Determinants of Sustainable Forest Management:

The Cases of Industrial Private Forest Plantations in East Africa and Non-industrial Private Forests in Sweden

Mohammed Besher Degnet

Propositions

1. Forest certification enhances sustainable forest management.
   (this thesis)
2. Profit motives of private companies do not necessarily undermine community development.
   (this thesis)
3. Empirical research in natural sciences is prone to errors and biases as is empirical research in social sciences.
4. A major drawback of social science research is the difficulty of clearly defining concepts.
5. The increase in private funding of research is both a blessing and a curse for the growth of science.
6. A society that dwells in its past struggles to build its present and future.

Propositions belonging to the thesis entitled:
"Determinants of Sustainable Forest Management: The Cases of Industrial Private Forest Plantations in East Africa and Non-industrial Private Forests in Sweden"

Mohammed Besher Degnet
Wageningen, 26 May 2021

Determinants of Sustainable Forest Management: The Cases of Industrial Private Forest Plantations in East Africa and Non-industrial Private Forests in Sweden

Mohammed Besher Degnet

Thesis committee

Promotor

Prof. Dr J.H.H. Wesseler
Professor of Agricultural Economics and Rural Policy
Wageningen University & Research

Co-promotors

Dr E.H. van der Werf
Associate Professor, Environmental and Natural Resource Economics Group
Wageningen University & Research

Dr V.J. Ingram
Associate Professor, Forest and Nature Conservation Policy Group
Wageningen University & Research

Other members

Prof. Dr E.H. Bulte, Wageningen University & Research
Prof. Dr V. Beckmann, University of Greifswald, Germany
Dr E.M. Kikulwe, Bioversity International, Kampala, Uganda
Prof. Dr G. Cornelis van Kooten, University of Victoria, Canada

This research was conducted under the auspices of the Wageningen School of Social Science (WASS).

Determinants of Sustainable Forest Management: The Cases of Industrial Private Forest Plantations in East Africa and Non-industrial Private Forests in Sweden

Mohammed Besher Degnet

Thesis

submitted in fulfilment of the requirements for the degree of doctor

at Wageningen University

by the authority of the Rector Magnificus

Prof. Dr A. P.J. Mol,

in the presence of the

Thesis Committee appointed by the Academic Board

to be defended in public

on Wednesday 26 May 2021

at 4 p.m. in the Aula.

Mohammed Besher Degnet

Determinants of Sustainable Forest Management: The Cases of Industrial Private Forest Plantations in East Africa and Non-industrial Private Forests in Sweden

286 pages

PhD thesis, Wageningen University, Wageningen, the Netherlands (2021)

With references, with summaries in Dutch and English

ISBN: 978-94-6395-712-0

DOI: https://doi.org/10.18174/541644

Acknowledgements

Many people have contributed for the completion of this thesis and for my personal development along this intellectual journey. I would like to place on record my gratitude for some of them. First, I would like to extend my gratitude to the respondents in the rural villages of Mozambique and Tanzania, who kindly offered me their precious time to participate in the surveys. Thank you for your patience in answering the lengthy questionnaires and for your hospitality during my visits to your villages. My sincere thanks also go to the enumerators and local organizers of the fieldworks of the study in both countries for their hard work and perseverance during the daunting tasks of the fieldworks. You made the fieldwork fun and enjoyable.

A special word of thanks goes to my supervisors: Prof. Justus Wesseler, Dr Edwin vander Werf and Dr Verina Ingram. Their critical reflections and comments helped sharpen my thoughts on the various issues raised in the thesis. My promotor, Justus, thank you for your continuous guidance, re-reading several versions of my papers. Thank you for believing in me to take the lead in my work and offering me the academic freedom to walk through the 'woods' of this intellectual journey. Justus, you are a 'father' figure for me, guiding me along my career as well as my personal development. Thank you for involving me in teaching and other tasks alongside my PhD study. I am also indebted to you for supporting my PhD study financially when the funder of my PhD project terminated the funding. I would not have been able to complete my study if it had not been for your generous support. I extend my deepest appreciation to you. Justus, it was great to have you as a promotor.

I would like to express my immense gratitude to my daily supervisor Edwin. Edwin, thank you for re-reading countless versions of my papers and STATA do & log-files, for your valuable suggestions and inputs, and for walking me by the hand along the PhD trajectory. Edwin, you have an eye for details and aim for second to perfection. You are one of the best organized persons whom I know. Your strict supervision and unwavering determination to uphold the highest standards of scientific practice have contributed a lot to improving my academic skills. Edwin, you are like a 'big-brother' figure for me, closely watching over my development both academically and personally. Your sincere follow up of how me and my family were doing off-the PhD trajectory are highly appreciated. Edwin, many thanks.

I am also grateful for my supervisor Verina. Verina, thank you for re-reading countless versions of my papers and your constructive comments. The great deal of support and your invaluable insights on my research from forest governance and policy perspective are highly appreciated. Your constant encouragement and guidance on the use of qualitative research methods have strengthened my skills in mixed method research. Verina, you are like a 'big-sister' figure for me, the balance between the self-autonomy provider Justus and the close-watcher Edwin. Verina, thank you for your understanding.

I would like to thank my current and former colleagues and friends at the Economics section and particularly at the Agricultural Economics and Rural Policy group (AEP) including Wim, Jack, Koos, Liesbeth, Rico, Dusan, Esther, Kutay and all fellow PhDs. Thank you for the lively conversations during the coffee breaks, shared lunches and dinners. My profound thanks go to Kutay and Dusan, with whom I have the great pleasure of working and socializing. Kutay, thank you for the good company and introducing me to the world of CrossFit and encouraging me to push the limit on myself to stay fit. The talks about science, physical exercise and life in our after-lunch and Sunday morning walks will always be remembered. Kutay, thank you for proofreading my thesis. I am also indebted to Dusan for introducing me to the self-liberating world of running. Because of you, I have become a regular 'runner' and enjoy the after-finish euphoria of 'runner's high' (though I agonizingly suffer during the run). Dusan, many thanks for the candid discussions about academics and life during our Sunday runs. A big thank you for proofreading my thesis from the cover page till the last page. My fellow PhDs, co-travellers in this intellectual journey, thank you for the nice times, for sharing our excitements and frustrations in the ups and downs of this stressful but exciting academic ride. Evert, Max, Yan and Karen, thank you for your support and cheering me up when I go out for my driving lessons (even though my driving skill is not up to your expectation). I am also grateful for Max for proofreading my thesis.

I am profoundly grateful to the admin-staff of the group and the section including Karen, Dineke, Betty, Gré, Frank and Marian. Thank you for handling the administrative hustle-bustle efficiently and making my journey smooth by arranging the necessary facilities. Your support both to my academic and personal life are highly appreciated. Karen, a huge vote of thanks for your role in arranging the finances for my study after the project was terminated. Dank je wel!

Outside the Netherlands, I would like to thank Prof. Helena Hansson, for hosting me at the Department of Economics of the Swedish University of Agricultural Sciences, Uppsala during my research visit. Helena, thank you for your valuable comments on my papers and granting me access to the data for one of my papers.

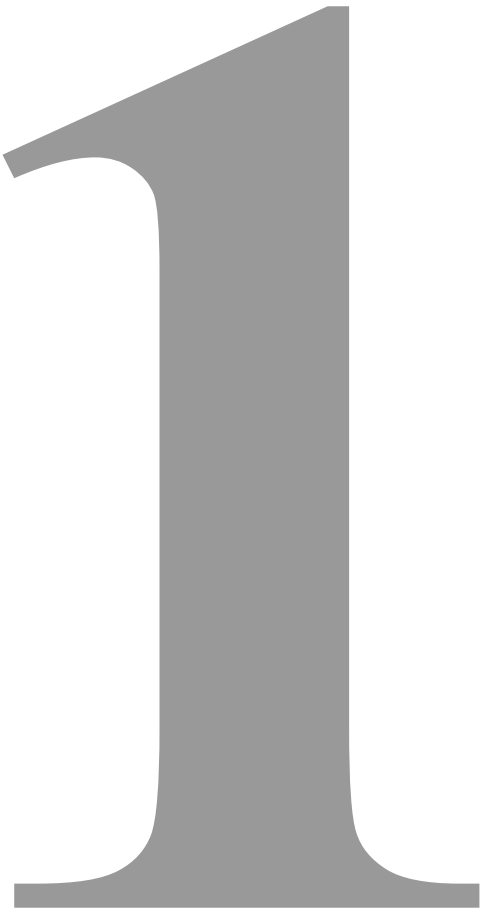
My sincere thanks also go to people who have made my stay in the Netherlands enjoyable and memorable. I would like to thank current and former members of the Ethiopian community in and around Wageningen and members of the Ethiopian Muslim community in the Netherlands. The fun times we had and the conversations about our beloved homeland are unforgettable. My brothers and sisters in the 'senselet' foundation, Mukemil, Adil, Omer, Nuredin, Meymuna, Zemzem, thank you for your role in my spiritual life and for constantly reminding me that there are more important things in life than academics.

Finally, special thanks to my family. I would like to thank my parents and siblings for keeping me in their prayers and taking care of Aziza and Hiyam while I was away for my study. My wife, Aziza, deserves a sincere gratitude. Enatu, thank you for your patience, love, support and prayer. You are my mentor in life and I will continue to learn from your wisdom. Above all,

you capped the beginning and ending of my PhD study with our two precious gifts. Our angels, Hiyu and Aymu, you are the jewels of my life.

Table of Contents

CHAPTER 1



Introduction

Chapter 1
Introduction

1.1 General Background

Forests play a central role in fostering sustainable development by providing multiple functions. With around 1.6 billion people globally relying on forests for their livelihood, forests are sources of wood products, shelter, jobs and income security for forest-dependent communities (UN, 2020). In addition, forests help mitigate climate change through carbon sequestration, contribute to maintaining the balance of oxygen, carbon dioxide, humidity in the air, protect watersheds, and reduce the risks of natural disasters, such as floods, droughts and landslides. Forests are the most biologically-varied ecosystems on land, sheltering more than 80% of the terrestrial species of animals, plants and insects (UN, 2020). Recognizing these multiple essential functions of forests, the United Nations Sustainable Development Summit in 2015 included the sustainable management of forests among the 17 Sustainable Development Goals (SDGs). SDG 15 emphasizes the significance of improving the livelihoods of people and communities and tackling deforestation, land degradation and biodiversity loss by creating the conditions for the sustainable management of all types of forests by 2020 (UN, 2015). Yet, despite some encouraging trends in recent years, many indicators show that progress towards sustainable management of forests is unsatisfactory (FAO, 2020).

The global forest sector has been undergoing many changes in the past few decades. Despite slowing rates in recent years, global forest cover loss has remained high in the past two decades (FAO, 2020; WRI, 2020). With annual rates of forest expansion falling short of annual rates of deforestation (See Figure 1), the world lost 7.84 million ha of forest cover per annum between 1990 and 2020 (FAO, 2020). For example, the tropics lost 11.9 million ha of tree cover in 2019, which amounts to losing the size of a football pitch of forest every 6 seconds during the entire year (Global Forest Watch, 2020). More specifically, in Africa, the rate of net forest loss has increased between 1990 and 2020 (FAO, 2020). The continent recorded the highest rate of net forest loss per annum in the decade to 2020, at 3.9 million ha, followed by South America, at 2.6 million ha (FAO, 2020). East Africa accounted for most of the net forest loss in the continent. The UN Strategic Plan for Forests aims to reverse the loss of forest cover globally through sustainable management of forests and increased efforts to combat forest degradation (FAO, 2020).

Figure 1. Annual rates of forest expansion and deforestation in the world, 1990–2020 (Source: FAO, 2020)

On the consumption side, global demand for wood products has been rising rapidly and is expected to grow further in the coming decades (Indufor, 2012b). The major causes of the rise in wood demand include population growth, income growth in emerging economies such as China and India, and energy and environmental policies (which focus on switching to renewable resources, such as wood) (FAO, 2009). The growing demand for wood and forest products has put additional pressure on the world's natural forests. With current trends expected to continue in the coming years, the global supply of wood is projected to fall short of global demand in the coming decades (Indufor, 2012b). In Africa, a sustained increase in wood supply is not expected to come from natural forests because of the declining area of natural forests due to land-use change, especially for agriculture (Indufor, 2012a). Thus, investments in new sources of wood supply, such as forest plantations, are highly needed, particularly in Africa, to satisfy the growing demand for wood (Indufor, 2012a).[1]

Forest plantations are considered alternative means to increase wood supply to meet the growing wood demand and reduce pressure on natural forests (Payn et al., 2015; Siry et al., 2005). This has led to the expansion of forest plantations globally in the past few decades. While the global area of forests and the supply of wood products from natural forests have been declining, the global area of forest plantations is increasing. The global area of forests decreased from 4.13 billion ha in 1990 to 4.06 billion ha in 2020, while the area of forest plantations increased from 167.5 to 223.3 million ha in the same period (FAO, 2015, 2020; Payn et al., 2015). This trend is expected to continue, and forest plantations are expected to be a major

[1] Forest plantations are planted forests which are intensively managed, consisting of one or two species, even age class, with regular spacing at planting and stand maturity (FAO, 2020).

source of wood supply in the coming decades (FAO, 2020; FAO, 2015; Indufor, 2012a,b; Payn et al., 2015; Pirard et al., 2017; Siry et al., 2005).

Even though the majority of the world's forests are state-owned, the share of private ownership of forests is on the rise, and the private sector is expected to be a major supplier of forest products in the coming years (FAO, 2020; Indufor, 2012b; Payn et al., 2015). Private investors are attracted to forest plantations because plantations grow faster, and the costs of managing them are often small compared to those of natural forests (Evans and Turnbull, 2004; Siry et al., 2005). In addition, plantations enable concentrated wood production on a smaller area of land and thus create conducive opportunities for their sustainable management (Siry et al., 2005). In Africa, these reasons, coupled with a lack of sufficient state funds for establishing plantations, have resulted in policies that encourage private ownership of plantations or concessions by states to private companies (FAO, 2018).[2] For example, in Tanzania, the Forest Policy (MNRT, 1998) and climate change strategies emphasize the role of private sector involvement in forest management (United Republic of Tanzania, 2015). Accordingly, domestic and foreign private companies have been granted land for establishing forest plantations in rural villages of many African countries (Purdon, 2013).

In Europe, an important change that occurred in the forest sector in the last three decades is the increase in private ownership of forests. The number and area of privately owned forests have increased substantially in Europe since 1990 (Forest Europe, 2015; Weiss et al., 2019; Živojinović et al., 2015). The main reasons for this increase were structural changes in the European agricultural sector and privatization of forest land in eastern and south-eastern European countries (Ficko et al., 2019; Weiss et al., 2019; Živojinović et al., 2015). By 2015, private forest ownership accounted for 52 percent of the forest area in Europe (excluding the Russian Federation) (FAO, 2020). Of these, non-industrial private forest (NIPF) owners comprise the largest share of forest owners in Europe (Juutinen et al., 2020).

Studies have shown various types of private forest management with different motivations of forest owners in Europe (Ingemarson et al. 2006; Nordlund and Westin 2011). Due to the growing demand for forest products, the production of forest resources from private forests has been given priority on the forest policy agenda in Europe (Hirsch and Schmithüsen, 2010).Various studies, however, show that the level of management on private forests is limited (Ní Dhubháin and Greene, 2009; Toivonen et al., 2005; Wiersum et al., 2005). For example, Wiersum et al. (2005), in a study conducted in nine European countries, found that 30 percent of private forest owners show an indifferent attitude towards forests (no interest in forest management). The authors found that these forest owners include absentee owners and retired local owners, who own only forest lands but who often do not rely economically on their forests. Active management of forests enhances the socio-economic and environmental values of

[2] Concessions are rights conferred by states to private entities to harvest timber or other forest products or to manage forest (FAO, 2018).

forests and includes activities such as tending and thinning of forests. A wide range of policies and programs, such as grants for tending and thinning, aimed at encouraging private forest owners to actively manage their forests have been undertaken in Europe (Howley, 2013). The effectiveness of these interventions has been variable. A crucial unresolved challenge is balancing the production of wood and environmental services by private forest owners (Triviño et al., 2015; Angelstam et al., 2018; Lazdinis et al., 2019).

1.2 Industrial Forest Plantations and Local Communities in East Africa

Rising wood demand, favorable climatic conditions, and the availability of cheap labor and land have spurred the expansion of forest plantations in Africa. The area of planted forests in Africa is currently around 11.4 million ha, which accounts for two percent of the total area of forest in the continent (FAO, 2020). Mozambique and Tanzania are among the African countries which have witnessed substantial increases in their area of planted forests in the last three decades. In Mozambique, the area of planted forest increased from 38,000 ha in 1990 to 75,000 ha in 2015 and in Tanzania it increased from 150,000 ha to 290,000 ha during the same period (FAO, 2014). Forest plantations in Africa are mostly established on village lands through a lease-hold system (Purdon, 2013).

The socio-economic outcomes of forest plantations for local communities have been debated among researchers, policymakers and practitioners (Arttu et al., 2018; Baral et al., 2016; Gerber, 2011). On the one hand, forest plantations are associated with beneficial outcomes for communities and thus are viewed as opportunities for local development. Some of these beneficial outcomes include employment opportunities, higher wages and better living conditions for villagers, investments in infrastructure (such as schools, roads and health centers) by plantations, tax revenue for the state, and income from exports of timber products (Bleyer et al., 2016; FAST, 2014; Landry and Chirwa, 2011; Pirard et al., 2017).

On the other hand, non-governmental organizations (NGOs), researchers and local communities have expressed concerns about detrimental outcomes of forest plantations for communities. The most persistent concerns associated with plantations include conflicts about land ownership, displacement of customary land uses of villagers and restrictions on their access to and control over land and other natural resources (Bleyer et al., 2016; Byakagaba and Muhiirwe, 2017; Charnley, 2005; Gerber, 2011; Gerber and Veuthey, 2010; German et al., 2014; Locher and Müller-Böker, 2014; Schoneveld et al., 2011). Akin to other large-scale land acquisitions in developing countries, forest plantations in this regard have been regarded as another form of ‘land grab’ or ‘green grab’ and linked with conflicts with local communities, often dubbed as ‘carbon violence.’ Recent studies, however, suggest that many reports of ‘land grab’ are based on insufficient data and that there is a dearth of evidence to verify the extent of land grabs associated with large-scale land acquisitions (Liao et al., 2016; Locher and Sulle, 2014; Schoneveld, 2014).

1.3 Non-industrial Private Forest Owners in Sweden

Most of the private forests in Europe are owned by individuals or families and large holdings by companies are rare (Weiss et al., 2019). This implies that private forest management is largely influenced by the attributes of individual forest owners. In recent years, demographic and social changes have encouraged a growing diversity of private owners' interests, values and demands towards their forests and forest management types, which in turn affect the order of priorities (for example, timber production versus amenity values of forests) regarding their management decisions (Ziegenspeck et al., 2004). Forest owners vary in their environmental concern in forest management (Hirsh, 2010). Private forest management decisions involve balancing profit motives with environmental services of forests (Sotirov et al., 2017).

In Sweden, non-industrial private forest owners own about half of the productive forest area (Swedish Forest Agency, 2019). According to the amendments to the Forestry Act in 1994, forest management decisions are largely in the hands of the forest owner instead of being enforced by public regulators (Lidestav et al., 2015; The Forestry Act, 2020). Forest management decisions and practices of private forest owners can influence the wood supply and environmental services of forests (Haugen et al., 2016). As private forest owners have control over decisions regarding their forests, the management of private forests is thus, to a large extent, influenced by the choices and actions of forest owners (Lidestav et al., 2015). The changes in forest ownership in Sweden can be regarded as representative of the Northern boreal regions more generally (Beland Lindahl and Westholm, 2012)

1.4 Sustainable Forest Management

Another development in the forest sector in the past few decades is related to forms of forest governance. Forest governance refers to all formal and informal, public and private regulatory structures concerning the utilization and conversion of forests (Giessen and Buttoud, 2014). Forest governance affects forest management decisions (Giessen and Buttoud, 2014). In response to the decline in area and quality of global forest, various forms of forest governance have been promoted by states, international organizations and civil society groups to enhance sustainable forest management (SFM). Forest management refers to "...the administrative, economic, legal, social, technical and scientific aspects of managing natural and planted forests" (FAO, 2020). SFM is "a dynamic and evolving concept" and is intended to "maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations" (UN, 2007). Even though SFM has been defined in various ways, it is generally agreed that the concept entails balancing the economic, social and environmental aspects of forest management (FAO, 2020).

One of the forest governance mechanisms is forest certification (Arts, 2014; Arts and Visseren-Hamakers, 2012; Bass, 2001; Cashore, 2002; Cashore et al., 2007). Frustrated by the poor progress of efforts by the UN to enhance SFM, major environmental NGOs and global wood retailers established the first forest certification scheme, the Forest Stewardship Council (FSC), in 1993 (Nussbaum and Simula, 2005). The FSC is an independent international organization

that sets out standards and indicators for SFM (FSC, 2012). The FSC is one of the most prominent certification schemes in the world, with a total certified area of about 213 million ha as of October 2020 (FSC, 2020). Forest certification is a market-based initiative whereby a third-party certifier verifies whether standards and requirements of SFM are met by forest owners (Bass, 2001; Nussbaum and Simula, 2013). Forest certification seeks to encourage forest owners to comply with the standards of SFM through promoting price premiums and increased market share for wood products obtained from sustainably managed forests (Ehrenberg-Azcárate and Peña-Claros, 2020; Miteva et al., 2015; Siry et al., 2005). Despite initial optimism about the efficacy of forest certification in achieving SFM, a growing body of literature has produced mixed results regarding the role of forest certification in fostering SFM (Arts and Visseren-Hamakers, 2012; Romero et al., 2013).

Many countries worldwide recognize the importance of achieving SFM (Siry et al., 2005). SFM affects the economic, social and environmental outcomes of forests. With the increasing role of forest plantations as suppliers of timber and non-timber forest products, the socio-economic outcomes of plantations for adjacent communities in developing countries have received attention in recent literature (Arttu et al., 2018; Pirard et al., 2017). Sustainable management of forest plantations affects whether plantations are opportunities or menace for development. In this regard, it is vital to assess the factors that affect SFM and, thereby, the socio-economic outcomes of forest plantations. In Europe, SFM policies prioritize the environmental values of forests. As private actors, NIPF owners make decisions regarding their forest management. Personality affects human behavior and thus can shape the environmental concern of private forest owners (Hirsh, 2010; Solino and Farizo, 2014). In this regard, understanding the role of personal values and personality traits of forest owners in their environmental considerations in forest management is crucial for forest management policy and practice (Eggers et al., 2014; Weiss, 2019).

What are the implications of the changes in the forest sector and policy discussed above for sustainable forest management? Which factors affect the outcomes of management of forest plantations for local development? Do the personal values and personality traits of NIPF owners influence their environmental concern in Europe? This thesis assesses the factors that affect SFM in the context of large-scale industrial private forest plantations and non-industrial private forests. More specifically, the subsequent three chapters (Chapters 2 to 4) of the thesis aim to contribute to the literature on the factors that explain the mixed socio-economic outcomes of industrial forest plantations for local communities in developing countries. I focus on the socio-economic aspects of management of forest plantations and operationalize SFM in terms of desirable socio-economic outcomes for communities adjacent to plantations. The fifth chapter of this thesis aims to contribute to the literature on the role of personal values and personality traits in the environmental concern of non-industrial private forest (NIPF) owners. Throughout the chapters of the thesis, SFM is the unifying thread that connects the chapters. The remainder of this introductory chapter provides the problem statement of the research and describes the

objectives and research questions that will be addressed in the thesis. In addition, this chapter provides a brief overview of the methodologies used for the research and ends with an outline of the thesis. In Sub-section 1.4.1, I explain the theoretical relationships between SFM and ownership and certification of forest plantations. In Sub-section 1.4.2, I explain the theoretical relationships between environmental concern in forest management and the personalities of forest owners.

1.4.1 Factors that Affect the Socio-economic Outcomes of Industrial Forest Plantations

As explained earlier, SFM aims at maximizing the socio-economic and environmental values of forests. What are the factors that can explain the differential socio-economic outcomes of forest plantation management? Despite the continued expansion of forest plantations in developing countries, there are few quantitative studies on the factors that affect the outcomes of plantations for rural communities (Pirard et al., 2017). A recent systematic review of the local socio-economic outcomes of forest plantations globally suggested that the outcomes differ across contexts (such as land uses prior to plantations, how long plantations have been established) (Arttu et al., 2018). However, studies that focus on identifying factors and contexts that contribute either to positive or negative outcomes are largely lacking. Despite studies and anecdotal evidence suggesting that ownership categories of forests affect outcomes of forest management and achievement of policy goals (see e.g., Siry et al., 2005), the aspect of ownership is rarely studied in research on forest management or forest policy (Weiss et al., 2019). According to Weiss et al. (2019), research on ownership of forests needs to address the question of how the form of ownership relates to forest management and the provision of goods and services. The authors call for stronger theoretical foundations and innovative conceptual approaches to forest ownership research that proactively capture future implications. This thesis is a step in this direction.

I focus on two categories of socio-economic outcomes of sustainable plantation management: investment in local infrastructure and social services (which are considered public goods) by plantations and community participation in plantation management. I postulate that private forest plantation companies are more likely to have stronger incentives for the provision of local infrastructure and social services as well as community participation in plantations' management as compared to state-owned forest plantations. Why would a profit-seeking private company invest in local infrastructure and social services that have public good characteristics? My conjecture is based on the following theoretical underpinnings. First, studies show that profit-seeking private firms can invest in public goods as part of corporate social responsibility (CSR). For example, Besley and Ghatak (2007) used a market equilibrium model of competitive profit-maximizing firms and utility-maximizing consumers to assess the provision of public goods by profit-seeking firms. The authors assume firms move first with the options of producing a private good with or without a public good and a group of consumers value the public good. Their results show that responsible firms that invest in social services enjoy higher returns as a reward for their good behavior. Hence, private businesses with external effects can

incorporate CSR as part of their profit-maximizing strategy. Furthermore, Besley and Ghatak (2007) mathematically prove that profit-seeking private firms can be more efficient than state-owned or non-for-profit entities in the provision of public goods, primarily due to government failure and weak monitoring in the public sector.

Second, private businesses can invest in public goods with the expectation of being on the receiving end of reciprocal fairness. Reciprocal fairness implies that people treat well those who treated them well, but treat negatively those who treated them badly. Starr (2008) extends the concept of reciprocal fairness to the case of businesses. Based on insights gained from experimental studies on the pro-social behavior of individuals, she posits that individuals react favorably to companies that are considered to be fair in dealing with their stakeholders. Investments in public goods and associated positive perceptions by local communities may reduce the risk of conflicts with local communities and related losses (Indufor, 2012a). Such positive perceptions of local communities regarding the activities and investments of forest plantations may also reduce their vulnerability (and associated costs) to pressures from socially and environmentally oriented NGOs, which may otherwise lead to reputational risks. Besides, investors screen companies into socially responsible portfolios based on their relations with customers, workers and communities. This entails that private companies may invest in public goods to attract shareholders and investors. Hence, public goods can be voluntarily supplied by private economic agents (Bergstrom et al., 1986; Cornes and Sandler, 1996).

Another important factor that affects forest management is forest certification. In the 1990s, forest certification emerged as a market-based, non-state forest governance system to promote SFM (Arts, 2014; Cashore, 2002; Cashore et al., 2007). Forest certification uses the provision of financial or reputational incentives to encourage forest owners to comply with the standards of SFM (Ehrenberg-Azcárate and Peña-Claros, 2020; Miteva et al., 2015). Incentives include price premiums and increased market access for certified products by appealing to consumers' preferences towards certified forest products based on their social, economic and environmental attributes (Blackman and Rivera, 2011; Ehrenberg-Azcárate and Peña-Claros, 2020; Nussbaum and Simula, 2013; van der Ven and Cashore, 2018). The standards of SFM and monitoring by certifying bodies, and the expected benefits of certification, can add to the incentives of private companies to invest in social services and local infrastructure (Bass et al., 2001; FAO, 2018; Tumlinson and Morgan, 2013; Zivin and Small, 2005). In Africa, FSC is the dominant forest certification scheme with a total certified forest area of about nine million ha as of October 2020 (Ehrenberg-Azcárate and Peña-Claros, 2020; FSC, 2020). One of FSC's sustainable forest management principles (Principle 4: community relations) requires forest owners to maintain or enhance workers and local communities' long-term social and economic wellbeing (FSC, 2012).

Furthermore, forest certification can potentially improve social aspects of forestry operations such as plantation-community relations (Cubbage et al., 2010). For example, the FSC standard of SFM has a strong social aspect that purports to improve relationships between forest owners

and local communities (Cerutti et al., 2017; Payn et al., 2015). Specifically, Principle 4 of FSC's standard of SFM concerns community relations which requires forest owners to respect the rights of forest adjacent communities including their rights of participation and consultation regarding forest management. Whether forest certification is associated with positive changes in community participation in forest management has been contested (Romero et al., 2017; Tricallotis et al., 2018). While some studies found no or little evidence of improved community engagement in forest management associated with certification (McCarthy, 2012; Stringer, 2006), others have documented a positive role of forest certification in enhancing community engagement in forest management (Cerutti et al., 2017; Cubbage et al., 2010; Dare et al., 2016; Miteva et al., 2015; Rametsteiner and Simula, 2003; Tsanga et al., 2014). Notwithstanding these, quantitative studies about the role of forest certification in the sustainable management of plantations are scarce (Ehrenberg-Azcárate and Peña-Claros, 2020).

1.4.2 Personality and environmental concern of NIPF owners in Sweden

The forest sector is given a key position in climate change mitigation and biodiversity protection in the European Green Deal (Wolfslehner et al., 2020). Most of the environmental challenges the world is facing today are results of human actions, and may require behavioral solutions (Oskamp, 2000; Saunders, 2003). Understanding the role of attributes of forest owners in shaping their environmental concern can aid in better targeting and framing environmental advice and improve communication with forest owners to promote SFM. Recognizing this, many studies have explored the social and psychological factors that shape attitudes and behavior towards the environment (Dietz et al., 2005; Dietz et al., 1998; Schultz, 2001; Van Liere & Dunlap, 1980). However, most of these studies focus on the role of specific values and norms in predicting environmental concern. Despite the large number of NIPF owners in Europe, quantitative studies that assess the role of attributes of forest owners in their environmental concern are limited. Some studies have recently related environmental concern with the personality traits of individuals (for example, see Hirsh, 2010). The "Big five" broad dimensions of personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience) are commonly used in research on personality traits. Personality traits of Agreeableness and Openness have been associated with pro-environmental values (Hirsh & Dolderman, 2007). These findings are in line with the predictions of theoretical models that relate pro-environmental attitudes to higher levels of empathy and self-transcendence (Schultz, 2000; Schultz & Zelezny, 1999), which are associated with Agreeableness and Openness, respectively. Individuals who are more empathic and less self-focused are more likely to develop a personal connection with nature and exhibit pro-environmental attitudes (Bragg, 1996; Mayer & Frantz, 2004).

