for plants or trees that require a relatively long time to be harvested. Not only cinnamon trees, but agroforestry crops in general take longer to reach harvestable maturity. Thereby, the farmers follow the market in crops and agroforestry crops do not always give the best market price” (farmer leader, desa tuo, Merangin)*

Cinnamon is indeed a worldwide commodity, just like more agroforestry commodities, mostly produced for the export market. Therefore, the benefits of cinnamon are depended on the fluctuations of the world cinnamon market . Also during the long waiting time for cinnamon to reach quality, the market and therefore prices can change drastically. Instead of changing completely to another crop, combination of cinnamon with short-term crops could work positively for the famers’ economic situation. Of the farmer households who participated in the survey, more than half (58.83% (n=60)) of the cinnamon farmers want to change to coffee. When farmers are quitting cinnamon and changing to coffee, the result might be that the agroforestry is losing the qualities of the cinnamon trees and possibly even change into a monoculture system.

Yet, an integrated agroforestry system with coffee and cinnamon is possible, which is explained by Musnardi Moenir on the following page. It should be noticed that this can result in several practices of such a system. There can be a cinnamon agroforest with coffee (figure 26), or a coffee plantation with cinnamon trees (figure 27). The first has a more positive effect on the environment than the latter.

**Figure 26** Cinnamon agroforestry with coffee



**Figure 27** Coffee plantation with cinnamon trees





Coffee (robusta) plants could grow in the shades of the cinnamon tree, as explained by Musnardi Moenir of WWF,

*Since 2000 the price of cinnamon has begun to increase. As a result farmers harvested their cinnamon, which resulted in empty gardens. Therefore robusta coffee seedlings have been planted between the cinnamon stumps. The cinnamon stumps will grow new shoots, and robusta coffee trees will grow along cinnamon buds. Robusta coffee will grow and can be harvested in the third year, while at the same time the cinnamon trees are also growing. Afterwards, the coffee can be harvested in the third, fourth, and fifth year. In the sixth year, cinnamon trees has grown high, which makes it no longer possible for the coffee plants to produce. (Mugnardi Moenir, WWF)*

Yet Musnardi understands why some farmers are changing completely from cinnamon to coffee,

*If the coffee is growing and producing well, the farmer might consider to use the area of cinnamon trees for more coffee plants. But this can also be the other way around. Since the coffee prices have been increasing lately, this also is a factor for farmers to choose more for coffee, since farmers are always looking for a commodity with the most satisfying price. (Mugnardi Moenir, WWF)*

For the farmers it is important to be informed before making sincere changes. The coffee market is being seen by the farmers as a more stable market, while coffee prices are subject to quite some change. At the moment of fieldwork, the coffee prices for local communities were relatively high compared to cinnamon. Therefore, according to WWF,

*“The farmers do not have enough information to understand that the high price for coffee is only related to high quality coffee. Farmers do not make calculations from the beginning of a crop to selling the crop which crops fits best in the agroforestry system. Therefore they need to be accompanied by a company or the government”.*

#### 5.1.1 CONCLUSION

In answering the sub question ‘On what basis are agroforestry systems considered to be conducive to a green economy?’, the main results from internal documents and interviews are that cinnamon trees with their deep roots are useful for soil conservation. Yet, when farmers decide to quit with cinnamon, the soil could lose its stability. It seems that getting the best benefits in creating a green economy out of an agroforestry system, farmers should be informed about inputs, and crop combinations. This applies to farmers who are already doing agroforestry, because it seems to be difficult for new farmers to start doing agroforestry. It is best for the economic situation of the farmer to combine long-term tree crops, such as cinnamon, with short-term cash crops, such as coffee.

## 5.2 THE LOCAL VALUE CHAIN

### A VALUE CHAIN ANALYSIS

This chapter aims at presenting the main characteristics of the actors and main structures of the cinnamon value chain in answering the sub questions: ‘How do different actors shape the cinnamon value chain?’ and ‘How is the cinnamon value chain an obstacle for a green economy and what can be done about it?’ by means of using the value chain analysis. This chapter will focus on governance of the value chain and the market links. Additionally, the linkages and relations between producers and buyers, which activities are carried out and where and how access to the value chain can be established for smallholders is being examined. The quantitative data used in this chapter is being elaborated on in the next chapter where the different value chains are compared on livelihood assets. The relations with stakeholders outside the value chain will be described in the final chapter. The results in this chapter come from interviews, internal documents of the companies, and sometimes supported by survey results.

#### 5.2.1 REGULAR VALUE CHAIN

As already shortly mentioned in the regional context chapter, at a regular value chain there are in general three middlemen present. The role of these middlemen is explained by WWF,

*“At first, there is the local collector in the village, who collects the cinnamon from one village. After he collected, a second middleman collects the cinnamon from several village collectors or village markets. Such collectors often control a specific area. After this, this collector brings the cinnamon to a wholesaler in the city where the cinnamon is being weighted and the quality will be determined in warehouses. Here the final steps of drying, selection and packing will be done. From such a warehouse, the collector hears the estimated prices to be paid according to the average quality of the cinnamon, with which he will inform the farmers or the smaller collectors. From here a third middlemen will collect the cinnamon from several areas and brings it to the port, mostly in Padang” (Pietra Widiadi, WWF).*

Farmers can choose to go to the warehouse when they have cinnamon to sale or they can be working on demand and solicited by the local collector themselves who need to insure regular sufficient supply (Cassia Co-op, 2012a). In the survey, particularly the latter occurs. The local collectors can be working independently, but also might work for the bigger wholesalers who will have his group of local collectors who go around in the countryside, on rural market places, to be the first to buy all available raw product. These wealthier wholesalers are mostly well connected to or part of the richest landowning families, at the head of hundreds of hectares of cinnamon plantations, and sometimes large scale landowners themselves. These wealthier farmers are most of the time not working on the land themselves but they have concession holders [*Ind. petani borongan*] and daily workers. The concession holders pay a fee to get the right to exploit a delimited parcel of cinnamon trees. This principle has taken over the older way of crop sharing (Cassia Co-op, 2012a). More information about the concession holder system can be found in Appendix 5. In the past, the wealthier landowners used



to have 60% of the land, while land workers or concession holders only 40% of the land (Cassia Co-op, 2012a). However, after a price rise in cinnamon, the concession holders could buy land and climbed up to be now the wealthier farmers (Cassia Co-op, 2012a).

After a first stage of roughdrying, the cinnamon bark is brought back to either the house of the concession holder, for further selection, cleaning and drying, or to the warehouse of destination where a local buyer will take care of the raw product (Cassia Co-op, 2012a). Transportation by small trucks is an extra cost and therefore usually part of the deal between the concession holder and the farmer, handled by one or the other. As the results of the survey shows, 72 (n=80) of the farmer let the cinnamon pick up by the local collector.

In the area of Kerinci, six major cinnamon wholesalers are reputed to be active, centralizing a great part of the overall Kerinci production of cinnamon (Cassia Co-op, 2012a). Still, some smaller wholesalers are to be found, spread out in the region and at village level, dealing smaller amounts of cinnamon but part of the final link of the cinnamon supply chain before export (Cassia Co-op, 2012a).

Farmers sell their cinnamon standing in the field to village collectors. In general, farmers sell their cinnamon to local collectors while using a cash payment system. They do not have a bargaining power in determining the price, as traders will give the same price while farmers have no access to another buyer. If there is no money for the harvest, then farmers will sell the tree to the collector, and the collector will do the harvest which will be calculated in the cinnamon price for the farmer (Cassia Co-op, 2012a). The collectors usually give farmers a 50% cash advance just before the harvest and the remainder about two months later. The collectors often harvest, peel, and dry the cinnamon. After sorting the dried cinnamon for quality, the village collectors sell the cinnamon to traders in the city. With productivity at 27 tons to 30 tons dry cinnamon per hectare, the collectors are earning in excess of IDR 2,025,500,000. Post-harvest processing costs are IDR 60,000,000 per hectare, which leaves the collectors with plenty of profit (Cassia Co-op, 2012a). Therefore, farmers lose profit by selling their cinnamon standing in the field to collectors. The main reason is that the farmers, except for the concession holders, do not have the cash to pay for the labor costs, post-harvest processing, transport and marketing and thereby farmers often lack the information for selling it directly by themselves. From the survey results it seemed that 63 (n=73) farmers feel they lack in information about the value chain. Most of the farmers of the group with the regular value chain do not know much about the value chain after the cinnamon is taken by the local collector. 8 farmers (n= 20) participated know a little bit about the value chain while 12 farmers (n=20) claim to have no understanding of the value chain (survey). However, these farmers do not think this is a problem because

*“Our relation with the local collector is completely based on trust. The local collector asks the same price as companies or this price is already a fixed price. I give cinnamon to the local collector because he is part of our community and therefore I trust him. he tells us information about the market for cinnamon and the prices. He sees more villages and has contact with the port in Padang and from there he knows about the market prices and developments. I do not really know how the value chain works, but I don’t think it is very necessary for me to know” (farmer, regular value chain).*

Yet, this is a substantial problem since as a result, only a part of the cinnamon profit ends up at the farmer. It seems that the farmers do not think the low cinnamon prices are the result of the many middlemen, but because of the cinnamon market. As a result, 35 (n=60) cinnamon farmers within the regular value chain are thinking of changing to other commodities with a better profit, and also one which can be harvested faster (survey).

A regular value chain is similar to the basic market principle where information regarding the prices and farming methods are easily transmitted by local collectors who are visiting several villages and where farmers are dependent on the price and the information these local collectors mention. The farmers are dependent on the local collector. As a response to the negative aspects of this value chain, several companies in this area have developed a shortened value chain in cinnamon. As explained before, these are Cassia Co-op and Kerinci Agro.

### 5.2.2 SHORTER VALUE CHAIN

To start with, Cassia Co-op has a mission to integrate into the cinnamon value chain through vertical coordination in order to control quality, secure availability and add value at origin (Cassia Co-op, 2012a). They try to achieve this goal by having direct contact farmers while supporting them in producing organic cinnamon by giving training and bonuses of IDR 1000 per kilogram for organic cinnamon. Cassia Co-op aims to improve the local economy by hiring local people and by processing the cinnamon in the same area. Yet for the price, Cassia Co-op is dependent on the market. The farmers who produce organic cinnamon sign a contract with Cassia Co-op, but the farmers can also choose to sell their cinnamon to other buyers if they want. Non-organic, or conventional cinnamon farmers will not sign a contract with Cassia Co-op but they can sell their cinnamon to Cassia Co-op. They train the contracted farmers to harvest the cinnamon when the trees are around 15 or 20 years old and to use only organic inputs, such as compost. Also, they try to empower the farmers by sharing knowledge about the market and price changes. Sustainable Spices Initiative (SSI) has money to fund pilot projects as these, and therefore they support the trainings with 30 to 50% (Lizzy van der Wal, SSI). These trainings happen in the training center of Cassia Co-op.

Once the farmers got the training, the farms will be audited for the Rainforest Alliance certification. Most of the farmers of Cassia Co-op were already producing cinnamon, sometimes even organic, but there was not yet an accessible market for. At this moment 2500 farmers are certified.

Despite the efforts of shortening the value chain and giving bonus for organic cinnamon, they still notice a decline in cinnamon supply while the demand is still growing. However, more farmers of Cassia Co-op are willing to continue cinnamon production (12 (n=20)) than with a regular value chain (6 (n=20)). As one farmer of Cassia Co-op mentioned:

*Many other farmers cut down their cinnamon plants because they are frustrated because of the low prices and start to plant other crops such as coffee and orange. Our price is enough for the effort we put in it and therefore we keep the cinnamon trees.*

Besides the contracts signed with organic cinnamon farmers, Cassia Co-op also works together with local collectors. These local collectors also sign a contract with cassia coop and pick up the cinnamon at the farmers' houses or fields.

Subsequently, they bring the cinnamon with a truck to Cassia Co-op. Therefore, the local collectors will get the bonus instead of the farmer. Also the price the local collectors ask to the farmers is not stipulated in a contract, and might therefore be lower than the collectors get themselves.

The farmer can choose whether he wants to bring it himself to Cassia Co-op or let the collector pick it up. However, most of the farmers do not have the tools to cut the cinnamon trees themselves or do not have a truck to bring it to Cassia Co-op. 20% to 40% of the farmers bring the cinnamon to Cassia Co-op themselves, while 60% to 80% let the cinnamon pick up by the local collector (Adrian Akhza, Cassia Co-op). Local collectors are part of Cassia Coop, but as the survey shows, their income is 6.6 times higher than the farmers. The average of farmers' income is IDR 1539705,88 (€105,91), while the average income of the local collectors is IDR 10166666,67 (€699,35) Local collectors are often part of wealthy families, owning a great amount of land themselves. A picture of local collectors' house is shown in figure 28. Cassia Co-op exports 100% of its cinnamon using around 5 to 6 containers per month of which 60% going to Europe.

**Figure 28** House of local collector of Cassia Co-op.



The governance of the company of Kerinci Agro is similar to that of Cassia Co-op. Kerinci Agro also aims to do sustainable trade, more specific to increase the income of farmers and decreasing the problems with gender by empowering women while hiring more women and giving them also a good salary. Kerinci Agro tries to improve the local economy by hiring employees from Pulau Sangar, the local village where the plant is located and by increasing value for cinnamon through processing it in the local plant (Hengki Putra, Kerinci Agro). Kerinci Agro informs the farmers every 2 to 3 months about the market situation of cinnamon. Concerning the price changes, Kerinci Agro seems to have more control than Cassia Co-op by using the following system, explained by Hengki Putra:

*"The port of Padang has a certain monopoly in the cinnamon prices because they have a stock in cinnamon, and hence they decide for the stocks to go up, the prices go down. This influences the behavior of the farmers because when the price of cinnamon in padang increases, farmers choose to cut down their cinnamon and on account of that, two weeks later the price of cinnamon decreases. Kerinci Agro is they have their own stocks and therefore they can create a stable price for the farmers" (Hengki Putra, director Kerinci Agro).*

If farmers come to bring cinnamon to the warehouse themselves, they get 30% higher on the price than a local collector would get (Hengki Putra, Kerinci Agro). Yet the survey results show that all 20 farmers surveyed let their cinnamon pick up

by the local collector. The farmers say to trust the local collector and giving them the fair price (survey). The farmers and local collectors have not signed contracts with Kerinci Agro, because they work on a system based on trust. Kerinci Agro is however buying the organic cinnamon from the same farmers since these farmers are audited by Ecocert certification. The main bottleneck Kerinci Agro is facing with organic cinnamon is that farmers are not used to the cleanliness and standards imposed by the audit of Ecocert. Yet, Kerinci Agro does not give training about organic farming because they feel the farmers themselves have the best knowledge.

According to the market links and relations described in this chapter, the governance structure of the shortened value chains of Cassia Co-op and Kerinci Agro seem to be similar. They both fit in a relational value chain since a lead firm in the chain specifies what is needed from the farmers and thereby has control over these farmers. Also both companies in the shortened value chain have control over certain local collectors who bring them their required amount.