Personal values describe goals individuals consider desirable, and as such, they function as guiding principles of individuals' behavior (Roccas et al., 2002; Schwartz, 1992, 2012). In the literature, ten universal basic personal value dimensions are identified (Schwartz, 1992). These are power, achievement, hedonism, stimulation, independence (self-direction), universalism,

benevolence, tradition, conformity, and security. Studies have shown associations between personal values and environmental concern (Stern et al., 1995; Nordlund and Garvill, 2002; Schultz et al., 2005; Steg et al., 2011; Oreg and Gerro, 2006; Hansla et al., 2008; Hedlund, 2011). For example, individuals that more strongly adhere to a pro-social or biospheric value domain have shown higher environmental concern. Conversely, individuals who prefer personal outcomes (such as wealth or power) have either a negative or insignificant association with environmental concern (Harring et al., 2017). It is acknowledged that human values are changing over time and these changes are assumed to affect the strategic choices of forest owners (Ingemarson et al., 2006). In this regard, an improved understanding of personal values and personality traits as predictors of individual forest owners' strategic motivations would be vital (Fischer et al., 2010; Ingemarson et al., 2006). However, studies that incorporate the role of both personal values and personality traits in environmental concern are rare (Marcus and Roy, 2019). Based on findings in the literature, I postulate that personal values and personality traits predict environmental concern in forest management of NIPF owners in Sweden.

1.5 Objectives and research questions

As noted before, SFM affects the socio-economic and environmental outcomes of forests. The overarching objectives of this thesis are twofold: to improve our understanding of the factors that affect socio-economic outcomes of industrial forest plantation management in East Africa and to assess the role of personal values and personality traits in environmental concern of non-industrial private forests in Sweden. I seek to achieve these objectives in two ways. First, I assess differences in perceived outcomes of forest plantation management by a comparative analysis of perceptions of communities nearby private, FSC-certified and non-certified, private plantations (in Mozambique) and a non-certified, state-owned plantation (in Tanzania). Second, I explore the content and dimensions of environmental concern of non-industrial private forest owners in Sweden and assess its relationship with the personality aspects of forest owners.

The specific research questions addressed in this thesis are:

(i) Do ownership and certification of forest plantations affect perceived changes in social services and infrastructure associated with investments by plantations? (Chapter 2)

(ii) Do ownership and certification of forest plantations affect community participation in the management of forest plantations? (Chapter 3)

(iii) Does forest certification enhance weak community participation in the management of forest plantations? (Chapter 4)

(iv) Do personal values and personality traits of non-industrial forest owners (NIPF) predict forest owners' environmental concern in forest management? (Chapter 5)

1.6 Methodology

The studies included in this thesis are based on primary observational data collected through surveys of households, communities and NIPF owners. When I started the PhD project, my objective was to assess outcomes of private forest plantations for local communities in East Africa, and I had planned to undertake two rounds of surveys in Mozambique and Tanzania to be able to collect panel data that will allow attributing changes in socio-economic outcomes in the study villages to forest plantations. I visited the study areas in 2016 and collected the first wave of data. However, the project under which my PhD was financed was terminated in 2018 by the funder, and unfortunately, I was not able to visit the study areas for the second wave of data collection. Hence, the chapters of the thesis that are related to SFM of large-scale industrial plantations (Chapters 2 to 4) are based on the cross-sectional data I collected in Mozambique and Tanzania in 2016. For the chapter on the environmental concern of NIPF owners in Sweden (Chapter 5), I collaborated with my host during a research visit to the Swedish University of Agricultural Sciences, Uppsala, Sweden (SLU) in 2019. During my stay at SLU, I obtained access to data on environmental aspects, personal values and personality traits of NIPF owners collected through a survey in Sweden. Chapter 5 is the outcome of the analysis of these data.

The following steps were taken in identifying study areas in Mozambique and Tanzania that are suited for the purpose of assessing SFM of forest plantations. First, I identified regions in the two countries with the presence of a large number of forest plantations. Accordingly, I identified the regions of Niassa and Nampula in Mozambique and Iringa in Tanzania as regions with a large number of plantations due to their climatic, agro-ecological conditions and favorable access to regional and international wood markets. As the first three research questions of the thesis relate to assessing the role of ownership and certification of forest plantations in influencing outcomes of SFM, I selected FSC-certified forest plantations owned by a private company in the selected regions in Mozambique and Tanzania. For comparison purposes, I selected a state-owned, non-certified plantation in Tanzania and non-certified, private plantations in Mozambique in the same regions where the private, certified plantations operate. I conducted household and community surveys in villages adjacent to the selected forest plantations in the study areas in the two countries in 2016.

A multi-stage sampling technique was used to select respondents for the surveys. In the first stage, study villages were selected based on the following criteria: First, they had to be located near forest plantations. Second, community development projects had to have been undertaken in the villages by the plantation companies and that at least some villagers had to work at the plantations. This criterion ensures that I compare plantations at relatively similar stages of

development and engagement with adjacent communities. Third, there had to be sufficient distance between the villages nearby the FSC-certified and non-certified plantations, to minimize the likelihood that the investments and activities by certified plantations affect the villages nearby the non-certified plantations and vice-versa. Lastly, the villages had to be of comparable size in terms of the number of households living in the villages.

In the second stage, I selected households to participate in the survey in each study village using a systematic sampling technique, the details of which are explained in each of the chapters. Using a structured household questionnaire, I collected extensive information on, among others, socio-demographic and economic characteristics of households, their perceptions about the changes (such as infrastructure and social services) associated with the investments of the plantations in their villages and their participation in the activities of the plantations. I augmented the household level quantitative data with semi-structured qualitative interviews in focus group discussions (FGD) held in each study village to discuss, among others, community perceptions about management of plantations, the impacts of the plantations in the villages and the land-use and tenure prior to the start of plantations. The questionnaires used for the household and community surveys are provided in Appendix A.

To answer the first research question of the thesis, in Chapter 2, I compared perceptions of households about changes in local infrastructure (number and quality of health centers, length and quality of roads and bridges) and social services (school enrolment and quality of education) in villages nearby FSC-certified, private plantations and a non-certified, state-owned plantation. As explained in Section 1.4, SFM requires forest owners to enhance the social and economic wellbeing of forest adjacent communities. Investments in local infrastructure and social services by plantations are regarded as a symbol of compliance with SFM guidelines. The dependent variables in the econometric analyses have three ordered categories: 1 if the household perceived the plantation to have (greatly) decreased the quantity or quality of the social service or infrastructure, 2 if the household reported no change, and 3 if the household perceived the plantation to have (greatly) increased the social service or infrastructure. As the dependent variables in the econometric analyses have ordered categories, I used an ordered logistic regression model to analyze the relationship between ownership and certification of the forest plantations and perceived changes in each type of social service and infrastructure.

To answer the second research question, in Chapter 3, I assessed the perceptions of households about their participation in the activities of plantations in their villages. To explore the role of ownership and certification of forest plantations in influencing community participation in forest management, I compared perceptions of households in villages nearby FSC-certified, private plantations and a non-certified, state-owned plantation about their participation in plantations' activities. As the dependent variables in the econometric analysis have two or more ordered outcomes, I used binary and ordered logit regressions to estimate the relationship between forest ownership and certification and various indicators of community participation in forest management (whether households have a say in plantations' activities, to what extent

they are satisfied with their say in plantations' activities, whether households perceive that plantations respond to community complaints and grievances and to what extent households consider plantation a 'friendly good neighbor').

Building on the finding regarding the combined role of forest ownership and certification in influencing community participation in forest management in Tanzania (Chapter 3), I assess the specific role of forest certification in fostering community participation in forest management in Chapter 4. I compared perceptions of households in villages nearby FSC-certified and non-certified, private plantations in Mozambique about their participation in activities of plantations. I used binary and ordered logit regressions to estimate the association between forest certification and various indicators of community participation in forest management (whether households have a say in plantations' activities, to what extent they are satisfied with their say in plantation activities, and to what extent households consider plantation a 'friendly good neighbor').

Chapter 5 explores the environmental concern of NIPF owners and its relationship with personal values and personality traits. The study is based on a survey of NIPF owners in Sweden. The survey among the NIPF owners was part of a larger study on the regulation of agricultural and forestry land acquisition in Sweden. The survey included detailed modules on forest owners' demographic and socio-economic characteristics, questions related to forest owners' considerations for environmental aspects in forest management (which are used to measure the latent construct of environmental concern) and their personal values and personality traits (the specific modules of the questionnaire used for the survey are given in the appendix). Personal values were measured based on a short version of Schwartz's personality scale (Lindeman & Verkasalo, 2005). Schwartz's personality scale identifies ten basic values: power, achievement, hedonism, independence, stimulation, universalism, benevolence, tradition, conformity and security. Sampled NIPF owners were asked to indicate the importance of each of these values as a guiding principle in their life. A common method of measuring personality traits is the Big Five Inventory (BFI) approach (Hirsh, 2010). The BFI describes five broad aspects of personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (John et al., 1991; 2008). Sampled NIPF owners were asked to what extent they agree with each of 44 statements that may describe their characteristics. I used exploratory factor analysis to explore the dimensions of environmental concern of sampled NIPF owners. Exploratory factor analysis reduces the statements regarding environmental considerations of forest owners into factors that underlie the latent construct, environmental concern (Hair et al., 2010). I used hierarchical seemingly unrelated regressions (SUREG) to assess whether the personal values and personality traits of NIPF owners predict the environmental concern of the forest owners. SUREG is a preferred estimator because the error terms of the equations used to predict environmental concern from personal values and personality traits are likely to be correlated (Verbeek, 2012).

In each of the econometric analysis of the chapters of the thesis, the demographic and socio-economic characteristics of sampled respondents enter as covariates. The details of the data collected through the surveys and the sampling procedures are discussed in each chapter of the thesis.

1.7 Outline of the thesis

This thesis is organized into six chapters including this introductory chapter. Chapters 2 to 4 focus on factors that affect sustainable management of forest plantations in Tanzania and Mozambique. In Chapter 2, I explore whether ownership and certification of forest plantations affect perceived changes in local infrastructure and social services in rural Tanzania. Chapter 3 assesses whether ownership and certification of forest plantations affect community participation in the management of forest plantations in Tanzania. Chapter 4 examines whether forest certification enhances community participation in the management of private forest plantations in Mozambique. Chapter 5 focuses on the role of personal values and personality traits in environmental concern in forest management among NIPF owners in Sweden. Chapter 6 provides a synthesis of the key findings of the thesis, discusses the limitations of the study and the implications of the findings for policy and future research.

CHAPTER 2

2

Forest plantations' investments in social services and local infrastructure: an analysis of private, FSC certified and state-owned, non-certified plantations in rural Tanzania[3]

[3] This chapter is based on the article: Degnet, M.B., van der Werf, E., Ingram, V. and Wesseler, J., 2018. Forest plantations' investments in social services and local infrastructure: an analysis of private, FSC certified and stateowned, non-certified plantations in rural Tanzania. *Land Use Policy, 79*, pp.68-83.

Abstract

With the rapid expansion of forest plantations worldwide, communities, NGOs and researchers are increasingly expressing their concerns about the outcomes of plantations' activities for local households. This study investigates the perceptions of local households about forest plantations' investments in social services and local infrastructure in rural Tanzania. We consider households living in villages adjacent to private, FSC certified forest plantations and households in villages adjacent to a state-owned, non-certified plantation. We use survey data from 338 households to analyze perceived changes in school enrolment, quality of education, and the number and quality of health centers, roads and bridges associated with investments by plantations. We use a mixed method approach and complement the results from a logistic regression model with observations of the size and quality of social services and infrastructure in the villages and with findings from focus group discussions. The results show that households in the villages adjacent to both the private, FSC certified and state-owned, non-certified forest plantations associate the plantations with improved social services and local infrastructure in the study villages. Moreover, we find that the private, FSC certified forest plantations are viewed more favorably than the state-owned, non-certified plantation in terms of their contributions to social services and local infrastructure in the study areas. Richer households tend to perceive the investments of the plantations more favorably than poorer households in the study villages.

Keywords: private forest plantations; social services; perceptions; certification; FSC; Tanzania

2.1 Introduction

Forest plantations are increasingly promoted as a means to satisfy the rising demand for forest products in the world. The global decline of timber supply from natural forests has been accompanied by an increase in the supply of timber from planted forests in the past three decades and this trajectory is expected to continue in the coming years (FAO, 2015; Indufor, 2012a,b; Payn et al., 2015; Pirard et al., 2017). While the global forest area decreased from 4.28 billion hectares in 1990 to 3.99 billion hectares in 2015, the area of planted forests increased from 167.5 to 277.9 million hectares in the same period (FAO, 2015; Payn et al., 2015). Rising wood demand, availability of land and suitable climatic conditions in the tropics have encouraged investment in forest plantations in this region (Indufor, 2012a,b). The area of planted forests in Africa increased by about 37% between 1990 and 2015: from 11.7 million hectares in 1990 to 16 million hectares in 2015 (FAO, 2015). Tanzania is one of the countries in Africa which have witnessed rapid expansion of forest plantations and the country's area of planted forests almost doubled in the past three decades: from 150,000 hectares in 1990 to 290,000 hectares in 2015 (FAO, 2015). Private investments in sustainable forest plantations are growing especially in developing countries because public institutions often lack the financial incentives and capacity to ensure sustainable forest management (FAO, 2015; World Bank, 2008). Tanzania has a long history of promoting private forestry to contribute to development and poverty alleviation (URT, 1998). Accordingly, private forest plantations have been expanding rapidly in the country and are expected to overtake state-owned plantations as the major source of wood supply in the coming years (AFF, 2011; Indufor, 2011). Tanzania is also among the countries with the fastest growing area of FSC certified forests in Africa (FSC, 2015).[4]

Views regarding large-scale private forest plantations and the outcomes of their activities for local communities are mixed. On the one hand, non-governmental organizations, researchers and local communities have voiced concerns about adverse outcomes of such plantations. Recurring concerns are related to conflicts about land ownership, displacement of local households and restrictions on their access to and control over land and other natural resources (Bleyer et al., 2016; Byakagaba and Muhiirwe, 2017; Charnley, 2005; Gerber, 2011; Gerber and Veuthey, 2010; German et al., 2014; Locher and Müller-Böker, 2014; Schoneveld et al., 2011). For example, Gerber (2011) found that displacement of local people was associated with the expansion of industrial forest plantations in the global south. In a review of perceptions towards socio-economic outcomes related to plantation forestry, Schirmer (2006) found that such plantations are associated with a loss of social services (schools, financial institutions) in rural areas as a result of population decline due to voluntary or forced displacements of rural dwellers. On the other hand, studies and anecdotal evidence indicate that local households

[4] Forest Stewardship Council (FSC) is an independent global not-for-profit organization that sets standards for responsible forest management to promote socially, economically and environmentally beneficial outcomes (FSC, 2015).

perceive forest plantations positively in terms of their socio-economic outcomes (Bleyer et al., 2016; FAST, 2014; Landry and Chirwa, 2011; Pirard et al., 2017). Positive perceptions are commonly related to employment opportunities, higher wages, better living conditions and infrastructure investments by plantations. For example, private forest plantations were associated by local households with improved wealth and perceived well-being of local households and with improved employment opportunities and infrastructure in Mozambique (Bleyer et al., 2016; Landry and Chirwa, 2011). Perceptions of communities towards changes associated with plantations may differ from actual changes linked with plantation activities. Even in situations where plantations have undertaken investments in social services, community perceptions may not reflect these as positive changes. This may arise if the social services are not of use to local communities but rather just promote the activities of the plantations and if communities value the social investments by the plantations less than the value they place on the village land used by the plantations. Moreover, even though actual investments have been made by plantations, these may not necessarily translate into uniform positive (perceived) changes to all community members. Differences between actual and perceived changes may partly be indicative of differential effects of plantations' activities on various groups.

In this study, we examine the perceptions of local households in rural villages in Tanzania about investments by private, FSC certified forest plantations in social services (school enrolment and quality of education) and local infrastructure (health centers, roads and bridges), and compare them with perceptions towards a state-owned, non-certified plantation. It is important to consider the perceptions of local people in investigating the outcomes of investments in land use changes, especially in long-term and risky investments such as forestry operations (Edelman et al., 2013; Pirard et al., 2017; Smalley and Corbera, 2012). In developing countries, forest plantations are often established on village lands which used to be under customary land use arrangements. Whether land-use changes to plantations are accepted by adjacent communities partly depends on the legal nature of the land acquisition, consultation of communities in the acquisition process and on the land-use type before the plantations (Purdon, 2013). An analysis of perceptions of communities towards forest plantations provides insights into the expectations of communities about rural land-use changes to plantations and the acceptability of different types of plantations. Such an analysis can inform the formulation of a land-use policy as social acceptability is an important element in designing such a policy. Social acceptance of plantations depends on acceptance by local communities and can influence the sustainability of plantations (Williams, 2014). Using household data from villages nearby private, FSC certified and state-owned, non-certified plantations, we apply ordered logistic regression analysis to quantitatively examine the relationship between the plantations and households' perceived changes in social services and infrastructure. Further, we examine whether the perceptions of households vary over socio-economic characteristics. Evidence shows that perceptions of households towards forest plantations vary among different socio-economic groups. For example, richer households and households who work for plantations

perceived the outcomes of plantations' activities positively in Mozambique (Bleyer et al., 2016; Landry and Chirwa, 2011). Unlike previous studies, we compare private, FSC certified plantations with state-owned, non-certified plantations to assess whether ownership and certification status drive differences in perceived changes associated with plantations. We use a mixed-method approach whereby we complement the results from the quantitative analyses with a qualitative analysis of community perceptions based on focus group discussions and with results from visual inspection of the size, operation and quality of social services and infrastructure in the study villages.

Despite the continued expansion of private forest plantations in developing countries, there are few quantitative studies on the perceptions of rural communities towards the outcomes of the investments of these plantations (Pirard et al., 2017). Moreover, these studies have focused on the perceptions of communities on the (expected) roles of plantations in employment generation, changes in incomes or wealth and access to forest products for households in adjacent villages (Bleyer et al., 2016; Landry and Chirwa, 2011). However, community development implies more than an increase in household income or wealth: investments in social services and infrastructure sustain long-term development and poverty alleviation (Arrow et al., 2012; Casaburi et al., 2013; Duffy-Deno and Eberts, 1991). Still, national and local governments in developing countries often lack the financial resources to improve infrastructure provision, especially in remote rural areas. In such situations, the role of private sector investments can be vital (Collier and Cust, 2015).

Our study contributes to two academic areas. First, it extends the literature on the perceptions of local communities towards forest plantations by providing quantitative evidence on perceptions of villagers towards changes associated with plantations' investments in social services and local infrastructure. We take a comparative approach involving households in villages adjacent to FSC certified plantations of a private forest company and households in villages neighboring a state-owned, non-certified plantation. Most studies on the interplay between forest plantations and local communities are based on qualitative data and do not triangulate the results from the qualitative surveys with results from quantitative survey data (Locher and Müller-Böker, 2014; Obidzinski et al., 2012; Pirard et al., 2017). Quantitative studies on the perceptions of households towards private forest plantations thus far have not used a comparative approach to assess differences in household perceptions among plantations under different ownership and certification status. Ownership and certification status can potentially affect how plantations conduct their activities and thereby drive differences in (perceived) changes associated with plantations. These are due to the profit maximization motive of private owners and the standards and criteria of certifying bodies which demand contributions to local communities and thus making private, certified plantations more likely to be associated with positive changes in local development (Bass et al., 2001; FSC, 2012). Landry and Chirwa (2011) used quantitative data to assess the potential socio-economic outcomes of plantations in Mozambique and dealt with anticipated outcomes reported by local households

(ex-ante analysis), not perceptions related to actual outcomes realized after operations started. Bleyer et al. (2016) used quantitative ex-post data to analyze the socio-economic outcomes of private investments in land-use changes using a village without plantations for comparison. In our study, we include villages nearby a state-owned, non-certified plantation for comparison.

Second, our study contributes to the literature on the private provision of public goods by highlighting the role of corporate social responsibility and sustainable business interest as drivers of pro-social investments in social services and local infrastructure by private forest plantations. Following Besley and Ghatak (2007) and Starr (2008) we hypothesize that the private, FSC certified plantations are expected to have stronger incentives to invest in public goods in the form of social services and local infrastructure, as compared to the state-owned, non-certified plantation. Since investors and shareholders may demand corporate social responsibility (CSR) to secure long-term returns from their investments, private, certified plantations may invest in public goods to attract investors and shareholders (Starr, 2008). In addition, multilateral development agencies and creditors may condition availing finances to plantations on their contributions to surrounding communities, which may influence how plantations engage with local communities. Though governments could perhaps demand CSR from their plantations, this is less likely than for profit-seeking private investors. Private firms are more efficient than public firms in investing in social services (Besley and Ghatak, 2007). In addition, weak monitoring in the public sector of developing countries imply lower scope for social investments by state-owned plantations (Besley and Ghatak, 2007). This is also partly reflected in the lack of incentives to get certified by state-owned plantations in developing countries. Certification is often regarded as an indicator of socially responsible investment and is expected to lead to better market access and price premiums and enhance brand credibility and corporate reputation among customers, socially and environmentally oriented NGOs and potential investors and donors (Auld et al., 2008). In addition, private owners of plantations need to guarantee their access to land as compared to state-owned plantations and one mechanism of doing this can be investing in local development (Ribot and Peluso, 2003). The results of the study are pertinent to current concerns about the integration of modern large-scale private forest plantations with adjacent communities and their contributions to public goods (social services and infrastructure) in rural areas of developing countries.

The remainder of the paper proceeds as follows. The next section introduces the analytical framework. Section 2.3 describes the study context and data. Section 2.4 presents the methods. The results and robustness checks are described in Section 2.5. The last section concludes.

2.2 Analytical framework

To assess the perceptions of households towards investments by private, FSC certified and state-owned, non-certified forest plantations in social services and local infrastructure, we conceptualized how the incentives of the private, FSC certified plantations to make such investments may be stronger. There can be multiple reasons for a profit-seeking private, FSC certified plantation company to have stronger incentives to invest in social services and local

infrastructure as compared to a state-owned, non-certified plantation. First, studies show that corporate social responsibility (CSR) leads to the provision of public goods by for-profit private firms operating in a competitive environment. Besley and Ghatak (2007) show that more responsible firms with social investments enjoy higher returns as a reward for good behavior. Hence, CSR can be part of profit-maximizing strategy by businesses with external effects. Besley and Ghatak (2007) also show that CSR by profit seeking firms can be more efficient in providing public goods compared to state-owned or non-for profit entities. This is mainly due to government failure and weak monitoring in the public sector. Starr (2008) extends the notion of reciprocal fairness to the case of businesses. Reciprocal fairness implies that people treat kindly those people who have treated them well, but treat negatively those who have treated them poorly. Drawing from insights gained from experimental studies on social preferences and pro-social behavior of individuals, she posits that people react positively to companies that are considered to be fair in dealing with their stakeholders. Investors screen companies into socially responsible portfolios based on their relations with customers, workers and communities. To attract shareholders and investors, private companies may invest in a socially responsible way, even at the cost of forgoing some profits. Hence, public goods can be voluntarily supplied by private economic agents (Bergstrom et al., 1986; Cornes and Sandler, 1996). Second, companies may invest in local development to retain FSC certification or to become certified. One of FSC's sustainable forest management principles (Principle 4: community relations) requires forest owners to maintain or enhance workers' and local communities' long-term social and economic well-being (FSC, 2012).[5] The standards and monitoring by certifying bodies, and the expected market gains of certification, can add to the incentives of private companies to invest in social services and local infrastructure (Bass et al., 2001; FAO, 2018; Tumlinson and Morgan, 2013; Zivin and Small, 2005). Consumers are expected to be willing to pay more for the products of certified plantations as certification is regarded as an indicator of the positive contribution of plantations to the development of neighboring communities (Romero et al., 2013; Romero et al., 2017).Third, there is a direct benefit to the company where roads and bridges are used to transport inputs and outputs, and schools and health centers may contribute to better educated and healthier workers. Though this own benefit incentive may apply to both private and state-owned forest plantations, it is likely to be stronger in case of private plantations than state-owned plantations due to stronger profit-seeking orientations of the former. We use these insights from the literature to guide our expectations as to why households nearby the FSC certified plantations of a private company may perceive its investments more positively as compared to households near a state-owned, non-certified plantation.

[5] Indicators 4.3 and 4.4 under this principle state respectively that plantations " ... shall provide reasonable opportunities for employment, training and other services to local communities*"* and "...contribute to the social and economic development of local communities." (FSC, 2012)

The private forest company, to be introduced in Section 2.3, invests in tree planting and wood processing activities (e.g. sawmill). These activities generate direct and indirect outputs. Examples of direct outputs are sawn timber, poles, and pallets as well as non-wood products such as carbon credits. Indirect outputs include social services and infrastructure that the company (co-)finances in villages adjacent to its plantations. The private forestry company may decide (for reasons discussed earlier in this section) to invest in the construction and improvement of school and health center facilities, roads and bridges in neighboring villages. These investments can lead to improved access to social services (e.g. quality education and increased school enrolment) and infrastructure (e.g. roads and bridges) in the villages. We measure such outcomes using subjective indicators based on the perceptions of local households regarding the changes in social services and local infrastructure associated with the investments of the plantations. The specific indicators used in this study are households' perceptions about the extent to which investments by the plantations changed the number and quality of health centers, quality of education, the number of children in schools and the length and quality of roads and bridges in their villages. In addition, we visually assessed the functionality, quality and use of the services and infrastructure by villagers.

Improved availability of social services and infrastructure is expected to enhance the relationship of the company with stakeholders such as local communities, customers, workers and NGOs and help its plantations retain their FSC certification. Improved relations with stakeholders are expected to lead to better business outcomes for the company such as increased profit, market share and market access. Investments in roads and bridges may facilitate the activities of the company thereby raising profits. Roads and bridges contribute to increased market integration and access to information for local households and may lead to positive local livelihoods outcomes in the form of social services and infrastructure. According to the Sustainable Livelihoods Approach (SLA), livelihood assets consist of natural, financial, physical, social and human capital (Ellis, 2000). The activities of the private forest company may contribute to improved human capital in the form of increased school enrolment and education quality as well as physical capital (health centers, roads and bridges). Based on our analytical framework, we hypothesize that households in villages adjacent to the private, FSC certified forest plantations are more likely to associate the plantations with improved social services and infrastructure as compared to households nearby the state-owned, non-certified plantation.

2.3 Study setting and data

2.3.1 The setting

The study was carried out in four villages in Mufindi district, in the Iringa region of Tanzania: Idete, Kihanga, Mapanda and Nzivi (Figure 2.1).[6] Mufindi district covers an area of 7,515 km² and in 2012 had a population of 265,829 with a density of 35.4 persons/km² (NBS, 2013). Iringa is one of the regions in Tanzania with the largest growing area of forest plantations (PFP, 2017). The study villages were selected according to the following criteria. First, they had to be located near forest plantations within the same administrative region. Second, community development projects had to have been undertaken in the villages by the respective plantations and that at least some villagers had to work for the respective plantations. This criterion ensures that we are comparing plantations at relatively similar stages of development and engagement with adjacent communities. Third, there had to be sufficient distance between the villages nearby the private, FSC certified and state-owned, non-certified plantations as we want to minimize the likelihood that the investments by the private, FSC certified plantations affect the villages nearby the state-owned, non-certified plantation and vice-versa. Finally, the villages had to be of comparable size in terms of the number of households living in the villages. We used information from district offices, company documents and plantation managers to identify villages that fulfil these criteria. Idete and Mapanda are adjacent to FSC certified plantations owned by a private company. The plantation in Mapanda also has Verified Carbon Standard (VCS) certification. Kihanga and Nzivi are adjacent to a state-owned, non-certified plantation. Table 2.1 provides information on the characteristics of the villages. All villages were established in the 1970's and can be regarded as large size villages in terms of the number of households. While Kihanga and Nzivi are relatively located closer to the major district town of Mafinga and are more easily accessible by road transport, Idete and Mapanda are located further away from the town.

[6] The village is the lowest administrative unit in Tanzania. In this thesis, the terms village and community are used interchangeably.

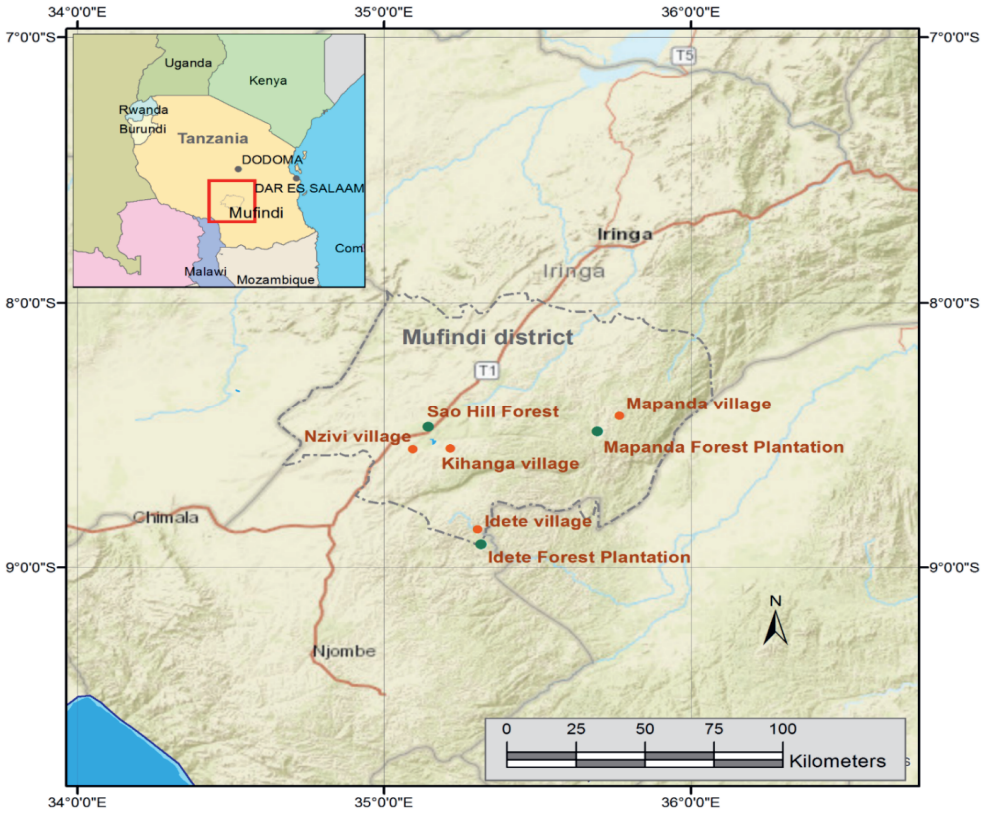


Figure 2.1 Map of study area, Mufindi district, Tanzania

Table 2.1 Characteristics of study villages

Village	Year established	Number of households	Distance to the nearest town market (in minutes by public transport)	Connected to at least one road useable by cars in all seasons?	Owner of nearby Plantation	FSC Certification
Idete	1974	864	42	Yes	Private	Yes
Mapanda	1974	1080	105	Yes	Private	Yes
Kihanga	1974	850	50	Yes	State	No
Nzivi	1974	821	40	Yes	State	No

Source: Focus group discussions and company documents

The private plantations are owned by Green Resources AS and are FSC-certified. Green Resources is the largest forest plantation company in East Africa and was established in the 1990s. By 2016, Green Resources had developed about 17,000 ha of standing forest plantations on 74,000 ha of land in Tanzania, the majority of which used to be grassland with scattered shrubs and isolated trees.[7] The company acquired the land on a 99 years lease from the Government of Tanzania, by negotiating with the relevant authorities in accordance with the 2006 Land Law (Green Resources AS, 2009; Purdon 2013). Under this law, land is granted by the village under the supervision and mandate of the district authorities and authenticated by the Ministry of Lands and Human Settlement Development through the regional office in Mbeya. The company's strategy is based on the sustainable development of the areas in which it operates. Its mission is to be Africa's leading afforestation company working for the benefit of shareholders, employees and adjacent communities by establishing, maintaining and harvesting high-quality forest plantations for offsetting carbon and producing timber, electricity poles, pallets, briquettes (Green Resources AS, 2017).