### 5.2.3 CONCLUSION

In answering the sub questions ‘How do different actors shape the cinnamon value chain?’ and ‘How is the cinnamon value chain an obstacle for a green economy and what can be done about it?’, the main characteristics of both chains, and both companies with the shorter value chains, are shown in table 4. Within a regular value chain, farmers are not always producing organic because they cannot certify this. They do not get training and do not know much about the value chain. For the two companies with a shortened value chain, it seems that Kerinci Agro is shortening the value chain by using local customs, such as direct cash payment and trust system, while Cassia Co-op is working with contracts. As for the value chain analysis, the input-output structure is being given at the following chapter. The geographic scope, as discussed in the beginning of this chapter, only includes the area of Jambi (the cinnamon farmers), until the port in Padang. The governance structure has been discussed and can be found in the table below. Upgrading of the product is certification and local processing for both companies.

**Tabel 4** Main characteristics value chains; shortened value chain: Cassia Co-op, Kerinci Agro; regular value chain.

Main characteristics	Cassia Co-op	Kerinci Agro	Regular value chain
Value chain governance	relational value chain	relational value chain	market
Certified/ organic/ conventional	Rainforest Alliance certified, try to boost organic	Ecocert certified, try to boost organic	not certified, but can be organic
Knowledge/ training value chain	every month price information, training	every 2/3 months price information, no training	price information from local collector, no training
Knowledge/ training cinnamon production	training only in organic production	no training, information from social network	no training, information from social network
Contract farmers	yes, organic farmers	no (system based on trust)	no (system based on trust)
Influencing cinnamon price	by bonus for organic	by having own stocks (not dependent on Padang)	international market, port of Padang
Access to value chain	farmer himself or through local collector	farmer himself or through local collector	through local collector

## 5.3 THE FARMERS AND THEIR LIVELIHOODS

### *A SUSTAINABLE LIVELIHOOD ANALYSIS*

To answer the sub question ‘What is the difference in livelihood and environmental assets between farmers of a regular and a shortened cinnamon value chain?’, this chapter aims to provide an overview of the livelihoods through the sustainable livelihood framework by discussing the main capitals which provide the assets for a sustainable livelihood. The results are from the survey. A comparative analysis is done by the two value chains; the shortened and the regular value chain, are divided in four groups. The shortened value chain is divided in two groups of farmers of two companies; Cassia Co-op (n=20) and Kerinci Agro (n=20). The regular value chain is also divided in two groups of farmers; farmers who are still producing cinnamon (n=20) and farmers who are changing to coffee (n=20). Presented in this chapter, the farmers of Cassia Co-op are group 1, farmers of a regular value chain are group 2, farmers who are changing to coffee are group 3, and farmers of Kerinci Agro are group 4. The livelihood and environmental assets measured through this framework are an indicator for green economy. Before studying the household livelihood assets per group through the capitals, an overview of the household characteristics will be discussed.

In order to contribute to the main research question of ‘*to what extent does shortening the value chain of agroforestry commodities, more specific cinnamon, contribute to a green economy?*’ a selection in essential information of the livelihood assets is made which offer information in contributing to a green economy. The most crucial variables for therefore are the inputs training, pesticides and fertilizers. The essential outputs are the prices, income, and soil fertility. Other variables given are to clarify these main variables.

#### 5.3.1 GENERAL HOUSEHOLD CHARACTERISTICS

On average, the land of cinnamon farmers is mostly divided between land to cultivate the horticultural crops that is located not far from their homes where they keep on average 23 crops, mostly horticultural crops such as potatoes, tomatoes, beans, chili and other vegetables, and agroforestry land with the cinnamon trees and other tree crops which is located far from their homes. 35 farmers (n=60) want to change, while 20 farmers already changed to coffee. 38 cinnamon farmers (n=58) noticed that cinnamon is very important for their income, and 12 (n=58) mentioned cinnamon to be important for their income. 22 farmers (n=80) have jobs besides farming as a teacher, handyman, or builder in the land of others. These are farmers who finished at least high school. The income farmers earn every month is subject to change, but the average of the four groups is between IDR 2.000.000 (= €137, 59) to IDR 4.000.000<sup>2</sup> (= €257,18) per month, spending it mostly on family costs (83.5%). While each of them need to fund their family members on average 2.3 persons. 58 farmers (n=60) are dependent on natural resources such as water from the river which they use for irrigation. In the survey mostly male headed household heads participated. 72 (n=80) were male and 9 female. When asked it was mentioned that the male household members would have a better overview of the crops.

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<sup>2</sup> Poverty rate for the Jambi province was in 2016 IDR 1.906.650. Minimum income for these villages (UMP) is IDR 800.000

### 5.3.2 NATURAL CAPITAL

To describe the natural capital as the first capital of the sustainable livelihood framework, it is useful for the environmental assets to look at the inputs such as size of the land, the amount of land, and the amount of chemical or organic pesticides and fertilizers. The output variables, such as amount of crops, mainly has effect on livelihood assets. At the theoretical chapter of value chains, the access of smallholders to the value chains was analyzed, using four factors. One of these is access to land, which partly also depends on social capital. However, at natural capital it is being discussed whether farmers own, rent, or inherit land, which also says something about the accessibility to land. Finally, all these variables are compared between the two value chains. The results of this section therefore adds to the main research question on the extent to which the shortened value chain contributes to a green economy.

#### Land

Within the survey, 77 (n=80) mentioned that they own the land themselves, and only 3 farmer households who rent (part of) the land. The farmers of Cassia Co-op have the most amount lands and hectare, but also the most mutual difference as can be seen by the standard deviation. The farmers of Cassia Co-op have an average of 4.35 land ( $\pm 3.48$ ) of 12.6 hectare ( $\pm 15.39$ ). This standard deviation in amount of hectare is possible due to a few farmers taking part in the survey who are also local collectors (survey). Without the outliers, the mean of land hectare of group 1 is 7.12 ( $\pm 8.19$ ). The group farmers with the regular value chain have much less land than the group of Cassia Co-op, an average of 1.73 ( $\pm 0.91$ ) and 2.8 hectares ( $\pm 1.93$ ). The farmers who are changing or have changed to coffee have on average more land than the farmers with cinnamon with a normal value chain, with a mean of 3 lands ( $\pm 1.65$ ) and 2.2 hectares ( $\pm 1.65$ ). The group of Kerinci agro have an average of 2.45 lands ( $\pm 1.32$ ) of 5 hectare ( $\pm 2.14$ ).

**Table 5** Anova test with post-hoc Dunnett test for land hectare (in hectare) and amount of lands <sup>3</sup>. Group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro

Variable	F	1	2	3	4
Land hectare	6.46***	12.60 <sup>±b</sup> 15.39	2.80 <sup>±ab</sup> 1.93	2.21 <sup>±ab</sup> 1.65	4.88 <sup>±ab</sup> 2.15
Amount of land	3.68*	4.35 <sup>±ab</sup> 3.48	1.73 <sup>±ab</sup> 0.91	3.00 <sup>±a</sup> 1.65	2.37 <sup>±ab</sup> 1.30

<sup>3</sup> For both variables, the p value is lower than the  $\alpha$  level, which means that the variances are not equal and the homogeneity of variance assumption is not accepted.



When looking at the variable of land hectare in table 2, a significant difference can be noticed among the four groups. Groups 2, 3, and 4 are not significant with each other but they are all significant with group 1. This implies that group 1 has significantly more land hectare than the other three groups. For the amount of lands, group 1 is significant with group 4 and group 2. Group 3 is not significant to the other 3 groups. This means that group 3 is not significant to the other three groups when it comes to the amount of land. This implies that the relationship of amount of land between group 1, 2, and 4 relate to each other more than group 3

In the Jambi province, cinnamon trees are often being inherited from generation to generation and widely spread over the districts of Kerinci and Merangin. 45 households (n= 80) participated in the survey said to have inherited the land. Renting of land is not that common, most households bought their land from neighbors or inherited it from their parents or grandparents. As table 6 shows, and is being explained in the regional context chapter, the land with cinnamon trees is often inherited from older generations and, this makes it more difficult for farmers to abandon the cinnamon trees .

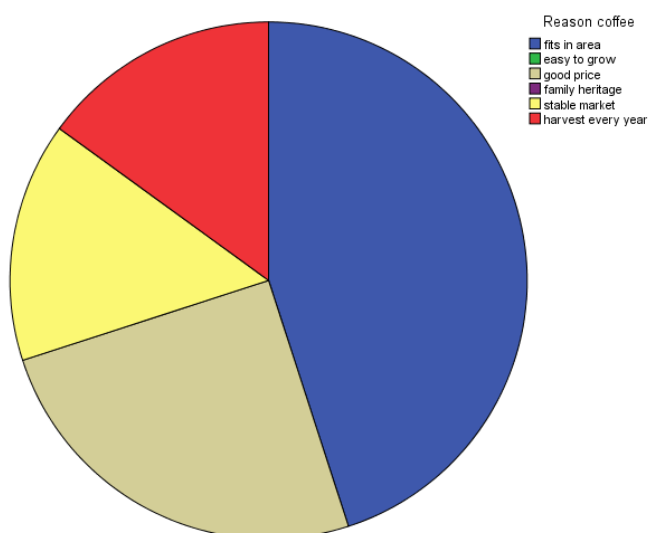
**Table 6** Amount of farmers who own lands (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

Variable	1 (N=20)	2 (N=20)	3 (N=20)	4 (N=20)	Total (N=80)
Land bought	8	6	5	13	32
Land inherited	9	14	15	7	45
Land rented	3	0	0	0	3

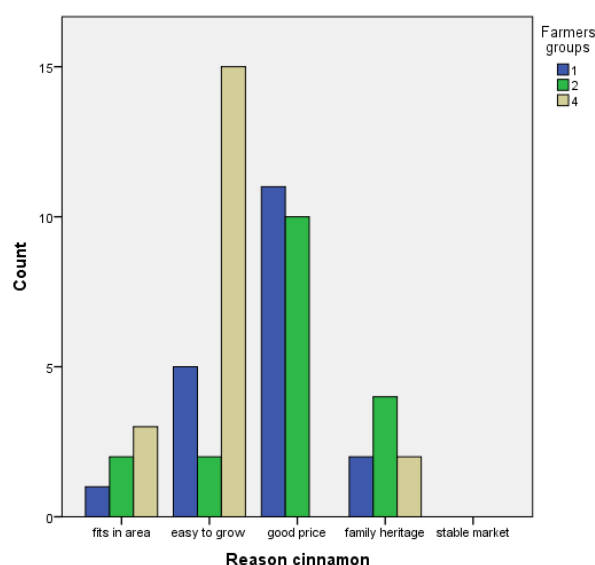
### Crops

As for why farmers choose for a specific crop, depends on different kinds of factors. According to figure 29 and 30, the reason why the farmers have chosen for cinnamon, and some have changed to coffee, is mainly due to economic reasons. As described at the general household characteristics, this corresponds with the fact that all farmers (n=80) mention that cinnamon is an important and crucial crop for their income. 22 farmer households (n=57) mention that cinnamon is easy to grow (Cassia Co-op: 5, regular value chain: 2, Kerinci Agro: 4). For coffee its seems that fitting in the area is seen as most essential (figure 30). Also the ability of having harvest every year and a stable market are reasons for farmers to choose for coffee as can be noticed from figure 29.

**Figure 29** Reasons for coffee (group 3: change to coffee)



**Figure 30** Reasons for cinnamon (Group 1: Cassia Co-op, 2: regular value chain, 4: Kerinci Agro)



Many farmers in this area who are practicing agroforestry, are combining coffee and cinnamon trees. Yet, a quarter of the survey households of the group who is changing to coffee, abandoned the cinnamon trees. An explanation of why the farmers do not keep mixing coffee with cinnamon is not clear. Yet, as described at the regional context chapter, farmers abandon cinnamon trees when the prices are not satisfying or when the area is too high for creating a good quality cinnamon. An explanation about the farmers' behavior is given below. 35 (n=60) farmers asked whether they want to change to another commodity, answered that they want to change from cinnamon to coffee. For 17 (n=20) farmers who changed to coffee, the coffee is seen as important or very important and therefore a main crop for the income.

*"Farmers can be impatient, especially when they are in need of money. This results in farmers who are not waiting for the cinnamon trees to reach the age of good quality and not making a management plan. They get especially frustrated when they waited such an amount of years and then the price is disappointing. This causes that farmers want to change to a commodity which gives a harvest every year or even more often." (Pietra Widadi, WWF)*

When looking a bit more general at the crops, it can be noticed from table 7 that on average, the farmer households have 1.46 household crops and 1.97 market crops, whereby the farmers of group 1 have the most household crops and the farmers of group 2 have the most market crops. The relationship between the groups is non-significant. As for the amount of crops, the differences between the four groups are significant. The farmers of group 1, 2, and 3 are not significant different towards each other, while the amount of crops of farmers of group 4 is significant towards all groups. For household crops, this is the same. When looking at market crops, there is no significant difference between the four groups. This implies that for crops and household crops, group 4 has a significantly different amount than the other groups. For market crops the relation is non-significant, meaning that there is no difference in the amount of market crops<sup>4</sup> between the four groups.

**Table 7** Anova with post-hoc Dunnett test for the amount of crops, household crops, and market crops<sup>5</sup>. (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

Variable	F	1	2	3	4
Crops	3.18***	2.74 <sup>±ab</sup> 0.65	2.55 <sup>±ab</sup> 0.51	2.60 <sup>±ab</sup> 0.68	4.84 <sup>±b</sup> 0.69
Household crops	1.46***	1.11 <sup>±ab</sup> 0.76	0.85 <sup>±ab</sup> 0.37	0.95 <sup>±ab</sup> 0.22	2.89 <sup>±b</sup> 0.57
Market crops	1.97 <sup>ns</sup>	1.89 <sup>±a</sup> 0.88	2.45 <sup>±a</sup> 0.51	1.95 <sup>±a</sup> 1.15	0.95 <sup>±a</sup> 0.62

<sup>4</sup> Household crops: potatoes, tomatoes, beans, chili and other vegetables.  
Market crops: cinnamon, coffee, rice.

<sup>5</sup> For both variables of household and market crops, the p value is lower than the  $\alpha$  level, which means that the variances are not equal and the homogeneity of variance assumption is not accepted. For the amount of crops, the assumption can be accepted.

## Fertilizers/ pesticides

The farmers have been asked about their use of pesticides and fertilizers, what kind, how much, and for which crops. This is useful information since this has effect on the quality of the soil. Organic production should contribute to a green economy more than when chemical pesticides and/ or fertilizers are used.

As mentioned in the regional context chapter, cinnamon trees are known for growing naturally, without many pesticides or fertilizers. Yet some farmers do use these inputs, for the cinnamon or for the crops in the cinnamon agroforest.

For all farmers participated in the survey, 27 farmers (n=80) use pesticides for the cinnamon trees while 49 farmers (n=77) uses fertilizers for the cinnamon trees, compared to 44 (n=76) pesticides and 66 (n=68) fertilizer for other crops such as chili and coffee. Organic fertilizers could be leaves of the cinnamon tree, about which is more described in the paragraph

The farmers of group 1 do not use pesticides for their cinnamon, but 12 farmer households (n=20) use pesticides for other crops, mostly chili and sometimes coffee. These farmer households also use fertilizers for cinnamon, but all 10 households who do this use organic fertilizer. The farmers of group 1 mostly apply the pesticides and fertilizer when needed, and not on a regular basis.