For comparison purposes, we identified a state-owned, non-certified plantation of comparable size with eucalyptus and pine trees, Sao-Hill forest plantation, which is also located in Mufindi district. Sao Hill is the largest state-owned plantation which currently provides the bulk of wood supply in the country. Even though it was established much earlier than Green Resources, major planting expansions occurred in the 1990s with funding by the World Bank (World Bank, 1983). By 2016, it had a total standing plantation area of 41,600 ha on 65,000 ha of land. By

[7] The discrepancy between the size of land holding and standing forest plantation arises because plantation development occurs in phases. It takes time to get the finances and other inputs to start planting after obtaining the land. Besides, standing forests may decrease due to harvesting for commercial purposes and natural loss of trees.

2013, Sao Hill forest plantation Division I, which is the plantation block adjacent to our study villages, had a total planted area of 12,829 ha (URT, 2013b).

2.3.2 Data

In October 2014, we made a short visit to the study area and interviewed stakeholders, including villagers, village leaders, plantation workers and managers, teachers, health workers, tree grower association members, district officers and customers of plantations (Ingram et al., 2016). We used the results of the interviews to inform the design of the survey. Data were collected in 2016 through a survey amongst 338 households (171 in villages adjacent to the private, FSC certified plantations and 167 in villages adjacent to the state-owned, non-certified plantation), selected using systematic sampling. Using structured questionnaires, we collected data on the socio-demographic and economic characteristics of households and their perceptions about the changes associated with the investments of the plantations in their villages. We asked respondents about perceived changes in social services and local infrastructure that are related to the operations and investments of the plantations. Two enumerators administered the survey per respondent to avoid enumerator bias and errors from fatigue. A focus group discussion (FGD) was held in each village to discuss the perceptions of the community about the socio-economic changes related to the investments and activities of plantations. Village leaders and key informants were asked to suggest representative groups of people in the villages (in terms of profession, gender, age and wealth). The research team then randomly selected every third person from the list of potential participants provided by the village leaders and key informants to participate in the FGD. The focus groups had 10-20 participants to allow for a thorough discussion and active participation and took on average 1.5 hours. The household surveys and FGD were conducted by enumerators fluent in the local languages and English.

Additionally, we used government reports (URT, 2013a; URT, 2015) and visual inspections to assess the existence, operation and quality of social services and infrastructure (co-)financed by the plantations in the villages and to triangulate with the survey data findings. We used a 5-point Likert scale (1 = Unusable, 2 = Poor, 3 = Satisfactory, 4 = Good, 5 = Very good) to rate the quality and operation of each unit of infrastructure according to predefined criteria. The criteria include the condition, age and quality of each unit of social service and infrastructure and whether it is in need of (urgent) maintenance. For example, we assessed whether facilities like classrooms, teachers offices, toilets, desk chairs in schools are in good condition and functional or need urgent maintenance. We assessed whether roads and bridges can be used for motorized transport during all seasons of the year.

2.4 Methods

2.4.1 Comparative approach

A comparative investigation of perceptions of villagers towards investments of private and state-owned plantations with different ownership and certification status in villages within similar settings allows us to assess and interpret differences in perceptions related to changes associated with these investments (Ragin, 2014). Our comparative approach uses villages adjacent to private, FSC certified forest plantations and villages adjacent to a state-owned, non-certified plantation, all of which are located in

Table 2.2 Mean comparisons of household characteristics

Characteristics	Description	Villages near by private, FSC certified plantations	Villages near by state-owned, non-certified plantation	p-value[a]
Age of head	Age in years	44.50 (15.59)	44.91 (13.15)	0.79
Sex of head	Dummy, 1 = male	0 .82 (0.38)	0.76 (0.42)	0.15
Education of head	Education level, 0 = no schooling, 1 = kindergarten, 2 = primary, 3 = secondary, 4 = college and above	1.82 (0.90)	1.84 (0.87)	0.84
Household size	Number of members within the household	4.49 (1.96)	5.23 (2.06)	0.00***
Total farm size	Land size in hectares	1.98 (2.33)	1.43 (1.58)	0.01**
Employed by plantation	Dummy, whether at least a household member is employed by plantation, 1 = yes	0.07 (0.26)	0.09 (0.29)	0.36
Forest use	Dummy, whether a household collects forest products, 1 = yes	0.95 (0.21)	0.90 (0.29)	0.08*
Total household income	Annual household income in million TZS in 2015[b]	1.27 (1.48)	1.81 (4.09)	0.13
Share of agri-cultural income	Percentage of agricultural income in total income	59.13 (39.81)	43.45 (39.20)	0.00***

Share of business income	Percentage of business income in total income	11.30 (25.36)	22.44 (33.53)	0.00***
Share of forest income	Percentage of forest income in total income	5.18 (19.47)	7.39 (21.50)	0.33
Share of off-farm income	Percentage of off-farm income in total income	17.24 (30.63)	22.14 (35.60)	0.18

Note: Standard deviations in parentheses. */**/*** indicate mean differences between villages adjacent to the private, FSC certified and state-owned, non-certified plantations are statistically different at 10/5/1% significance level respectively.

[a] We used t-tests for comparing the means of the variables.

[b] TZS is the Tanzanian currency shilling. The August 8, 2016 exchange rate was €0.41 for 1,000 TZS.

the same district with similar agro-ecological and administrative environment. The villages adjacent to the state-owned, non-certified plantation are used as a benchmark to compare differences in perceptions. Thus, our approach enables us to assess the relationship between the plantations and perceived changes in social services and local infrastructure associated with their investments, while controlling for household and village characteristics. Since data on social services and infrastructure prior to the start of the operations of the plantations were not available, we focused on the perceptions of households about the changes associated with the investments of the plantations. In such villages, local households are largely expected to know who financed the social services and infrastructure, which enables us to assess the perceptions towards the changes related to the investments by the plantations. To mitigate the limitations of using such subjective indicators, we triangulated the household perceptions with community perceptions using FGDs, information from company documents and visual observations of social services and infrastructure.

Table 2.2 presents the results of the difference in means tests of the characteristics of the households in villages adjacent to the private, FSC certified and state-owned, non-certified plantations. The households in the two groups of villages differ in some of their characteristics. There are statistically significant differences in terms of average household size and share of income from agriculture of the households. However, households in both groups consist on average of about five persons and agriculture is the main economic activity. Households in villages adjacent to the state-owned, non-certified plantation earn a larger share of their income from business activities such as petty trade. Households in villages neighboring the private, FSC certified plantations farm on average larger area of land than households in villages near the state-owned, non-certified plantation. A slightly higher percentage of households in villages nearby the private, FSC certified plantation are engaged in collecting forest products than in villages adjacent to the state-owned, non-certified plantation. The most commonly collected

forest product in the villages is fire wood which is mostly collected from natural and community forests. Some households also reported having collected forest products from the plantations. We control for the differences in these characteristics in our quantitative analyses as described in the next section.

2.4.2 Methods of analysis

As our dependent variable uses a Likert scale, we use an ordered logistic model to analyze the relationship between the private forest plantations and perceived changes in each type of social service (school enrolment and quality of education) and infrastructure (number and quality of health centers, length and quality of roads and bridges) in the villages. We asked respondents to what extent they think that the forest plantations have changed the social services or infrastructure in their villages. Accordingly, the dependent variable has three ordered categories: 1 if the household perceived the plantation to have (greatly) decreased the quantity or quality of the social service or infrastructure, 2 if the household related the plantation with no change, and 3 if the household perceived the plantation to have (greatly) increased it. In the ordered logistic model, the probability that household i from village j selects category $k \in \{1,2,3\}$, is

$$P(Y_{ij} = k|\boldsymbol{x}_{ij}) = \frac{e^{\alpha_k - x'_{ij}\boldsymbol{\beta}}}{1+e^{\alpha_k - x'_{ij}\boldsymbol{\beta}}} - \frac{e^{\alpha_{k-1} - x'_{ij}\boldsymbol{\beta}}}{1+e^{\alpha_{k-1} - x'_{ij}\boldsymbol{\beta}}}, \quad (2.1)$$

where $\alpha_3 = \infty$ and $\alpha_0 = -\infty$. The vector $\boldsymbol{x}$ includes the independent variables. The main explanatory variable indicates whether household i lives in a village adjacent to a private, FSC certified forest plantation.[8] We refer to this variable as 'private, FSC certified' in the regression tables in Section 2.5.2 and in the appendix. The variable takes a value of 1 if the household lives in a village adjacent to a private, FSC certified plantation, and 0 otherwise. We include a vector of household controls to account for relevant household characteristics expected to influence their perceptions about the outcomes of the investments by the forest plantations. These include sex and education level of the household head, household size, size of farmland, total household income and whether a household member works for the plantation in its village. Studies and anecdotal evidence indicate that vulnerable groups (women, the less educated and the land poor) may perceive the investments of plantations negatively (Bleyer et al., 2016). This may be due to the exclusion of these groups from the activities of the plantations or due to the disproportionate effects of plantations on these groups. For example, women and the less educated may be less likely to be employed to work on the plantations (Pirard et al., 2017).

[8] The value of the variable which indicates whether household *i* lives in a village adjacent to a private, FSC certified forest plantation is the same for households who live in the same village. Hence, it is important to cluster standard errors at the village level to relax the independent observations assumption. This implies that the observations are independent only across villages.

Differences in responses may also be due to other household-specific factors (e.g., conflicts with plantations about land rights) unrelated with actual changes in the outcome variables. For example, households who were relocated from their farm plots and those who largely rely on land for their livelihoods may perceive the investments of plantations negatively (Bleyer et al., 2016). Hence, we included shares of the different income sources of the households as controls to proxy for the livelihood strategies of the households.

As noted, we use ordered logistic regression analysis. Since the coefficients of an ordered logit regression cannot be interpreted directly, we further report marginal effects and odds ratios. The marginal effect approximates the effect of a unit change in an explanatory variable on the expected value of an outcome variable, keeping other variables constant (Wooldridge, 2010). The odds ratio is the ratio of the odds of an outcome – i.e. $P(Y_{ij} = k|\boldsymbol{x}_{ij})/(1 - P(Y_{ij} = k|\boldsymbol{x}_{ij}))$ – to the odds of the same outcome when an explanatory variable changes by a unit (Verbeek, 2012).

2.5 Results

2.5.1 Cross-sectional mean comparisons of perceived changes in social services and infrastructure

Figure 2.2 compares the mean values of the outcome variables between the villages adjacent to the private, FSC certified and state-owned, non-certified plantations. These outcome variables are the dependent variables in the econometric analyses in Section 2.5.2. The responses are aggregated from a 5-point Likert scale (greatly decreased, decreased, no change, increased, greatly increased) to a 3-point Likert scale: (greatly) decreased, no change, (greatly) increased.[9] We used the 5-level Likert scale in the household survey to give respondents more options to choose from. Households in all villages on average reported positive perceived changes in social services and local infrastructure associated with the investments by the plantations. However, the mean values for households nearby the private, certified plantations are higher than the mean values for households nearby the state-owned, non-certified plantation. A one-sided t-test shows that the mean values of the outcome variables in the villages nearby the state-owned, non-certified plantation are statistically greater than 2: the category that corresponds to the response 'no change' (See Table 1A.1 in Appendix 1A). These are cross-sectional mean comparisons and do not control for household and village level characteristics that may also affect perceptions. In the econometric analyses in Section 2.5.2, we include household covariates to describe the variation between the villages adjacent to the private, FSC certified and state-owned, non-certified plantations.

[9] We used the Brant test of parallel regressions to assess whether all coefficients for each of the outcome variables satisfy the parallel slopes assumption. The results show that we cannot reject the null hypothesis of proportional odds ratios or parallel regressions (p-values > 0.05). This indicates that the outcome categories are independent and we can merge adjoining categories of the 5-point Likert scale for ease of interpreting the coefficients.

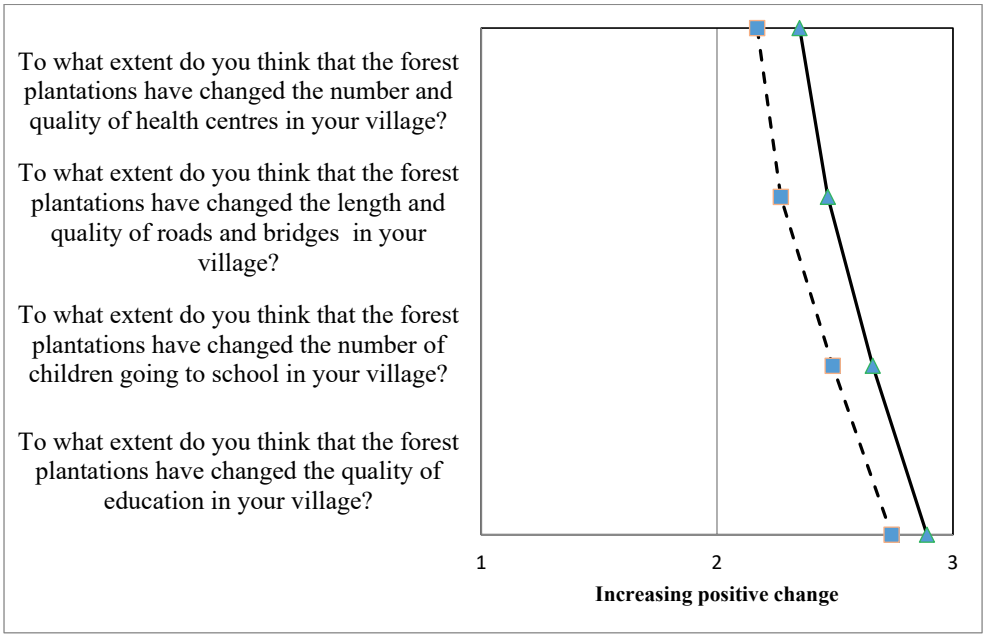


Figure 2.2: Mean values of household responses about perceived changes in social services and local infrastructure in villages nearby private, FSC certified (solid line) and state-owned, non-certified plantations (dashed line); Likert scale, 1 = (greatly) decreased, 2 = no change, 3 = (greatly) increased.

2.5.2 Econometric results

In this section, we present the results of the econometric analyses of the perceived changes in each of the social services and infrastructure associated with the investments by the plantations. Due to missing observations, which are evenly distributed over the villages nearby the private, certified and state-owned, non-certified plantations, the estimations were done using 289 observations. Table 1A.2 in Appendix 1A provides the descriptive statistics of the explanatory and dependent variables used in the estimations. We estimated all regressions using the 3-point Likert scale outcome variables. The results using the 5-point scale are qualitatively the same and are presented in Table 1A.3 in Appendix 1A.

2.5.2.1 Household perceptions about perceived changes in number and quality of health centers

Table 2.3 presents the results regarding the perceived changes in the number and quality of health centers. In column (a), we present the ordered logistic regression coefficients. The marginal effects and odds ratios are provided in columns (b) and (c) respectively. There is a statistically significant positive relationship between the private, FSC certified plantations and

perceived increases in the number and quality of health centers in adjacent villages. Households in villages adjacent to the private, certified plantations are on average 25.2% more likely to perceive that the plantations have improved the number and quality of health centers, than households in villages adjacent to the state-owned, non-certified plantation (Column (b)). The odds ratio of 3.52 indicates that the odds of households in villages adjacent to the private, certified plantations to report that the plantations have (greatly) increased the number and quality of health centers in their villages are 252% higher than the odds for households in villages adjacent to the state-owned, non-certified plantation. The positive perceptions towards the private, certified plantations might be due to the investments of the company in improving health centers in the villages. According to FGD and field observations, the company has financed a dispensary and improvement of existing health centers in adjacent villages (see Section 2.5.3).

Households with higher income were more likely than poorer households to report positive perceptions towards the changes in health centers associated with the plantations. Households who collect forest products were less likely, as compared to those who do not, to report positive changes.

2.5.2.2 Household perceptions about perceived changes in quality of education

We find a statistically significant positive relationship between the private, certified plantations and perceived increases in the quality of education in adjacent villages (Table 2.4). Households in villages adjacent to the private, certified plantation are on average 26.4% more likely than households in villages

adjacent to the state-owned, non-certified plantation to perceive that the plantations have (greatly) improved the quality of education in their villages (Column (b)). The odds ratio is 3.68. FGDs and field observations show that the private, certified plantations company invested in the construction and improvement of school buildings (classrooms and teachers' offices) and facilities (student desk chairs,

Table 2.3 Perceived changes in number and quality of health centers

Variables	Ordered logit coefficients (a)	Marginal effects (b)	Odds ratio (c)
Private, FSC certified	1.259***	0.252***	3.522***
	(0.120)	(0.027)	(0.421)

Age of head	0.013	0.002	1.012
	(0.013)	(0.002)	(0.013)
Sex of head	-0.156	-0.031	0.855
	(0.206)	(0.042)	(0.176)
Education of head	-0.020	-0.004	0.979
	(0.198)	(0.039)	(0.194)
Household size	-0.077	-0.015	0.926
	(0.063)	(0.012)	(0.058)
Total farm size	-0.032	-0.006	0.968
	(0.022)	(0.005)	(0.021)
Employed by plantation	-0.039	-0.008	0.962
	(0.208)	(0.042)	(0.200)
Forest use	-0.573**	-0.115**	0.563**
	(0.179)	(0.033)	(0.100)
Total household income	0.029*	0.006*	1.029*
	(0.015)	(0.003)	(0.015)
Share of agriculture income	-0.007	-0.001	0.993
	(0.011)	(0.002)	(0.011)
Share of business income	-0.012	-0.002	0.988
	(0.014)	(0.002)	(0.013)
Share of forest income	-0.009	-0.002	0.991
	(0.010)	(0.002)	(0.009)
Share of off-farm income	-0.010	-0.002	0.990
	(0.007)	(0.001)	(0.006)
Village dummies	Yes		
Pseudo-R^2	0.058		
Observations	289		

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the number and quality of health centers in your village?", 3-point Likert scale where 1 = (greatly) decreased, 2 = no change, 3 = (greatly) increased. Robust standard errors in parentheses are clustered at the village level. */**/*** indicate statistically significantly different from zero in columns (a) and (b) and different from 1 in column (c) at 10/5/1 % levels respectively.

teachers' housing duplex, toilets; see Table 2.7). Such investments are expected to reduce the number of teachers who leave the villages to work in urban areas (most likely to be the best quality teachers).

Households with older and more educated heads and those with higher incomes are more likely than their counterparts to perceive that the nearby plantation to have (greatly) increased the quality of education in their villages. On the other hand, male-headed households and households whose members work for the plantations are less likely to perceive that the activities of the plantations have improved the quality of education. The result related to households who work for the plantations is not as expected and could be due to household-specific factors (e.g., conflicts related to working conditions and salary levels) which could influence their responses.

Table 2.4 Perceived changes in quality of education

Variables	Ordered logit coefficients (a)	Marginal effects (b)	Odds ratio (c)
Private, FSC certified	1.303***	0.264***	3.679***
	(0.045)	(0.015)	(0.164)
Age of head	0.035***	0.007***	1.036***
	(0.006)	(0.001)	(0.006)
Sex of head	-0.858**	-0.174**	0.424**
	(0.409)	(0.078)	(0.173)
Education of head	0.468**	0.095**	1.596**
	(0.180)	(0.033)	(0.287)
Household size	0.081	0.016	1.084
	(0.079)	(0.016)	(0.086)
Total farm size	-0.118	-0.024	0.889
	(0.076)	(0.015)	(0.067)
Employed by plantation	-0.882***	-0.179***	0.413***
	(0.222)	(0.049)	(0.912)
Forest use	0.122	0.025	1.129
	(0.237)	(0.048)	(0.267)
Total household income	0.093*	0.019*	1.097*
	(0.052)	(0.010)	(0.056)
Share of agriculture income	0.005	0.000	1.004
	(0.005)	(0.000)	(0.005)
Share of business income	0.002	0.000	1.002
	(0.005)	(0.000)	(0.005)
Share of forest income	-0.002	-0.000	0.998
	(0.008)	(0.001)	(0.007)
Share of off-farm income	0.007	0.001	1.007

	(0.009)	(0.002)	(0.009)
Village dummies	Yes		
Pseudo-R^2	0.083		
Observations	289		

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the quality of education in your village?", 3-point Likert scale where 1 = (greatly) decreased, 2 = no change, 3 = (greatly) increased. Robust standard errors in parentheses are clustered at the village level. */**/*** indicate statistically significantly different from zero in columns (a) and (b) and different from 1 in column (c) at 10/5/1 % levels respectively.

2.5.2.3 Household perceptions about perceived changes in school enrolment

Households in villages adjacent to the private, certified plantations are on average 15 % more likely than households in villages adjacent to state-owned, non-certified plantation to perceive that the plantations have (greatly) increased the number of children going to school (Table 2.5). The odds ratio of 3.18 indicates that the odds of households in villages adjacent to the private, certified plantations to report that the plantations have (greatly) increased the number of children going to school in their villages are 218% higher than the odds of households in villages adjacent to the state-owned, non-certified plantation. This may be explained by an increase in the capacity of schools to accommodate more children due to school buildings, classrooms and school facilities (co-) financed by the private plantation company (see Section 5.3).

Table 2.5 Perceived changes in school enrolment

Variables	**Ordered logit coefficients (a)**	**Marginal effects (b)**	**Odds ratio (c)**
Private, FSC certified	1.157***	0.150***	3.182***
	(0.111)	(0.014)	(0.354)
Age of head	0.009	0.001	1.009
	(0.015)	(0.002)	(0.015)
Sex of head	-0.838**	-0.109**	0.432**
	(0.314)	(0.037)	(0.136)
Education of head	0.271	0.035	1.312
	(0.250)	(0.031)	(0.328)
Household size	0.039	0.005	1.039

	(0.069)	(0.009)	(0.072)
Total farm size	-0.016	-0.002	0.984
	(0.076)	(0.009)	(0.074)
Employed by plantation	-0.323	-0.042	0.724
	(0.507)	(0.07)	(0.367)
Forest use	1.168***	0.151***	3.215***
	(0.341)	(0.043)	(1.097)
Total household income	0.072**	0.009**	1.075**
	(0.030)	(0.004)	(0.032)
Share of agriculture income	0.002	0.000	1.002
	(0.005)	(0.000)	(0.005)
Share of business income	0.003	0.000	1.002
	(0.004)	(0.000)	(0.004)
Share of forest income	-0.005	-0.000	0.995
	(0.008)	(0.001)	(0.008)
Share of off-farm income	-0.002	-0.000	0.998
	(0.013)	(0.001)	(0.013)
Village dummies	Yes		
Pseudo-R^2	0.084		
Observations	289		

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the number of children going to school in your village?", 3-point Likert scale where 1 = (greatly) decreased, 2 = no change, 3 = (greatly) increased. Robust standard errors in parentheses are clustered at the village level. **/*** indicate statistically significantly different from zero in columns (a) and (b) and different from 1 in column (c) at 5/1 % levels respectively.

The results also indicate that male-headed households are less likely than female-headed households to perceive that the plantations have increased the number of children going to school. Richer households and households who are involved in collecting forest products are more likely than their counterparts to perceive that the plantations have improved school enrolment in the villages.

2.5.2.4 Household perceptions about perceived changes in roads and bridges

There is a statistically significant positive relationship between the private, FSC certified plantations and perceived increases in the length and quality of roads and bridges in adjacent villages (see Table 2.6). Households in villages adjacent to the private, certified plantations are on average 22.9% more likely than households in villages adjacent to the state-owned, non-certified plantation to perceive that the plantations have (greatly) improved the length and

quality of roads and bridges. The odds ratio is 2.75. FGDs and observations of infrastructure in the villages confirm that the private forest company had (co-)financed the construction and improvement of roads and bridges in neighboring villages.

Households with older and more educated heads and with higher income are more likely, as compared to their counterparts, to report positive changes in the length and quality of roads and bridges associated with the investments by the plantations in their villages. On the other hand, male-headed and larger size households are less likely to associate plantations with positive changes in the length and quality of roads and bridges.

Table 2.6 Perceived changes in length and quality of roads and bridges

Variables	Ordered logit coefficients (a)	Marginal effects (b)	Odds ratio (c)
Private, FSC certified	1.011***	0.229***	2.747***
	(0.032)	(0.008)	(0.087)
Age of head	0.019***	0.004***	1.018***
	(0.005)	(0.001)	(0.005)
Sex of head	-0.504**	-0.114**	0.604**
	(0.202)	(0.045)	(0.122)
Education of head	0.261***	0.059***	1.298***
	(0.073)	(0.016)	(0.095)
Household size	-0.056**	-0.013**	0.945**
	(0.024)	(0.005)	(0.022)
Total farm size	-0.060	-0.014	0.941
	(0.057)	(0.013)	(0.054)
Employed by plantation	-0.165	-0.037	0.848
	(0.278)	(0.09)	(0.235)
Forest use	-0.373	-0.085	0.688

	(0.379)	(0.086)	(0.261)
Total household income	0.051**	0.011**	1.052**
	(0.020)	(0.005)	(0.021)
Share of agriculture income	0.000	0.000	1.000
	(0.007)	(0.002)	(0.007)
Share of business income	-0.003	-0.000	0.997
	(0.009)	(0.002)	(0.008)
Share of forest income	-0.001	-0.000	0.999
	(0.013)	(0.003)	(0.013)
Share of off-farm income	-0.006	-0.001	0.994
	(0.009)	(0.002)	(0.009)
Village dummies	Yes		
Pseudo-R^2	0.048		
Observations	289		

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the length and quality of roads and bridges in your village?", 3-point Likert scale where 1 = (greatly) decreased, 2 = no change, 3 = (greatly) increased. Robust standard errors in parentheses are clustered at the village level. **/*** indicate statistically significantly different from zero in columns (a) and (b) and different from 1 in column (c) at 5/1 % levels respectively.

2.5.2.5 Robustness checks

To examine the robustness of our results to alternative specifications, we first investigated if our results hold true for each of the villages nearby the private, FSC certified plantations (Idete and Mapanda) by including a dummy variable for each of the four villages in the estimations (See Table 1A.4 in Appendix 1A). While we find statistically significant positive relationships between the plantations and perceived increases in the length and quality of roads, school enrolment and quality of education in both Idete and Mapanda, relative to the reference village (Kihanga), the plantation was related with positive changes in the number and quality of health centers only in Mapanda (again relative to Kihanga). This result may be due to the fact that while the private company co-financed a dispensary in Idete, it invested in building a dispensary, maternity ward and houses for nurses in Mapanda (see Table 2.7). This may in turn be related to the VCS certification the Mapanda plantation has in addition to being FCS certified. The Climate, Community, Biodiversity (CCB) standards of VCS calls for project activities to enhance the wellbeing of communities (Wood, 2011). This may also partly explain the relatively higher positive perceptions of households in Mapanda village as compared to the positive perceptions in Idete regarding all of the outcome variables except the changes in school

enrolment associated with the activities of plantations (See Table 1A.4 in appendix 1A). Though the results are not perfectly consistent, this supports our claim that certifications that include community-related standards lead to improved perceptions about investments in local social services by the plantations. Second, we explored whether the perceived positive changes associated with the private, FSC certified plantations are heterogeneous among different income groups. For this, we included an interaction variable of income quartile groups with the dummy variable $Private, FSC\ certified_{ij}$ as an explanatory variable, dropped the 'total household income' variable and estimated all the regressions. We did not find any significant effect of the interaction variable, suggesting that perceived positive changes do not vary across income groups. Third, to investigate whether household-specific factors (unrelated to the investments in social services and infrastructure by the plantations) affect the perceived changes associated with the private, certified plantations, we estimated the regressions including two more household-specific explanatory variables: whether a household was relocated from its landholding and the extent to which a household considers the plantation a 'good neighbor' (see Table 1A.5 in Appendix 1A). Our results remain robust.

2.5.3 Community perceptions and field observations of village social services and infrastructure

Table 2.7 shows the various development projects undertaken by the plantations in each village as indicated in the FGDs. Villagers neighboring the private, FSC certified forest plantations (Idete and Mapanda) reported that the plantation company (co-)financed the construction and improvement of school buildings, teachers' houses, roads and bridges, dispensaries and related facilities. In contrast, villagers neighboring the state-owned, non-certified plantation (Kihanga and Nzivi) reported fewer community development projects by the plantation. While men and the youth were mentioned as the groups who most benefitted from the community projects in the FGD in Idete, all members of the community were mentioned to have benefitted in the other three villages.

Field observations and the plantation company reports (Green Resources AS, 2009) show that the private, certified plantation company (co-)financed the construction of a secondary school, a maternity ward, a house for nurses, two bridges and a graded road in Mapanda. Similarly, it (co-)financed a nursery school, two classrooms in a primary school, teachers' houses, a bridge and a road in Idete. Visual inspections indicated that the infrastructure in villages adjacent to the private, certified plantations are generally of better quality and equipped with better facilities. School records show that more children attended schools in villages nearby the private, certified plantations as compared to villages neighboring the state-owned, non-certified plantation. Hence, the FGD and field observations confirm the results based on the reports by individual households in the villages.

2.6 Conclusions and discussions

Perceptions of local households matter in examining the operations and investments of forest plantations in rural communities as perceptions can affect how communities relate to the plantations (Wiley and Mbeya, 2001). Against this background, we examined the perceptions of local households in rural villages in Tanzania about the investments of large-scale private, FSC certified and state-owned, non-certified forest plantations in social services and local infrastructure. Our results show that households in villages adjacent to the private, FSC certified and state-owned, non-certified forest plantations perceived the changes in social services and local infrastructure associated with the plantations positively. We found that villagers adjacent to the private, FSC certified plantations perceive the changes more favorably as compared to those adjacent to the state-owned, non-certified plantation. Focus group discussions and visual inspections confirm that villages adjacent to the private, FSC certified forest plantations are better off in terms of the number and quality of health centers, number of students in school as well as length and quality of bridges and roads. We further found that richer and female-headed households are more likely to associate plantations with positive changes in social services and infrastructure, indicating that perceptions with regard to forest plantation infrastructure investments are not uniform across households.

The motivations for private companies to invest in public goods such as social services and infrastructure differ. These motives include to maximize profit, to ease business operations, adhering to corporate social responsibility and pro-social investments, as part of a (certification) strategy that requires contributions to community development, and due to shareholder and donor requirements for sustainable investments (Tumlinson and Morgan, 2013; Zivin and Small, 2005). These reasons appear to increase the incentives of private, certified forest plantations to invest in public goods by raising the expected (long-term) net benefits of investing in community development. Moreover, such investments and resulting positive perceptions by local households may reduce the risk of conflicts with local communities and associated losses (Indufor, 2012a). Positive perceptions of local communities regarding the activities and investments of forest plantations may also reduce their vulnerability (and associated costs) to pressures from socially and environmentally oriented NGOs which may otherwise lead to reputational risks. So, investments in public goods may be regarded as the price private forest plantation companies pay for reducing such risks for their businesses. This is sometimes referred to as a social license to operate (Joyce and Thomson, 2000). Hence, investments in public goods by private, certified forest plantation companies can be part of a risk reduction and profit maximization strategy.

Our results are consistent with the findings of other studies that show positive perceptions of households towards forest plantations and certified forestry operations in terms of their contributions to public goods in adjacent villages in East Africa (Bleyer et al., 2016; Kalonga and Kulindwa, 2017; Landry and Chirwa, 2011). Our results further suggest that private forest plantations are perceived more positively than state-owned, non-certified plantations by locals

in the study villages, in terms of public goods provision to adjacent communities, at least when the private plantations are FSC certified. Investors and creditors in forest plantations in the study areas may boost these incentives by requiring private sector forest managers to make pro-social investments or become certified as a condition for investing in the plantations. Hence, policies and strategies aimed at creating a conducive environment for private sector investments in forest plantations in the study areas may enhance positive changes from sustainable forest management beyond the boundary of the plantations. The differences in perceptions among different social groups suggest that stakeholder engagement and monitoring of activities by forest plantations should take into account the heterogeneous views within communities, their different needs and differing outlooks towards their community- related activities. It is important to ensure the coherence of forest plantation activities with adjacent communities and listen to their needs and priorities if such investments are to be beneficial for the majority of local stakeholders.

Our results give insights into the perceptions of villagers about changes in social services and physical capital associated with large scale forest plantations in rural Africa. One implication of the results is that such forest plantations may not necessarily be viewed negatively by local stakeholders in terms of the interplay between their activities and the livelihoods of adjacent communities. It is, however, important to note that in this study, we looked at perceptions related to forest plantations' investments in public goods only. Further studies on the perceptions of villagers towards the implications of the operations and investments of forest plantations with regards to various socio-economic outcomes are highly needed before we have a better understanding of the interplay between forest plantations and adjacent communities. This requires in part well-designed studies on the topic using a large number of forest plantations and villages in various countries.

Table 2.7 Social services and infrastructure projects undertaken by plantations in the villages

Village	Plantation owner	Teachers Offices	Houses for teachers	School building and class rooms	Road and bridges	Toilets for schools	Houses for nurses	Dispensary
Idete	Private, FSC certified	X	X	X	X	X		X
Mapanda	Private, FSC certified	X	X	X	X		X	X
Kihanga	State, non-certified			X				
Nzivi	State, non-certified	X	X					

It should be noted that Green Resources has been embroiled in land-related conflicts concerning some of its forest plantations in Uganda (Lyons and Westoby, 2014; Richards and Lyons, 2016). However, we found no reported land-related conflicts between villagers and the company's forest plantations in Tanzania (for the year 2015). Most reports of negative perceptions of Green Resources' operations in Tanzania occurred in the period 2010 to 2012. However, many press reports of 'land grabbing' have since been found to be based on questionable data (Locher and Sulle 2014; Schoneveld, 2014), leading to "a blurred situation regarding the status and actual impact of (proposed) investments in forestry, providing an inadequate basis for related political decisions or social actions" (Locher and Sulle, 2013, p.2). In our survey, three households reported being relocated due to the activities of the plantations in the study villages in Tanzania. We asked households about perceived changes in the availability of farm land and did not find evidence of reductions in availability of farm land due to forest plantations in the villages. The differences in perceptions towards the company's forest plantations in Tanzania and Uganda may be due to differences in the management of forest plantations between the countries and the land leasing process. Furthermore, Malkamäki et al. (2017) concluded that several studies on outcomes of forest plantations for local communities have focused on geographical areas associated with reports of land-related conflicts due to forest plantations. Unlike such studies, we have a large number of randomly selected households in our study, which puts us in a better position to look into perceptions of different groups of society.

The objective of our study is limited to assessing differences in the perceptions of households living in the vicinity of FSC certified, private and non-certified, state-owned plantations with regard to the overall changes in the quantity and quality of social services and infrastructure associated with investments by the plantations. As such, our results do not necessarily imply that private, certified forest plantations are always more likely than non-certified, state-owned plantations to lead to better benefits from and access to social services and infrastructure for local households. Future studies interested in examining the effects of plantations' investments in social services and infrastructure on local communities would benefit from more objective and accurate measures of the changes in the uses, benefits and access of villagers to the social services and infrastructure. For example, changes in kilometers of tarmacked and/or graded roads and the number of bridges constructed can be used to assess changes in quantity and/or quality of roads and bridges; changes in quality of education can be measured by changes in the number of teachers per students, teachers' education and remuneration, access to learning aids, students' test scores; changes in school enrolment can be measured by changes in total enrolment rates and enrolment rates of female students; changes in quantity and quality of health centers can be measured by changes in qualified health personnel and access to health services (number of people who received health care in a given period). This would require the availability of baseline data on existing social services and infrastructure to be able to disentangle the contribution of the investments of the plantations to the changes in the quantity and quality of the services and infrastructure.

Finally, the following points are pertinent regarding the validity of our results. First, although the study was conducted in only four villages, which may reduce the statistical power of our quantitative analysis, the internal validity of our results holds well because villages within the same district were homogenous and our study villages can be regarded as representative of villages in the district. The outcome variables of interest, which are related to perceived changes in social services and local infrastructure associated with the investments by the plantations in adjacent villages, also justify focusing on villages in the vicinity of the forest plantations as compared to including more villages located further away. Besides, the large number of households - the level at which the outcomes are measured in our study - further increases validity. Notwithstanding these, we triangulated our quantitative results with qualitative analyses of community perceptions regarding the changes through focus group discussions and with a visual inspection of the level and quality of social services and infrastructure in the villages. Second, to relate the perceived changes to private ownership of plantations, ideally the only difference between the forest plantations should be the form of ownership. In our study, the private plantations are FSC-certified while the state-owned forest plantation is not certified. So, our results should be seen as providing insights on the relationship of the combination of these factors with the perceived positive changes associated with the plantations. Future research could try to disentangle the contribution of ownership from the contribution of certification. Third, we looked at forest plantations owned by one company operating in the same district, indicating a need for caution in generalizing our results to other forest plantations in Tanzania and beyond. An important line of future research could be to expand the analysis to larger number of forest plantations and villages with various socio-economic contexts, development policies and land allocation processes in developing countries.

Acknowledgements

We would like to thank our local partners from Sokoine University of Agriculture, Tanzania and the team of local enumerators, particularly Panataleo Munishi and Hemedy Mayanda, who assisted us in carrying out the fieldwork for the study. We appreciate the hospitability and cooperation of the plantation managers and communities during our stay in the villages.

Funding: This study was part of a project financed by the Netherlands Development Bank (FMO). FMO is one of the financiers of Green Resources AS. However, neither FMO nor Green Resources was involved in the design of the study, data collection, analysis, interpretation of the results or writing of the paper. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the funding organization or Green Resources AS.

Appendix 1A

Table 1A.1 Mean and p-values of the outcome variables based on one-sided t-tests for checking whether the mean values of the dependent variables from the responses in the villages nearby the state-owned, non-certified plantation are statistically greater than 2 (the category related to the response 'no change').

Variable	Mean	p-value
Number and quality of health centres	2.174	0.000***
Quality of education	2.491	0.000***
Number of children going to school	2.742	0.000***
Length and quality of roads and bridges	2.275	0.000***

Note: *** indicates statistical significance at 1% level. The null hypothesis of the test states that the mean value for each outcome variable is equal to 2 while the alternative hypothesis states that the mean value is greater than 2. Rejecting the null hypothesis (p-value=0.000) implies that the mean value for each dependent variable is statistically greater than 2.

Table 1A.2. Descriptive statistics of variables

Variable	Mean		Std. deviation		Min.		Max.		N	
	Private, FSC certified	State, non-certified	Private, FSC certified	State, non-certified	Private, FSC certified	State, non-certified	Private, FSC certified	State, non-certified	Private, FSC certified	State, non-certified
A. Dependent variables										
Perceived changes in number and quality of health centres[a]	2.35	2.17	0.62	0.55	1	1	3	3	171	167
Perceived changes in number and quality of roads and bridges[a]	2.47	2.27	0.59	0.65	1	1	3	3	171	167
Perceived changes in school enrolment[a]	2.89	2.74	0.33	0.49	1	1	3	3	171	167
Perceived changes in quality of education[a]	2.66	2.49	0.55	0.59	1	1	3	3	171	167
B. Household (hh) controls										
Age of head (in years)	44.50	44.91	15.59	13.15	23	20	85	85	169	163

Sex of head[b] (0=female, 1=male)	0 .82	0.76	0.38	0.42	0	0	1	1	171	167
Education of head[c](0-4)	1.82	1.84	0.90	0.87	0	1	4	4	171	167
Household size (in number)	4.49	5.23	1.96	2.06	1	1	12	11	171	167
Total farm size (in hectares)	1.98	1.43	2.33	1.58	0.10	0.20	12	16.4	168	164
Employed by plantation[b] (0=No, 1= Yes)	0.07	0.09	0.26	0.29	0	0	1	1	170	169
Forest use[b] (0=No, 1= Yes)	0.95	0.90	0.21	0.29	0	0	1	1	170	166
Total hh income (in million Tzs)	1.27	1.81	1.48	4.09	0.03	0	10	39.8	155	150
Share of agricultural income (%)	59.13	43.45	39.81	39.20	0	0	100	100	164	159
Share of business income (%)	11.30	22.44	25.36	33.53	0	0	100	100	164	159
Share of forest income (%)	5.18	7.39	19.47	21.50	0	0	100	100	164	160
Share of off-farm income (%)	17.24	22.14	30.63	35.60	0	0	100	100	164	159

Note: [a] Private, FSC certified = villages nearby the private, FSC certified plantations, State, non-certified = villages nearby the state-owned, non-certified plantation

[b] categorical variable: 1= (greatly) decreased, 2= no change, 3= (greatly) increased

[c] binary variable

[d] categorical variable: 0= no schooling, 1= kindergarten, 2=primary, 3= secondary, 4= college and above

Table 1A.3. Household perceptions about changes in social services and infrastructure associated with investments of plantations: Ordered logit estimation results using the 5-point Likert scale outcome variables from responses in original data

Variables	Changes in length and quality of roads and bridges	Changes in quality of education	Changes in school enrolment	Changes in number and quality of health centers
	(a)	(b)	(c)	(d)
Private, FSC certified	1.199***	1.368***	1.038***	1.318***
	(0.040)	(0.067)	(0.228)	(0.101)
Age of head	0.019***	0.031***	0.014	0.012
	(0.005)	(0.008)	(0.013)	(0.013)
Sex of head	-0.235	-0.652*	-0.674	-0.204
	(0.240)	(0.313)	(0.499)	(0.293)
Education of head	0.291***	0.443***	0.274*	-0.010
	(0.065)	(0.089)	(0.239)	(0.182)
Household size	-0.042**	0.083	0.023	-0.091
	(0.015)	(0.057)	(0.047)	(0.067)
Total farm size	-0.063	-0.167**	-0.105	-0.041
	(0.048)	(0.053)	(0.068)	(0.049)
Employed by plantation	-0.008	-0.803***	-0.453	-0.032
	(0.392)	(0.172)	(0.387)	(0.158)
Forest use	-0.582	0.363***	1.784***	-0.292**
	(0.555)	(0.082)	(0.370)	(0.093)
Total household income	0.066*	0.071*	0.048***	0.040*
	(0.033)	(0.028)	(0.011)	(0.017)
Share of agriculture income	-0.001	0.007*	0.008	-0.004
	(0.006)	(0.003)	(0.006)	(0.011)
Share of business income	-0.005	0.004	0.009***	-0.013
	(0.007)	(0.006)	(0.002)	(0.013)
Share of off-farm income	-0.006	0.008	0.004	-0.009
	(0.010)	(0.007)	(0.005)	(0.005)
Share of forest income	-0.001	0.002	-0.001	-0.008
	(0.012)	(0.007)	(0.006)	(0.008)
Village dummies	Yes	Yes	Yes	Yes

Pseudo-R^2	0.057	0.074	0.057	0.063
Observations	260	268	269	274

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the quantity and/or quality of the respective social service and infrastructure in your village?", 5-point Likert scale where 1 = decreased greatly, 2 = decreased, 3= no change, 4= increased, 5 = increased greatly. Robust standard errors in parentheses are clustered at the village level. */**/*** indicate statistically significantly different from zero at 10/5/1 % levels respectively.

Table 1A.4. Household perceptions about changes in social services and infrastructure associated with investments of plantations: Ordered logit estimation results using individual dummies for each village

Variables	Changes in length and quality of roads and bridges (a)	Changes in quality of education (b)	Changes in school enrolment (c)	Changes in number and quality of health centers (d)
Mapanda[a]	1.011***	1.303***	1.157[b]***	1.259***
	(0.030)	(0.040)	(0.110)	(0.120)
Idete [a]	0.485***	0.959***	1.851***	0.195
	(0.140)	(0.130)	(0.070)	(0.120)
Nzivi [a]	0.099	0.736***	1.237[b]***	0.197***
	(0.090)	(0.110)	(0.120)	(0.050)
Kihanga [a]	Omitted	Omitted	Omitted	Omitted
Age of head	0.019***	0.035***	0.009	0.013
	(0.000)	(0.010)	(0.010)	(0.010)
Sex of head	-0.504*	-0.858*	-0.838**	-0.156
	(0.200)	(0.410)	(0.310)	(0.210)
Education of head	0.261***	0.468**	0.271	-0.020
	(0.070)	(0.180)	(0.250)	(0.200)
Household size	-0.056*	0.080	0.039	-0.077
	(0.020)	(0.080)	(0.070)	(0.060)
Total farm size	-0.060	-0.118	-0.016	-0.032
	(0.060)	(0.080)	(0.080)	(0.020)
Employed by plantation	-0.165	-0.882*	-0.323	-0.039
	(0.280)	(0.220)	(0.510)	(0.210)
Forest use	-0.373	0.122	1.168***	-0.573**
	(0.380)	(0.240)	(0.340)	(0.180)
Share of agriculture income	0.000	0.005	0.002	-0.007
	(0.010)	(0.000)	(0.000)	(0.010)
Share of business income	-0.003	0.002	0.003	-0.012
	(0.010)	(0.000)	(0.000)	(0.010)
Share of off-farm income	-0.006	0.007	-0.002	-0.010
	(0.010)	(0.010)	(0.010)	(0.010)
Share of forest income	-0.001	-0.002	-0.005	-0.009
	(0.010)	(0.010)	(0.010)	(0.010)

Total household income	0.051*	0.093	0.072*	0.029
	(0.020)	(0.050)	(0.030)	(0.010)
Pseudo-R^2	0.048	0.083	0.084	0.058
Observations	289	289	289	289

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the quantity and/or quality of the respective social service and infrastructure in your village?", 3-point Likert scale where 1 = decreased, 2 = no change, 3 = increased. Robust standard errors in parentheses are clustered at the village level. */**/*** indicate statistically significantly different from zero at 10/5/1 % levels respectively.

[a] Dummy variable: 1= Village as indicated, 0 otherwise.

[b] In column (c), the coefficient for Mapanda (a village nearby Mapanda forest plantation, a private, FSC certified plantation) is smaller in magnitude than the coefficient for Nzivi (a village nearby the state-owned, non-certified plantation), which might seem to suggest that the households in Nzivi perceive the plantation in their village to be related with stronger positive changes in school enrolment than households in Mapanda village do. A test of equality of the coefficients shows that we cannot reject the null hypothesis of equality of the coefficients (p-value = 0.7185), indicating that households in Nzivi and Mapanda have statistically similar positive perceptions about the changes in school enrolment associated with the plantations in their villages.

Table 1A.5. Household perceptions about changes in social services and infrastructure associated with investments of plantations: Ordered logit estimation results using household specific factors (whether the household was relocated and to what extent the household agrees that the plantation is 'a good neighbor') as additional explanatory variables

Variables	Changes in length and quality of roads and bridges (a)	Changes in quality of education (b)	Changes in school enrolment (c)	Changes in number and quality of health centers (d)
Private, FSC certified	1.001***	1.234***	1.112***	1.276***
	(0.039)	(0.079)	(0.118)	(0.156)
Age of head	0.024***	0.038***	0.014	0.018
	(0.004)	(0.007)	(0.016)	(0.015)
Sex of head	-0.519**	-0.769*	-0.811**	-0.166
	(0.175)	(0.437)	(0.381)	(0.229)
Education of head	0.298***	0.382*	0.231	-0.005
	(0.076)	(0.198)	(0.336)	(0.195)
Household size	-0.015	0.064	0.015	-0.066
	(0.043)	(0.059)	(0.068)	(0.075)
Total farm size	-0.112*	-0.099	-0.019	-0.046
	(0.064)	(0.098)	(0.104)	(0.048)
Employed by plantation	-0.008	-0.899***	-0.361	0.097
	(0.392)	(0.212)	(0.553)	(0.163)
Forest use	-0.433	-0.105	1.315**	-0.601**
	(0.438)	(0.228)	(0.548)	(0.304)
Total household income	0.040**	0.107**	0.058**	0.031*
	(0.014)	(0.054)	(0.024)	(0.016)
Household relocated[a]	-0.320***	0.030	-0.405	-0.420*
	(0.076)	(0.819)	(0.865)	(0.186)

HH perceives plantation 'good neighbor'[b]	0.068	0.205*	0.320***	-0.031
	(0.068)	(0.120)	(0.062)	(0.031)
Share of agriculture income	0.002	0.007	0.008	-0.007
	(0.009)	(0.006)	(0.007)	(0.011)
Share of business income	-0.005	0.004	0.006	-0.014
	(0.011)	(0.004)	(0.005)	(0.014)
Share of off-farm income	0.005	0.007	-0.001	-0.011
	(0.010)	(0.008)	(0.012)	(0.007)
Share of forest income	-0.001	-0.002	-0.001	-0.011
	(0.013)	(0.007)	(0.011)	(0.010)
Village dummies	Yes	Yes	Yes	Yes
Pseudo-R^2	0.061	0.093	0.106	0.072
Observations	260	268	269	274

Note: The dependent variable is the response to "To what extent do you think that the forest plantations have changed the quantity and/or quality of the respective social service and infrastructure in your village?", 3-point Likert scale where 1 = decreased g, 2 = no change, 3= increased,. Robust standard errors in parentheses are clustered at the village level. */**/*** indicate statistically significantly different from zero at 10/5/1 % levels respectively.

[a] Binary variable: 0=No, 1=yes

[b] Categorical variable: 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree

CHAPTER 3

Do Locals Have a Say? Community Experiences of Participation in Governing Forest Plantations in Tanzania[10]

[10] This chapter is based on the article: Degnet, M.B., van der Werf, E., Ingram, V. and Wesseler, J.H., 2020. Do locals have a say? Community experiences of participation in governing forest plantations in Tanzania. *Forests, 11*(7), p.782.

Abstract

As large-scale forest plantations expand in developing countries, concerns are rising about their relation to and integration with adjacent local communities. In developing countries with weak enforcement of property rights, private plantations are more likely than state-owned plantations to involve villagers in plantation's activities in order to secure and guarantee their access to land and labor resources. Certification standards of the Forest Stewardship Council (FSC) and adherence to responsible investment guidelines further strengthen this likelihood by requiring plantations to consult and engage local communities. Using household data from Tanzania, we assess households' experiences with their participation in plantation activities by comparing the experiences of households in villages adjacent to private, FSC-certified plantations with those of households in villages adjacent to a non-certified, state-owned plantation. Our quantitative analyses show that households in the villages adjacent to the private, certified plantations are more likely to report participating in plantation activities. Our results show that the certified plantations are more likely to respond to community complaints and grievances. We further find that male-headed households and households of plantation employees are more likely than female-headed households and households without plantation employees to participate in plantations' activities. Our results imply that forest management certification can complement state policy approaches of sustainable forest management to enhance community participation in forest management.

Keywords: forest plantations; participation; access; certification; FSC; Tanzania

3.1 Introduction

Tanzania has seen a rapid expansion of forest plantations on state and village lands since the 1990s (Jacovelli, 2014; Payn et al., 2015). The forest policy of the country specifically emphasizes the role of private sector investment in its forestry sector and private forest plantations are predicted to supply the largest share of the country's industrial wood demand in the coming years (FAO, 2015; Indufor, 2011, 2012). An important challenge to the management and expansion of forest plantations in Tanzania and other developing countries is related to their governance vis-à-vis the expectations of adjacent communities (Cubbage et al., 2014; Payn et al., 2015). Government allocation of land under customary tenure, known as village lands, to plantations has led to concerns among researchers and socially-oriented NGOs regarding the relation of private plantation companies with adjacent local communities and whether the voices of locals are taken into account in the activities of the private forest plantations (German et al., 2014; Schoneveld, 2017). The relation between private plantations and communities could be strained due to loss of customary land uses and access to natural resources for local communities (Gerber, 2011), and adverse environmental effects such as loss of soil quality, reduced water quantity and quality and the spread of invasive trees to farms in adjacent communities (Lyons, 2014; Pott, 1997).

Community participation is regarded as one of the key factors for effective forest governance in tropical countries (Agrawal et al., 2008). Forest governance comprises rules, norms, principles and decision procedures with regard to the use and conservation of forests and affects the type and level of involvement of local communities in the management of forests (Giessen and Buttoud, 2014). Community participation can improve the sense of ownership among stakeholders and foster transparency and accountability among plantation owners (Handberg, 2018). Recent empirical studies on the socio-economic impacts of large-scale forest plantations recommend that plantations should engage local communities to enhance positive and mitigate negative outcomes of plantations for local communities (Landry and Chirwa, 2011; Malkamäki et al., 2018). Tanzania is one of the few developing countries with well-developed participatory forest governance policies. The country's forest policies and regulations emphasize the participation of local communities in the management of forests (Mustalahti and Lund, 2009). Community participation and consultation between forestry companies and local communities are growing in importance with the increasing recognition of voluntary certification standards such as the Forest Stewardship Council (FSC) (Payn et al., 2015).[11] Voluntary forest certification has been recognized as a contemporary form of forest governance (Arts, 2014; Cashore, 2002; Cashore et al., 2007). Forest certification is a private initiative that uses the market-based mechanism of independent labelling and monitoring to pursue sustainable forest management (Arts, 2014). Tanzania is among the African countries with fastest growing area of certified forests (FSC, 2018a).

In this study, we analyze whether the ownership and certification status of large-scale forest plantations affect how plantations relate and engage with local communities in rural Tanzania. We compare the experiences of the participation of local communities adjacent to FSC-

[11] Forest Stewardship Council (FSC) is an independent worldwide not-for-profit organization that establishes standards and predefined criteria for responsible forest management to encourage socially, economically and environmentally beneficial outcomes of forest resources (FSC, 2015).

certified, private plantations with those of communities adjacent to a non-certified, state-owned plantation. In developing countries such as Tanzania, land is essentially owned by the state and weak definition and enforcement of property rights pose a risk for land-related investments (Boone, 2015). In this regard, private plantations are more likely than state-owned plantations to use community participation to secure and maintain their benefits from investment in forest land (Ribot and Peluso, 2003). Voluntary certification standards for responsible forest management such as FSC require plantation owners to allow for community participation and consultation in the governance of plantations (Payn et al., 2015). Our main research question is: are differences in community participation between forest plantations related to differences in ownership and certification status of the plantations? In addition, we examine whether the perception of local communities about their participation in the activities of forest plantations differs over socio-economic characteristics. While studies on participation in community forests and natural forests found that participation varies over socio-economic characteristics (Agrawal and Gupta, 2005), whether this holds true in the case of forest plantations has not been studied before. Ideally, we would compare community participation in FSC-certified private plantations and FSC-certified state-owned plantations. However, there are no FSC-certified state-owned plantations in East Africa (FSC, 2019). By selecting an area in Tanzania with a history of large scale plantations developed in a similar ecological, administrative and socio-economic context, we can explore the correlation between community participation and the combined effect of ownership and certification status of plantations. This approach will enable us to minimize the effects of idiosyncratic factors that may be correlated with differences in community participation between the forest plantations we compare in the study.

Previous studies have not examined whether community participation differs between private and state-owned plantations. The literature on participatory forest governance has mostly focused on community and natural forests. Plantation forests pose different challenges than natural forests, such as land rights and employment instability, affecting the engagement of plantations owners and managers with communities (FSC, 2014). This context has led FSC to make the distinction between plantation and natural forests explicit in its standards, including the National Forest Stewardship Standard for Tanzania (FSC, 2018b). Mustalahti and Lund (2009) reviewed legislative documents on participatory forest governance in Tanzania, Mozambique and Laos to investigate the degree to which the legislation supports the rights and access of communities adjacent to forest resources, including high value forest plantations. The authors further used interviews to collect qualitative data from stakeholders (local communities, private enterprises, forest officers, politicians, and researchers and consultants) in villages with forests under participatory forest management (PFM) to assess the implementations of the policies at the local level. They found that the policy framework in Tanzania recognizes the rights of communities to participate in the management of adjacent forests. In Mozambique and Laos, however, the economic interests of powerful private actors are promoted at the expense of those of the local communities. The study also found that, despite policies supporting community participation in forestry, local communities were systematically excluded from sharing in returns from commercially valuable forest resources in all three countries. Recent studies on economic returns from various models of land sharing by commercial forest plantations in Laos show that models that integrate local communities in participatory land use

planning (for example, plantation models that integrate local food production) yield the highest returns to plantation companies and contribute the most to household livelihoods (Phimmavong et al., 2019; Van der Meer Simo et al., 2020). Szulecka et al. (2016) traced the development of forest plantations in Indonesia and used an exploratory empirical case-study of a large FSC-certified, public-private plantation company to identify historical and current approaches in plantation management and governance. They asked stakeholders – such as plantation managers, workers, and forestry experts – to rate the plantation company on selected social, economic and environmental indicators on a four-point Likert scale (1= poor; 2= fair; 3= good; 4= very good). The authors found that while the plantation is positively rated by stakeholders in terms of community participation (due to access to trainings, good access to information regarding the plantation such as bulletins, secretariat), there are difficulties in local mechanisms for conflict resolution between communities and the company (such as managing conflicts due to disagreements between in-migrant plantation workers and permanent settlers). Dare et al. (2011) assess the link between forest certification and community engagement in plantation management in Australia. Using a qualitative survey of plantation managers and community members combined with a document analysis of forest regulations and forest certification standards, the authors found that forest certification is positively related to community engagement processes. Cubbage et al. (2010) reported that certified forest plantations lead to improved community relations in Argentina and Chile. However, the authors based their study on interviews of plantation managers only and the sample size of the study was too small (10 respondents) to perform a quantitative analysis. Unlike previous studies on community participation in forest governance, we use data from a large sample of households to quantitatively assess how local communities experience their involvement in the activities of forest plantations in rural Tanzania. Our study contributes to the literature and debate on community participation in large-scale forest plantation land use practices in Africa by assessing differences in community participation across forest management and certification types.

The rest of the paper is structured as follows. The next section describes the conceptual framework. The case study context and data are explained in Section 3.3. Section 3.4 elaborates the methods of analysis and the results and sensitivity analyses are presented in Section 3.5. The last section concludes.

3.2 Conceptual framework

Forest governance comprises "a) all formal and informal, public and private regulatory structures, i.e. institutions consisting of rules, norms, principles, decision procedures concerning forests, their utilisation and their conservation, b) the interactions between public and private actors therein and c) the effects of either on forests" (Giessen and Buttoud, 2014, p.1). Our study deals with forest governance at the local level, i.e. "... the smallest area at which a forest project or program can be implemented by involving various actors" (Secco et al., 2014, p. 61). Local forest governance commonly includes decentralisation of forest governance and participation (Arts and Visseren-Hamakers, 2012; Ribot et al., 2006; van der Arend and Behagel, 2011) where participation refers to "the process where stakeholders make choices that

determine (or co-determine) new institutions" (Handberg, 2018, p. 436). Stakeholders include local individuals and communities who are affected by these institutions and choices. Participation can take various forms depending on the degree of stakeholder involvement and power (Arnstein, 1969; Berkes et al., 2000; Freeman, 2010; Handberg, 2018; Ribot et al., 2010). Handberg (2018) distinguishes between weak and strong participation. Weak participation refers to stakeholder consultation, where stakeholders have the role of informing decision makers. Strong participation refers to stakeholder control, where stakeholders have the power to make choices that (co-)determine the institutions (Handberg, 2018). Our paper deals with weak participation in the governance of forest plantations by assessing the experiences of local communities regarding their say in the activities of forest plantations adjacent to their villages.

The dimensions of forest governance can be measured using indicators, i.e., quantitative or qualitative variables to concisely describe, understand, monitor and assess governance quality (Secco et al., 2014). Secco et al. (2014) identified participation as one of the key dimensions of governance and further divided participation into seven sub-dimensions with possible indicators. In this study, we focus on three sub-dimensions of participation: stakeholder inclusion, representativeness and equity in participation. We use the perception of local households regarding whether they perceive they have a say in the activities of plantations as a proxy for stakeholder inclusion in plantation activities. To make the concept of 'having a say' clear to respondents of our survey and link the concept to factual mechanisms of participation, we asked respondents how they express their views about plantation activities to plantation companies. Furthermore, we assess household satisfaction with the governance of forest plantations for which we use household's self-reported satisfaction with their say in forest plantations activities as a proxy. To address the question of representativeness and equity in community participation in plantation activities, we assess whether the likelihood of respondents to report that they have a say in plantations' activities and the satisfaction with their say varies over the socio-economic characteristics of households.