17 farmer households (n=20) of group 3, use pesticides for cinnamon, and 15 farmer households (n=20) use it for other crops, such as coffee. This is also the group with the most amounts of chemical pesticides and fertilizers and use both more on a regular basis. The graph shows that the farmers of group 3 use pesticides as well as fertilizers once a week. Farmers of group 2 use both pesticides and fertilizers, but less for cinnamon than other crops. The pesticides this group uses are 13 (n=20) chemical and for the fertilizers this is 6 (n=20). Only four farmer households (n=20) of group 4 use pesticides for cinnamon, more farmers (14) use it for other crops. All 20 farmers of this group use fertilizers for other crops, while 15 farmers (n=20) use fertilizers for cinnamon. This group uses pesticides once every month and fertilizer once a week.

Figure 31<sup>6</sup> Amount of pesticides per group.

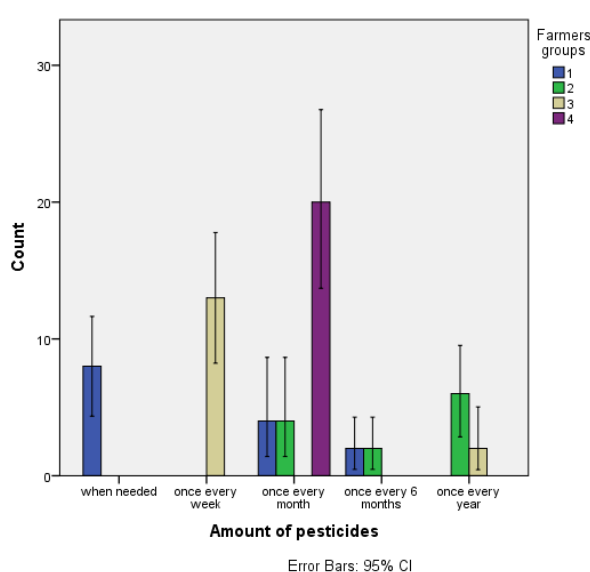
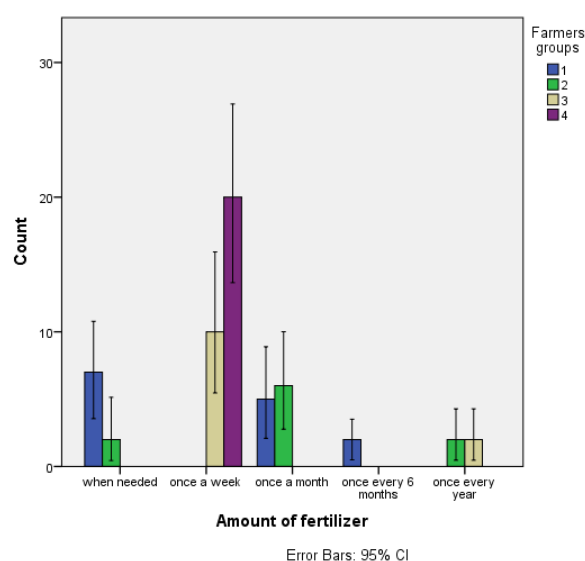


Figure 32 Amount of fertilizers per group.



<sup>6</sup> (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

**Table 8** Amount of pesticides and fertilizers per group. (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

	Variable	1 (N=20)	2 (N=20)	3 (N=20)	4 (N=20)	Total (N=80)
Pesticides	Cinnamon	0	6	17	4	27
	Other crops	12	9	15	14	50
	Chemical	6	13	17	12	48
	Organic	2	2	2	1	7
	Both	1			7	8
Fertilizers	Cinnamon	10	8	17	15	50
	Other crops	10	20	17	20	67
	Chemical	6	6	15	12	39
	Organic	11	14	4	0	29
	Both	3			8	11

#### Observable changes in natural capital

When asked for observable changes in the land, farmers mentioned that they notice a negative change in soil fertility. 38 (n=75) of the farmers participated in the survey mentioned that the fertility of the soil is rapidly declining. This has effect on the financial capital since farming costs increased each year as soil fertility declines and the farmers have to increase the dosage of increasingly expensive chemical fertilizer for the vegetables (Cassia Co-op, 2012b). As seen in table 8, for the differences between the four groups, 7 (n=20) of the farmers of group 1, 10 (n=20) farmers of group 2, 12 (n=20) farmers of group 3, 6 (n=20) farmers of group 4 notice that the fertility of their land is rapidly declining. It raises questions that the farmer households of the group 2 (regular cinnamon value chain) and group 3 (the farmer households who are changing to coffee) experience the most loss in fertility notice. The other two groups use organic farming, as two farmers of Cassia Co-op explained:

*“Before Cassia Co-op, we used slash-and-burn activities to acquire land. But the soil always needed a lot of time to recover. Now, in the field where we started to farm organic, I notice that soil is recovering, we need less fertilizers and pesticides to create the same value.*

*“I see a huge difference in my own land since 2 years ago when I first joined Cassia Co-op. Before we managed our land by using fire and herbicides which turned out not to be good for the soil. The result was that the land increased being barren and unproductive and the fertility was declining. After Cassia co-op gave us training in how to farm with organic compost I noticed the land was recovering”.*

#### Natural resources

The farmers in this area are relatively dependent on natural resources such as rivers for water and the land for their crops. 78 (n=80) farmer households mentioned being highly dependent on the river, but only 2 (n=60) survey participants said to help manage these resources once in a while and only 4 (n=75) households mentioned paying for these natural resources.

When looking specifically to the cinnamon tree it seems that, though all the parts of cinnamon tree are useful, only the farmers of group 1, know how to use the several parts of the cinnamon tree. Almost all of these farmer

households use the tree trunk for firewood and the leaves for organic fertilizer. 6 farmers (n=20) of group 2 use the tree. Of the farmers of group 3, no one uses or used any products of the tree while 15 of group 4 use only the tree and 5 farmers use both the tree and the leaves.

**Table 9** Use of natural resources per group. (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

<i>Variable</i>	<i>1 (N=20)</i>	<i>2 (N=20)</i>	<i>3 (N=20)</i>	<i>4 (N=20)</i>	<i>Total (N=80)</i>
<i>Use of natural resources</i>	18	20	20	20	78
<i>Pay for natural resources</i>	1	3	0	0	4
<i>Land becoming less fertile</i>	7	10	12	6	35
<i>Use of products cinnamon tree</i>	19	6	0	15	40
<i>Use wood of cinnamon tree</i>	19	6	0	15	40
<i>Use of cinnamon leaves (fertilizer)</i>	17	0	0	0	17
<i>More tree crops for soil</i>	20	18	0	20	58

#### Chi-square test

The variable 'observable changes in natural capital' has been compared to the variables 'pesticides for cinnamon', 'kind of pesticides', 'fertilizers for cinnamon', and 'kind of pesticides'. This has been done through a chi-square test.

If the variables 'pesticides for cinnamon' and 'observable changes' were independent, the expected count would be if farmers use pesticides for cinnamon, that 13,7 farmers (n=75) notice the soil becoming less fertile. This result is not significant. The observable, and therefore real count is 16 farmers. Therefore, the expected count is lower than the observed count. Chi-square value is 1.514<sup>7</sup>. For the farmers who do not use pesticides for cinnamon, the expected count (24,3) to notice less fertile soil is higher than the observed count (22), meaning that a medium relation was observed between pesticides for cinnamon and observable changes in natural capital (Phi and Cramer's V: 0,142 with p = 0,469).

If the variables 'fertilizer for cinnamon' and 'observable changes' were independent, the expected count would be if farmers use fertilizer for cinnamon, that 23,8 farmers (n=73) notice the soil becoming less fertile. This result is not significant. The observable, and therefore real count is 21 farmers. Therefore, the expected count is higher than the observed count. Chi-square value is 4.071<sup>8</sup>.

<sup>7</sup> Assumption chi-square: if more than 20% have expected count less than 5, the assumption is violated. This is not the case for these variables.

<sup>8</sup> Assumption chi-square: if more than 20% have expected count less than 5, the assumption is violated. This is the case for these variables.

For the farmers who do not use fertilizers for cinnamon, the expected count (13,2) to notice less fertile soil is lower than the observed count (16), meaning that a medium relation was observed between fertilizers for cinnamon and observable changes in natural capital (Phi and Cramer's V: 0,236 with  $p = 0,397$ ).

For the variables 'kind of pesticides' and 'observable changes', the expected count would be if farmers use chemical pesticides, that 24.3 ( $n=58$ ) farmers would have less fertile soil. This result is significant. The observable count is 29 farmers. Chi-square value is 13.304<sup>9</sup>. When using chemical pesticides, land does become less fertile than when the two variables are independent. Therefore, it seems that a strong relation was observed between kind of pesticides and observable changes in natural capital (Phi and Cramer's V: 0,479 with  $p = 0,038$ ).

For the variables 'kind of fertilizer' and 'observable changes', the expected count would be if farmers use chemical fertilizers, that 15.9 ( $n=54$ ) farmers would have less fertile soil. This result is not significant. The observable count is 16 farmers. Chi-square value is 1.901<sup>10</sup>. With chemical fertilizers, the observed count is also more than the expected count, but less than chemical pesticides. Therefore a small to medium relationship was observed between kind of fertilizer and observable changes in natural capital (Phi and Cramer's V: 0,188 with  $p = 0,754$ ).

In conclusion, when farmers use pesticides for cinnamon, more farmers experience less fertile land than when the variables are independent. The opposite can be said from using fertilizer for cinnamon. When the farmers use chemical pesticides, more farmers experience less fertile land than when the variables are independent. For organic pesticides, this is the opposite. For the kind of fertilizers, this is the same as pesticides, but with a stronger relation. Therefore, when farmers use chemical pesticides, the land is more likely to become less fertile than using fertilizer or organic pesticides.

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<sup>9</sup> Assumption chi-square: if more than 20% have expected count less than 5, the assumption is violated. This is the case for these variables.

<sup>10</sup> Assumption chi-square: if more than 20% have expected count less than 5, the assumption is violated. This is the case for these variables.



**Table 10** Chi-square test for pesticides and fertilizers. (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

		<i>Observable changes natural capital</i>				
<i>Variable</i>			<i>No change</i>	<i>Less fertile</i>	<i>All forest changed into coffee</i>	<i>Total</i>
<i>Pesticides for cinnamon</i>	<i>No</i>	Count	21	22	5	48
		Expected count	18,6	24,3	5,1	48
	<i>Yes</i>	Count	8	16	3	27
		Expected count	10,4	13,7	2,9	27
	<i>Total</i>	Count	39	38	8	75
		Expected count	39	38	8	75
<i>Kind of pesticides</i>	<i>Organic</i>	Count	3	0	0	3
		Expected count	1,1	1,6	0,4	3
	<i>Chemical</i>	Count	13	29	5	47
		Expected count	17	24,3	5,7	47
	<i>Both</i>	Count	4	1	2	7
		Expected count	2,5	3,6	0,8	7
	<i>Total</i>	Count	21	30	7	58
		Expected count	21	30	7	58
<i>Fertilizer for cinnamon</i>	<i>No</i>	Count	8	16	2	26
		Expected count	10	13,2	2,8	26
	<i>Yes</i>	Count	20	21	6	47
		Expected count	18	23,8	5,2	47
	<i>Total</i>	Count	28	37	8	73
		Expected count	38	37	8	73
<i>Kind of fertilizers</i>	<i>Organic</i>	Count	3	1	0	4
		Expected count	1,9	1,6	0,5	4
	<i>Chemical</i>	Count	17	16	6	39
		Expected count	18,1	15,9	5,1	39
	<i>Both</i>	Count	5	5	1	11
		Expected count	5,1	4,5	1,4	11
	<i>Total</i>	Count	25	22	7	54
		Expected count	25	22	7	54

### 5.3.3 HUMAN CAPITAL

For measuring the status of human capital, the second capital of the sustainable livelihood framework, the farmers' knowledge of the value chain is an essential asset for the farmers' livelihood. Thereby, knowledge of organic farming is an important environmental asset. The amount of knowledge the farmer has, influences the choices he makes. Also, the access to training, as part of the access of smallholders to the value chain, is discussed. This gives insights in the ability of farmers to reach for information. The level of education and health are also influencing the farmers' livelihoods. The human capital variables are more focused on the socio-economic assets than environmental assets, but therefore not less important in the question to what extent the shortened cinnamon value chain contributes to a green economy.

#### Level of education

28 farmers (n=67) did graduate from elementary school, whereas only 19 farmers (n=67) graduated from high school. When looking at the difference between groups, the farmers of group 1 have the highest level of education, with 12 (n=20) farmers having finished senior high school. Within group 2, only 6 farmers (n=14) finished junior high school, in group 3, did 6 farmers (n=20) finish junior high school and 4 farmers finished senior high school. In group 4, 3 farmers made it through senior high school.

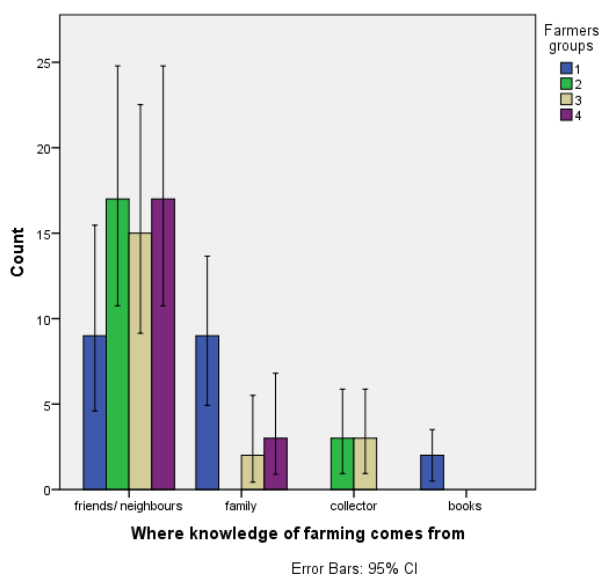
#### Knowledge about farming

This variable shows the amount of knowledge farmers have about farming cinnamon.