Our expectation regarding the relationship between ownership of forest plantations and the likelihood that adjacent communities report that they have a say in plantation activities is guided by insights from access theory. Access theory posits that actors may use various mechanisms to secure and maintain their benefits from resource use (Ribot and Peluso, 2003). One of these mechanisms is engaging adjacent communities (Bluwstein, 2017). Since forest plantations are often established on village lands, which used to be governed by customary rules, investors in plantations may commit some resources to cultivate relations with villagers so as to gain, control and maintain their access over the plantations they own (Ribot and Peluso, 2003). Furthermore, plantation owners may decide to invest in improving their relations with adjacent communities to gain and maintain access to a workforce. Community participation in natural resource governance is an important example of a shift in control of territory and people from the state to private actors (Bluwstein, 2017). Plantation investors actively engage local people to access and control village lands and mitigate social risks such as conflicts over land access (Bluwstein, 2017). In many developing countries, where the state essentially owns land and land tenure regimes have often been used to build state authority in rural areas, the need to secure and maintain access to resources (land and labour) is likely to be stronger for private plantations than for state-owned plantations (Boone, 2015). Even though regulations on forest

governance in Tanzania require all types of forest owners to consult and engage local communities, compliance with such regulations is low, particularly in state-owned forests, due to absence of enforcement coupled with incentive problems in state enterprises (Mustalahti and Lund, 2009). Hence, we expect the likelihood to involve local communities in plantation activities to be higher in the case of private plantations than in state-owned plantations.

Guidelines for responsible forest management typically reflect principles of accountability, fairness/equity, the participation of all stakeholders, transparency and availability of information on how forests are governed and managed (Capistrano, 2010; European Commission, 2010; FAO, 2011; Finance Alliance for Sustainable Trade, 2014; Lawson and MacFaul, 2010). Compliance with guidelines of certification schemes can be seen as an indicator of responsible forest management. Voluntary forest certification has been identified as a prime example of non-state market-driven governance (Cashore, 2002). Forest certification bodies such as FSC recognize forest owners who voluntarily comply with predefined principles of sustainable forest management. Compliance with the principles emanates partly from market and non-market benefits of certified plantations and timber (Cashore, 2002; Carlson and Palmer, 2016). Using a qualitative meta-synthesis approach, Carlson and Palmer (2016) identified improved governance, community empowerment and reputational gains as less tangible benefits of FSC certification commonly reported by producers and these benefits justify the cost of certification. Principle 3 of FSC's sustainable forest management principles requires forest owners to recognize and respect indigenous people's rights. Indicator 4.4 of FSC's Principle 4 of community relations states that "(c)onsultations shall be maintained with people and groups (both men and women) directly affected by management operations." (FSC, 2012). Investors and share-holders in plantations may recognize compliance with these principles of FSC as indicators of responsible forest governance (Mayers et al., 2013). Hence, we expect that the likelihood of community participation in plantation activities is higher in the case of FSC-certified plantations than in non-certified plantations.

Based on our conceptual framework, we formulate the following hypotheses to be tested empirically:

Households in villages adjacent to the FSC-certified private plantations are more likely than households in villages adjacent to the state-owned, non-certified plantation:

H1: to report to have a say in the activities of the plantations.

H2: to report higher satisfaction with their say in the activities of the plantations.

H3: to consider the plantations in their villages 'a good friendly neighbour'.

H4: to report that the plantations address and respond to community complaints and grievances.

The likelihood of participation of households in natural resource governance may vary across socio-economic and demographic characteristics. Agrawal and Gupta (2005) found that the likelihood of participation in environmental governance in Nepal increases with wealth and social status while it decreases with education. Ribot et al. (2010) find that social stratification affects who participates in forest governance. Szulecka et al. (2016) in their study in Indonesia

found that stakeholders positively rated an FSC-certified forest plantation company in terms of participation (access to training and information regarding the plantation to workers). However, the study relied on qualitative interviews of a small number of selected stakeholders (plantation managers, workers and community members) and did not explore whether responses differ across the socio-economic characteristics of the interviewees. Based on these findings, we formulate the following hypothesis:

H5: Male-headed households, richer households and households of plantation workers are more likely than their counterparts to report having a say in the activities of the plantations.

We test these hypotheses by comparing household survey data from two villages adjacent to FSC- certified private forest plantations and two villages adjacent to a non-certified, state-owned forest plantation in Tanzania.

3.3 Case study context and data

3.3.1 Forest governance framework in Tanzania

The 1998 National Forest Policy of Tanzania covers all types of forests and emphasizes that the country's forests and forest-based industries contribute to sustainable and equitable national development (URT, 1998). The policy calls for the consultation and participation of adjacent communities in the management of forests. The 2001 National Forest Programme highlights the need to create an enabling environment for gender-balanced participation of all stakeholders in forest governance. The Programme promotes the devolution of forest management and recognizes local communities as key partners in plantation forest management (URT, 2001). In 2002, the Forest Act was enacted as the legal framework for forest management in Tanzania (URT, 2002). The main objective of the Act is to promote and enhance the contribution of the forest sector to sustainable national development. The Act requires forest owners to have a forest management plan, which includes a description of adjacent local communities and an outline of a scheme for the involvement of these communities in the use and management of the forest. According to the 2002 Forest Act, local communities should be consulted in the preparation of detailed forest management plans (URT, 2002). Despite these policies, the implementation of participatory forest governance in Tanzania has suffered from two major bottlenecks: slower progress in areas with high-value forest resources and a lack of support to local communities to assert their legal rights (Mustalahti and Lund, 2009).

3.3.2 Study area

The study was carried out in Iringa region in Tanzania, a region which has seen major expansions of plantations in the past few decades (PFP, 2017). We identified two FSC-certified plantations owned by a private forestry company, Green Resources AS (hereafter GR), located in Mufindi district in Iringa (see Figure 3.1). GR had developed about 17,000 ha of eucalyptus and pine plantations on 74,000 ha of land in Tanzania by 2016. Before the establishment of the plantations, the land used to be grassland with scattered shrubs and isolated trees. The company acquired the land on a 99 years lease from the Government of Tanzania in accordance with the

2006 Land Law (Green Resources AS, 2009; Purdon, 2013). According to this law, land is granted by the village under the supervision and mandate of the District authorities and authenticated by the Ministry of Lands and Human Settlement Development through the Regional Office in Mbeya.

The nature of land tenure and the process of land acquisition in Tanzania have been well documented in a study by Purdon (2013). He states that the 1999 Land Act and the 1999 Village Land Act in the country recognized customary land rights through the creation of a new land tenure category, Village Land (the Village Land Act affirms the occupation and use of Village Land in accordance with the customary law of the area). Village Land is among the three basic land tenure categories created under the Land Act, in addition to Reserved Land (generally protected areas and government forest reserves) and General Land. Despite being termed Village Land, all land in Tanzania officially belongs to the state or the president. Although, according to the Land Act, only General Land can be leased to foreign investors, foreign investment projects almost always entail some transfer of Village Land to General Land due to the large availability of Village Land in Tanzania (Purdon, 2013).

One of the land acquisition projects investigated in the study by Purdon (2013) is the plantations project of Green Resources in the villages of Idete and Mapanda. These plantations and villages are included in our study as well, as we describe below. Purdon (2013) found that the villages of Idete and Mapanda had recognized jurisdiction over village lands, as they both possessed a Certificate of Village Land. Under the Village Land Act, having such a certificate affirms the ownership and use of Village Land in accordance with the customary law of the area. According to Purdon (2013), Village Council minutes in Mapanda record an initial meeting with GR in June 1997, when the company requested 20,000 ha At a subsequent Village Assembly meeting in October 1997, the Village Council recommended the area to be handed over. The vote was 272 to 1 in favour of the land transfer. Minutes from a Village Assembly meeting in September 1997 in Idete indicate that GR initially sought a large tract of land, up to 70,000 ha, but minutes from a 1998 meeting of a District Land Acquisition Committee indicate that GR initially requested 24,993 ha This was reduced by the district government to 15,000 ha, but eventually only 11,663 ha was transferred in Idete. The final extent of Mapanda village lands transferred to GR was 4,652 ha Since the acquisitions involved lands greater than 250 ha, it was necessary for GR to obtain approval from the National Commissioner for Lands at the Ministry of Lands. The findings of the study by Purdon (2013) imply that private and state-owned plantations in Tanzania fall under the legal tenure regime of General Land.

For comparing community participation in the FSC-certified private plantations with community participation in a non-certified, state-owned plantation, we selected Sao-Hill forest plantation as a comparison. Sao-Hill is a state-owned eucalyptus and pine plantation of comparable size to GR. The Sao-Hill forest plantation is also located in Mufindi district and is the largest state-owned forest plantation in Tanzania. By 2016, it had a total area of 41,600 ha of standing trees on 65,000 ha of land. Large-scale afforestation took place between 1950 and 1990 with funds from the government of Tanzania and aids from development partners, mainly the World Bank. Administratively, Sao Hill plantation is divided in four divisions, each being headed by a divisional manager. By 2013, Sao Hill forest plantation Division I, which includes

the plantation block adjacent to our study villages, covered a total planted area of 12,829 ha (URT, 2013).

The common historical context regarding land tenure and the process of land acquisition in Tanzania, together with the study plantations being located in the same district, implies that the plantations face the same administrative and socio-economic features. Moreover, the plantations undertook major planting activities relatively during the same period. Thus, the study setting will enable us to mitigate the effects of specific factors that may derive differences in the participation of communities in plantations' activities between the plantations selected for the study.

We used the following four criteria to select villages adjacent to the GR and Sao-Hill forest plantations for conducting our household surveys: proximity to the selected forest plantations; plantations had started operations (such as planting and community projects) in the villages such that we will be able to compare plantations at relatively similar stages of development; plantations employ villagers; and there is sufficient distance between the villages adjacent to the FSC-certified private and the non-certified, state-owned forest plantations to minimize spill-over effects.[12] We used maps, information from district offices and plantation managers, as well as company documents to identify villages that fulfil these criteria. Accordingly, the villages of Idete and Mapanda, which are adjacent to the Idete and Mapanda forest plantations of GR respectively, and the villages of Kihanga and Nzivi, adjacent to the Sao-Hill plantation Division I, were selected for the study (Figure 3.1). Table 3.1 provides an overview of the characteristics of the study villages.

The study villages and plantations are located in the same district under the same administrative setting and have similar socio-economic and environmental characteristics, which reduces the chance of confounding factors affecting the results. The focus group discussions (FGDs) and documents from the plantations and district offices did not show differences between the villages, which could plausibly contribute to differences in community participation in the plantations' activities. As shown in Table 3.1, all villages were established in 1974 and are connected to at least one road accessible by motor transport throughout the year. There was at least one functioning school in each study village in 2015. Table 3.2 shows that the sampled households in the villages adjacent to the FSC-certified private plantations and the non-certified state-owned plantation are similar in terms of average age, gender and education of household head and household size. The households in the villages adjacent to the FSC-certified plantations do not differ significantly from the households in the villages adjacent to the non-certified, state-owned plantation (Degnet et al., 2018). Most households in both groups of villages are farmers, with agriculture the main source of livelihood in the district (NBS, 2013). These household socio-economic characteristics reflect a picture apparent at the district level: average household size was 4.2 in Mufindi district and 4.3 in the Iringa region according to the 2012 census. The major ethnic group in the district and study villages is the Wahehe, constituting about 85 percent of the total population of the district. The study villages are

[12] Even though the state-owned plantation in Kihanga village was established earlier than the other plantations, major planting and expansions occurred in all plantations in the late 1980s and 1990s.

located on the Mufindi plateau, with an altitude of 1700-2000m above sea level and soils of yellow highly leached clays (NBS, 2013).

Table 3.1 Characteristics of study villages

Village	Year village was established	Number of households in the village	Distance to the nearest town market (in minutes by public transport)	Village is connected to at least one road useable by cars in all seasons?	Was there at least one functioning school in the village in 2015?	Owner of nearby plantation	FSC-certification status of nearby plantation
Idete	1974	864	42	Yes	Yes	Private	Yes
Mapanda	1974	1080	105	Yes	Yes	Private	Yes
Kihanga	1974	850	50	Yes	Yes	State	No
Nzivi	1974	821	40	Yes	Yes	State	No

Source: Focus group discussions and Green Resources AS, 2009

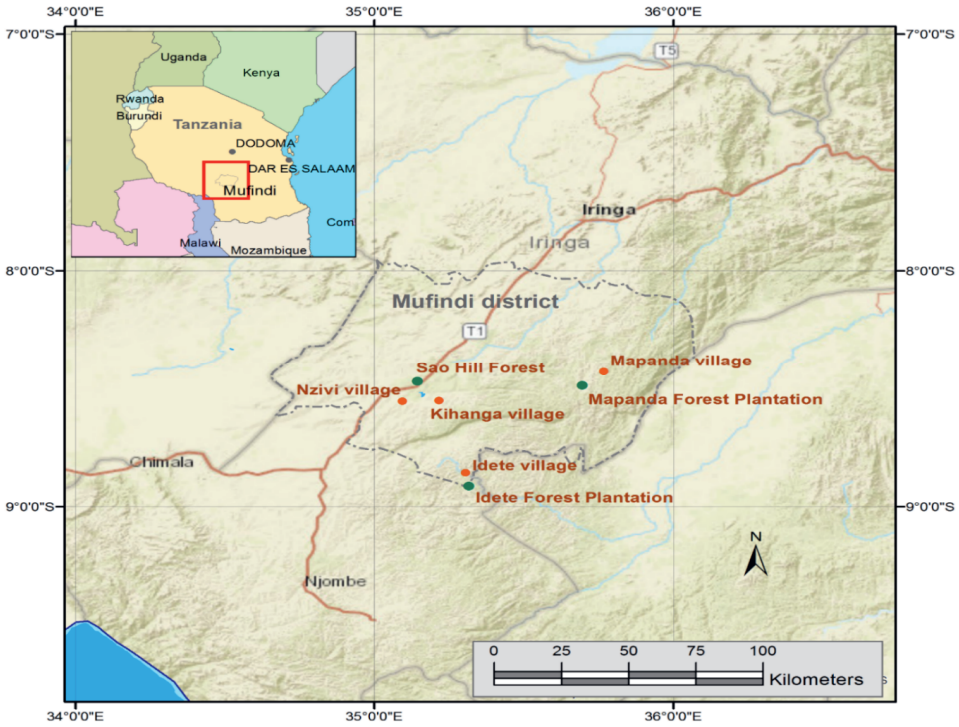


Figure 3.1 Map of study villages, Mufindi district, Tanzania.

3.3.3 Data

Survey data were collected between January and March 2016 from 338 households selected using systematic sampling in the study villages. We used the following procedure to select survey respondents. First, we obtained lists of households in the selected villages from village chiefs. Then, we selected every fourth household in the list to participate in the survey. We sampled roughly similar numbers of households in the villages since the total number of households in the villages was not significantly different (except in Mapanda where we sampled a larger number of households), as shown in Table 3.1. Using structured questionnaires, we collected data on the socio-demographic and economic characteristics of the households and their perceptions about their participation in the activities of the plantations. We asked respondents whether they have a say in the activities of the plantations in their villages and the extent of their satisfaction with their say. As a follow-up question, we asked in which activities of the forest plantations the households have a say. We further asked households whether they think that the plantation company responds to community grievances and complaints and to what extent households agree with the statement the plantation in your village is "a 'friendly' good neighbor". The exact questions used in the survey are provided in Table 2A.1 in Appendix 2A. Two enumerators administered the survey per respondent to minimize bias and errors from fatigue. A focus group discussion (FGD) was held in each village to discuss community

perceptions about the consultation of adjacent communities in the activities of the plantations as well as about land tenure and use before the establishment of the plantations. The focus groups consisted of 10-20 individuals to allow for a detailed discussion and active participation and took between 1 and 2 hours. The household surveys and FGDs were conducted by enumerators fluent in the local languages and English.

Table 3.2 provides the descriptive statistics of the variables used in the regressions. We can see from the table that the mean values for the dependent variables are higher in villages adjacent to the private, FSC- certified forest plantations than in villages adjacent to the non-certified, state-owned plantation. The percentage of households who reported to have a say in the activities of the plantations in the villages adjacent to the FSC-certified private plantations and the non-certified state-owned plantation is 38% and 19% respectively. Although the percentage of households who reported to have a say is higher in the villages nearby the FSC-certified plantations than in the villages near by the non-certified plantation, the percentage is low given the requirement for consultations about plantation management operations enshrined in FSC's principles of sustainable forest management. This can be explained by limited actual engagement by GR. In 2014, GR started a project with Monkey Forest Consulting (MFC) to review its community engagement to improve it and started identifying stakeholders in communities and developed a new engagement strategy to involve them in the company's stakeholder management, to manage grievances, and to improve stakeholder communication (Green Resources AS, 2015a; Green Resources AS, 2015b). Despite developing and implementing a stakeholder engagement plan, a communication plan, and a grievance mechanism, GR reported that meetings with communities were infrequent and community programs were not fulfilled due to financial reasons, resulting in feedback that the company had not fulfilled its promises on community commitments, leading to some individuals to become disengaged (Green Resources AS, 2017). On average, those households nearby the private, FSC-certified plantations that report that they have a say in plantation activities are satisfied with their say, while on average those households nearby the state-owned plantation are slightly dissatisfied. According to 57% of the respondents nearby the private, FSC-certified plantations, the company responds to community complaints and grievances. For households nearby the state-owned, non-certified plantation this percentage is 36%. Finally, on average both sets of households slightly agree with the statement that the plantation is a friendly, good neighbor.

The average age and average education level of the household heads in the two groups of villages are almost identical. The majority of the sampled households in the villages are headed by males. Households in villages adjacent to the certified, private forest plantations are on average slightly smaller in size than households in villages adjacent to the non-certified, state-owned plantation, but farm on average a larger area of land. The villages adjacent to the non-certified, state-owned plantations have a slightly higher portion of households with at least one member working at the plantation than the villages adjacent to the certified, private plantations. The majority of the households in both categories of villages had collected some forest products (mostly firewood) in 2015. Households in villages adjacent to the non-certified, state-owned plantation on average earned higher self-reported incomes for the year 2015 than households in the villages adjacent to the certified, private forest plantations. Agriculture is the main source

of income in both sets of study villages. Households in the villages adjacent to the non-certified, state-owned plantation earn a larger share of their income from business, forest and off-farm income sources than households in the villages adjacent to the certified, private plantations do.

Table 3.2 Descriptive statistics of variables

Variable	Mean		Std. deviation		Min.		Max.		N	
	Private, FSC	State	Private, FSC	State	Private, FSC	State	Private, FSC	State	Private, FSC	State
A. Dependent variables										
Household has say in the activities of plantations[a]	0.38	0.19	0.49	0.39	0	0	1	1	156	145
Extent of household satisfaction with say in plantation activities[b]	3.58	2.82	0.83	1.12	2	1	5	5	60	28
Plantation company responds to community complaints and grievances[a]	0.57	0.36	0.49	0.48	0	0	1	1	141	126
Household considers plantation 'a friendly good neighbor'[c]	3.36	3.17	1.09	1.30	1	1	5	5	165	150
B. Household (hh) characteristics										
Age of head (in years)	44.50	44.91	15.59	13.15	23	20	85	85	169	163
Sex of head (0=female, 1=male)	0 .82	0.76	0.38	0.42	0	0	1	1	171	167
Education of head[d] (0-3)	0.98	0.99	0.62	0.58	0	0	3	3	171	167
Household size (in number)	4.49	5.23	1.96	2.06	1	1	12	11	171	167
Total farm size (in hectares)	1.98	1.43	2.33	1.58	0.10	0.20	12	16.4	168	164
Employed by plantation (0=No, 1= Yes)	0.07	0.09	0.26	0.29	0	0	1	1	170	169
Forest use (0=No, 1= Yes)	0.95	0.90	0.21	0.29	0	0	1	1	170	166
Total hh income (in million Tzs[e])	1.27	1.81	1.48	4.09	0.03	0	10	39.8	155	150
Share of agricultural income (%)	59.13	43.45	39.81	39.20	0	0	100	100	164	159
Share of business income (%)	11.30	22.44	25.36	33.53	0	0	100	100	164	159
Share of forest income (%)	5.18	7.39	19.47	21.50	0	0	100	100	164	160
Share of off-farm income (%)	17.24	22.14	30.63	35.60	0	0	100	100	164	159

Note: [a] binary variable: 1 = Yes, 0 = No

[b] categorical variable: 1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, 5 = very satisfied

[c] categorical variable: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

[d] categorical variable: 0 = no schooling, 1 = primary, 2 = secondary , 3 = college and above

[e] Tzs is the Tanzanian currency shilling. The August 8, 2016 exchange rate was €0.41 for 1,000 TZS.

3.4 Method of analysis

We estimated a series of logistic regressions with village dummies and relevant household controls to analyze the perception of households about their participation in the activities of the private, FSC- certified plantations and the non-certified, state-owned plantation. The dependent variables include four indicators of outcomes of community participation in forest governance to test Hypotheses 1-4:

1. Whether household i from village j has a say in the activities of the plantation in its village (1 = yes and 0 = no);
2. To what extent a household is satisfied with its say, only if the respondent answered 'yes' to the question whether her/his household has a say in plantation activities (5-point Likert scale ranging from 1 = very dissatisfied to 5 = very satisfied);
3. Whether a household perceives the plantation company to address and respond to community complaints and grievances (1 = yes and 0 = no) and;
4. To what extent a household agrees with the statement "the plantation in your village is a friendly good neighbor" (5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree).

The main explanatory variable, labelled as 'Private, FSC_{ij}' in Table 3.3, indicates whether household i lives in a village j that is adjacent to a private, FSC-certified forest plantation.[13] The variable takes a value of 1 if the household lives in a village adjacent to a private, FSC-certified plantation, and 0 otherwise.

We estimated the regressions using the software STATA 14. Since coefficients from logit regressions cannot be directly interpreted, we provide and interpret odds ratios (Table 3). Let $P(Y_{ij} = k|\boldsymbol{x}_{ij})$ denote the probability for household i in village j that the outcome variable Y_{ij} takes value k, conditional on a vector of control variables $\boldsymbol{x}_{ij}$. Then the odds ratio is the ratio of the odds of outcome k – i.e. $P(Y_{ij} = k|\boldsymbol{x}_{ij})/(1 - P(Y_{ij} = k|\boldsymbol{x}_{ij}))$ – to the odds of the same outcome when an explanatory variable changes by a unit while holding the other explanatory variables ($\boldsymbol{x}_{ij}$) constant (Verbeek, 2012). For example, if the odds ratio of male-headed households to report that they have a say in plantations' activities is two, this indicates that male-headed households are twice as likely as female-headed households to report that they have a say in plantation activities. An odds ratio of greater than one indicates a positive relationship between the explanatory and dependent variable and an odds ratio of less than one indicates a negative relationship.

[13] Our main explanatory variable in the regression analyses, i.e., 'Private, FSC_{ij}', does not vary across households who live in the same village. Hence, we cluster standard errors at the village level.

3.5 Results

In this section, we present the results of the regressions related to each hypothesis and the results from the FGDs. Table 3.3 provides the odds ratios of the estimated regressions for the four dependent variables.

3.5.1 Households' say in plantation activities

Our first hypothesis states that households in the villages adjacent to the FSC-certified, private plantations are more likely than households in the villages adjacent to the state-owned, non-certified plantation to report having a say in the activities of the plantations. The results in column (a) of Table 3.3 show a statistically significant positive relationship between households living in the villages near by the private, FSC-certified plantations and the odds of households reporting that they have a say in plantation activities. Hence, we fail to reject Hypothesis 1. The odds ratio of 2.23 indicates that the odds of households in the villages adjacent to the FSC-certified, private plantations reporting that they have a say in plantations' activities are 123% higher than the odds for households in the villages adjacent to the non-certified, state-owned plantation.

Furthermore, we asked households in which activities of the plantations they have a say and the ways through which they voice their say. The most common activities in which households reported to have a say include expansion of plantations and planting of new areas, investments in community development projects such as roads and schools by plantation owners and the use of chemicals in plantation and timber processing activities. The most common ways of having a say for villagers are through the village chief and village meetings.

3.5.2 Households' satisfaction with their say in plantation activities

Households who responded "yes" to the survey question for Hypothesis 1 were asked about their extent of satisfaction with their say in the activities of the plantation in their village. Hypothesis 2 states that households in the villages near the certified, private plantations are more likely than households near the non-certified, state-owned plantation to report that they are satisfied with their say. The results in column (b) show that the odds ratio is 18.55 and is statistically significantly different from unity. Hence, we fail to reject Hypothesis 2. The high odds ratio is due to the small number of households (78) that reported to have a say in plantation activities and the fact that the dependent variable is a categorical variable with five categories. The odds ratio is computed for the highest category ('very satisfied') versus the other categories, resulting in the case of rare events where some of the response categories (in this case, the category 'very satisfied' and 'very dissatisfied') have only a few observations (only four and three households respectively) and therefore the standard error is large.

3.5.3 Plantation company addresses and responds to community complaints and grievances

Hypothesis 3 states that households in the villages adjacent to the FSC-certified private plantations are more likely than households in the villages adjacent to the non-certified, state-owned plantation to report that the plantations respond to community complaints and grievances. There is a statistically significant positive relationship between households living in the villages nearby the certified, private plantations and the odds of households to report that the plantation in their village addresses and responds to community complaints and grievances (column (c)). Hence, we fail to reject Hypothesis 3. The odds ratio of 3.38 indicates that the odds of households in the villages adjacent to the FSC certified, private plantations to report that the plantations in their villages address and respond to community complaints and grievances are 238% higher than the odds for households in the villages adjacent to the non-certified, state-owned plantation.

3.5.4 Extent households agree with the statement: "the plantation in your village is a friendly good neighbor"

Hypothesis 4 is about the relationship between ownership and certification status of plantations and to what extent households in the nearby villages agree with the statement: "the plantation in your village is a friendly good neighbor." Households in the villages adjacent to the certified, private forest plantations are more likely than households in the villages adjacent to the non-certified, state-owned plantation to agree with the statement. The odds ratio is 1.51 and statistically significant. Hence, we fail to reject Hypothesis 4.

3.5.5 Relationships between household characteristics and household participation

Given the expected relationships between household socio-economic characteristics and having a say (a proxy for participation) in forest planation activities, Hypothesis 5 concerns the relationships between household characteristics (sex of head, whether a household member works for the plantation in the village and household income) and the likelihood of households reporting having a say in plantation activities. The results shown in column (a) of Table 3.3 show that male-headed households are more likely than female-headed households to report having a say in plantation activities. Households with a member working for the plantations and households who earn a higher proportion of their income from agriculture are more likely than their counterparts to report having a say in the plantations' activities. However, households engaged in collecting forest products are less likely than those who do not collect forest products to report to have a say in the activities of the plantations. We did not find a statistically significant relationships between household income and the odds of households reporting having a say in plantation activities.

3.5.6 Sensitivity analyses

We examine the sensitiveness of our results to alternative specifications as follows. First, we exclude the village dummies and estimate the models to assess the sensitiveness of the estimates to the exclusion of the village dummies. As can be seen in Table 2A.2 in Appendix 2A, the odds ratios are roughly the same as those of the odds ratios of the regressions with the village dummies reported in Table 3.3. This suggests that it is unlikely that our results are driven by any potential (un)observable time-invariant differences between the study villages which might otherwise explain the differences. Second, we estimate the logit models using the observations for which responses are non-missing across the four specifications. This results in exactly the same number of observations across the three specifications.[14] The results of this exercise are shown in Table 2A.3 in Appendix 2A and our results remain robust.

[14] Note that the model in Column (b) in Table 3.3 uses households who replied 'Yes = 1'to the survey question in Column (a) and as a result has the smallest number of observations. However, as this estimation is based on responses to a follow up question, it cannot be considered as the model with the highest number of missing observations.

Table 3.3 Odds ratios of estimated logit models

Variables		Household has a say in plantation activities	Extent of hh satisfaction with its say in plantation activities	Plantation company responds to community complaints and grievances	Plantation is a 'friendly good neighbor'
		(a)	(b)	(c)	(d)
Private, FSC (1=yes)		2.230***	18.554** [a]	3.383***	1.511***
		(0.397)	(18.081)	(0.278)	(0.157)
Age of head		0.991	1.027***	1.032*	1.005
		(0.019)	(0.006)	(0.018)	(0.005)
Sex of head (1= male)		2.396**	0.127	1.779**	0.799*
		(0.723)	(0.258)	(0.348)	(0.099)
Education of head	Primary	0.616	8.751***	2.395	1.612**
		(0.201)	(3.917)	(2.066)	(0.366)
	Secondary	0.771	40.553*** [a]	1.814	2.881
		(0.514)	(18.587)	(2.136)	(1.941)
	College and above	1.047	63.263** [a]	6.655**	2.127
		(1.782)	(127.732)	(5.746)	(1.447)
Household size		1.089	1.220	1.051	1.083
		(0.103)	(0.155)	(0.045)	(0.067)
Total farm size		1.079	0.758**	0.831***	0.946
		(0.058)	(0.109)	(0.018)	(0.101)
Employed by plantation (1 = yes)		4.016***	1.565	1.270	1.775
		(1.426)	(1.128)	(0.460)	(1.005)
Forest use (1 = yes)		0.601*	3.369**	0.469	4.003***
		(0.173)	(1.405)	(0.380)	(0.712)
Total household income		0.997	0.943**	1.123**	1.035**
		(0.013)	(0.022)	(0.046)	(0.016)
Share of agriculture income		1.012**	0.977	0.998	1.001
		(0.004)	(0.018)	(0.008)	(0.003)
Share of business income		1.008	0.990	0.999	1.001
		(0.008)	(0.014)	(0.013)	(0.006)
Share of off-farm income		1.003	1.001	1.005	1.009*
		(0.003)	(0.010)	(0.005)	(0.005)
Share of forest income		1.006	0.993	0.985	1.001
		(0.009)	(0.018)	(0.013)	(0.007)
Constant		0.082**	-	0.069***	-
		(0.102)		(0.037)	
Village dummies		Yes	Yes	Yes	Yes
Pseudo-R^2		0.095	0.192	0.113	0.030
Observations		261 [b]	78	234	274

In column (a), the dependent variable is the response of the household to the question: "Do you have a say in the activities of the forest plantation in your village", (1= yes).

In column (b), the dependent variable is the extent of satisfaction of a household with its say in the activities of the plantation in its village (i.e., if the household reported to having a say in plantation activities).

In column (c), the dependent variable is the response of a respondent to the question: "Do you think that the plantation company in your village addresses and responds to complaints and grievances from the village" (1 = yes).

In column (d), the dependent variable is to what extent a household agrees with the statement: "the plantation in your village is a friendly good neighbor."

3.5.7 Community perceptions about participation

In the FGDs in each study village, we asked the participants about the ownership and use type of the land before the establishment of plantations (see Table 3.4). While participants in Idete indicated that before the plantations were established, the land was under state ownership, participants in the other three villages indicated that the land was village land. Participants in the villages of Idete and Nzivi reported that the land before the plantations was used for agriculture. On the other hand, in the villages of Mapanda and Kihanga, it was indicated that the land prior to the plantations was grassland.

To obtain insights about community participation, we asked participants whether villagers were consulted about the establishment of the plantations in their villages and whether villagers have a say in the community projects of the plantations (which is a community level analog of the question of whether a household has a say we asked in the survey). Except in the village of Kihanga (where the plantation was established long before the village existed), participants in the FGDs reported that villagers were consulted before the plantations were established. In addition, all communities reported that they have a say in the community projects of plantations.