When it comes to how farmers possess this knowledge, variance between the four groups is present. In general, 58 (n=80) says to obtained this knowledge of farming from friends and neighbors. 14 (n=80) from family, and 2 farmers (n=80) got the knowledge of farming from books. 6 farmers (n=80) mentioned that they got their knowledge about farming from the local collector. As one farmer of the regular value chain mentioned:

*"The local collectors are going to more places and see different ways of farming. Therefore I believe they know more about the new farming methods than I do. Also he shows how more profit can be achieved by what way of farming and he also tells us the difference between the different qualities. The local farmers also informs us about the current market prices for the main crops of coffee and cinnamon" (farmer regular value chain, group 2).*

**Figure 33** Knowledge of farming (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.



For Cassia Co-op it is crucial that the farmers know about the different qualities of cinnamon because it costs time and money when the farmers mix up the different qualities. Yet this happens often, which is a reason for Cassia Co-op to give the training. As the local director of Cassia Co-op mentions:

*“Sometimes the collaboration with the farmers can be hard because some farmers mix up the qualities of the cinnamon. Therefore training is needed. It is obvious that when farmers received training, the farmers have more knowledge of the differences between the qualities. Therefore the training is important for Cassia Co-op itself. When the farmers do not know the difference it is more work for the workers at the plant to make the selection between the different qualities. The certified farmers do receive training in organic farming, but also how to organize themselves. We endeavor to contact all farmers who are producing organic cinnamon, yet this is not always possible”.*

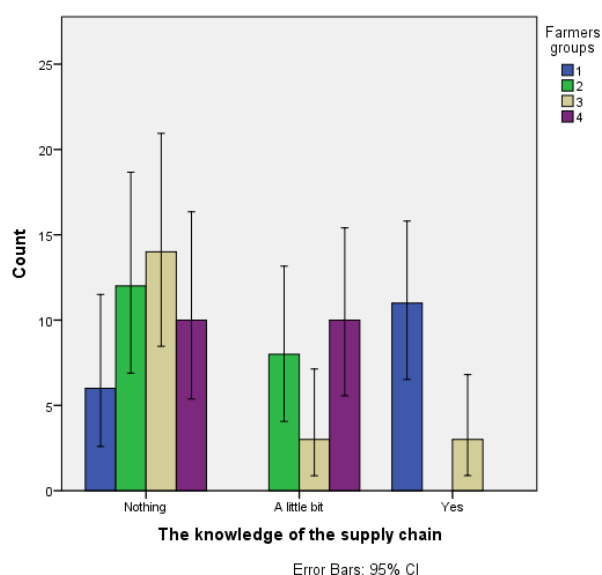
19 (n=20) farmers of Cassia Co-op (group 1) mentioned to have received this training, compared to only two of group 2 (regular value chain) and 0 of the other two groups. The government, gives training only to the leader of farmer groups. Yet cinnamon farmers are not always part of farmer cooperatives and therefore hard to reach more about farmer cooperative is said at the social capital. One respondent of the group with a regular value chain said:

*“Only leaders of a community do get training, and only of the communities who asked for the training or support. Yet I do not want to be part of a community because then my time will be with other people instead of my farm.”(farmer regular value chain).*

#### Knowledge about the value chain

This variable shows the amount of knowledge farmers have about the value chain and whether they know what happens with their cinnamon after they sold it. When farmers know how the value chain works, they might know more about the profits made by the local collector. When looking at knowledge of the value chain, the farmers of Cassia Co-op also know most (11 (n=17)) know about the whole value chain process while the farmers who are changing to coffee know least. 14 (n=20) say to know nothing about the value chain.

**Figure 34** Knowledge of the supply chain (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.



### Lack in information

The farmers were also asked if they feel whether they lack in certain kind of information. 63 (n=73) participants feel indeed they are lacking in information concerning farming or the value chain. Of these 63 farmers, 10 farmers are of Cassia Co-op (group 1), 18 farmers of the regular value chain (group 2), 15 farmers of the group who is changing to coffee (group 3), and 20 farmers of Kerinci Agro (group 4).

### Labor

35 farmers (n=80) have labor working on the farm land (table 11). Yet, this is mostly for other crops and not for cinnamon. The cinnamon plantation is often quite distanced and high up the hills from the farmers' residence which makes the maintenance of the fields not regularly and sometimes difficult. The farmers usually think about the cinnamon plot as a wild area that does not need much attention, and mostly go there about once in three years, or even just in harvest time (Cassia Co-op, 2013). Most of the labor for cinnamon is therefore only needed in times of harvest.

As can be seen table 11, farmers of group 4 (farmers of Kerinci Agro), all have labor working on their land. This corresponds with the fact that these farmers also have the most hectares of land (table 2). However, none of these farmers have family working on their farms. Group 3, the farmers who are changing or have changed to coffee, have the utmost amount of family working on the land at most of the time (10 farmer households (n=20)).

**Table 11** Amount of farmer households with labor on farming land (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

<i>Variable: Labor on farming land</i>	<i>1 (N=20)</i>	<i>2 (N=20)</i>	<i>3 (N=20)</i>	<i>4 (N=20)</i>	<i>Total (N=80)</i>
<i>No</i>	15	8	14	0	37
<i>Yes</i>	1	10	4	20	35
<i>Only during harvest time</i>	4	2	2	0	8

**Table 12** Amount of farmer households with family working on farming land (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

<i>Variable: Family working on land</i>	<i>1 (N=20)</i>	<i>2 (N=20)</i>	<i>3 (N=20)</i>	<i>4 (N=20)</i>	<i>Total (N=80)</i>
<i>No</i>	11	6	2	16	35
<i>Only husband and wife</i>	4	6	6	0	16
<i>More family members, in time of harvest</i>	4	4	2	2	12
<i>More family members, all the time</i>	1	4	10	2	17

**Table 13** Amount of work on farming land (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

<i>Variable: Work on land</i>	<i>1 (N=19)</i>	<i>2 (N=18)</i>	<i>3 (N=20)</i>	<i>4 (N=20)</i>	<i>Total (N=77)</i>
<i>All year</i>	13	14	16	20	63
<i>Seasonal</i>	6	4	4	0	14

#### Possibility to doctor

The districts of Kerinci and Merangin have both 1 hospital. Kerinci has 52 medical clinics and Merangin has 79. Yet in each village there is a village health center [*Ind.: Puskesmas Pembantu*].

#### 5.3.4 PHYSICAL CAPITAL

The physical capital is the third capital of the sustainable livelihood framework and shows whether the farmers use traditional or machine way of farming, and whether they have access to transport, and seeds. These variables can influence the farmers' choices of bringing the cinnamon to the buyer or letting the collector pick up the cinnamon in the village. These last variables show whether a shortened value chain makes a difference for farmers in their position in the value chain.

#### Farming method

The land where plantation crops such as cinnamon are grown is managed using traditional systems that are dependent largely on nature using traditional farming methods. Only 4 (n=80) farmers mentioned that they are farming on a machine-based way. The remaining 76 farmers answered to farm on a traditional way, without the use of any modern technologies.

### Access to input

The amount of pesticides and fertilizers for cinnamon and other crops already has been discussed at the natural capital paragraph. To elaborate on this, the survey also reviewed whether farmers buy these pesticides or fertilizers themselves or whether they get it from friends, neighbors, the government or a company. Same has been asked for seeds. 23 farmer households (n=68) buy or find the seeds themselves, 44 farmers (n=68) get the seeds from neighbors or friends, while only 1 farmer household (n=68) mentioned to get the seeds from the government or a company. When we compare the different groups, 17 (n=20) farmers of Cassia Co-op (group 1) get the seeds by themselves, and 2 (n=20) from neighbors and friends and one from the company. 8 farmer households (n=20) of the regular value chain (group 2) get the seeds from neighbors and friends. All 20 farmers of the group who is changing to coffee (group 3) get the seeds from neighbors or friends. Of the farmers of Kerinci Agro (group 4), 14 farmer households (n=20) get the seeds from neighbors or friends and 6 (n=20) farmer households by themselves.

### Transport

Despite 20 farmers (n=23) choose not to bring the cinnamon to the supplier or collector themselves, 68 (n=80) farmers have access to or own a motorcycle. When looking at the differences between the four groups it can be noticed that farmers of Cassia Co-op and Kerinci Agro, all 20 farmers have a motorcycle while farmers of the regular value chain 16 farmer households (n=20) has a motor, and of the group changing to coffee, 12 farmer households (n=20) possess a motor cycle. None of the respondents have said to own a car or other transportation options. 34 farmers (n=77) qualifies the road towards the village as good, and 43 farmer households (n=77) qualifies this road as not good, or even bad. This could lead to the preference of farmers for local collectors coming to the village and picking up the cinnamon.

## 5.3.5 FINANCIAL CAPITAL

Financial capital is the fourth capital of the sustainable livelihood framework and includes several types of income, such as from the farm, off farm activities, remittances, but also accessibility to financial resources which is part of the value chain analysis to include smallholders into the value chain. Financial capital is a necessity to be resilient for shocks, which can be diversified by having income from several sources or crops. These variables can be used in examining whether a shortened value chain has a positive effect on the farmer households' income and whether such an improved income is used to contribute to a green economy. This can be done by investing in livelihood capitals or environmental capitals.

### Income

When looking at income, a few differences can be noticed. The farmer households of Kerinci Agro have the most amount of monthly income of IDR 377.631.5 (€259,79). Second is the farmer households of Cassia Co-op with an average monthly income of IDR 283.3750 (€195). Third is the farmers household group with a regular value chain with an average monthly income of IDR 2400000 (€165,16), and lastly is the group of farmer households who is changing to coffee of IDR 233333.3 (€160,58). With respect to these numbers, the farmer households who sell their cinnamon to the companies with a shorter value chain seem to have more income. Yet, this difference could also partially be caused by the better prices of certified, organic cinnamon. Therefore, the price differences we will discuss below. As can be seen from table 15, income is not

significant and also between the four groups, there are no significant differences. All groups have a monthly income above the minimum income for these villages, which is around IDR 800.000 per month.

For 57 farmers (n=79) is income derived purely from farming while 22 farmers (n=79) also enjoy a salary from jobs outside farming. These jobs mainly include teaching or village council. From the survey, it appeared that these farmers with jobs outside farming are the same ones as who finished senior high school or more than high school.

Of the farmer households of group, 12 farmer households (n=19) derive their income from farming, for the farmer households of group 2 this is 16 (n=20), of group 3, 9 farmer households (n=20) are dependent on only farming and for group 4, these are 20 farmer households (n=20). Therefore, it can be said that the farmers of the regular value chain (group 2) and Kerinci Agro (group 4), their monthly income is only dependent on their crops and therefore subject to change of several factors such as the quality of the soil and the price of the crops. When looking at the table 14, variable of income percentage from farming, there is a significant difference between the four groups. Group 1, 2, and 3 are significant with group 4 (Kerinci Agro), but not with each other. This implies that group 4 has a significantly different income than the other three groups.

**Table 14** Anova with post-hoc Dunnett test for income<sup>11</sup> and income % from farming <sup>12</sup> (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

Variable	F	1	2	3	4
Income	1.58 <sup>ns</sup>	2833750± <sup>a</sup> 3815828,14	25000± <sup>a</sup> 1071152, 85	2333333,33± <sup>a</sup> 1671561,44	3776315.79± <sup>a</sup> 1710942.59
Income % from farming	4.99**	73,25± <sup>ab</sup> 41,46	84,25± <sup>ab</sup> 13,89	78,5± <sup>ab</sup> 15,31	100± <sup>b0</sup>

### Prices

Especially the amount of income derived from the cinnamon harvest largely depends on the price and quality at the time of the sale. This also applies for the prices of coffee. At the graph below it is visible what the prices are for cinnamon and coffee for each group. Here it should be noticed that the prices for the first three groups (1: Cassia Co-op, 2: Regular value chain, 3: Changing to coffee) were collected in June 2016 while the prices of the last group (4: Kerinci Agro) have been collected in January 2017. The time could therefore be a reason for the differences, though the differences could also be partially caused by the value chain process of the company.

*“The trees are in general harvested once every 15 years, except when the farmers are in need of money before the tree reached this age. However, at an earlier age such as 10 or 12 years old, the cinnamon is of low quality which negatively affects the selling price. Cinnamon harvested from trees that are more than 25 years old*

<sup>11</sup> Poverty rate for the Jambi province was in 2016 IDR 1.906.650. Minimum income for these villages (UMP) is IDR 800.000

<sup>12</sup> For both variables, the p value is lower than the  $\alpha$  level, which means that the variances are not equal and the homogeneity of variance assumption is not accepted.



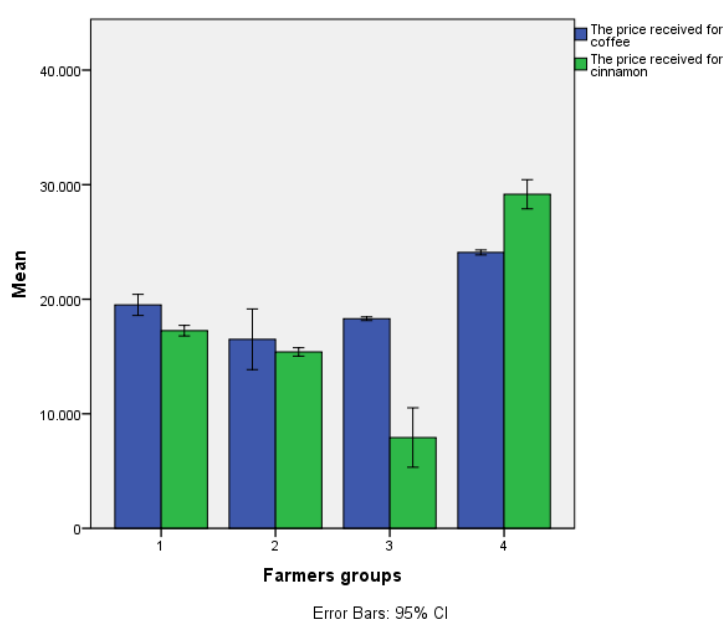
*fetches in general IDR 50,000,000 to IDR 60,000,000 per hectare, depending on quality” (Internal communication Cassia Co-op).*

When looking at figure 14, some differences between the prices for coffee and cinnamon can be noticed between the groups. Within the groups, the standard deviations are not very high which means that most of farmers of the same group get around the same price. Here, as coherent to the levels of income, the farmer households of Kerinci Agro (group 4) receive the best prices for both cinnamon (IDR 28842.11 (€1,68 )) and coffee (IDR 24083.33 (€1,66)). Second, farmers of Cassia Co-op (group 1) receive IDR 17.000 (€1,17) for cinnamon and IDR 19.500 (€1,34). Third, the farmer households with a regular value chain (group 2) receive a price of IDR 15400 (€1,06) for their cinnamon and IDR 16500 (€1,14) for coffee and the group who is changing to coffee (group 3) receive or received in the past a price of IDR 7925 (€ 0,55) for their cinnamon and they receive for their coffee a price of IDR 18.300 (€1,26) One farmer of the regular value chain mentioned that

*“Around the year 2000 the price of cinnamon went down with around IDR 7000 per kilogram. As a result, the price for cinnamon a few years ago was IDR 4500 per kilogram. Subsequently many farmers stopped with cinnamon. They got frustrated and cut the trees and even pulled out the entire tree trunks. I did not stop but it was frustrating that the price was this low. However, a few years ago the price went up again, and it still going up. At this moment, I get IDR 15500 per kilogram cinnamon (June 2016). Yet when the price will decrease again and reaches below the level of IDR 15000 per kilogram I would want to stop with the production of cinnamon and change to coffee”.*

It is noticeable from the survey that more farmers think like the farmer as described above. The border of changing to another crop such as coffee is at the price of IDR 15000 (€ 1, 03) per kilogram. As long as the price is more than IDR 15000 per kilogram, farmers indicate not to be willing to change to another commodity.

**Figure 35** Prices of cinnamon and coffee. (1: Cassia Co-op, 2: regular value chain, 3: changing to coffee, 4: Kerinci Agro).



When looking at the table 15, there is a significant difference between the four groups. Group 1, 2, and 3 are significant with group 4. Group 1 is also significant with group 3 and 4 but not with group 2.

**Table 15** Anova with post-hoc Dunnett test for cinnamon price and coffee price <sup>13</sup> (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

Variable	F	1	2	3	4
Cinnamon price	173.90***	17.0000± <sup>b</sup>	15400± <sup>ab</sup>	7925± <sup>ab</sup>	28842.11± <sup>b</sup>
		903.21	788.07	5535.23	986.75
Coffee price	6.80***	19500± <sup>a</sup>	16500± <sup>ab</sup>	18300± <sup>ab</sup>	24083.33± <sup>b</sup>
		577035	656.85	340.28	204.12

#### Access to finance

In general, farmer households have access to a bank account, and there is a micro-finance project for farmers in this area (Doda Nugroho, WWF). Yet, finance does not always have to be in the form of money. For example, cinnamon is often used as a savings account and therefore creates access to finance when the farmer needs of it. The reason for this is explained by Pak Non below:

*“It takes around 15 years for cinnamon trees to reach a considerable amount of quality. Yet for the farmers this is a relative long period to wait. This is also a reason why cinnamon cannot be reliable as the main income for farmers. For most of them, cinnamon is seen as a saving for the future. If there is a necessity in a large amounts of, such as marriage, pilgrimage and education expenses for their children, then they will cut their cinnamon. Money is mostly needed during times when the school fees need to be paid (January or July) or as preparation for the period of the Ramadan (Ind.: lebaran). At such times farmers sell the cinnamon because they need the money, but the problem is that most of the farmers do this at the same time. This causes a reduction in the cinnamon price”. (Pak Non)*

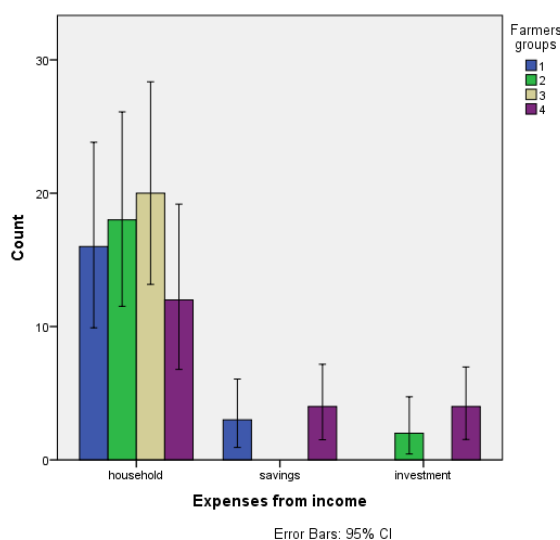
The survey also asked the farmers whether they have deposits other than cinnamon. 52 farmers (n=70) farmers claims not to have any other deposits. 12 (n=70) said to have jewelry as a deposit and 6 farmers (n=70) mentioned to have cattle as a deposit. None of the 80 farmers says to receive remittances from family abroad.

<sup>13</sup> For both variables, the p value is lower than the  $\alpha$  level, which means that the variances are not equal and the homogeneity of variance assumption is not accepted.

## Expenditure

The expenditure of the income from the farmers' households is by 66 farmers (n=79) used in household spending, such as education for children, food consumption, and the house. Only 3 farmers (n=19) of Cassia Co-op are able to save some of the income. From the survey it seemed that 2 of these 3 farmers are local collectors and also have an higher income than the average farmer of Cassia Co-op. 2 farmers (n=20) of the group with a regular value chain invest their income in trade. 4 farmer households (n=20) of Kerinci Agro invest and 4 farmer households put have the ability to save some income.

**Figure 36** Expenditure from income. (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).



### 5.3.6 SOCIAL CAPITAL

The social capital is the final capital of the sustainable livelihood framework and shows the farmers' accessibility and support of social networks. Social networks can be relations in kinship, friendship or in a village. Such social relations for farmers could lead to access to land or market or price information, and could therefore improve other capitals. In a regular value chain, it is more common that the local collector is part of the social relations of the farmer. Here the focus will be on the amount of farmers working with other farmers (in cooperatives) or working together with neighbors. Social capital influences farmer households' livelihood because it could function as a social safety net. This shows at the same time horizontal coordination and collaboration, mentioned in the theory of smallholders inclusion in the value chain. As the local director of Cassia Co-op mentioned:

*"One way farmers increase their social capital usually is through farmer organizations. Farmer organizations strengthen the ability of farmer households to organize harvesting and collective marketing leading to higher efficiency and better prices for farmers while strengthening their position in the value chain, which in the end will*

*increase their income and social capital. Such farmer groups or cooperatives are in the districts of Kerinci and Merangin relatively weak (Cassia Co-op, 2012a)”.*

This is also visible from the survey results, noticing that 55 farmers (n=70) are not organizing themselves in a farmer cooperative with other farmers while only 15 farmers (n=70) say they are organizing themselves in a farmer cooperative. Organizing of farmer within a farmer cooperative is not only sufficient for the farmers but also for other stakeholders, as the local director of Cassia Co-op mentioned:

*“Organization of farmers is also beneficial for the traders, processors and exporters of cinnamon since we then are assured of sustainable sourcing of cinnamon through a shortened value chain. Moreover, traceable and sustainable produced cinnamon, which are increasingly demanded by the market, is much easier to realize with organized farmers”.*

That farmer groups or cooperatives are relatively weak in the districts of Kerinci and Merangin does not mean that they do not exist. As an internal document of Cassia Co-op claims, one province wide farmer organization has been found, named Persatuan Petani Jambi (PPJ):

*“PPJ has members in Kerinci and stated that more than 1,000 farmers have membership, owning on average 2 hectare of cinnamon. Yet such farmer cooperatives do not seem to have a program or information about their activities. Also in the past the local government has taken some initiatives to organize farmer groups at village levels around government funded agriculture development projects, although not formally dissolved, most groups were already no longer active by 2012. Also, most of these initiatives are focused on horticulture commodities while most of these farmers also produce cinnamon”.*

According to these documents, these existing farmer groups expected government support for inputs and training (Cassia Co-op, 2012b). However, as the survey results show, 56 farmer households (n=78) who participated have never received training from a company or government. Also 46 respondents (n=72) mention not to have any other support such as money, seeds or tools received from the government. 26 farmer households (n=72) however, did.

**Table 16** Farmer organizes with other farmers, four groups compared (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

Variable:	1 (N=11)	2 (N=19)	3 (N=20)	4 (N=20)	Total (N=70)
Farmer organizing with other farmers					
No	0	17	18	20	55
Yes	11	2	2	0	15

### Working together

Besides organizing themselves in a farmer cooperative, farmers can also just work together with friends or neighbors. However, 37 farmers (n=79) are not working together with other farmers, such as neighbors or other farmers in the village, while 37 farmers (n=79) do. This can be seen in table 17 below.

Farmers of the regular value chain (group 1) mentioned that sometimes they do not want to work together with other farmers. As one farmer explained:

*I am not willing to work together with other farmers. When I work together with other farmers, I cannot focus on my own land and as a result the harvest will decrease because the crops need my full attention. Yet sometimes I buy seeds from the neighbors but in the end we all focus on our own land (farmer regular value chain).*

Sometimes farmers are not officially working together, yet they are helping each other in the village out. This is called the Gotong Royong principle, as explained by the following farmer from Cassia Co-op:

*“Although most of the farmers do not work together with other farmers on the land, some of the farmers like me are involved in communities such as a ‘restoration group’. In such a group we gather to do some communal work such as keeping the village from water infiltration or we are fixing roads. We call this Gotong Royong. Such a group exists of mainly men from the village doing the hard work while the women have other tasks, such as cleaning the village” (farmer Cassia Co-op).*

**Table 17** Farmer work together with other farmers, four groups compared (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

Variable:	1 (N=20)	2 (N=19)	3 (N=20)	4 (N=20)	Total (N=79)
Farmer works together with other farmers					
No	4	17	1	20	42
Yes	16	2	19	0	37

The variable ‘farmers organizes with other farmers’ has been compared to the variables ‘training received’ and ‘support received from government’. This has been done through a chi-square test.

If the variables ‘training received’ and ‘farmer organized with other farmers’ were independent, the expected count would be if farmers who organizes with other farmers, that 2.4 farmers (n=69) farmers would have received training. This result is significant. The observable, and therefore real count is 2.4 farmers. Therefore, the expected count is higher than the observed count. Chi-square value is 57.068<sup>14</sup>. For the farmers who do not organize themselves, the

<sup>14</sup> Assumption chi-square: if more than 20% have expected count less than 5, the assumption is violated. This is the case for these variables.

expected count (9,6) to receive training is higher than the observed count (0), meaning that a strong relation was observed between training received and farmer organizes with other farmers (Phi and Cramer's V:0.909 with  $p = 0,000$ ).

If the variables 'support received' and 'farmer organized with other farmers' were independent, the expected count would be if farmers who organizes with other farmers, that 4,8 farmers ( $n=68$ ) would have received training. The result is significant. The observable count is 1 farmer. Therefore, the expected count is higher than the observed count. Chi-square value is 5.843<sup>15</sup>. For the farmers who do not they do not organize themselves, the expected account (20,2) to receive support is lower than the observed account (24). Therefore, a negative effect was observed between support received and farmer organizes with other farmers. (Phi and Cramer's V:-0.293 with  $p = 0,016$ ).

In conclusion, when farmers organizes with other farmers, more farmers receive training than when the variables are independent. For support from the government, this is the opposite.

**Table 18** Chi-square test for pesticides and fertilizers. (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro.

If farmer organizes with other farmers						
			No	Yes	Total	
	Training received	No	Count	55	2	57
			Expected count	45,4	11,6	57
	Yes	Count	0	12	12	
		Expected count	9.6	2,4	12	
	Total	Count	55	14	69	
		Expected count	55	14	69	

	Support from government	No	Count	31	12	43
			Expected count	34,8	8,2	43
	Yes	Count	24	1	25	
		Expected count	20,2	4,8	25	
	Total	Count	55	13	68	
		Expected count	55	13	68	

<sup>15</sup> Assumption chi-square: if more than 20% have expected count less than 5, the assumption is violated. This is the case for these variables.

### 5.3.7 CONCLUSION LIVELIHOOD ANALYSIS

The sustainable livelihood analysis is used to get a better grip on the livelihood assets of the farmer households in both value chains and to notice the differences in value chains on creating a green economy. In answering the question ‘What is the difference in livelihood and environmental assets between farmers of a regular and a shortened cinnamon value chain?’, an abbreviated conclusion is given here by looking at the main results. The main indicators to measure the effect on a green economy are the inputs training, pesticides and fertilizers. The essential outputs are the prices, income, and soil fertility.

**Table 19** Comparison of variables pesticides, fertilizers, soil fertility, and training (in farming). four groups compared (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

<i>Variable</i>	<i>1 (N=20)</i>	<i>2 (N=20)</i>	<i>3 (N=20)</i>	<i>4 (N=20)</i>
<i>Pesticides</i>	Cinnamon: 0  Other crops: 12  when needed/ once a month/ once every 6 months  chemical (6), organic (2) both (1)	Cinnamon: 6  Other crops:9  once a month/ once every year  chemical (13), organic (2)	Cinnamon: 17  Other crops:15  once a week/ once every year  chemical (17), organic (2)	Cinnamon: 4  Other crops:14  once a month  chemical (12) Organic (1)
<i>Fertilizers</i>	Cinnamon: 10  Other crops: 10  when needed/ once a month  chemical (6), organic (11) both (3)	Cinnamon: 8  Other crops: 20  When needed/ once a month/ once a year  chemical (6), organic (14)	Cinnamon: 17  Other crops:17  once a week/ once a year  chemical (15), organic (4)	Cinnamon: 15  Other crops:20  once a week  chemical (12) Organic (0)
<i>Soil less fertile</i>	7	10	12	6
<i>Training</i>	20	2	0	0



**Table 20** Comparison for variables knowledge of value chain, price cinnamon, and income. four groups compared (group 1: Cassia Co-op, group 2: regular value chain, group 3: change to coffee, group 4: Kerinci Agro).

<i>Variable</i>	<i>1 (N=20)</i>	<i>2 (N=14)</i>	<i>3 (N=20)</i>	<i>4 (N=13)</i>
<i>Knowledge value chain</i>	Nothing: 6	Nothing: 12	Nothing: 14	Nothing: 10
	Yes: 11	Yes: 0	Yes: 3	Yes: 10
	A little bit: 0	A little bit: 8	A little bit: 3	A little bit: 0
<i>Price cinnamon</i>	17000	15400	7925	28842.11
	(±903.21)	(±788.07)	(±5535.23)	(±986.75)
<i>Income</i>	2833750	25000	2333333	3776315.79
	(±3815828.14)	(±1071152.85)	(±1671561.44)	(±1710942.59)

From table 19 it can be noticed that groups 1 (Cassia Co-op) and 4 (Kerinci Agro) of a shorter value chain have ‘better’ environmental results. These groups have the least amount of farmers who notice their land to be less fertile. However, training seems to be an important factor for using less chemical pesticides and fertilizers.

Table 20 shows that groups 1 (Cassia Co-op) and 4 (Kerinci Agro) of a shorter value chain have ‘better’ results considering their economic situation.

When considering the chi-square tests of pesticides and fertilizers, it can be concluded that when farmers use chemical pesticides, the land is more likely to become less fertile than using fertilizer or organic pesticides. For the chi-square about the variables ‘farmer organizes with other farmers’ and ‘training received’ and ‘support from government’, it can be concluded that when farmers organizes with other farmers, they are more likely to receive training. For support from the government, this observed amount is not more than the expected, and therefore, from these results, it seems that for support from the government it is not needed to organize with other farmers.

Concluding from these results, we could say that the answer to the sub question ‘What is the difference in livelihood and environmental assets between farmers of a regular and a shortened cinnamon value chain?’ is that both groups of the shorter value chain have relatively ‘better’ results on the indicators for a green economy than the groups of a regular value chain because less use of chemical inputs, more fertile soil, higher prices for cinnamon, and higher overall monthly incomes.

## 5.4 POLICIES INFLUENCING THE CINNAMON VALUE CHAIN

This chapter aims to answer the final sub question ‘How do policies influence the contribution of a shortened cinnamon value chain to a green economy?’. Here the main policies are being discussed which influence the cinnamon value chain and the environment such as the national park. These are also part of the livelihood framework and value chain analysis as ‘existing governance structures and processes’ which have impact on farmers households’ livelihood assets.

### 5.4.1 POLICIES INTEGRATING IN THE CINNAMON VALUE CHAIN

Cinnamon from Kerinci has been known in the market under the name Cusiavera Kurintji, which is trying to get international brand awareness, known for the texture and quality as one of the best in the world (Musnardi Mounir, WWF). An example of such a product is presented in figure 37. The Forestry Department of Kerinci is planning to get the certificate based on geographic indication for giving an identity to cinnamon, which might help to protect the product. Because Kerinci does not have a port for themselves, they ship the cinnamon mostly through Padang. This is why no recognition has been given to the cinnamon from Kerinci and why West-Sumatra is more known for the cinnamon production (interview Department of Forestry Kerinci). A shorter value chain could be an opportunity here. At the same time, through certification the cinnamon gets added value, and therefore a higher price. Certification is mostly initiated by businesses that want to export an original organic product. According to Cassia Co-op (2012), the difference between an organic product and a legally sourced organic product are important. Yet, certification costs time and money, and quality products, often not possible to create by farmers themselves. Thereby, farmers who are not part of farmer cooperatives or specific businesses cannot certify themselves.

Farmer cooperatives are also useful to increase sales value, while sharing the costs of harvesting and marketing and to make plans for intercropping that meets market demand (Cassia Co-op, 2012b). Also through farmer cooperatives is mostly the only way for farmers to receive support from organizations or the government. Farmer cooperatives are most commonly established for rice production. There are also farmer cooperatives for cash crops such as tobacco, and coffee. These cooperatives receive funding and material (fertilizer, seedlings) from the government, and then disburse this to members (Agriculture Department, Kerinci).