3.6 Discussions and conclusions

In recent years the relations between forest plantations and adjacent communities have come under increased scrutiny by researchers and NGOs. Community participation can influence the outcomes of plantation's operations and shape plantation-community relations. Understanding community perceptions about their participation in plantations' activities helps to design effective governance structures regarding land-use change and planning. We examined how local communities experience their participation in the activities of forest plantations adjacent to their villages in Tanzania. Using case study data from households living nearby FSC-certified, private plantations and a non-certified, state-owned forest plantation, we explored differences in community participation in the plantation's operations. Our results indicate that households adjacent to the FSC-certified, private plantations in the study villages are more likely than households adjacent to the non-certified, state-owned plantation to report having a say and being satisfied with their say in the plantations' activities. In addition, households near the certified, private plantations are more likely than households near the non-certified, state-owned plantation to report that the plantation company addresses and responds to community

complaints and grievances, and to view the plantation as a 'friendly good neighbor'. These results suggest that stakeholder, more specifically community, inclusion or participation in plantation management is more likely in the case of the FSC-certified, private plantations. Results from FGDs show that villagers have a say in the community development projects of plantations in all villages. These projects include building schools, health centers and road and bridges.

Table 3.4 Community perceptions about participation, pre-plantation land use and tenure type

Village	Plantation owner	Land ownership before plantations	Land-use type before plantations	Were villagers consulted before the plantations started?	Does the village has a say in the community projects of plantations?
Idete	Private, FSC certified	State	Agricultural land	yes	yes
Mapanda	Private, FSC certified	Village land	Grass land and forest	yes	yes
Kihanga	State, non-certified	Village land	Grass land	NA[a]	yes
Nzivi	State, non-certified	Village land	Agricultural land	yes	yes

Note: [a] The plantation was established before the establishment of the village.

Source: Focus group discussions and Green Resources AS, 2009; 2016a

Given the setting of our study, we have three important lessons learned. First, since forest plantations are often established on village lands that used to be governed by customary rules, investors in plantations may commit resources to cultivate relations with villagers to gain, control, legitimize and maintain their access to plantation lands (Ribot and Peluso, 2003). Access theory posits that actors use various mechanisms and processes to secure and maintain their access to resources needed for their investments. In developing countries with weak enforcement of property rights, private plantations are more likely than state-owned plantations to involve villagers in plantation's activities to secure and guarantee their access to land and labor resources. Such community engagement occurred in the study area, with the private plantation company (GR) undertaking community relations and community development projects using dedicated community relations staff (Green Resources AS 2015; 2016a,b; 2017). The private plantation company in this case explicitly mentions the importance of its relationships with local communities, in terms of community projects and employee satisfaction and retention, as a way to manage risks such as fires and personnel grievances (Green Resources AS 2016a, p17, p45) and avoid conflicts, for example concerning land tenure (Green Resources

AS 2017, p27). Our results confirm that the private forest owners were able to use community participation as a route to legitimacy and to increase acceptance by locals as also observed by other studies (e.g. de Vos et al., 2016; Peluso and Lund, 2011; Kull, 2002). Hence, we also find support for the claim that plantation companies can use community involvement to secure a "social license" for their operations, in which legitimation plays a key role (Li, 2015).

Second, given the motives of private companies to maximize profit, adhering to corporate social responsibility as part of a (certification) strategy that requires community participation can also add to the incentives of certified, private plantations to engage local villagers in plantations' activities. As a non-state market-driven governance system, forest certification uses the timber product value chain to incentivize and coerce plantation companies to comply with principles and criteria of sustainable forest governance (Cashore, 2002; Overdevest, 2010). Shareholders, donors and investors in plantation companies may require community participation for sustainable investments (Tumlinson and Morgan, 2013; Zivin and Small, 2005). Timber plantation management models that engage local communities result in the highest economic returns to plantation companies and improve local livelihoods, leading to avoidance of potential conflicts over land (Phimmavong et al., 2019; Van der Meer Simo et al., 2020). Van der Meer Simo et al. (2020) further found that local households were open to expansion of plantation models that provide beneficial effects to local villagers by incorporating their interests. A participatory approach is important because rural households highly depend on land as a source of livelihood and may contest plantation development unless their interests are integrated and recognized in land use and plantation development processes (Arvola et al., 2020; Van der Meer Simo et al, 2019). In the case of the private plantation in our study, voluntary certification as a demonstration of sustainability was a prerequisite for its major investors (FinnFund, 2017; FMO, 2017).The private plantation company also proclaimed the importance of sustainability certification (FSC) as part of its strategy of sustainable development of the areas where it operates (Green Resources AS, 2016a). The participation of local communities in the activities of forest plantations may also reduce the plantations' vulnerability to and associated costs resulting from pressures from socially and environmentally oriented NGOs, which may otherwise lead to reputational risks. As such, community participation may enable private forest plantation companies to reduce these risks for their businesses. The company's viewpoint, in this case, mirrors this assumption, with GR stating that "*close co-operation with local stakeholders, leading development banks and progressive NGOs provide important inputs that are highly beneficial for our operations*" (Green Resources AS, 2016b, p2) and that "*GR aims to mitigate all negative impacts, it actively manages the risks associated with its operations, and seeks to mitigate (and where mitigation is not possible minimize) negative impacts. GR aims to have an overall positive impact on the environment, surrounding communities, and stakeholders*" (Green Resources AS, 2017, p3).

Third, even though national regulations on forest governance require all types of forest owners to involve local communities, inefficiencies and lower incentives in state-owned enterprises in developing countries imply that state-owned plantations are less likely to implement this on the ground (Besley and Ghatak, 2007). Our findings are in line with those of Cubbage et al. (2010), Dare et al. (2011) and Szulecka et al. (2016), who found that FSC-certified forest plantations were positively assessed in terms of participation and engagement by stakeholders. Our study

goes a step further and compares private, certified plantations with a non-certified, state-owned plantation to tease out the correlation between ownership and certification of plantations and experiences of community participation.

The results of our case study have wider implications. First, our results suggest that creating incentives for encouraging plantations to comply with national guidelines of sustainable management of forests and monitoring plantations' compliance with these guidelines can improve community engagement in plantation management. Second, we find a significant correlation between forest certification and the likelihood of community engagement in plantation management as reported by others as well (e.g. Cerutti et al., 2017; Cubbage et al., 2010; Dare et al., 2011; Miteva et al., 2015; Rametsteiner and Simula, 2003; Tsanga et al., 2014). Our results support the argument that market-based forest governance mechanisms, such as forest management certification, can complement top-down approaches of state policy instruments of sustainable forest management to foster community participation in forest management as already mentioned by Bartley (2007) and Bernstein and Cashore (2004).

The differences in the likelihood to reporting having a say in plantations' activities for households with different socioeconomic and demographic characteristics suggest that some social groups (e.g., women headed-households) are less likely to participate in plantation activities. This finding is in line with the results of studies on community participation in the governance of forests and other natural resources (Agarwal, 2001; Agrawal and Gupta, 2005; Botchway, 2001; Zulu 2008). Participation of women in the governance of community forests in developing countries was limited because of gender norms and even in a situation when women participate, they have a passive role (FAO, 2020).

The following points warrant due consideration regarding our results. First, there is a need for caution in interpreting our results since community participation is not an end by itself. Our results show a positive correlation between the private, FSC-certified plantations and community participation in the study area. This does not necessarily imply that private, FSC-certified plantations lead to positive socio-economic outcomes for local communities. Whether community involvement in the governance of forest plantations improves socio-economic outcomes for local villagers depends partly on the purpose for which it is used and is beyond the scope of this study (de Vos et al., 2016; Husseini et al., 2016; Peluso and Lund, 2011; Zulu, 2008). Community participation can be used as a means to legitimize plantations' access to land and labor and can be a tool to the dispossession of locals unless the rights and benefits of local villagers are protected (de Vos et al., 2016; Kull, 2002). Weak community participation (consultation) has often been found to be tokenistic with no active involvement of communities in activities of forest owners that can potentially affect communities (De Vos et al., 2018; Husseini et al., 2016). In our study, households in the villages nearby the certified, private plantations are more likely to consider the plantations "a friendly good neighbor" and this suggests that the participation of households is not merely tokenistic. Further studies are needed to better understand the relative merits of weak and strong participation in promoting the active involvement of communities in forest governance. Second, we used subjective measures of community participation based on the perceptions of households about their say in plantations' activities. Perceptions may be affected by other factors not directly related to community

participation in plantation activities such as, wage levels and employment opportunities in plantation companies and other economic opportunities. Future studies could also incorporate quantitative measures of community participation (such as counting the number and type of participants in community meetings, the frequency of community meetings, and the gender composition of (active) participants) and triangulating those with results of perception-based data for identifying possible biases. These will also help to uncover the role of socio-economic and demographic characteristics in community participation. Third, our study compares FSC-certified private plantations with a non-certified state-owned plantation, as there are no FSC-certified state-owned plantations in East Africa. Hence, our results provide insights into the links between community participation and the combined effects of ownership and certification status of the plantations. An important line for further research would be to separate the ownership and certification status of plantations and their link with community participation. Refining the indicators of community participation could also provide more in-depth insights. Fourth, the number of plantations and villages in our study is limited, and hence it is not possible to generalize our findings to other plantations in different contexts. Extending the analysis by including more plantations and villages within different contexts is an important avenue for future research.

Acknowledgements: We would like to thank our partners from Sokoine University of Agriculture, Tanzania and the team of enumerators, particularly Panataleo Munishi and Hemedy Mayanda, who assisted us in undertaking the fieldwork for the study. We are grateful for the hospitability and cooperation of the plantation managers and communities during our stay in the villages. We would also like to thank three anonymous reviewers for their constructive comments and suggestions.

Funding: This study was part of a project financed by the Netherlands Development Bank (FMO). FMO is one of the investors in Green Resources AS. Neither FMO nor Green Resources were involved in the design of the study, data collection, analysis, interpretation of the results or writing of the paper. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the funding organization or of Green Resources AS.

Appendix 2A

Table 2A.1. Excerpt of survey questions from household questionnaire

6.12	Do you think that the plantation company in your village responds to and addresses the complaints /grievances from the village?	€ Yes € No € Do not want to answer € Not applicable
6.23	Do you have a say in the activities of the plantation company in your village?	€ Yes € No € Do not want to answer
6.23.1	If yes to 6.23, how do you have your say in the activities of the plantation company? (More than 1 answer possible)	€ In meetings € Through letters € I'm a representative € As a worker € Through the council € Through the village chief € Through village development committee € Other, specify:
6.23.2	If yes to 6.23, to what extent are you satisfied about your say in the activities of the plantation company?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable

To what extent do you agree with the following statement?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Do not want to answer
7.4	"The plantation company is a 'friendly' good neighbor."							

Note: In the survey questions in the original questionnaire the phrase "the plantation company" in the tables above was replaced with "Green Resources" for the respondents in the villages adjacent to the private, FSC-certified company. For respondents in the villages adjacent to the non-certified, state-owned plantation, the phrase "the plantation company" was replaced by "Sao-Hill".

Table 2A.2. Odds ratios of estimated logit models without including village dummies

Variables		Household has a say in plantation activities (a)	Extent of hh satisfaction with its say in plantation activities (b)	Plantation company responds to community complaints and grievances (c)	Plantation is a 'friendly good neighbor' (d)
Private, FSC (1=yes)		2.389***	14.465***	3.566***	1.532**
		(0.516)	(12.10)	(0.193)	(0.217)
Age of head		0.991	1.022***	1.032*	1.005
		(0.019)	(0.007)	(0.018)	(0.005)
Sex of head (1= male)		2.588***	0.165	1.743***	0.800
		(0.738)	(0.291)	(0.289)	(0.095)
Education of head	Primary	0.598	7.139***	2.388	1.608*
		(0.193)	(3.400)	(2.025)	(0.364)
	Secondary	0.728	21.62***	1.821	2.874
		(0.488)	(7.431)	(2.114)	(1.908)
	College and above	1.028	25.51	6.437*	2.119
		(1.763)	(48.93)	(5.614)	(1.457)
Household size		1.102	1.165	1.046	1.083
		(0.101)	(0.151)	(0.046)	(0.067)
Total farm size		1.066	0.752*	0.835***	0.947
		(0.057)	(0.108)	(0.017)	(0.099)
Employed by plantation (1 = yes)		4.051***	1.253	1.253	1.777
		(1.431)	(0.803)	(0.450)	(1.003)
Forest use (1 = yes)		0.526*	1.947	0.539	4.053***
		(0.150)	(0.880)	(0.378)	(0.700)
Total household income		0.995	0.924**	1.129**	1.036*
		(0.014)	(0.025)	(0.042)	(0.017)
Share of agriculture income		1.013**	0.982	0.998	1.001
		(0.004)	(0.016)	(0.008)	(0.003)
Share of business income		1.009	0.995	1.000	1.001
		(0.008)	(0.014)	(0.013)	(0.006)
Share of off-farm income		1.003	1.004	1.006	1.009
		(0.003)	(0.009)	(0.006)	(0.005)
Share of forest income		1.007	0.995	0.986	1.001
		(0.009)	(0.017)	(0.013)	(0.007)
Constant		0.0919	-	0.0572***	-
		(0.117)		(0.035)	
Village dummies		No	No	No	No
Pseudo-R^2		0.093	0.176	0.112	0.030
Observations		261	78	234	274

Note: Robust standard errors in parentheses are clustered at the village level. */**/*** denote statistically significantly different from 1 at 10/5/1 % levels respectively.

In column (a), the dependent variable is the response of the household to the question: "Do you have a say in Green Resources' (Sao-Hill's for households in the villages adjacent to the non-certified, state-owned plantation) activities?", (1= yes).

In column (b), the dependent variable is the extent of satisfaction of a household with its say in the activities of the plantation in its village (i.e., if the household reported having a say in plantation activities).

In column (c), the dependent variable is the response of a respondent to the question: “Do you think that the plantation company in your village responds to and addresses the complaints /grievances from the village?”, (1 = yes).

In column (d), the dependent variable is to what extent a household agrees with the statement: “the plantation in your village is a friendly good neighbor.”

Table 2A.3. Odds ratios of estimated logit models using the observations for which responses are non-missing across the four specifications

Variables		Household has a say in plantation activities	Extent of hh satisfaction with its say in plantation activities	Plantation company responds to community complaints and grievances	Plantation is a 'friendly good neighbor'
		(a)	(b)	(c)	(d)
Private, FSC (1=yes)		2.512***	20.611**	3.473***	1.501***
		(0.395)	(20.127)	(0.373)	(0.136)
Age of head		0.994	1.026***	1.033**	1.002
		(0.019)	(0.007)	(0.017)	(0.002)
Sex of head (1= male)		3.778***	0.176	1.793**	0.752
		(1.029)	(0.338)	(0.351)	(0.191)
Education of head	Primary	0.467**	8.809***	2.679	1.848**
		(0.173)	(3.278)	(2.071)	(0.519)
	Secondary	0.478	49.351***	1.830	2.924
		(0.357)	(19.174)	(2.159)	(2.847)
	College and above	0.864	81.671**	7.628**	4.334
		(1.630)	(160.582)	(5.825)	(5.235)
Household size		1.108	1.216	1.069	1.048
		(0.094)	(0.152)	(0.055)	(0.092)
Total farm size		1.068	0.757*	0.799***	1.005
		(0.038)	(0.111)	(0.056)	(0.086)
Employed by plantation (1 = yes)		3.348**	1.512	1.259	1.922*
		(1.443)	(1.170)	(0.445)	(0.668)
Forest use (1 = yes)		0.365	3.730**	0.672	6.882***
		(0.266)	(1.617)	(0.835)	(4.096)
Total household income		0.992	0.944**	1.103**	1.023**
		(0.014)	(0.021)	(0.056)	(0.008)
Share of agriculture income		1.011	0.976	0.998	0.994
		(0.007)	(0.018)	(0.008)	(0.007)
Share of business income		1.006	0.989	1.000	0.992
		(0.009)	(0.014)	(0.013)	(0.008)
Share of off-farm income		1.003	1.002	1.006	1.003
		(0.004)	(0.010)	(0.005)	(0.009)
Share of forest income		1.004	0.992	0.987	0.995
		(0.012)	(0.018)	(0.013)	(0.009)
Constant		0.126	-	0.041***	-
		(0.209)		(0.015)	
Village dummies		Yes	Yes	Yes	Yes
Pseudo-R^2		0.110	0.192	0.114	0.035
Observations		232	76	232	232

Note: Robust standard errors in parentheses are clustered at the village level. */**/*** denote statistically significantly different from 1 at 10/5/1 % levels respectively.

In column (a), the dependent variable is the response of the household to the question: "Do you have a say in Green Resources' (Sao-Hill's for households in the villages adjacent to the non-certified, state-owned plantation) activities?", (1= yes).

In column (b), the dependent variable is the extent of satisfaction of a household with its say in the activities of the plantation in its village (i.e., if the household reported having a say in plantation activities). Hence, the number of observations is smaller than those in the other columns.

In column (c), the dependent variable is the response of a respondent to the question: “Do you think that the plantation company in your village responds to and addresses the complaints /grievances from the village?”, (1 = yes).

In column (d), the dependent variable is to what extent a household agrees with the statement: “the plantation in your village is a friendly good neighbor.”

CHAPTER 4

Does forest certification enhance weak community participation in forest plantation management? Evidence from household perceptions in Mozambique[15]

[15] This chapter is based on the article: Degnet, M.B., van der Werf, E., Ingram, V. and Wesseler, J., 2020. Does forest certification enhance weak community participation in forest plantation management? Evidence from household perceptions in Mozambique. Under review at *Forest Policy and Economics.*

Abstract

With the increasing expansion of large-scale forest plantations in developing countries, concerns are rising about relationships between plantations and local communities. Community participation in forest plantation management can improve relationships between forestry companies and adjacent communities and affect the distribution of benefits from plantations. The social dimension of the Forest Stewardship Council's (FSC) sustainable forest management standard targets the participation of local communities in plantation management. Using household survey data from villages adjacent to plantations owned by two private forest companies in Mozambique, we assess households' perceptions about their participation in plantations' activities. We compare the perspectives of households in villages adjacent to FSC-certified plantations with those of households in villages adjacent to non-certified plantations. Our quantitative analyses show that households in the villages adjacent to the certified plantations are more likely to perceive that they weakly participate in activities of plantations. In terms of socio-economic characteristics, male-headed households and households with plantation employees were more likely than their counterparts to weakly participate in plantations' activities. However, we did not find statistically significant relationships between the perceptions of households in villages near the certified plantations and those near the non-certified plantations regarding their satisfaction with their participation, the extent to which they consider the plantation a 'friendly good neighbor' and whether households have benefitted from the plantations. Our results suggest that market-based approaches of forest governance, such as forest management certification, can complement state policy towards sustainable forest management which promotes community participation in plantation management.

Key words: Forest plantations; Forest certification; Sustainable forest management; Weak participation; Mozambique

4.1 Introduction

Since the 1990s, forest certification has gained importance as a market-based, non-state forest governance system to promote sustainable forest management (SFM) (Arts, 2014; Cashore, 2002; Cashore et al., 2007). Forest certification seeks to encourage forest owners to comply with the standards of SFM through the provision of financial or reputational incentives (Ehrenberg-Azcárate and Peña-Claros, 2020; Miteva et al., 2015). Incentives include price premiums and increased market access for certified products by appealing to consumers' preferences towards certified forest products based on their social, economic and environmental attributes (Blackman and Rivera, 2011; Ehrenberg-Azcárate and Peña-Claros, 2020; Nussbaum and Simula, 2013; van der Ven and Cashore, 2018). The most prominent forest certification schemes in the world are the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC), with a total certified area of about 201 million ha and 327 million ha, respectively (FSC, 2019; PEFC, 2019; van der Ven and Cashore, 2018). In Africa, FSC is the dominant scheme with a total certified forest area of about six million ha as of December 2019 (Ehrenberg-Azcárate and Peña-Claros, 2020; FSC, 2019; PEFC, 2019). FSC is an independent global not-for-profit organization that sets standards and criteria for SFM (FSC, 2012).[16]

With the increasing expansion of large-scale forest plantations in developing countries, concerns are rising in particular about the relationship between plantations and adjacent local communities endangering SFM (Dare et al., 2011; Szulecka et al., 2016). Forest certification can potentially improve social aspects of forestry operations, such as plantation-community relations (Cubbage et al., 2010). For example, the FSC standard of SFM has a strong social aspect that purports to improve relationships between forest owners and local communities (Cerutti et al., 2017; Payn et al., 2015). Principle 4.2 of the community relations standard of FSC states that "the organization shall recognize and uphold the legal and customary rights of local communities to maintain control over management activities within or related to the management unit to the extent necessary to protect their rights, resources, lands and territories" (Payn et al., 2015).[17]

Whether forest certification is associated with positive changes in community participation in forest management has been contested (Romero et al., 2017; Tricallotis et al., 2018). While some studies found no or little evidence of improved community engagement in forest management associated with certification (McCarthy, 2012; Stringer, 2006), others have documented a positive role of forest certification in enhancing community engagement in forest management (Cerutti et al., 2017; Cubbage et al., 2010; Dare et al., 2011; Degnet et al., 2020;

[16] Sustainable forest management (SFM) is generally defined as maintaining and enhancing the economic, social and environmental values of all types of forests, for the benefit of present and future generations (UN, 2007).

[17] The organization refers to "the person or entity holding or applying for certification and therefore responsible for demonstrating compliance with the requirements upon which FSC certification is based" and the management unit is 'a spatial area or areas submitted for FSC certification with clearly defined boundaries managed to a set of explicit long term management objectives which are expressed in a management plan." (FSC, 2015).

Miteva et al., 2015; Rametsteiner and Simula, 2003; Tsanga et al., 2014). In addition to these inconclusive and contradicting findings, the studies mentioned are mostly qualitative and focus on certified community-owned or natural forests (Ehrenberg-Azcárate and Peña-Claros, 2020). Furthermore, some of these studies (Cubbage et al., 2010; Dare et al., 2011) rely on interviews with plantation managers and key informants, with little emphasis on local communities.[18] Using a qualitative study of plantation managers and community members together with a document analysis of relevant regulations and forest certification standards, (Dare et al., 2011) found that forest certification improved community engagement processes in plantation management in Australia. In a study of impacts of forest management certification in Argentina and Chile, (Cubbage et al., 2010) found that certified forest plantations reported improved community relations. Degnet et al. (2020) found that community participation was more likely in FSC-certified, private forest plantations than a non-certified, state-owned plantation in Tanzania. As the authors compared FSC-certified, private forest plantations with a non-certified, state-owned plantation, the role of certification could not be isolated. Tsanga et al. (2014) found that FSC-certification led to improved relations between certified concessions and local communities and to reduced conflicts (related to boundary disputes between logging concessions and village lands) and damages (to cultural sites and farm areas) in or near concession areas in Cameroon.

Motivated by the finding that households nearby FSC-certified privately-owned plantations were more likely than households nearby a non-certified, state-owned plantation to participate in the activities of plantations in Tanzania (Degnet et al., 2020), this study empirically explores the role of forest certification in enhancing community participation in the management of large-scale forest plantations in rural Mozambique. We compare the perceptions of households about their participation in the activities of plantations in villages adjacent to FSC-certified, private forest plantations with those in villages adjacent to non-certified, private plantations. In addition, we study the relationship between households' socio-economic characteristics (sex, age, level of education and income) and their perceived participation in plantations' management. This is novel because while studies have documented correlations between socio-economic characteristics (sex and income) and participation in the management of community and natural forests (Agrawal and Gupta, 2005), it is not known whether or not this is the case in large-scale private forest plantations. To explore the role of socioeconomic factors in community participation, we examine whether or not the experiences of households about their participation in the activities of plantations vary across socio-economic characteristics.

The study thus seeks to add to the scant literature on the contribution of forest certification to improved community engagement in plantation management in two ways. First, we quantitatively assess the correlations between forest certification and community participation

[18] Local communities are communities of any size that are in or adjacent to a forest plantation, and also those that are close enough to have a significant impact on the economy or the environmental values of the forest plantation or to have their economies, rights or environments significantly affected by the management activities or the biophysical aspects of the plantation (FSC, 2015*)*.

in forest plantation management. Unlike previous studies (Cubbage et al., 2010; Dare et al., 2011), we use a large sample of household data collected in villages adjacent to large-scale FSC-certified and non-certified private plantations in Mozambique. This large-N analysis provides insights about the perspectives of the main categories of stakeholders affected by plantations - local communities living adjacent to plantations - regarding their engagement in plantations' management. Improved understanding of the relationship between forest certification and community participation in plantations' activities informs the discussions about the role of certification in promoting responsible forest management. Second, we triangulate our quantitative results from household surveys with qualitative analysis of information from focus group discussions in the study villages. The qualitative analysis will complement our quantitative analysis and thereby improve the robustness of our results (van der Ven and Cashore, 2018).

The paper unfolds as follows. In Section 4.2, we explain the conceptual framework. This is followed by a description of the study context, data and methods of analyses in Section 4.3. In Section 4.4, we present the results. We end with discussions and conclusions in Section 4.5.

4.2 Conceptual framework

Forest governance is defined as the way in which public and private actors (including large enterprises) and stakeholders negotiate, make and implement decisions about the management of forests (FAO, 2020). Stakeholders include individuals and organizations, such as local communities and indigenous people, with interest in the products provided by a forest (Nussbaum and Simula, 2013). The concept of forest governance has evolved to comprise various actors at different levels and includes state regulations about the use of forests as well as non-state mechanisms, such as the use of voluntary forest certification to support SFM (FAO, 2020). Forest management is implemented at a forest unit and "deals with the administrative, economic, legal, social, technical and scientific aspects of managing natural and planted forests" (FAO, 2020). FSC recognizes forest owners who comply with predefined standards of SFM. Compliance with the standards of FSC is seen as a measure of SFM and emanates from market benefits of certified plantations and timber (Carlson and Palmer, 2016; Cashore, 2002).

Community participation is required and promoted in forest plantation management as part of forest certification (Dare et al., 2011). Principle 3 of the SFM principles of FSC stipulates that forest owners recognize and respect indigenous people's rights. Principle 4 of community relations states that "consultations shall be maintained with people and groups (both men and women) directly affected by management operations." (FSC, 2012). Plantations' investors and shareholders may view compliance with these FSC principles as an indicator of responsible forest management (Garforth et al., 2013). Community participation entails various activities depending on the extent of community involvement and power (Arnstein, 1969; Berkes et al., 2000; Freeman, 2010; Handberg, 2018; Ribot et al., 2010). These activities range from

community consultation (termed weak participation) to community decision making (termed strong participation) (Handberg, 2018). Forest regulations in Mozambique recognize community participation and consultation as rights of communities in the management of nearby forest industries (Mustalahti and Lund, 2009).

This study focuses on weak community participation in the activities of private forest plantations as communities are not expected to have decision-making rights about the management of plantations owned by private companies (Dare et al., 2011; Barrow et al., 2002). We use the perception of households regarding whether they have a say in the activities of plantations as an indicator for weak participation in plantation activities. In addition, we assess households' satisfaction with their participation in the management of nearby plantations and whether households benefitted from plantations operating in their villages. We further developed an additional indicator of community participation based on insights from Good Neighbor Charters (GNCs). GNCs aim at enabling local people to participate in company decisions and practices that can potentially affect local communities or the environment (Dare et al., 2011). Accordingly, we use the response of households regarding whether they consider plantations in their villages as "friendly good neighbor" to assess households' experience with their participation in plantation activities that can potentially affect their communities.

Guidelines for responsible forest management embody principles of participation and equity in managing forests (Capistrano, 2010; European Commission, 2010; FAO, 2011; Finance Alliance for Sustainable Trade, 2014; Lawson and MacFaul, 2010). Increased capacity for consultation and collaboration with local communities is identified as one of the social impacts of certified forests (Nussbaum and Simula, 2013). Since FSC certification requires community engagement in forest management, we expect households in villages nearby FSC-certified plantations to be more likely to weakly participate in the plantations' activities than households in villages nearby non-certified plantations. Similarly, we expect households in villages nearby certified plantations to be more likely to report satisfaction with their participation in the plantations' activities. In addition, we expect households in the villages adjacent to the certified plantations to be more likely than households adjacent to the non-certified plantations to consider the plantation in their village as "a friendly good neighbor" and report that they benefited from the plantations.

Responsible forest management entails opportunities for participation by all community members (FAO, 2020). However, studies on community participation in community-owned and natural forests have shown that socio-economic characteristics are correlated with the likelihood of villagers to participate in forest management. Agrawal and Gupta (2005) found that the likelihood of participation in environmental management is positively related to wealth and social status while it is negatively related with education. Degnet et al. (2020) found that male-headed households, and households with plantation workers, were more likely than their counterparts to participate in plantations' activities in Tanzania. Following the findings of these studies, we expect that male-headed households, richer households and households with

plantation workers to be more likely than their counterparts to participate in the activities of plantations.

4.3 Study context and methods

4.3.1 Overview of forest governance policies in Mozambique

Mozambique is endowed with a significant amount of forest cover. By 2015, the country's natural forest cover was estimated to be around 38 mil. ha while its planted forest cover was around 75,000 ha (FAO, 2015). The country's share of planted forests are expected to increase further in the face of the depletion of natural forests (FAO, 2015). Mozambique has favorable conditions, such as growing regional and international demand for forest products and availability of land, for the expansion of forest plantations. The country's National Reforestation Strategy envisages increasing the country's plantation area to more than one million ha by 2030 which would generate 250,000 jobs and create US$1.5 billion worth of manufactured products and exports (World Bank, 2018). The Land Law of 1997 of Mozambique recognizes communities' rights to land and puts community consultation as a requirement when assigning rights of use to another party. The Forest and Wildlife Law of 1999 establishes state ownership of forests and wildlife (Mustalahti and Lund, 2009). It promotes the establishment of forest industries and the export of manufactured wood products. The Law delineates the rights and benefits of forest-dependent local communities, covering subsistence level use of resources, participation in the co-management of forest resources, and community consultation and approval prior to allocation of exploitation rights to third parties. It establishes two types of licenses for legal timber production: forest concessions and simple licenses. Forest concessions are granted to domestic and foreign operators for areas larger than 20,000 ha with an approved management plan, and can be allocated for up to 50 years. Concessionaires are required to have an annual harvesting license that specifies the volume and species they fell. The Law outlines development benefits (such as, investments in village infrastructure) derived from timber production under a concession regime. Simple licenses offer harvesting quotas of 500 cubic meters per year or less across 10,000 ha for five years and exclusively to domestic operators. While these simple licenses require a simplified management plan, no area mapping takes place; essentially, it is a harvesting license (Mustalahti and Lund, 2009).

The 2002 Forest and Wildlife Regulation states that all timber operators, whether concessionaires or simple license operators, must consult with local communities and receive permission from these in order to exploit forest resources and give precedence to local community members when employing relevant staff. The 2002 Regulation also creates local councils for the management of natural resources, composed of all relevant parties to timber trade, including local communities, all of whom are tasked with overseeing all timber operations in concessions and simple license areas. The Local Councils may suggest improvements to legislation and to forest management. In spite of this Regulation, forest governance in Mozambique in general has been characterized by a central government favoring

commercial timber exploitation at the expense of communities' rights (Mustalahti and Lund, 2009).