From the survey results can be noticed that only 15 cinnamon farmers participated (n=70) in the survey are organized in a farmer cooperative and therefore they miss out on funding from the government. Additionally, the Agriculture Department in Kerinci stated that farmer groups for cinnamon do not exist. A reason could be that the limited input costs make the time spent on organizing and lobbying for funds an inefficient use of time for cinnamon production (Agriculture Department, Kerinci). Cinnamon is not seen as a priority for the government. Most kind of support is only focused on horticulture commodities.

However, once farmers are organized in a cooperative the Agriculture Departments of Kerinci and Merangin mention to give training to farmers about the market and the value chains of crops. These trainings they give are focused on learning and support. Other support given to farmer cooperatives is when they need help or support in crop production such as input (Agriculture Department, Merangin). Yet when the farmers want to start farming organically, or when they want to organize themselves in a farmer cooperative, no support from the Agriculture Department in both districts is given. The Government Department of Agriculture in Kerinci mentioned that they help farmers with the provision of seeds and searching for new land. The Economy Department in Merangin however does give subsidies to certain cooperatives. Yet, this is mostly focused on cash crops such as coffee by providing machines for maintenance, support with coffee packaging, and by helping the farmers to get into production of coffee or to enhance their productivity (Economic Department, Merangin). The Economic Department also tries to provide market access and give the farmers an easy way to sale their coffee. However, there is a technique to reach farmers who are not organized in a farmer cooperative. The Forestry Department in Kerinci claimed the following:

*Every month we release information about market prices, from people in the port of Padang, and traders price, from which they receive the information from farmers. Through a television show, the farmers are informed with this price information. For many farmers this is the only way to get information about crops and prices from outside the village (except for the information from the local collectors) (Staff Forestry Department, Kerinci).*

In order to rely on cinnamon for their income, farmers could also combine their cinnamon with other sources of income as described in the introduction. To combine cinnamon production with that, the Department of Forestry and Plantation held a training and assistance for farmers to improve their knowledge and skills to explore the potential of the society around them such as to start building eco-tourism potential, cultivation of oyster mushrooms and they also provide seeds of coffee and chocolate, so that farmers can increase their income through other sources (Cassia Co-op, 2013). However, these trainings were not given in the villages participated in the survey.

**Figure 37** Local product from Kerinci.



#### 5.4.2 National park policies

As mentioned in the introduction and the regional context chapter, forest encroachment is happening at the national park of Kerinci. TNKS told that this is also hard to control since people have cinnamon within the borders of the national park since 1992. Cinnamon plantation overlaps the border of the national park. If this only concerns cinnamon, it is not a problem according to the TNKS employees, but the problem is that farmers start to cultivate more crops in between the cinnamon trees.

Park maintenance is important to ensure the sustainability of agriculture and economic security. The problem with keeping control of the farmers is partly due to the limited number of inspectors, and insufficient control at the many entry points of the park (Cassia Co-op, 2013). It seems that the cooperation between the park inspectors and the local government is not sufficient to eradicate illegal logging in the national park (Cassia Co-op, 2013).

*In 1992 stones were put as markers for the borders of the national park, which were checked and officially changed every five years. However, the TNKS staff noticed that most of these stones have been moved in between these five years. Especially the area of Lempur is problematic since local people have a strong feeling of authority, and therefore they are hard to persuade that they cannot do agriculture within the borders of the national park. Sometimes people claim it is their land, which causes a conflict (TNKS Kerinci Staff).*

There is also a program from WWF based on increasing coffee production outside protected areas, in order to increase rural livelihoods and create agroforest corridors across Jambi. KPH makes agreements with the society. KPH is a key element of forest governance reform for embracing REDD + and related initiatives. KPH aims to monitor policies, empower communities, and have a high level of stakeholder participation. KPH is more focused on villages than farmer cooperatives. They also have projects concerning cinnamon in which they give seedlings of cinnamon and other tree crops to farmers in the villages close to the border of the national park, mostly the buffer zone, to increase their livelihoods.

#### 5.4.3 STRATEGY FOR GREEN GROWTH

As several policy documents show, the Indonesian government has started to integrate green growth in decisions by adding value to existing commodities through agro-industry, agroforestry, sustainable fishery, and ecotourism, as well as developing new sustainable commodities. Conservation of protected areas and management through KPH is also mentioned. However, no concrete actions are mentioned to implement or enforce these policies (Bappenas, 2017).

When looking at the local level, it could be noticed that government employees of the Forestry Department in Kerinci did not know anything about an official program or policy for green economy. They did, however, know about the term, and that it was about creating environmentally conscious jobs. The same regarding the Forestry Department Merangin. Also, employees of KPHP did not know anything about green economy. In local policy documents, green growth strategy was not to be found.

When looking at the relationships between the several stakeholders, WWF mentioned to discuss about green growth with the local government departments. WWF coordinates working together with the government but the activities are not in

line and therefore collaboration is difficult.

In relation to the companies, Cassia Co-op did cooperate with international and local organizations such as IDH and local governmental departments such as KPH in the beginning (Adrian Akza, Cassia Co-op). However, this was two years ago for the last time and from other organizations or departments they did not receive money or training. Kerinci Agro did not have any contact with organizations or local government departments.

#### 5.4.4 CONCLUSION

In answering the research question ‘How do policies influence the contribution of a shortened cinnamon value chain to a green economy?’, this chapter mainly looked at the main field where the local and national governments can impact the value chain, and their main limitations and possibilities in contributing to a green economy. The government integrates the value chain through farmer cooperatives. However, cinnamon farmers are often not part of such a cooperative. It raises questions that the local government thinks the cinnamon from Kerinci needs protection, but then leaved the door open to businesses. Cinnamon production would be a good fit for the buffer zone of the national park, but the government is caution because of the fear for increasing forest encroachment. Finally, policies for a green economy are to be found at regional or national level, but the concrete action plans cannot be found. Therefore a general limitation is the communication between the government and companies, but also between organizations and the government, and different levels of the government.

**Table 20** Concluding table possibilities and limitations for stakeholders integrating in the cinnamon value chain

	Possibility	Limitation
<b>Certification</b>	better price, brand recognition for the area > protecting the product	smallholders are not able to advocate or initiate certification themselves
<b>Farmer cooperatives</b>	used to increase value and support from the government	not yet focused on cinnamon
<b>National park</b>	increase livelihoods through use buffer zone	encroachment, not enough land
<b>Green growth strategy</b>	Conservation of protected area, develop sustainable commodities, adding value to existing commodities	not much information about the policies on local level

## 6. CONCLUSIONS



This thesis aimed to answer the research question *'to what extent does shortening the value chain of agroforestry commodities, more specific cinnamon, contribute to a green economy?'*. This is done through a mixed method research design through farmer households' surveys measuring the capitals of the sustainable livelihood framework, conducting interviews with government officials and the directors of the companies, and document reviews of local governments and companies. The market linkages, structure, and governance of the cinnamon value chain have been analyzed through the value chain analysis.

The key findings are that a shortened cinnamon value chain contributes to green economy through increased livelihood assets as a result of higher cinnamon prices, emerged by local processing and certifying of the cinnamon. A shortened cinnamon value chain does not eradicate middlemen, but uses them to become part of the system. Also, farmers use less chemical fertilizers and pesticides when they got training in organic farming. However, not all companies within a shortened value chain give training, which shows that there are also differences within a value chain. The remainder of this chapter gives a short summary of this study, after which the main results are discussed.

In answering the first sub question, agroforestry systems are conducive to a green economy on the basis of organic agriculture and the use of a variety of tree crops. The positive effect of cinnamon on an agroforestry system is that after the cinnamon tree is cut for harvest, the roots stay in the ground as the tree regrows naturally and therefore prevails soil stability and watersheds. For the economical side of an agroforestry system, the cinnamon tree does not need much labor and effort, and brings enough cash to provide for a savings account. Yet, when farmers decide to quit with cinnamon, the soil could lose its stability. It seems that getting the best benefits in creating a green economy out of an agroforestry system, farmers should be informed about inputs, and crop combinations. This applies to farmers who are already doing agroforestry, because it seems to be difficult for new farmers to start doing agroforestry. It is best for the economic situation of the farmer to combine long-term tree crops, such as cinnamon, with short-term cash crops, such as coffee. Coffee could be mixed in an cinnamon agroforestry especially in the first years when the cinnamon is chopped. Nonetheless, in the end farmers seem to be choosing for just one or two profitable crops, combined with some crops for own consumption. The cash crops are merely chosen out of economic reasons. One of the reasons for this is that the local governments give support for the crops which are most profitable at that moment. Hence, farmers follow the crops for which they get support. As these crops are mostly market dependent, farmers making their livelihoods only more vulnerable to price changes. Increasing of the cinnamon price could make farmers being less dependent on government support.

The actors who shape the value chain of agroforestry products have influence on these revenues. Therefore, in answering the second sub question, these actors and how they shape the cinnamon value chain is discussed. Revenue to the agroforestry products can be added through certification and local production, as the main characteristics are of a local value chain. The farmer in a shortened value chain however, has direct contact with the company who buys the cinnamon from the farmer, and exports it as well. Therefore the process of the cinnamon production is often done locally. There are however differences between companies within the local value chain. Cassia Co-op gives their farmers training in organic cinnamon, as well as a bonus for farmers who bring organic cinnamon, while Kerinci Agro does not. Kerinci Agro uses the local market structures of trust and social relations, while Cassia Co-op uses contracts between the company, the farmers, and the local collectors. The cinnamon price offered to the farmers by Kerinci Agro however, is higher than the price of Cassia Co-op. Partly this has to do with the moment of survey, however Kerinci Agro creates its own stable prices



through their own cinnamon stack. The farmers of Cassia Co-op are dependent on the prices influenced by the cinnamon stack in the port. It seems that through the stacks, the port decides for prices to go up or down. This means that cinnamon buyers in the port have a considerable influence on the cinnamon prices.

There are however still local collectors working as middlemen in the shortened value chain, but this collector belongs to the lead company. Still, the prices that the local collector asks to the cinnamon farmer are not constipated in a contract, and therefore the shortened value chain does not control the prices asked by the local collector to the farmer. In comparison, in a regular cinnamon value chain, there are several local collectors. The farmers are dependent on these local collector for information, but also as only buyer in a market system. Because the local collector often buys the cinnamon standing in the field, the farmer loses in profit than when he cuts the trees himself and sells the cinnamon bark. The cinnamon farmer is sometimes not aware of this price difference, yet sometimes the farmer trusts the local collector for buying the cinnamon with a good price.

This pursues to the next sub question, how the regular value chain can be an obstacle in contributing to a green economy. Price information seems to be a relevant obstacle for farmers of the regular value chain since they receive most of their information from the local collector. Another obstacle for the farmer of the regular value chain is the accessibility to training or support. Cinnamon farmers are often not organized in farmer cooperatives and therefore hard to reach for project by the local government. However, as the chi-square results have shown, farmers who are not organized with each other are less likely to receive training than to receive government support. Still, in the shortened value chain, contracted farmers are given training in the value chain and organic farming. This however depends on the company in the value chain since this is not the practice with Kerinci Agro. A third obstacle is that farmers cannot certify themselves, and therefore need to be appointed to a company. Cinnamon farmers in a shortened value chain can be certified, once they farm organic cinnamon, and therefore value is added to the cinnamon.

This raises questions about the difference of both value chains in livelihood and environmental assets. The main differences seem to be in financial and human capital. First, the cinnamon price received by the farmer in a shortened value chain is higher than the price a farmer of the regular value chain receives. The value added to the cinnamon through certification has besides a positive effect on organic farming, also an influence on the prices cinnamon farmers get. The overall monthly income of the farmers households also seem to be higher for farmers of a shortened value chain. Training seems to be an essential factor for the knowledge farmers have of organic farming and the value chain in contributing to green growth because less chemicals and more part of the cinnamon tree are being used. However, this is not a necessity for a shortened value chain, but company related. The same goes for the use of contracts. However, the relation to a green economy has not only to do with socio-economic aspects. Also environmental assets are essential. The use of chemical pesticides and fertilizers are less for both companies with the shortened value chain. One reason for this could be the promoting of organic cinnamon production through certifications. The results of the chi-square test show that using less chemicals, especially less chemical pesticides, this has a positive influence on the soil fertility.

The farmers who changed to coffee because of the obstacles of the regular value chain seem to be not very different in livelihood assets from the farmers of a regular value chain. However, it raises questions that when the price of cinnamon drops below IDR 15000 per kilogram, farmers decide to stop with the cinnamon trees and sometimes even completely change to monoculture coffee, with the associated consequences. Also coffee prices are not always as high as expected

since the coffee prices are also dependent on market changes and quality of which the latter is not familiar with the farmers how to reach the best quality. Higher cinnamon prices seems to keep more farmers in the cinnamon production, as the companies with the shortened value chains have the least amount of farmers who want to change to coffee.

The government could prevent the change from cinnamon agroforests to coffee plantations through policies. In the final sub question is elaborated upon how policies influence the contribution of a shortened value chain. It seems that do not much influence. Local governments can hardly reach cinnamon farmers since they are not organized in cooperatives. Local governments however try to improve income variety by giving trainings. How the selected groups for trainings are chosen however, is not clear. Cinnamon in agroforestry systems are often located in the buffer zones of the national park. However, these zones are hard to control because there are no clear borders. It raises questions what the actions will be in relation to forest encroachment. When agroforestry products have increased revenues, forest encroachment could slow down because of the increased livelihood assets caused by the variety of agroforestry crops.

In sum, this study argues that the shortened cinnamon value chain contributes to a green economy, provided that both livelihood and environmental assets are taken into consideration. Also, it should be noticed that there is a difference in approach between several companies within a shorted value chain.

## 7. DISCUSSION



This chapter will discuss the approach and methods of this research. Therefore, both limitations and contributions will be considered. First, the knowledge gap is discussed in terms of what this study contributes to literature. Second, the results will be interpreted by means of theory and practice. Third, the methodological, theoretical, and practical implications are given. The discussion closes with recommendation for further research and policy recommendations.

#### Adding to the knowledge gap

As mentioned in the introduction, current literature focuses on the contribution of agroforestry to a green economy. Not much research has been done about what makes farmers stay in producing agroforestry crops. In focusing on a shortened value chain, this is a gap in the literature that this study has contributed to, since there was no research found discussing this topic. No specific definition of a 'shortened value chain' was given by the literature. The definition used in this thesis is presented in the introduction as a value chain where farmers have direct contact with the company that also exports the product. This study added to existing literature by formulating a definition for shortened value chain and applying it to a cinnamon agroforestry system. The approach of this research was mainly explorative and therefore data was collected through open questions. An advantage of such an explorative method is that new information was collected.

The second knowledge gap contributes to the value chain analysis. The governance structure of the regular value chain misses a lead firm to control the market linkages. This contributes to the study done by Stamm et al. (2006), mentioning that most value chains in agribusiness are either multipolar driven or market-demand driven. However, this study did not focus on the competition between the two companies within the shortened value chain or among the local collectors. This is however important, as Stamm et al. (2006) acknowledge that sustained growth cannot be possible under the conditions of increasingly open markets and intensifying trade flows if it is not based on the competitiveness of the companies involved.

The third knowledge gap was that no research was found on the contribution of agroforestry systems to a green economy. However, literature has shown that agroforestry practices improve household food security by having a diversified range of crops while improving the quality of the soil (Dahlquist et al., 2007). As a result, this study contributes to existing literature of green economy by using an agroforestry system.

#### Results in relation to theory

In answering the main research question of this research, it became clear that sustainability as aim for a green economy, does not depend on environmental assets only, but that these are greatly impacted by the socio-economic assets of people their livelihoods and that environmental assets have an impact on livelihoods. The socio-economic indicators given by the OECD were therefore useful to this study because it contains both environmental as well as livelihood indicators (OECD, 2012). This section discusses the results of this study in relation to theory on livelihoods, the local policy framework, forest degradation and green growth.

Sustainability of a livelihood refers to, as mentioned in the beginning of this research, a livelihood that can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets both now and in the future (Scoones, 1998). These coping responses and adaptive strategies of farmer households largely define specific management practices of agroforestry systems, but are also linked to the prices of the crops. Therefore, an agroforestry system does not have positive results on environmental protection and livelihoods resilience automatically, but this is a result of the

opportunities at the household level, and the functions of crops in the agroforest. As Dahlquist et al. (2007) mention, incorporating a livelihoods framework into biodiversity conservation efforts that include agriculture can help identify the constraints households face for competing land uses and the socioeconomic and institutional structures and processes involved in land use change.

Local and national institutions and organizations such as the government also influence livelihood decisions. However, the policies for contributing to a green economy are still in inception and concrete implementation is not always clear. Regarding the national park, an example is shown by an American PhD student who did his research at the same time as this fieldwork was done. He mentioned that the greatest amounts of encroachment into the national park occurs in villages where field crops are most common. In these areas there are informal economies dedicated to establishing farming plots within National Park borders. This means that farmers pay a standard “tax” to local authorities to open and maintain land within National Park borders. Everyone seems to go along with this, from local authorities to the national park rangers. However, collaboration of companies, organizations and local governments could be a possible solution to such issues.

As a response to forest degradation, households in Kerinci have for centuries tried to protect, plant and manage trees on their land in order to provide one or more locally important forest functions, such as the provision of food, fuel, saleable commodities and protection of soil and crops. To prevent the destruction of strategically important forest areas, such as watersheds, conservation of these forest areas often was part of traditional and spiritual arrangements so that the sustainability of the agricultural system could be protected (Burgers, 2004). Today however, economic interests of individual households to satisfy their livelihood needs have become an increasingly motivating factor in land-use decisions and its management (Jepma, 1995; Agrawal & Gibson, 1999 in Burgers, 2004). How farmers mix agroforestry systems with different crops, depends on which crops have a positive economic opportunity and whether the farmers have a long-term or a short-term strategy (Burgers & William, 2009). These economic interests lead decisions of farmers, but farmers are often not looking for making a profit. When the prices are high, farmers will cut only the cinnamon trees they need. Also Burgers mentioned that when there is not direct purpose for the cash, the farmers are not interested in finding the best prices since keeping large amount of cash in the house would either attract thieves or villagers to ask for loans and other favors (Burgers, 2004). Therefore, a satisfying price could also be a reason why farmers let the local collector pick up their cinnamon instead of bringing it themselves to the company.

Throughout the research, the assumption is made that improved livelihood assets are coherent with green growth. In the introduction has been mentioned that this relationship however could assure a tensioned relationship. The United Nations Environment Program (UNEP) has played a leading role in shaping and promoting the green economy as “an engine for growth”, generating jobs and eradicating poverty—defining it as “one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (UNEP, 2011). However, tensions could occur towards a green economy when the livelihood assets of people improve.

Also Hallegatte et al. (2011) notices that though economic and social improvements tend to go hand in hand, it is not so simple when it comes to the economic and environmental pillars. She says that in general it seems that economic growth causes environmental degradation.

When comparing this research to existing literature in other areas, it can be noticed that agroforestry systems with cinnamon are very specific to Indonesia. Cinnamon agroforestry is contingent in Sri Lanka and India, but only in small amounts (Dahlquist et al., 2007). Furthermore,

#### Methodological implications

When looking at the methodological implications, most of them already have been described at the methodology chapter. A few additional limitations will be given here.

At first, a disadvantage of the explorative approach is that answers which led to new insights could be elaborated on because it did not fit the research question for this thesis.

Second, the results the sustainable livelihood framework are limited to a specific moment in time, since this research was only done in two months' time. The best way to study 'sustainable livelihoods' is a longitudinal study, collecting time series of various data under different circumstances (Burgers, 2004). However, this has not been possible since the limited time, money and resources. Instead a comparative analysis has been done and shows the differences in livelihood resilience between the shortened and the regular cinnamon value chains.

This research has not only been limited to a specific time-frame, but also to a specific place, in the west of the province of Jambi. This has not given implications such as the specific time frame since livelihood assets and natural resources are place-specific. However, larger structures and institutions than the local ones have effect on the farmers' livelihoods. Cinnamon is a commodity for the international market and therefore changes in the international market or policies have opportunities as well as risks for the farmers' livelihoods.

Another limitation of this study's methodology is the small survey sample of 80 farmers. As this sample may say enough for this research area, it may not be representative to other areas.

Further, the numbers in the survey such as the amount of trees or crops mentioned by the farmers is an estimation because most farmers do not know the exact numbers. Same goes for income because this changes every month.

Also, the environmental benefits of an agroforestry system have not been measured throughout this research because of the limitations of the researchers' knowledge. These environmental benefits however are measured by interpretation of the farmers by asking about the soil fertility.

Finally, causal relations are hard to prove as a result of many influences. One example is that both companies in the shorter value chains are using certifications for organic cinnamon, which affects the use of chemical inputs.

#### Theoretical implications

Concerning theoretical limitations, the two main analyses of sustainable livelihoods and value chains, partly overlapped with each other. Thereby, not all possible indicators of the livelihood framework have been tested for since indicators such as ethnicity and structures within the household because these were not relevant in answering the research question. Also, the more ecological side of a green economy and an agroforestry system is not measured quantitatively by this study. Instead, it has been measured through interpretation of the farmers as mentioned before. Overall, the focus has been put more on the governance structures and socio-economic assets.



### Practical implications

One practical implication for the contribution of shortened value chains to a green economy is that cinnamon farmers are not organized in farmer cooperatives. Therefore, cinnamon farmers are hard to reach for government support. One of the reasons for this, is that cinnamon is mostly seen as a crop for extra income. Another reason is that the government does not focus on cinnamon. Instead, they focus on crops with a good market price. As a result, farmers are also following this behavior, focusing only on short-term market crops, while neglecting future environmental implications.

Another practical implication for organic cinnamon is the demand for it. Cinnamon and other spices are often used in products only in small amounts. Therefore, the product does not become an 'organic' product by using only organic cinnamon for example. However, the demand for organic spices is going up (personal communication, Rainforest Alliance)

### Further research

As mentioned in the introduction of this study, it should be noticed that in contribution to a green economy, organic cinnamon production should improve the farmers' livelihoods more than possible other livelihood strategies such as migration, off-farm labor, or production of other crops. If other livelihood strategies bring more economic reasons, then farmers might change. Though this could also improve farmers' livelihoods, these other strategies might jeopardize the existence of agroforests. Since this research did not focus on these alternative livelihood strategies, further research could contribute to this. Insights into the tensioned relationship between improved livelihood assets and a green economy would be useful. Also, the biological side of organic agroforestry, and the economic side of an agroforestry system through a cost-benefit analysis would contribute to a better solution for a green economy. As a final recommendation for further research, it would be interesting to examine to what extent cinnamon farmers follow the market for selling their cinnamon and how inflation of the Indonesian Rupiah contributes to this trend as an perception of better prices.

## 7.1 RECOMMENDATIONS

Based on the results of the conclusions and discussion, several recommendations are proposed to increase the effect shortened value chains in agroforestry products can have in contributing to a green economy.

- When prices are stipulated in a contract, a long-term relationship between the buyer and the supplier can be established. Also, a contract between the local collector and the farmer makes sure that local collectors mention the fair prices to the farmers. This way, local collectors are not constraining the livelihoods assets of farmers.
- When training is given to farmers in organic farming by the government, this can best be related to farmers with an agroforestry system or living close to the national park. As a result, not only farmers of a specific company or product are be given training, but also farmers who are not connected to a farmer cooperative. Therefore, livelihood assets are also improved of farmers not part of a shortened value chain.
- Farmer cooperatives in agroforestry products contribute to the previous recommendation and will make farmers more approachable to businesses as well as the local government.
- Development of a green prosperity strategy requires a tight integration between production of commodities, such as coffee and cinnamon, and developing sustainable value chains. This study shows that the environment and socio-economic factors are closely interlinked and influence each other.

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## 9. APPENDICES

### APPENDIX 1. SPSS OUTPUT ANOVA

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Household members	Between Groups	16,597	3	5,532	2,988	,036
	Within Groups	138,871	75	1,852		
	Total	155,468	78			
Land hectare	Between Groups	913,635	3	304,545	6,463	,001
	Within Groups	2780,143	59	47,121		
	Total	3693,777	62			
Amount of lands	Between Groups	61,828	3	20,609	3,675	,018
	Within Groups	269,153	48	5,607		
	Total	330,981	51			
Amount of crops	Between Groups	70,873	3	23,624	58,350	,000
	Within Groups	29,961	74	,405		
	Total	100,833	77			
Amount of market crops	Between Groups	4,043	3	1,348	1,969	,126
	Within Groups	50,637	74	,684		
	Total	54,679	77			
Amount of household cops	Between Groups	53,920	3	17,973	68,812	,000
	Within Groups	19,067	73	,261		
	Total	72,987	76			
The price received for cinnamon	Between Groups	4361112133,578	3	1453704044,526	173,898	,000
	Within Groups	626963815,789	75	8359517,544		
	Total	4988075949,367	78			
The price received for coffee	Between Groups	270996666,667	3	90332222,222	6,796	,001
	Within Groups	611408333,333	46	13291485,507		
	Total	882405000,000	49			
Income category	Between Groups	25149794664217,350	3	8383264888072,450	1,535	,213
	Within Groups	398642185855263,100	73	5460851861031,002		
	Total	423791980519480,500	76			
Income percentage from farming	Between Groups	7778,259	3	2592,753	4,768	,004
	Within Groups	40782,500	75	543,767		
	Total	48560,759	78			

## Multiple Comparisons

Dunnett t (2-sided)<sup>a</sup>

Dependent Variable	(I) Farmers groups	(J) Farmers groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Household members	1	4	-,782	,436	,184	-1,83	,26
	2	4	-1,082*	,436	,041	-2,13	-,04
	3	4	-1,182*	,436	,023	-2,23	-,14
Land hectare	1	4	7,71765*	2,58816	,012	1,4625	13,9727
	2	4	-2,08235	2,43171	,732	-7,9593	3,7946
	3	4	-2,67183	2,29170	,521	-8,2104	2,8668
Amount of lands	1	4	1,982*	,759	,034	,12	3,84
	2	4	-,641	,897	,841	-2,84	1,56
	3	4	,632	1,760	,975	-3,69	4,95
Amount of crops	1	4	-2,105*	,206	,000	-2,60	-1,61
	2	4	-2,292*	,204	,000	-2,78	-1,80
	3	4	-2,242*	,204	,000	-2,73	-1,75
Amount of market crops	1	4	-,053	,268	,995	-,70	,59
	2	4	,503	,265	,151	-,13	1,14
	3	4	,003	,265	1,000	-,63	,64
Amount of household crops	1	4	-1,784*	,168	,000	-2,19	-1,38
	2	4	-2,045*	,164	,000	-2,44	-1,65
	3	4	-1,945*	,164	,000	-2,34	-1,55
The price received for cinnamon	1	4	-11842,105*	926,256	,000	-14060,47	-9623,74
	2	4	-13442,105*	926,256	,000	-15660,47	-11223,74
	3	4	-20917,105*	926,256	,000	-23135,47	-18698,74
The price received for coffee	1	4	-4583,333	2353,321	,129	-10209,17	1042,51
	2	4	-7583,333*	1697,004	,000	-11640,18	-3526,48
	3	4	-5783,333*	1697,004	,004	-9840,18	-1726,48
Income category	1	4	-942565,789	748635,992	,451	-2737869,26	852737,69
	2	4	-1376315,789	748635,992	,170	-3171619,26	418987,69
	3	4	-1442982,456	768631,196	,157	-3286236,42	400271,50
Income percentage from farming	1	4	-26,75000*	7,47045	,002	-44,6416	-8,8584
	2	4	-15,75000	7,47045	,097	-33,6416	2,1416
	3	4	-21,50000*	7,47045	,014	-39,3916	-3,6084

\*. The mean difference is significant at the 0.05 level.

a. Dunnett t-tests treat one group as a control, and compare all other groups against it.

### Household

- What is the village?  
**Nama desa ?**
- Of how many relatives does your family exist/ with how many people do you live here?  
**Berapa banyak jumlah keluarga kamu / Berapa banyak keluarga kamu tinggal di sini?**

### Farming

- How much land do you have?  
**Berapa banyak lahan pertanian yang kamu miliki? Apakah lahan pertanian tersebut milik kamu sendiri?**
  - How did you get the land?
    - Bought
    - Inherited
    - Rent
  - How many lands do you have?
  - How much hectare?
- What are the crops you are farming?  
**Apakah jenis tanaman kamu tanam?**
  - What are the main crops for your income?
- Why are you farming these crops?  
**Mengapa kamu menanam jenis tanaman tersebut?**
- Which of these are for household use and which for market?  
**Jenis tanaman mana yang digunakan untuk keperluan rumah tangga dan yang mana jenis tanaman untuk di jual di pasar?**
  - What are the prices you get for the market crops?  
**Berapa harga yang kamu dapatkan dari penjualan jenis tanaman yang kamu jual di pasar?**
- Are you selling the cinnamon to a big or small buyer?  
**Apakah kamu menjual jenis tanaman tersebut ke pengusaha kecil atau besar?**
- Do you use any pesticides for your cinnamon  
**Apakah kamu menggunakan pupuk jenis pestisida untuk kayu manis kamu**
- Do you use pesticides for other crops?  
**Apakah kamu menggunakan pupuk jenis pestisida untuk tanaman lainnya?**
- What kind of pesticides?  
**Apa jenis pupuk pestisida yang kamu gunakan?**

- How often do you use the pesticides?  
**Seberapa sering kamu menggunakan pupuk jenis pestisida?**
- What kind of fertilizer do you use?  
**Apa jenis pupuk yang kamu gunakan?**
- How often do you use this fertilizer?  
**Seberapa sering kamu menggunakan jenis pupuk tersebut?**
- Who buys the pesticides/ fertilizer? You or company?  
**Siapa yang biasanya membeli pupuk jenis pestisida? anda atau perusahaan?**
- Do you have more tree crops besides cinnamon?  
**Apakah anda menanam tanaman lain selain kayu manis?**
- Why did you choose for cinnamon?  
**Mengapa anda memilih kayu manis untuk ditanam?**
- How much do you get for your cinnamon (1kg)?  
**Berapa harga rata-rata 1 Kg kayu manis yang anda dapatkan?**
- Did you neglect other crops for choosing for cinnamon?  
**Apakah Anda mengabaikan tanaman lain untuk memilih untuk kayu manis?**
- Do you want to change to other commodities instead of cinnamon?  
**Apakah Anda ingin menukar kayu manis dengan tanaman lainnya?**
- Describe production of 10 major commodities (agriculture, forestry) in the last 5 years **Jelaskan 10 jenis tanaman produksi yang paling banyak dihasilkan oleh pertanian dan kehutanan dalam 5 tahun terakhir**
- What were the main changes in crops in the past 5 years?  
**Apa perubahan utama pada tanaman dalam 5 tahun terakhir?**
- Did you get any plants/ seeds from the buyer/ company or other organization/ government?  
**Apakah Anda mendapatkan bibit kayu manis/ biji dari pembeli/ perusahaan atau organisasi lainnya / pemerintah?**
- Do you know if your crops/ products are certified?  
**Apakah Anda tahu apakah tanaman Anda / produk bersertifikat?**
- How are you farming? With technologies?  
**Bagaimana keadaan pertanian anda? Menggunakan teknologi?**