4.3.2 Data collection

We used a multi-stage sampling technique for the selection of households for data collection. In the first stage, we identified Niassa and Nampula provinces as areas that have seen rapid expansions of plantations in Mozambique. The selection of the study villages was guided by the following criteria: proximity to forest plantations; plantations had started operations (such as planting trees and undertaking community projects) in the villages; plantations employ local villagers; and sufficient distance between the villages adjacent to the FSC-certified and the non-certified plantations to reduce spill-over effects. We identified villages that fulfil these criteria with the use of maps, company documents and information from plantation managers. Three of the study villages (Malulu, Naconda and Namuanica) are located in Niassa province and one (Namina) is located in Nampula province (Figure 4.1). Malulu and Namina are adjacent to FSC-certified private plantations and Naconda and Namuanica are adjacent to non-certified private plantations. In the second stage, we obtained a list of households for each village from the village chiefs. We then selected every third household on the list for our survey.

The FSC-certified plantations (the Mecuburi forest plantation in Nampula province and the Malulu forest plantation in Niassa) are forest concessions owned by Green Resources AS (GR hereafter), a privately-owned forest company operating in East Africa. Between 2006 and 2016, the company developed about 20,000 ha of standing eucalyptus and pine trees in Mozambique on about 252, 000 ha of land. It acquired the land on a 50-year concession basis, renewable for the same period, after community consultations and final approval by the Council of Ministers in 2009 (Green Resources, 2017). The non-certified plantations (Naconda and Namuanica) were owned by Florestas De Niassa, a private plantation project of the Rift Valley Corporation. Florestas de Niassa started in 2006 in north-western Mozambique and had planted over 7,000 ha of eucalyptus and pine trees between 2010 and 2016, on greenfield land (Rift Valley Corporation, 2016).

Data were collected between February and April 2016 through structured questionnaires from 326 households selected using systematic sampling. We collected data on the socio-demographic and economic characteristics of households and their perceptions about their participation in the activities of plantations adjacent to their villages. We asked respondents whether they have a say in the activities of the plantations and to rate their satisfaction with their say in plantations' activities on a five-point Likert scale (1 = very dissatisfied, ... , 5 = very satisfied). We use households' responses regarding having a say as a proxy for their participation in plantation activities. We further asked respondents to rate their agreement with the statement: "The plantation company is a 'friendly' good neighbor." on a five-point Likert scale (1 = strongly disagree, ... , 5 = strongly agree), and whether they agree that their household has benefitted from the plantation. The questionnaires were first prepared in English and then

translated into Portuguese. The paper questionnaires were converted into tablet versions using the Open Data Kit (ODK) software and were pretested with five households in Malulu village. The survey was administered by two enumerators per respondent to minimize bias and errors from fatigue. A focus group discussion (FGD) was held using semi-structured qualitative interviews in each village to discuss community perceptions

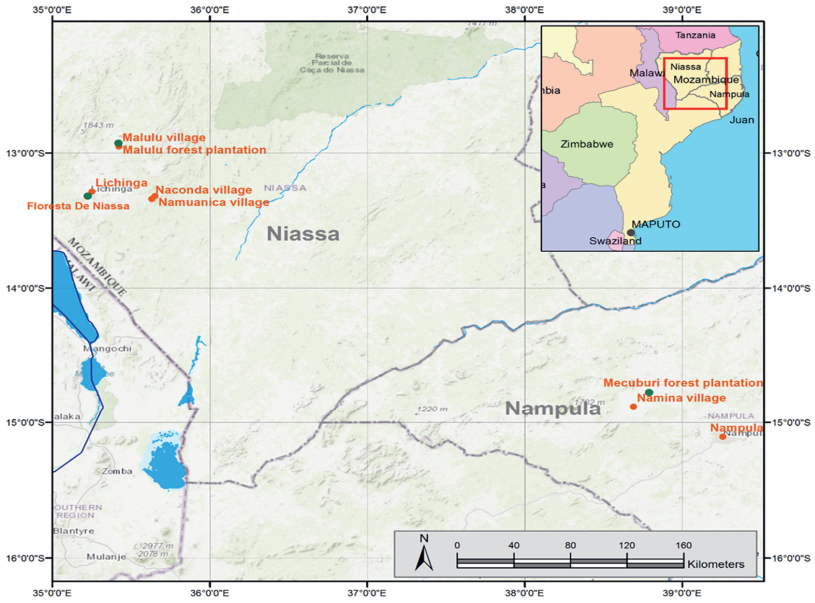


Figure 4.1 Map of study villages, Mozambique

about the management of the plantations, the land use type before the establishment of plantations and whether villagers were consulted before the plantations started their operations. Participants in FGDs in each village were asked whether village members were consulted before the establishment of plantations and the land use category of the plantation sites. The FGDs took place after the surveys and were intended to complement the results from the household survey. Village leaders and key informants suggested representative groups of people in the villages (in terms of profession, gender, age and wealth) for the FGD, and we selected the final participants in such a way that each group has at least one representative. The focus groups consisted of 10 to 20 individuals to allow for detailed discussion and active participation and lasted on average 1.5 hours. The household surveys and FGDs were conducted by enumerators fluent in the local languages, Portuguese and English. Transcripts of the semi-

structured qualitative interviews were made, capturing comments, consensus as well as differences in perceptions reported in the discussions.

4.3.3 Methods of analysis

Our main analysis draws on the quantitative household survey data. We estimated four logistic regressions with relevant household covariates to assess the perception of households about their participation in the activities of the private, FSC-certified plantations and the non-certified, private plantations. We clustered the standard errors at the village level to account for the fact that the main explanatory variable, i.e., whether a household lives in a village nearby an FSC-certified plantation, varies across villages. The dependent variables include responses to the following four survey questions which serve as the proxies of outcomes of community participation in forest management:

1. Do you have a say in the activities of the plantation company in your village? (1 = yes and 0 = no);
2. If yes to 1, to what extent are you satisfied with your say in the activities of the plantation company? (5-point Likert scale ranging from 1 = very dissatisfied to 5 = very satisfied);
3. To what extent do you agree with the following statement: "The plantation company is a 'friendly' good neighbor."? (5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree);
4. Do you agree with the statement: "My household has benefitted from the plantation company in my village." ? (1 = yes and 0 = no)

In addition to these quantitative analyses, we analyzed qualitative data from open questions in the FGDs as follows. First, we reviewed and combined the responses into coded themes on community perceptions about consultation in plantation activities (if they were consulted, how and when), the type of land tenure (customary or formal title, private or state ownership), and land use type of the plantation sites in the villages before the plantations started operations (agriculture, fallow, forest, grassland, residential or other). Then, we organized and summarized the responses based on phrases and keywords related to the themes. In addition, we analyzed information from company documents regarding the number and types of forest certifications of the companies as a demonstration of responsible forest management and adherence to corporate responsibility standards.

4.4 Results

4.4.1 Descriptive statistics of study variables

Table 4.1 provides the descriptive statistics of the variables used in the study. The table shows that a higher percentage (21%) of households in the villages near by the FSC-certified, private plantations reported participating in the activities of the plantations in their villages as compared to households nearby the non-certified, private plantations (6%). However, on average, those households nearby the FSC-certified plantations that report that they have a say in plantation activities are less satisfied with their participation than households nearby the non-certified plantations. On average, both categories of households agree with the statement that the plantation in their village is a friendly good neighbor. While 31% of the households in the villages nearby the certified plantations reported that their household benefitted from the plantation company, the percentage is 38% in the villages nearby the non-certified plantations.

The households in the two groups of villages have similar socio-demographic and livelihood characteristics. The average age of the household heads and average household size of the households in the two categories of villages are almost similar. The majority of the heads of the households in the study villages are male. Households in villages adjacent to the certified plantations farm on average a larger area of land than households in the villages nearby the non-certified plantations. The villages adjacent to the certified plantations have a higher portion of households (11%), with at least one member working at the plantation than the villages adjacent to the non-certified plantations (6%). A higher share of the households in the villages nearby the non-certified plantations than in the villages nearby the certified plantations had collected some forest products (mostly firewood) in 2015. Households in villages adjacent to the certified plantations on average earned higher self-reported incomes for the year 2015 than households in the villages adjacent to the non-certified plantations. Agriculture was the main source of income in both categories of study villages. In 2015, households in the villages adjacent to the certified plantations earned a larger share of their income from business and off-farm income sources than households in the villages adjacent to the non-certified plantations did. The share of income from forest was higher for households in the villages nearby the non-certified plantations than that of households nearby the certified plantations.

Table 4.1 Descriptive statistics of variables

	Mean		Std. deviation		Min.		Max.		N	
Variable	FSC	Non-FSC	FSC	Non-FSC	FSC	Non-FSC	FSC	Non-FSC	FSC	Non-FSC
A. Dependent variables										
Household has say in the activities of plantations [a]	0.21	0.07	0.41	0.25	0	0	1	1	140	138
Extent of household satisfaction with say in plantation activities [b]	2.71	3.33	1.01	0.87	1	2	4	4	28	9
Household considers plantation 'a friendly good neighbor' [c]	3.15	3.48	1.08	0.96	1	1	5	5	139	161
Household benefitted from plantation [d]	0.31	0.38	0.46	0.49	0	0	1	1	161	165
B. Household (hh) characteristics										
Age of head (in years)	41.22	43.09	13.98	15.74	18	20	76	82	157	149
Sex of head (0 = female, 1 = male)	0.89	0.84	0.31	0.37	0	0	1	1	161	165
Education of head [e] (1-3)	2.12	1.62	0.66	0.59	1	1	3	3	161	165
Household size (in number)	5.06	5.39	2.14	2.41	1	1	13	15	161	165
Total farm size (in hectares)	2.39	2.08	3.38	1.45	0.16	0.2	36	8.5	147	154
Employed by plantation (0 = No, 1 = Yes)	0.11	0.06	0.32	0.24	0	0	1	1	161	165
Forest use (0 = No, 1 = Yes)	0.86	0.98	0.35	0.15	0	0	1	1	159	165
Total hh income (in thousand MZN)	42.56	31.27	102.61	79.25	0.55	0	948	500	127	142
Share of agricultural income (%)	57.45	57.01	44.16	45.97	0	0	100	100	159	165
Share of business income (%)	11.58	8.13	28.99	25.64	0	0	100	100	159	165
Share of forest income (%)	2.89	3.98	12.86	17.55	0	0	100	100	159	165
Share of off-farm income (%)	18.32	11.45	34.64	29.36	0	0	100	100	157	165

Note:
[a] binary variable: 1 = Yes, 0 = No
[b] categorical variable: 1 = very dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, 5 = very satisfied
[c] categorical variable: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
[d] binary variable: 1 = Yes, 0 = No
[e] categorical variable: 1 = no schooling, 2 = primary, 3 = Secondary and above

4.4.2 Econometric results

4.4.2.1 Household perceptions about participation in forest plantation management

Table 4.2 presents the odds ratios of the estimated logistic regressions. The results in column (a) show a statistically significant positive relationship between households living in the villages adjacent to the FSC-certified plantations and the odds of households reporting that they weakly participate in plantation activities. The odds ratio of 5.71 implies that the odds of reporting that they weakly participate in plantations' activities (vis-a-vis not participate) were 471% higher for households in the villages nearby the FSC-certified plantations than for households in the villages nearby the non-certified plantations. Hence, we find support to our hypothesis regarding the higher likelihood of weak community participation in FSC-certified plantations than non-certified plantations. Respondents who reported that they participate in plantation activities were asked to rate the extent of satisfaction with their participation in the activities of the plantation in their village. The results in column (b) show that there is no statistically significant relationships between the odds of households reporting that they are satisfied with their participation in plantation activities and households living in the villages nearby the FSC-certified plantations. Similarly, the results in columns (c) and (d) respectively show that there are no statistically significant relationships between households living in the villages nearby the FSC-certified plantations and the odds of households reporting that they consider the plantation company a 'friendly' good neighbor and that they benefitted from the plantation. Hence, we neither find support nor reject our hypotheses regarding the relationship between FSC-certified plantations and household perceptions about their satisfaction with their participation and outcomes related to their perceptions of engagement with plantations (such as the sense of 'friendly' good neighbor and benefits to households from plantations).

Regarding the socio-economic characteristics, the results in column (a) show that having a female head of household and not having collected a forest product in 2015 are perfect predictors. That is, all female-headed households and all households who did not collect a forest product in 2015 reported that they do not participate in plantations' activities. In addition, large size households and households with at least one plantation worker were more likely to report to weakly participate in the activities of the plantations. For other socio-economic characteristics, we do not find a clear pattern.

Table 4.2 Odds ratios of estimated logit regressions

Variables		Household has a say in plantation activities	Extent of household satisfaction with its say in plantation activities	Extent to which household agrees that plantation is a 'friendly good neighbor'	Household benefitted from plantation company
		(a)	(b)	(c)	(d)
FSC-certified (1= yes)		5.712***	0.754	0.793	0.931
		(3.311)	(0.543)	(0.274)	(0.644)
Age of head		1.002	0.914***	0.995	0.986***
		(0.022)	(0.027)	(0.004)	(0.003)
Sex of head (1= male)		- [a]	-	1.039	2.079**
		(-)		(0.312)	(0.759)
Education of head[b]	Primary	0.718	1.197	1.130	1.455
		(0.315)	(1.095)	(0.262)	(0.433)
	Secondary and above	1.742	2.576*	1.318*	1.021
		(1.229)	(1.349)	(0.214)	(0.378)
Household size		1.149***	0.914	1.089	1.007
		(0.035)	(0.122)	(0.840)	(0.069)
Total farm size		1.077	1.488*	0.940**	0.922
		(0.078)	(0.347)	(0.026)	(0.089)
Employed by plantation (1 = yes)		5.368***	0.484	2.170	4.112***
		(3.005)	(0.401)	(1.041)	(1.689)
Forest use (1= yes)		-[a]	-	3.686***	2.313**
		(-)		(0.873)	(0.790)
Total household income		1.002	0.975	1.007***	1.003
		(0.001)	(0.022)	(0.002)	(0.002)
Share of agriculture income		0.989	1.022***	0.989**	0.981***
		(0.014)	(0.007)	(0.004)	(0.002)
Share of business income		0.985**	1.007	0.982*	0.993
		(0.007)	(0.012)	(0.009)	(0.008)
Share of off-farm income		0.992	1.015**	0.988*	0.981***
		(0.011)	(0.007)	(0.007)	(0.004)
Share of forest income		0.993	0.914	0.981***	0.972***
		(0.014)	(0.055)	(0.004)	(0.007)
Constant		0.053***	-	-	0.957
		(0.051)			(0.722)
Pseudo-R^2		0.177	0.189	0.045	0.130
N		172[c]	32[d]	211[c]	229[c]

Note: Robust standard errors in parentheses clustered at village level. *, **, *** signify $p < 0.10$, $p < 0.05$ and $p < 0.01$ respectively.

[a] 'Sex of head' = 0 (female) is a perfect predictor, i.e., all (19) respondents in the female-headed households answered " No" to the survey question: "Do you have a say in Green Resources' activities?" and hence Stata excludes these 19 observations from the regression. Similarly, 'forest use' = 0 is a perfect predictor, i.e., all (10) households who did not collect forest products in 2015 responded "No" to the survey question: "Do you have a say in Green Resources' activities?" and accordingly Stata excludes these observations from the regression.

[b] Reference category: 'No schooling.'

[c] Because some households responded "Do not know" or "Do not want to answer" to some of the survey questions, the estimations were performed on a smaller number of observations than the total number of households interviewed in the survey.

[d] As the question in Column (b) is asked to only those respondents who replied "yes" to the question in column (a), the regression in Column (b) is performed on very few observations.

In column (a), the dependent variable is the answer of the respondent to the question: "Do you have a say in the activities of the forest plantation in your village", (1= yes).

In column (b), the dependent variable is the extent of satisfaction of a household with its say in the activities of the plantation in its village (i.e., if the household reported having a say in plantation activities).

In column (c), the dependent variable is to what extent a household agrees with the statement: "the plantation in your village is a friendly good neighbor."

In column (d), the dependent variable is the response of a respondent to the question: "Do you agree with the statement: 'My household has benefitted from the plantation company in my village'?", (1 = yes).

4.4.2.2 Community perceptions about participation and benefits from plantations

Table 4.3 reports results from our FGDs and document analysis. While participants in the FGDs in the villages of Namina (adjacent to an FSC-certified plantation) and Naconda (adjacent to a non-certified plantation) reported that village members were consulted prior to the establishment of plantations, participants in the villages of Malulu (adjacent to an FSC-certified plantation) and Namuanica (adjacent to a non-certified plantation) reported that this was not the case. With regard to the land use category of the plantation sites before the plantations were established, FGDs participants in the villages of Malulu, Namina and Namuanica reported that the land before the plantation sites was used for agriculture. In the village of Naconda, it was indicated that the plantation site was grassland before the plantation started.

With regard to community participation in community development projects (such as the construction of roads, schools and health centers) implemented by the plantations, participants in FGDs in all villages except Malulu reported that villagers do not have a say in the community projects of the plantations. These village-level results regarding community participation suggest that our results regarding household participation in plantation activities reported in Column (a) of Table 4.3 might be driven by responses from Malulu. We test whether this is the case in Section 4.2.3. Participants in all villages except Naconda reported that their villages have benefitted from the community development projects of the plantations. In Section 4.2.3, we check whether this finding at the village level corresponds to the result obtained from the household survey reported in Table 4.2.

Table 4.3 Community perceptions about participation, pre-plantation land use type and benefits from plantations

Village	Certification	Land-use type before plantations	Were villagers consulted before the plantations started?	Does the village have a say in the community projects of plantations?	Do you think that the village has benefitted from the community projects of plantations?
Malulu	FSC certified	Agricultural	No	Yes	Yes
Namina	FSC certified	Agricultural	Yes	No	Yes
Naconda	Non-certified	Grass	Yes	No	No
Namuanica	Non-certified	Agricultural	No	No	Yes

Source: FGDs and Green Resources AS, 2013; 2016

4.4.2.3 Robustness checks

As the results in Section 4.2.2 show, FGDs participants in Malulu (nearby an FSC-certified plantation) reported that villagers have a say in the community projects implemented by plantations. Participants in all villages except Naconda reported that their villages have benefitted from the community projects of the plantations. We examined whether the results from the household surveys confirm these findings from the FGDs as follows. We re-estimated the regressions of Table 4.3 by including a dummy variable for each of the four villages instead of a dummy for the villages nearby the FSC-certified plantations. As FGD participants in Malulu reported having a say in community projects of plantations, we used Malulu (which is located nearby an FSC-certified plantation) as the reference village in the estimations. The results in Column (a) of Table 4.4 show that respondents in all villages are less likely to state that their household has a say in plantation activities than respondents in Malulu. Even though the odds ratios for Namina (FSC-certified) are less than one (i.e., relative to the odds ratios of Malulu (FSC-certified)), we expect the odds ratios for Naconda and Namuanica (non-certified) to be statistically lower than the odds ratios for Namina. Statistical tests on the odds ratios of Namina vs Naconda and Namina vs Namuanica show that we reject the null hypotheses of equal odds ratios at 1% level of significance (p-value = 0.000) and accept the alternative hypothesis that the odds ratios for Namina are statistically larger than the odds ratios for Naconda and Namuanica. The results in Column (d) of Table 4.4 show statistically significant positive correlations between the households in the villages of Namina (FSC certified) as well as in Namuanica (non-certified) (again relative to the reference village Malulu (FSC certified)) and households' responses regarding whether they benefitted from plantations. The dummy for Naconda (non-certified) is not statistically significant. We statistically tested the equality of the odds ratios and the results show that we reject the null hypotheses of equal odds ratios of Namina vs Naconda and Naconda vs Namuanica (p-value = 0.000) and of Namina vs Namuanica (p-value = 0.031). Thus, the villages ranked in decreasing magnitude of odds ratios are Namina, Namuanica and Naconda and this ranking is in line with the results from the qualitative interviews reported in Table 4.3 that households in villages adjacent to the certified plantations are more likely to perceive that they participate in activities of plantations. For completeness, we provided the results of the regressions related to the other outcome variables (Columns (b) and (c)) in Table 4.4.

Table 4.4 Odds ratios of logit estimations using individual dummies for each village

Variables		Household has a say in plantation activities	Extent of household satisfaction with its say in plantation activities	Extent to which household agrees that plantation is a 'friendly good neighbor'	Household benefitted from plantation company
		(a)	(b)	(c)	(d)
Malulu (FSC certified)[a]		-	-	-	-
Namina (FSC certified)		0.414***	0.198***	0.464***	12.889***
		(0.047)	(0.066)	(0.099)	(3.194)
Naconda		0.042***	0.186***	1.335***	1.375
		(0.005)	(0.099)	(0.096)	(0.269)
Namuanica		0.178***	1.830*	0.656**	7.381***
		(0.009)	(0.669)	(0.139)	(3.622)
Age of head		1.002	0.908***	0.992**	0.986***
		(0.019)	(0.017)	(0.003)	(0.003)
Sex of head (1= male)		-[b]	-	1.142	1.881*
				(0.349)	(0.707)
Education of head[c]	Primary	0.841	2.247	1.119	1.377
		(0.417)	(1.455)	(0.272)	(0.599)
	Secondary and above	1.779	4.681***	1.229	1.323
		(1.362)	(2.186)	(0.183)	(0.745)
Household size		1.121***	0.942	1.055	1.123*
		(0.027)	(0.096)	(0.083)	(0.072)
Total farm size		1.098	1.604*	0.934**	0.865
		(0.098)	(0.417)	(0.026)	(0.136)
Employed by plantation (1 = yes)		5.709***	0.715	2.194*	5.019**
		(2.987)	(0.565)	(0.978)	(3.185)
Forest use (1= yes)		-[b]	-	3.119***	6.059***
				(0.903)	(0.601)
Total household income		1.002	0.966*	1.007***	1.008**
		(0.001)	(0.019)	(0.002)	(0.004)
Share of agriculture income		0.989	1.010	0.988***	0.980***
		(0.014)	(0.008)	(0.004)	(0.001)
Share of business income		0.982**	0.992	0.978**	1.002
		(0.008)	(0.007)	(0.009)	(0.010)
Share of off-farm income		0.991	1.000	0.984**	0.987*
		(0.013)	(0.007)	(0.006)	(0.007)
Share of forest income		0.993	0.915	0.974***	0.987
		(0.017)	(0.066)	(0.005)	(0.014)
Constant		0.448**			0.044**
		(0.181)			(0.055)
Pseudo-R^2		0.207	0.229	0.054	0.229
N		172	32	211	229

Note: Robust standard errors in parentheses clustered at village level. *, **, *** signify $p < 0.10$, $p < 0.05$ and $p < 0.01$ respectively.

[a] Malulu is omitted because it is the reference category for the village dummies.
[b] 'Sex of head' = 0 (female) is a perfect predictor, i.e., all (19) respondents in the female-headed households answered " No" to the survey question: "Do you have a say in Green Resources' activities?" and hence Stata excludes these 19 observations from the regression. Similarly, 'forest use' = 0 is a perfect predictor, i.e., all (10) households who did not collect forest products in 2015 responded "No" to the survey question: "Do you have a say in Green Resources' activities?" and accordingly Stata excludes these observations from the regression.
[c] Reference category: 'No schooling.'
In column (a), the dependent variable is the answer of the respondent to the question: "Do you have a say in the activities of the forest plantation in your village" (1= yes).
In column (b), the dependent variable is the extent of satisfaction of a household with its say in the activities of the plantation in its village (i.e., if the household reported to have a say in plantation activities).
In column (c), the dependent variable is to what extent a household agrees with the statement: "the plantation in your village is a friendly good neighbor."
In column (d), the dependent variable is the response of a respondent to the question: "Do you agree with the statement: ' My household has benefitted from the plantation company in my village?" (1 = yes).

4.5 Discussions and conclusions

With the inadequacy of traditional state-led governance structures to enhance sustainable forest management, market-based non-state instruments, such as FSC's voluntary certification and adherence to responsible investment guidelines have gained uptake. The objective of this study was to assess the relationship between FSC-certified forest plantations and weak community participation in plantation management. Using data from households living nearby FSC-certified and non-certified private plantations in Mozambique, we explored differences in weak community participation in plantation management. Our results indicate that households in the villages adjacent to the FSC-certified plantations are more likely than households in the villages adjacent to the non-certified plantations to participate weakly in plantations' activities. Our results do not lend statistical support to our hypotheses that households in the villages nearby the FSC-certified plantations to be more likely to be satisfied with their participation in plantations' activities or to perceive that the plantation adjacent to their village is a 'friendly good neighbor,' or to have benefited from plantations.

In recent years, relations between forest plantations and local communities have increasingly attracted the attention of researchers and NGOs (e.g. De Vos et al., 2018; Lyons and Westoby, 2014). Our evidence (albeit weak) regarding the positive relationship between forest certification and weak community participation can be explained by the motives of plantation companies to reap market benefits of certification, adhering to principles of forest certification that require community participation. As a non-state, market-driven approach, forest certification acts as a form of governance of the timber product value chain to shape and demonstrate plantation companies' compliance with principles and criteria of sustainable forest management (Cashore, 2002; Overdevest, 2010). Shareholders, donors and investors in plantation companies may set community participation as a condition for responsible

investments (Tumlinson and Morgan, 2013; Zivin and Small, 2005). This was the case for the FSC-certified plantations, with voluntary certification being a precondition of financing in the company that owns the FSC-certified plantations and as a symbol of SFM (FinnFund, 2017; FMO, 2017). The company stressed the importance of FSC certification for its objective of economic and social development of the communities around its plantations (Green Resources, 2016). The participation of local communities in the activities of forest plantations may be expected to reduce plantations' susceptibility to conflicts with communities and related costs resulting from pressures from socially and environmentally oriented NGOs (Cerutti et al., 2017).

Our finding that forest certification can influence community participation in plantation management is consistent with the findings of Cubbage et al. (2010), Dare et al. (2011), Degnet et al. (2020) and Szulecka et al. (2016) who reported that FSC-certified forest plantations were positively evaluated in terms of participation and engagement by stakeholders. Our study adds to this literature by comparing FSC-certified and non-certified private plantations to identify the correlation between certification and community participation using a large-N quantitative data set. A comparative approach aids the understanding of relationships between forest certification and community participation in plantations' activities and thus can inform the design and implementation of effective governance structures to promote sustainable forest management.

Despite the statistically significant relationship between certified plantations and weak community participation, the share of households (21%) in the villages adjacent to the certified plantations who reported to participate in plantations' activities is not high, taking into account the requirements of FSC certification. In addition, we did not find statistically significant differences between the certified and non-certified plantations regarding the other outcome variables. These results can be related to weak implementation and enforcement that characterize forest governance in Mozambique (World Bank, 2018). The obstacles that result in low participation of local communities in decisions regarding resource management and the challenges of managing plantation company-community relations in Mozambique have been well-documented (World Bank, 2018; Mustalahti and Lund, 2009). An alternative explanation for the low participation rate relates to the opportunity costs of households. While households may appreciate the possibility to participate, they might receive higher gains from alternative allocation of their labor time, such as farming activities.

NGO publications and media coverage report on land-related conflicts reduced access to natural resources for locals, unresolved compensation for land, low salaries and poor working conditions related to the plantations of GR in Mozambique (WRM, 2018). However, reports of 'land grabbing' have subsequently been found to be based on inadequate data and research, leading to unclear conceptions regarding the status and actual impact of (proposed) investments in forestry and agriculture (Locher and Sulle, 2014; Schoneveld, 2014).

Our results suggest strong statistically significant relationships between socio-economic characteristics (gender, household size, employment at plantations and dependence on forest products) and the likelihood of weak participation in plantation activities. The differences in the likelihood to participate in plantations' activities for households with different socioeconomic and demographic characteristics indicate that some social groups (e.g., women headed-households) are less likely to participate in plantation activities. These findings are consistent with the results of studies on community participation in the management of forests and other natural resources (Agarwal, 2001; Agrawal and Gupta, 2005; Botchway, 2001; Degnet et al., 2020; Zulu, 2008). According to FAO (2020), women's participation in the governance of community forests in developing regions was restricted due to conservative gender norms and even in situations when women participate, they have a passive role. Studies have shown that women in many developing countries have limited participation in the use of land-related resources due to cultural constraints (Watts, 2008)

The results of the FGDs regarding land use prior to the start of the plantations are in line with the findings of previous studies. Ecological surveys conducted in 2008 and 2009 in the study sites indicated that prior to the GR plantations, the landcover was composed of shifting small-scale cultivation, short and tall grasslands, shrub savannah and woodland (miombo and riverine forest), which were easily identified in the field and in satellite images from 2005 (Sitoe, 2008, Sitoe et al., 2009). The tall grasslands were typically abandoned 'machambas' (agricultural land) with a few exotic species such as mango and cashew trees (Sitoe et al., 2009, Green Resources AS, 2013). The FSC-certified plantation sites were reported as degraded or abandoned land that does not qualify as areas of special interest or high conservation value forest (Green Resources AS, 2019). Florestas De Niassa (2016) reports that the non-certified plantations (Naconda and Namuanica) were on "greenfield" land.

Our findings have implications for policy and practice. First, our results suggest that market-based approaches of forest governance, such as forest management certification, can supplement state policy approaches of sustainable forest management to enhance community participation in forest management (Bartley, 2007; Bernstein and Cashore, 2004; Degnet et al., 2020). Market benefits of certified plantations can strengthen compliance of plantation owners with requirements of community participation stipulated in national regulations such as the Land Law of 1997 and the 2002 Forest and Wildlife Regulation. Second, community participation in forest plantation management in Mozambique may be strengthened by clear rules and procedures by the public sector regarding plantation-community relations as well as improved implementation and enforcement of forest governance regulations (World Bank, 2018). Third, interventions and policies aimed at encouraging community participation in plantation management should be tailored to the needs and situations of various socio-economic groups to create equal opportunities for participation of all groups of communities. Fourth, low community participation rates are not necessarily a sign of badly implemented SFM schemes if households have high opportunity costs of labor.

Finally, the following points need to be stressed regarding our results. First, we quantified community participation using subjective measures based on perceptions of households about their participation. Perceptions are liable to be shaped by factors not directly linked to community participation in plantation activities such as, income and employment opportunities in plantation companies or reduced access of households to forest resources due to the presence of plantations (Nube et al., 2015). Potential exists for further work on the topic by incorporating objective measures of community participation (such as counting the number and type of participants in community meetings, the frequency of community meetings, and the gender composition of (active) participants) to complement results of perception-based measures. Second, the study is based on a limited number of plantations and villages, and hence our findings cannot be generalized to other plantations in different contexts. Further research on the topic based on a larger number of plantations and villages with different contexts would show whether our results also hold beyond the setting of our study.

Acknowledgements: We would like to express our gratitude to our partners from the University of Eduardo Mondlane, Maputo, Mozambique and the team of enumerators, especially Almeida Sitoe and Estêvão E. Chambule, who assisted us in undertaking the fieldwork for the study. We thank the plantation managers and communities for their hospitability and cooperation during our stay in the villages. Comments and suggestions from Helena Hansson on earlier versions of the paper are gratefully acknowledged.