**Human capital/ Social capital**



- What is the highest educational degree you got? Where did you get this?  
**Apa pendidikan terakhir yang Anda punya? Dimana kamu mendapatkan itu?**
- How did you get the knowledge for farming these crops?  
**Bagaimana Anda mendapatkan pengetahuan untuk pertanian tanaman tersebut ?**
- Do certain people of a farmcommunity get training, which they share with other people?  
**Apakah orang-orang tertentu mendapatkan pengetahuan pertanian dari pelatihan, kemudian mereka berbagi ilmu pertanian dengan orang lain?**
- Did you get any training in how to farm from companies/ government or organizations? **Apakah Anda mendapatkan pelatihan cara bertani dari perusahaan/ pemerintah atau organisasi?**
- Do certain people not get training?  
**Siapa yang tidak mendapatkan pelatihan?**
- Why do they not get the training?  
**Mengapa mereka tidak mendapatkan pelatihan?**
- How did you get knowledge about cinnamon?  
**Bagaimana Anda mendapatkan pengetahuan tentang kayu manis?**
- Do you feel you are lacking in certain type of information?  
**Apakah Anda merasa kurang mendapatkan informasi tentang pengetahuan kayu manis?**
- Are there people in labor working on the land?  
**Apakah ada orang yang anda gaji untuk bekerja di lahan pertanian anda?**
- Do people of this family work on the land? some of them, all of them? Who?  
**Apakah org dikeluarga ini bekerja di lahan? Sebagian atau semuanya? Siapa?**
- Do you/ they work all year at the land? Do they only work on the farm for one season? **Apakah anda/ mereka bekerja sepanjang tahun dikebun?apakah mereka bekerja di satu musim?**
- Do you have some people in labor working at the land?  
**Apakah Anda memiliki beberapa orang tenaga kerja yang bekerja dikebun?**
- What do you know about the supply chain of cinnamon?  
**Apa yang Anda ketahui tentang rantai pasokan kayu manis?**
- Did you get training from company/ government or organizations in how to organize yourself or with other farmers?  
**Apakah Anda mendapatkan pelatihan dari perusahaan / pemerintah atau organisasi apakah mendapatkan pelatihnnya sendiri atau dengan kelompok petani lainnya?**  
**Natural capital**
- From who is this land?  
**Dari mana anda mendapatkan tanah ini?**

- Is there a part of the land which cannot be used?  
**Apakah ada bagian dari tanah yang tidak dapat digunakan?**
- Does the land after some crops need a time of rest?  
**Apakah lahan pertanian yang ada kerjakan ada masa waktu istirahat?**
- Describe observable changes in natural capital conditions in the last 5 years  
**Jelaskan perubahan kondisi lahan pertanian yang anda garap selama 5 tahun terakhir?**
- How much do you rely on natural habitats such as river/ forest?  
**Berapa banyak anda mengandalkan habitat alami seperti sungai / hutan?**
- Are you paying someone for these forest products?  
**Apakah Anda membayar seseorang untuk produk habitat alami seperti sungai/hutan?**
- Do you manage natural resources/ public infrastructure? Do you know who does? **Apakah Anda mengelola sumber daya alam / infrastruktur publik? Apakah Anda tahu atau tidak siapa yang mengelola hal tersebut?**
- Did any social conflicts occur in the past five years, in particular related to land use, including forest use?  
**Apakah ada konflik sosial terjadi dalam lima tahun terakhir, khususnya terkait dengan penggunaan lahan, termasuk pemanfaatan hutan?**

#### **Physical capital**

- What kind of transport do you have? (motor bike or car or ..)?  
**Apa kendaraan yang anda gunakan?**
- Is there a good road to bring your cinnamon to the supplier?  
**Apakah ada jalan yang baik untuk membawa kayu manis Anda ke pemasok?**
- Do you prefer to give it to the local collector or to bring it yourself to the buyer? Why? **Apakah Anda lebih memilih untuk memberikannya kepada kolektor lokal atau untuk membawa sendiri ke pembeli? Mengapa?**

#### **Supply chain**

- Can you describe supply/market chain for cinnamon, from production to commercial industry?  
**Dapatkah Anda menjelaskan pasokan / rantai pasar untuk kayu manis, dari produksi untuk industri komersial?**
- To who do you sell your cinnamon? (local collector or buyer)  
**Kepada siapa anda menjual kayu manis Anda? (Kolektor lokal atau pembeli lainnya)**

- How did you get into contact with this buyer?

**Bagaimana Anda mendapatkan pembeli ini?**

- Is this always the same buyer or other buyers also?

**Apakah menukarkan pembeli yang sama atau pembeli yang berbeda (pembeli lainnya)?**

- What do you think of the relation with the buyer?

**Bagaimana pendapat anda dengan hubungan anda dengan pembeli?**

- Do you notice when prices go up or down?

**Apakah anda mencatat ( membuat catatan ) naik turunnya harga?**

- Is there a way how you and other farmers organize?

**Apakah langkah-langkah anda melakukan organisasi petani?**

- Do you work together with neighbors/ collecting together?

**Apakah Anda bekerja sama dengan tetangga / mengumpulkan bersama-sama?**

- Did you get training from the company or organizations in organizing with other farmers?

**Apakah Anda mendapatkan pelatihan dari perusahaan atau organisasi?**

- Do you join in a group of farmers or do you work alone?

**Apakah anda bergabung dalam kelompok tani atau bekerja sendiri?**

#### **Financial capital**

- What is your income on average per month?

**Apakah penghasilan Anda rata-rata per bulan?**

- How much percent is from farming?

**Berapa persen pendapatan yang dihasilkan dari pertanian/ perkebunan?**

- What is the main purpose you use your income on?

**Apakah tujuan utama Anda menggunakan penghasilan yang Anda pada?**

- When you have an higher income, will you plant more diversified crops or stay to one kind?

What kind? Trees?

**Bila Anda memiliki pendapatan yang lebih tinggi, akan Anda menanam tanaman lebih beragam atau tinggal untuk satu jenis? Jenis apa? Pohon?**

- Is there also income from outside land? (jobs)

**Apakah ada juga pendapatan dari lahan di luar? (Pekerjaan)**

- Do you have other activities besides farming?

**Apakah Anda memiliki kegiatan lain selain pertanian?**

- How much labor does the farming take (in people and hours)?

**Berapa banyak tenaga kerja yang bertani mengambil (pada orang dan jam)?**

- How much labor does the cinnamon take (in people and hours)?

**Berapa banyak tenaga kerja untuk kebun kayu manis (pada orang dan jam)?**

- How important is the cinnamon for your income?

**Seberapa penting hasil dari bertani kayu manis terhadap penghasilan Anda?**

- Do you still uses cinnamon as a deposit or now you sell it faster?

**Apakah anda menyimpan kayu manis sebagai simpanan (tabungan) atau anda menjualnya langsung?**

- Do you have other deposits such as livestock, jewelry?

**Apakah Anda memiliki simpanan lain seperti ternak, perhiasan?**

- Do you receive any support from government (money or products)?

**Apakah Anda menerima dukungan dari pemerintah (uang atau produk)?**

- Did you get any help/ subsidy from company, organizations or the government? **Apakah Anda mendapatkan bantuan / subsidi dari perusahaan, organisasi atau pemerintah?**

- Did your income change (increased or decreased) after farming cinnamon?

**Apakah penghasilan anda berubah setelah bertani/berkebun kayu manis?**

- What is your profit from cinnamon now?

**Keuntungan apa anda dapat dari bertani/ berkebun kayu manis?**

- Do you have family members living away who remit money? How much?

**Apakah Anda memiliki anggota keluarga yang tinggal jauh yang mengirimkan uang? Berapa banyak?**

- How is this money used?

**Bagaimana uang ini digunakan?**

### **Green Economy**

- Are you more willing to do agroforestry/ combine tree crops when youre income is higher?

**Apakah Anda lebih bersedia untuk melakukan agroforestry / memperbaiki alam (ekonomi hijau pengukuran) ketika Anda pendapatan yang lebih tinggi / harga yang lebih baik untuk kayu manis??**

- Are you trying to use tree crops for the soil?

**Apakah Anda mencoba untuk menggunakan tanaman pohon untuk tanah?**

- How do you manage and maintain the cinnamon plantations?

**Bagaimana Anda mengelola dan memelihara perkebunan kayu manis?**

- How do you sustain of continuous harvest in cinnamon? **Bagaimana Anda mempertahankan panen?**

- What do you do with the other parts of the cinnamon tree (tree, leaves)?

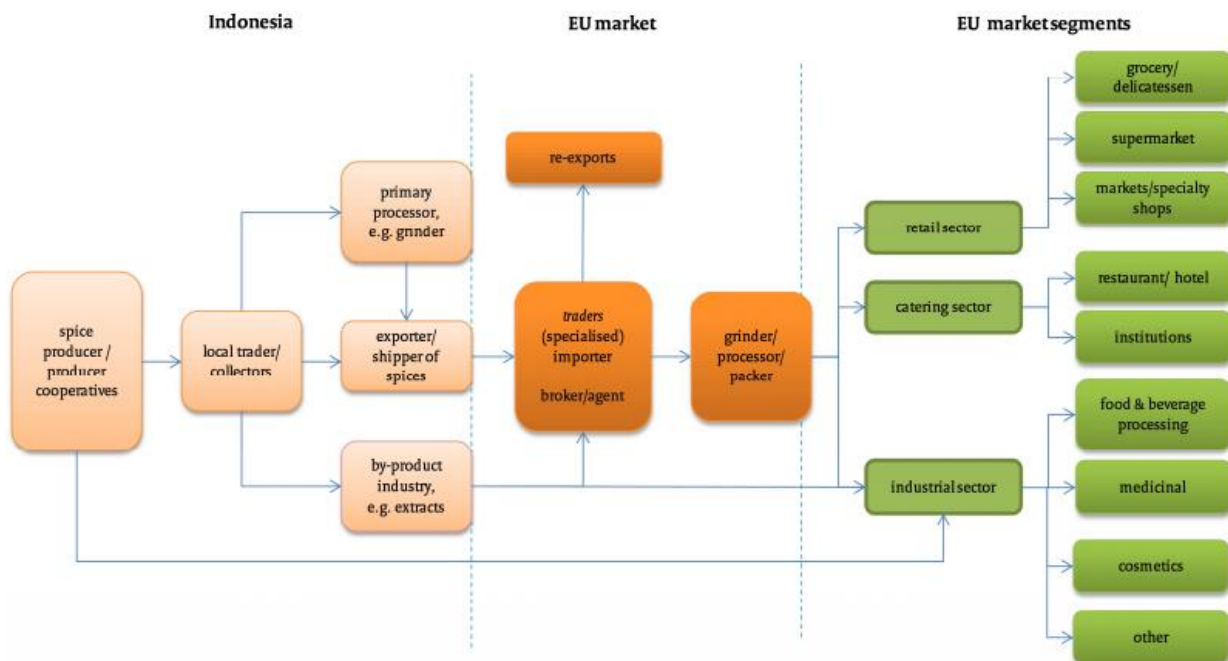
**Apa yang Anda lakukan dengan bagian lain dari pohon kayu manis (pohon, daun)?**

**Extra**

- What would you like to see differently (in crops/ training/ help/ organization)?

**Apa yang akan Anda ingin melihat secara berbeda (pada tanaman / pelatihan / bantuan / organisasi)?**

### APPENDIX 3: THE COMPLETE VALUE CHAIN FOR INDONESIAN SPICES



### APPENDIX 4: THE CINNAMON PRODUCTION PROCESS.

Harvesting the bark of the cinnamon tree is hard, but technically simple work. At first, the farmer collects the bark on the lower part of the trunk. A simple machete [*Ind.: parang*] and a very sharp small hook [*Ind.: pengubak*] are the only tools required to cut and peel the skin from the tree (Cassia Co-op, 2012a). After this, the farmer will leave the partially naked trunk for a 15 days period of time. Subsequently, he comes back to cut down the tree with a chainsaw and collect the bark from all remaining parts, including small branches. After roughly cleaning the outside face of the still humid bark, with a sharpened scraper [*Ind.: pengikis*], the collected wooden skin will be spread and dried in the sun for a first stage of drying before being transported (Cassia Co-op, 2012a). After harvested and cut down a cinnamon tree, a few young trees will simply and naturally grow again from a single remaining stump. Ideally, the farmer selects between the 3 to 5 new trunks to make sure that at least one of them gets large and tall enough.

The production process is as following:

- raw material
- dry
- sorting
- crossing
- blending
- packaging

Every step, has also several steps. At the following page, several a few steps within the crossing, grinding, and blending of cinnamon is presented:



Dried cinnamon bark.  
Collected and sorted by  
quality.



Dried cinnamon bark, cut in  
smaller pieces. When these  
cinnamon sticks are of good  
quality, they are sometimes  
sold like this.



The first step of grinding



The final step of grinding.  
Sometimes the cinnamon is  
exported like this, sometimes  
it is grinded even smaller.

*After having identified the targeted parcel, or bidang [ind.], to be harvested, the concession holder has to deal with the landowner to estimate the fee to be paid and to get an agreement. The price paid is based on the evaluation of the crop to come, an estimate count of the total weight, all qualities included, of the bark yet to be collected. An average price per kilo will then be determined, also linked to the spice market values at that time, and the fee should, usually, be paid before harvest time occurs. The petani borongan is hereby taking all economical risks and needs to be a specialist in the cinnamon to give an accurate evaluation of the trees count, their age and quality, on the targeted plantation. Once the deal has been made with the landowner, the concession holder takes control of all the process of harvesting and gets full rights to exploit all resources, including the wood left over. The concession holder will then put up a task force, a group of waged laborers, to insure harvest of the cinnamon bark as planned. While informal, these groups of daily workers are constituted on a regular base, averagely ranging from 3 to 10 persons used to work together and, if not direct family, usually at least village related. The concession holder is their direct boss and will also be in charge of registering each one's precise production, weighing the still humid bark just after it has been collected and brought back on the side of the nearest road from the field. The wage paid to the daily workers is a previously decided fixed price paid per kilo actually harvested. An efficient laborer is reputed to be able to collect an average 80 to 100 kg of bark per day, mainly depending on the difficulties of the field, its steepness and distance from the road where the product has to be manually transported. The price paid per kilo is also lowered or heightened accordingly. The concession holder may or may not take his part in the manual process of peeling the skin from the trees, acting alternately as a first level laborer, and thus increasing his revenue by his own production, or favoring the sole organizational part, mediator and team leader roles.*