Funding: This study was part of a project financed by the Netherlands Development Bank (FMO). FMO was one of the investors in Green Resources AS. Neither FMO nor Green Resources were involved in the design of the study, data collection, analysis, interpretation of the results or writing of the paper. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the funding organization or of Green Resources AS.

CHAPTER 5

Exploring environmental concern in forest management and its relation with personality: The case of non-industrial private forest owners in Sweden[19]

[19] This chapter is based on the article: Degnet, M.B., Hansson, H., Hoogstra-Klein, M.A. and Roos, A., 2020. Exploring environmental concern in forest management and its relation with personality: The case of nonindustrial private forest owners in Sweden. Under review at *Forest Policy and Economics.*

Abstract

Environmental benefits have become priority objectives for the management of forests, including for private forest owners in many countries. Understanding and promoting environmental-friendly private forest management requires a measure of environmental concern of forest owners and knowledge of factors that influence it. Such a measure allows to explore underlying motivations of forest owners to include environmental aspects in their forest business. This in turn helps in developing and implementing effective pro-environmental forestry policies. In this paper, we assess environmental concern in forest management of 226 non-industrial private forest (NIPF) owners in Sweden. In particular, we sought to achieve a two-fold objective: a) to quantitatively explore the content and dimensionality of the environmental concern construct of forestry owners and b) to identify the association between environmental concern of forest owners and their personal values and personality traits. Principal factor analysis resulted in a two-dimensional environmental concern construct encompassing: environmental strategy and environmental orientation. Hierarchical seemingly unrelated regressions (SUREG) showed that personal values and personality traits help to explain environmental concern in forest management of NIPF owners. A better understanding of the environmental concern of forest owners and its relationship with individuals' attributes will help in better designing, framing and targeting tailor-made interventions to promote environmental considerations in forest businesses.

Key words: Environmental concern; Non-industrial private forest owners; Personal values; Personality traits; Exploratory factor analysis; Sweden

5.1 Introduction

Developing a green economy is high on the agenda of the European Union, reflecting the urgency felt to respond to the environmental challenges such as air and water pollution, soil erosion, climate change and increasing pressure on natural resources we currently face. Forest ecosystems and the forest sector can contribute significantly to greening the economy. As the Rovaniemi Action Plan for the Forest Sector in a Green Economy (RAP), adopted in 2013, already stated, "*forests are already delivering renewable, environmentally friendly products and vital services to society, and there is great potential for even more*" (UNECE/FAO, 2014). With the recent European Green Deal proposal, aiming at carbon neutrality and a healthy environment in the EU by 2050 (European Commission, 2019), the importance of the forest sector in this process is underlined again, as forests and the forest sector "*are well positioned to play a strong role in reaching the objectives of the European Green Deal*" (CEPF, 2019). During the past decades, the environmental perspective had already become an integral part of the debate on forests, e.g. forests as important carbon sinks and for biodiversity conservation (Nordlund and Westin, 2010; Wolfslehner et al., 2020). However, in this Green Deal environmental considerations in forest management is considered to be more important than ever before. Hetemaki (2020), for example, observes that with the Green Deal the focus has shifted to protection and restoration of biodiversity and the improvement of carbon storage in forest ecosystems as priority objectives for the management of forests.

The provision of these environmental benefits in the EU is to a large extent in the hands of non-industrial private forest (NIPF) owners (Vedel et al., 2015; Haugen et al., 2016; Uggla, 2018) as they own approximately half of the European forest land (Hirsch and Schmithuesen, 2010). While many NIPF owners express concern for economic benefits and do harvest trees, many owners also own their forest partly for non-monetary uses, including purely environmental properties (Ficko et al., 2019; Eggers et al., 2014). Simultaneously delivering wood and non-provisional ecosystem services can be, however, an unresolved challenge (Triviño et al. 2015; Naumov et al., 2018; Lazdinis et al., 2019) and forest management practices are the outcome of individual preferences balancing productivity-profit considerations with environmental benefits. This has resulted in a heterogeneous mixture of forest management practices, from 'sustained yield' forestry (economic primacy of timber production), 'multi-purpose forestry' (economic primacy of timber production and other Ecosystem Services (ES)) to 'ecosystem management' (primacy of biodiversity conservation), or 'carbon forestry' (primacy of climate mitigation and adaptation) (Sotirov et al., 2017; Takala et al. 2017).

Research has shown that the extent to which environmental considerations are included in forest management are often linked to forest owner's "greenness" and "environmental concern." The research of Howley et al. (2013) among Irish farm foresters, for example, observed that the level of concern for environmental issues significantly influenced their management practices. Nordlund and Westin (2010) concluded in their research that the environmental values of Swedish forest owners influenced their environmental management positively and their

economic management negatively. Mitani and Lindhjem (2015) found in their research that a positive environmental attitude increases Norwegian forest owners' probability of participating in biodiversity conservation.

Understanding and promoting environmental-friendly forest management among NIPF owners would, therefore, be facilitated by a measure of environmental concern of forest owners and knowledge about its antecedents, i.e. of factors that form environmental concern. It is acknowledged that human values are changing over time and these changes are assumed to affect the strategic choices of forest owners (Ingemarson et al., 2006). In this regard, understanding underlying personal values and personality traits that determine individual forest owners' strategic motivations would be vital (Fischer et al., 2010; Ingemarson et al., 2006). In particular, previous literature has found that personal values and personality traits influence individuals' business-related activities. Indeed, Fayolle et al. (2014) found personal values to be related to entrepreneurial activities and Kotey and Meredith (1997) found personal values to be related to the choice of strategic business orientation. Personality traits have been found related to the success of entrepreneurial activities (Zhao et al, 2010; Brandstätter, 2011; Leutner et al, 2014), to individual's choice of occupational status (Zhao & Seibert, 2006; Brandstätter, 2011) and to individual's willingness to be self-employed (Zhao et al, 2010; Brandstätter, 2011). In this paper, we therefore (1) quantitatively assess the empirical content and structure of environmental concern of NIPF owners in their forestry management and (2) explore environmental concern in more detail by investigating the role of personal values and personality traits in explaining environmental concern. These insights can help, a.o., policy makers, NGOs, advisory bodies and consultants, to better target and frame environmental advice and improve communication with forest owners about environmental considerations in forest management.

This paper contributes to the scholarly debate in three ways. First, we provide a clear conceptualization of environmental concern as theoretical construct and measure its scale and dimensionality in a private forestry setting using factor analysis. Most studies so far lack theoretical foundation and conceptual development (Fischer et al., 2010; Geiser and Crul, 1996; Aykol and Leonidou, 2015). Second, most of the existing studies focus on the stated behavior of NIPF owners (Meijer et al., 2015; Shivan and Mehmood, 2010), and they do not enable us to identify whether environmental considerations are aimed at promoting business interests or emerge due to intrinsic qualities. Our scale of environmental concern will allow us to assess the role of personal values and personality traits in environmental considerations in forestry business strategies. Third, as research combining values and personality traits together and understanding how they jointly impact environmental concern is limited (Parks and Guay, 2009; Marcus and Roy, 2019), this research will contribute to a more integrative view of the individual (Marcus and Roy, 2019).

Swedish NIPF owners were selected as a case study. With around half of the Swedish forestland owned by individual private forest owners, they form the largest category of forest owners in

Sweden (Skogsstyrelsen/Swedish Forest Agency, 2017). Management decisions are the responsibility of the individual forest owner who is encouraged to include environmental considerations in their management (Lidestav et al., 2015; Skogsvårdslagen/The Forestry Act, 2020). Environmental measures that are enforced in a top-down way are often considered as an infringement of ownership rights. This is especially the case when these environmental measures interfere with timber production and the related income (Hertog et al., 2019). The Swedish private forestry, therefore, forms an excellent case to help understand private forest owners' decisions in relation to environmental concern in forest management.

In what follows, we provide the theoretical framework of the study in Section 5.2. The research methodology is explained in Section 5.3. Section 5.4 presents the results. We end with discussions and conclusions in Section 5.5.

5.2 Theoretical background

The conceptualization of environmental concern varies and several meanings of the concept can be found in the literature (Stern et al., 1993; Dunlap and Jones, 2002; Takács-Sánta, 2007, Hirsh, 2010). In this study, we define environmental concern as "the attitudes of NIPF owners regarding the importance of environmental aspects in their forest management and planning."

As such, we consider environmental concern a latent theoretical construct, which cannot be measured directly. Latent constructs can, however, be assessed by the use of measurement items (DeVellis, 2016). There are various approaches for measuring the environmental concern of individuals. These range from subjective approaches based on self-report measures, to more objective approaches based on field observations with the help of informants, trained observers, or technical devices as well as behavioral tasks in the laboratory (Lange and Dewitte, 2019). Self-report measures assess different behavioral properties related to the environment by asking individuals, for example, if they engage in pro-environmental behavior. While some studies use single-item measures to assess specific or general pro-environmental behavior, others develop more comprehensive multi-item scales that are typically less exposed to measurement errors (Churchill, 1979). Other studies generate scales of pro-environmental behavior based on psychometric analysis of item and scale properties. Such a measure allows the evidence-based confidence necessary to replicate the same validated scale in other studies, thus contributing to the accumulation of knowledge of environmental-friendly behavior (Lange and Dewitte, 2019).

In our case, we quantify environmental concern from measurement items based on self-reported responses of NIPF owners about their environmental attitudes and inclusion of environmental aspects in their forest management and planning. To correctly assess a latent construct, it is important to classify the construct as being reflective or formative, i.e. if causality goes from the latent construct to the measurement items (reflective) or if measurement items define the construct (formative) (Rossiter, 2002). In our study, causality is assumed from the latent construct to the measurement items, similarly to work done by Hansson and Lagerkvist (2012)

because the environmental concerns of NIPF owners are expected to influence their environmental attitudes and strategic choices in their forestry. This means that a reflective measurement model is used to empirically assess the structure and content of the latent construct: environmental concern (DeVellis, 2016; Jarvis et al., 2003; Hair et al., 2010).

Behavioral economics has in recent years shown that psychological models can be used to explain economic behavior (Thaler, 2016). Personality factors such as values and traits are crucial determinants of human-decision making (Ajzen, 1991; Hirsh, 2010; Solino and Farizo, 2014). It is well documented that values, beliefs and attitudes influence forest management behavior and decision making (Caprara et al., 2006; Meijer et al., 2015; Mozatto et al., 2018; Nordlund and Westin, 2011). Moreover, with changes in human values, the personalities of individuals are assumed to become more important than their socio-demographics in influencing their choices in forest management (Ingemarson et al., 2006). Various studies suggest that NIPF owners have multiple objectives, including both pecuniary and non-pecuniary motives (Eggers et al., 2014; Fischer et al., 2010; Ingemarson et al., 2006). Non-pecuniary motives are more likely to be related to individual personality differences than to the socio-economic groups individuals belong (Ingemarson et al., 2006). In a behavioral perspective, the environmental concern of NIPF owners can be interpreted in light of personality factors. Personality is defined as a combination of dynamic, self-regulatory systems that arise and function over the life span of individuals in the course of personal adaptations (Caprara & Cervone, 2000). Personality systems direct affective, cognitive, and motivational processes, guiding people toward achieving individual and collective goals (Caprara & Cervone, 2000). Two dimensions of personality are personal values and personality traits (Caprara et al., 2006).

The focus of our research is on the association of personal values and personality traits with the environmental concern of forest owners. The reason for this is that several studies (a.o. in psychology) indicate that personal values and personality traits might be important factors explaining environmental concern (see e.g. Hirsh, 2010; Parks and Guay 2009; Parks-Leduc et al., 2015). Marcus and Roy (2019) also concluded in their research that personal values and personality traits have "*distinct implications for ethical and sustainable management practice*." Moreover, they argue that it is important to assess values and personality together as this contributes to a more integrative view of the person (Marcus and Roy, 2019).

Personal values

Personal values belong to the most widely studied topics across the social sciences (Meglino and Ravlin 1998; Marcus and Roy, 2019). Schwartz (1992; 2011) defined personal values as i) beliefs; ii) being related to desired goals; iii) relating to several situations; iv) serving as standards which guide actions and/or evaluations; and v) being ordered according to their relative importance. Scholars studying value theory state that individuals share a common set of values, but the strength with which the different values are held differ per individual

(Rokeach 1973). Value orientations are also not mutually exclusive, i.e. individuals may hold to a certain degree several value orientations that, for example, could differ for the value object (such as the environment) (Stern and Dietz, 1994).

The literature distinguishes ten universal basic personal value dimensions (Schwartz, 1992):

(1) power, describing social status and prestige, control or dominance over people and resources.

(2) achievement, describing personal success through demonstrating competence according to social standards.

(3) hedonism, describing pleasure and sensuous gratification for oneself.

(4) stimulation, describing excitement, novelty, and challenge in life.

(5) independence (self-direction), describing independent thought and action—choosing, creating, exploring.

(6) universalism, describing understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.

(7) benevolence, describing preservation and enhancement of the welfare of people with whom one is in frequent personal contact.

(8) tradition, describing respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self.

(9) conformity, describing restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.

(10) security, describing safety, harmony, and stability of society, of relationships, and of self.

The ten dimensions of personal values are interrelated in that they exist along a motivational continuum (Schwartz, 1992; Bardi & Schwartz, 2003).

Several studies have shown the link between individual values and environmental concern (Stern et al., 1995; Nordlund and Garvill, 2002; Schultz et al., 2005; Steg et al., 2011; Oreg and Gerro, 2006; Hansla et al., 2008; Hedlund, 2011). Studies have, for example, shown that individuals that more strongly adhere to a pro-social or biospheric value domain have a higher environmental concern. Conversely, individuals who favor personal outcomes (such as wealth or power) have either a negative or insignificant link with environmental concern (Harring et al., 2017).

Personality traits

Whereas values represent a psychologically embedded construct within the motivational complex, personality traits refer to "e*nduring characteristics of the individual that summarize trans-situational consistencies in characteristic styles of responding to the environment*" (Olver and Mooradian, 2003, p 110). Olver and Mooradian (2003) consider personality traits as i) being associated with the biophysiological response system; ii) heritable; iii) immune to the influence of the individual's parents and societal context; and iv) generally stable during the individual's adult life. The Five Factor Model (FFM, sometimes also called the "Big Five Model") (John et al., 2008) is a frequently used model describing personality traits (Roccas et al., 2002; Soto et al., 2011). The model distinguishes five traits, which are considered to embody most of the human personality:

(1) neuroticism, describing the degree to which a person experiences the world as threatening and beyond his/her control.

(2) openness to experience, describing the degree to which a person needs intellectual stimulation, change, and variety.

(3) extraversion, describing the degree to which a person needs attention and social interaction.

(4) agreeableness, describing the degree to which a person needs pleasant and harmonious relations with others.

(5) conscientiousness, describing the degree to which a person is willing to comply with conventional rules, norms and standards.

The relation between specific personality traits and (a lack of) environmental concern has been studied in several studies (Hirsh, 2010; Milfont and Sibley, 2012). Hirsh (2010), for example, found that higher levels of agreeableness and openness were related to greater environmental concern, with smaller positive relationships emerging with neuroticism and conscientiousness. Borden and Francis (1978) found that enthusiastic, extraverted, more conscientious and mature people showed a higher environmental concern. Pettus and Giles (1987) found that conscientious, self-confident and sincere people could be related to pro-environmental attitudes. Milfont and Sibley (2012) concluded that "*individuals who are sympathetic, selfless, responsible, who score high on traits related to extraversion and conscientiousness, and the personality dimension of neuroticism, tend to be more environmentally engaged*".

Thus, regarding personal values, it is plausible to assume that environmental concern is impacted by the values held by the individual. Personal values characterize goals individuals consider desirable and as such they work as guiding principles of individuals (Roccas et al., 2002; Schwartz, 1992, 2011). Hence, we posit that personal values function to guide NIPF in the environmental concern they show in their forestry management and planning.

Personality refers to the intensity with which individuals undertake specific actions (Roccas et al., 2002) and individuals respond to their environments (Olver and Mooradian, 2003). We, therefore, assume that NIPF who differ in personality type will differ in their intensity of environmental concern in their forestry management and planning.

Thus, we formulate the following hypotheses:

H1: Forest owners' personal value profiles significantly influence their environmental concern in forest management and planning.

H2: Forest owners' personality traits significantly influence their environmental concern in forest management and planning.

5.3 Methods

5.3.1 Case and sampling procedure

The data for the study were collected through a survey conducted between June and August 2018 among NIPF owners in Sweden. The survey was part of a larger study on the regulation of agricultural and forestry land acquisition in Sweden. NIPF owners own half of the productive forest area in Sweden (Eggers et al., 2014). Addresses of NIPF owners were obtained from a register of forestry owners held by Lantmäteriet, the Swedish mapping, cadastral and land registration authority. Only forestry holdings owned by physical persons were sampled. The sample was stratified so that larger holdings had a higher probability of being included in the survey. No holdings of less than 50 hectares of forestry land were included in the sample. The reason was to focus on the NIPFs that are more likely to be economically dependent on their forest holding, thus excluding holdings that are more likely kept for hobby reasons and/or which are kept for country-style living preferences. A total of 1962 randomly selected unique forestry owners were contacted by regular mail and invited to participate in an online survey. After one reminder, a total of 226 usable surveys were collected.

Table 5.1 presents the descriptive statistics of the study sample. Most of the respondents were male (78 %). The average age of the respondents was about 60 years and the average respondent had a high school forestry education. The average household size was two persons and the majority of the respondents live at their forest holding. The average size of the forests was 610 hectares. The majority of the respondents own a single forest holding and most of the forests (61 %) are certified.

Table 5.1 Descriptive statistics of socio-economic characteristics of the study sample

Variable	Mean (Standard deviation)
Gender (1 = male, 0 = female)	0.78 (0.41)
Age of respondent	60.59 (11.34)
Education level of respondent[a]	2.81 (1.66)
Household size (number)	2.45 (1.04)
Live at the forest holding (1 = yes, 0 = no)	0.67 (0.47)
Size of forest land in hectares	609.60 (1262.59)
Dependence on forest income[b]	3.56 (2.18)
Diversified forestry holding (1 = yes, 0 = no)	0.39 (0.49)
Certified forestry holding (1 = yes, 0 = no)	0.61 (0.49)

Note: [a] 0 = basic education; 1 = High school; 2 = High school forestry; 3 = University forestry; 4 = Other university education; 5 = Other schooling

[b] 0 = Not at all to 7 = Very much

5.3.2 Survey

In addition to data on respondents' demographic and socio-economic characteristics, the survey included questions related to considerations for environmental aspects (the environmental concern) in forest management and planning as well as questions related to respondents' personal values and personality traits.

Regarding environmental concern, the sampled forest owners were asked to self-report on measurement items intended to assess the importance of environmental aspects in their forest management and planning. The measurement items were five-point Likert-scale statements to capture the degree of agreement of respondents about their environmental attitudes and various environmental aspects in their forest holding. The statements were adapted from Banerjee et al. (2003) and Leonidou et al. (2017). Respondents were asked to indicate the extent to which they agreed with the proposed statements. The beginning-point 1 refers to 'do not agree at all,' the middle point 3 to 'neutral' and the end-point 5 refers to 'agree completely.' To minimize the risk of respondents taking the easy way out, no opt-out options (Do not know and do not want to answer) were included. Responses to such scales are regarded as measurement items of latent

constructs of interest (DeVellis, 2016; Hair, et al., 2010; Jarvis, et al., 2003). The statements used in the survey are provided in Table 5.2.

We measured personal values based on a short version of Schwartz personality scale (Lindeman & Verkasalo, 2005). We asked NIPF owners to indicate the importance of each of the ten personal value dimensions as guiding principles in their life. The questions are posed in 9 point Likert-scale questions ranging from the starting-point 1= "Totally against my principle" to the end-point 9 = "Very important" (see Appendix 3A.1 for a full list of the questions).

Personality traits were measured from measurement items included in a short version of the Big Five Inventory (BFI) (John et al., 2008; Rammstedt & John, 2007; Soto et al., 2011). We included 11 items that can characterize an individual. The measurement items were posed to sampled NIPF owners as five-point Likert-scale questions about the extent of agreement with which the items describe a respondent (ranging from 1= Disagree strongly to 5= Agree strongly). Appendix 3A.2 provides a complete list of the exact questions asked to obtain the measurement items of personality traits in our survey.

5.3.3 Data analysis

As explained earlier, environmental concern is a latent construct that cannot be observed and measured directly. A common indirect way of measuring latent constructs is through indicators (Flake et al., 2017). In our study, we developed the measurement indicators for environmental concern by asking sampled NIPF owners to self-report their degree of agreement regarding statements related to environmental aspects in their forestry (See Section 5.3.2). After developing the measurement indicators for the latent construct of interest, a first step is to determine the direction of causality implied between the measurement indicators and the latent construct (Jarvis, et al., 2003; Podsakoff, et al., 2003; Rossiter, 2002). This will help in the choice of measurement model and type of scale development method to use in assessing the latent construct. Measurement models are categorized as reflective or formative. A reflective measurement model assumes the direction of causality from the latent construct to the measurement indicators. This suggests that the latent construct leads to the type of responses to the measurement indicators. A formative measurement model assumes the direction of causality goes from the measurement indicators to the latent construct. In our case, the environmental concern of forest owners is generally assumed to guide their forest management choices and thus cause the responses to the statements related to environmental aspects of forestry (the measurement indicators). This implies that a change in environmental concern is assumed to lead to changes in the measurement indicators and not the other way around. In addition, reflective measurement indicators covary with each other by construction, which is the case in the measurement statements of our study. Hence, our measurement model is reflective.

In the next step, we used exploratory factor analysis to obtain a scale measure of the environmental concern of NIPF owners. The choice of factor analysis instead of principal component analysis is guided by our assumption that the latent construct, environmental concern, underlies the observed measurement indicators. The exploratory factor analysis was preferred to confirmatory factor analysis as the scale for measuring the latent construct environmental concern is not yet well established in the literature. The analyses were conducted using the software STATA 15. We tested the sampling adequacy of the measurement statements using Kaiser's overall measure of sampling adequacy (KMO) to assess their suitability for factor analysis. Having confirmed the adequacy of the factor solution according to these criteria, the reliability of the scales obtained was evaluated using Cronbach's alpha, item-to-item correlation and item-to-total correlation (Hair et al., 2010).

We analyzed the correlation between environmental concern and NIPF owners' personal values and personality traits in two steps. In the first step, we predicted the environmental concern score for each NIPF owner. In the second step, we estimated three hierarchical seemingly unrelated regression (SUREG) models to assess the association between environmental concern of NIPF owners and their personal values and personality traits. In Model 1, we predicted the environmental concern scores of forest owners from their demographic and socio-economic characteristics only. In Model 2, we added personal values to Model 1. In Model 3, we added personality traits to Model 2. This procedure enables us to assess whether there is a statistically significant improvement in the fit of the models with the inclusion of personality traits and personal values. In other words, the procedure helps us understand whether personal values and personality traits of forest owners statistically and significantly explain the variation in their environmental concern.

5.4 Results

In this section, we present the results of our analysis. First, we provide the results of the exploratory factor analysis. Then, we provide the results of the regressions about the correlation between environmental concern and personal values and personality traits of NIPF owners.

5.4.1 Environmental concern of NIPF owners

Table 5.2 provides the descriptive statistics of the measurement items of environmental concern of sampled respondents. The average score of each of the measurement items is greater than three. The sampling adequacy KMO statistic is 0.873 (greater than the threshold value of 0.5), which implies that our data is suited for factor analysis.

Table 5.2 Descriptive statistics of measurement statements for environmental concern, N=226

Statement	Mean (SD)
At my forest, the environmental aspects are an important aspect in our strategic planning	3.45 (1.04)
At my forest, we think that reduced environmental impact is a quality factor	3.53 (1.01)
At my forest, we focus on merging environmental goals with other business goals	3.40 (1.01)
At my forest, we engage largely in developing products and processes that reduce environmental impact	3.11 (1.00)
At my forest, environmental considerations is a driving force that directs our business strategy	3.19 (1.02)
When we develop new products, we always take environmental impact into consideration	3.09 (0.95)
In my business we develop products and processes that minimize environmental impact	3.19 (1.02)

Note: The statements are 5-points Likert scale statements with the minimum scale 1 = 'do not agree at all'; 2 = 'Disagree a little'; 3 = 'neutral'; 4 = 'Agree a little'; 5 = 'agree completely'

N refers to the number of observations.

SD refers to standard deviation.

The exploratory factor analysis reduced the measurement statements into factors, reflecting the underlying construct of interest, i.e. environmental concern. Because the factors are likely to be correlated with each other, oblique rotation was used to rotate the factor solution and facilitate interpretation of the factors (Hair et al., 2010). The decision about the number of relevant factors is guided by theory and the meanings of the factors. Factor loadings were considered significant if they were above the threshold level of 0.40, which represents statistical significance at the 5% level with a sample size of at least 200 observations (Hair et al., 2010).

Based on the exploratory factor analysis (see scree plot of eigenvalues in Appendix 3A.3), we found two factors describing different dimensions of environmental concern (see Table 5.3). The first group, with high scores on statements 4-7, reflect pro-active environmental activities by NIPF owners. The second group, containing statements 1-3, reflects general considerations for environmental aspects by forest owners. These two elements perfectly fit the ideas of Banerjee et al. (2003), who stated that the interaction between businesses and the environment consists of two dimensions, i.e. environmental orientation ("the recognition by managers of the importance of environmental issues facing their firms") and environmental strategy ("the extent to which environmental issues are integrated with a firm's strategic plans"). Hence, we labeled the first group "environmental strategy" and the second group "environmental orientation."

We tested the reliability of the measurement scales obtained from the factor analysis using item-to-total correlations, item-to-item correlations and Cronbach's alpha. The item-to-total and item-to-item correlations were all greater than the threshold values of 0.5 and 0.3 respectively for both factors 1 and 2 (Hair et al., 2010). The Cronbach's alpha values for factors 1 and 2 were greater than the threshold value of 0.7 (Hair et al., 2010). These results suggest that the measurement scales are reliable.

Table 5.3 Factor solution of environmental concern construct

Statement	Factor 1 Environmental strategy	Factor 2 Environmental orientation
1. At my forest holding, environmental aspects are an important aspect in our strategic planning.	0.1165	**0.7078**
2. At my forest holding, we think that reduced environmental impact is a quality factor.	-0.0785	**0.6688**
3. At my forest holding, we focus on merging environmental goals with other business goals.	0.2271	**0.6513**
4. At my forest holding, we engage largely in developing products and processes that reduce environmental impact.	**0.5877**	0.2559
5. At my forest holding, environmental considerations is a driving force that directs our business strategy.	**0.5473**	0.2960
6. When we develop new products, we always take environmental impact into consideration.	**0.8672**	0.0083
7. In my business we develop products and processes that minimize environmental impact.	**0.7572**	0.0436
Range of item-to-item Spearman correlation coefficients	0.531 – 0.713	0.523 – 0.670
Range of item-to-total Spearman correlation coefficients	0.839 – 0.898	0.801 – 0.870
Cronbach's alpha	0.878	0.796

Note: Significant factor loadings in bold (i.e., greater than 0.4)

5.4.2 Personal values and personality traits of NIPF owners

Table 5.4 provides an overview of the descriptive statistics of the personal values of the respondents. As the table shows, on average the sampled respondents scored the highest on the personal value of independence (independent thought and action - choosing, creating, exploring) while they score the lowest on the personal value of power (social status and prestige, control or dominance over people and resources), compared to the other personal values.

Table 5.4 Descriptive statistics of personal values (N = 202)

Personal values	Mean	SD
Conformity	6.406	1.794
Tradition	6.094	1.835
Benevolence	6.777	1.709
Universalism	5.792	1.905
Independence	7.331	1.394
Stimulation	6.425	1.741
Hedonism	6.301	1.655
Achievement	5.584	1.948
Power	4.163	2.150
Security	6.718	1.735

Note: The personal values are measured based on 9-point Likert scale statements about the importance of each of the ten personal value dimensions as guiding principles in the lives of the respondents, with the minimum scale 1= "Totally against my principle" to the maximum scale 9 = "Very important."

Table 5.5 presents the descriptive statistics of the personality traits of the respondents. The table shows that, in comparison to the other personality traits, on average the respondents scored the lowest on neuroticism (i.e., the trait explaining the degree to which a person experiences the world as threatening and beyond his/her control) and the highest on conscientiousness (i.e., the trait explaining the degree to which a person is willing to comply with conventional rules, norms and standards).

Table 5.5 Descriptive statistics of personality traits (N = 202)

Personality traits	Mean	SD
Extraversion	3.488	0.783
Agreeableness	3.718	0.560
Conscientiousness	3.990	0.792
Neuroticism	2.190	0.779
Openness	3.014	0.893

Note: The personal traits are obtained from 5-point Likert scale statements about the extent of agreement with which items included in a short version of the Big Five Inventory (BFI) describe a respondent (ranging from 1= Disagree strongly to 5= Agree strongly).

We report the Spearman correlation coefficients between the factors (environmental strategy and environmental orientation) and the ten basic personal values dimensions and the Big Five personality traits scores in Table 5.6. The results show that the environmental strategy of NIPF owners is positively and significantly associated with several personal value aspects (conformity, tradition, benevolence, universalism, independence, stimulation and security), but not significantly associated with personality traits at all. Environmental orientation is positively and significantly associated with certain personal values (benevolence, universalism, independence, and stimulation) and one personality trait (conscientiousness). It is important to note here that Table 5.6 presents correlations between the factors and personality aspects (values and traits) without controlling other factors such as demographic and socio-economic characteristics of NIPF owners. In the next section, we include demographic and socio-economic characteristics of NIPF owners as covariates in assessing the influence of personal values and personality traits on environmental concern.

Table 5.6 Spearman rank correlation coefficients of factor scores with personal values and personal traits, N= 202

Variables	Environmental strategy	Environmental orientation
PERSONAL VALUES		
Conformity	0.125*	0.030
Tradition	0.127*	0.034
Benevolence	0.235**	0.128*
Universalism	0.320***	0.255**
Independence	0.161**	0.205**
Stimulation	0.274**	0.173**
Hedonism	0.052	0.075
Achievement	0.084	0.048
Power	0.001	-0.013
Security	0.221**	0.059
PERSONAL TRAITS		
Extraversion	-0.036	0.075
Agreeableness	0.065	0.089
Conscientiousness	0.111	0.234**
Neuroticism	-0.034	-0.026
Openness	0.084	0.041

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

5.4.3 Influence of personal values and personality traits on environmental concern of NIPF owners

Tables 5.7, 5.8 and 5.9 present the results of the hierarchical SUREG models for assessing the addition to model improvement of including personal values and personality traits of forest owners in predicting their environmental concern. In Model 1, we included only demographic and socio-economic characteristics to estimate the two factors, environmental strategy and environmental orientation. The results in Table 5.7 show that household size, dependence on forest income, having a diversified forest holding and certified forest holding are positively related to environmental strategy. On the other hand, education level of forest owner and dependence on forest income are positively related to environmental orientation.

Table 5.7 Model 1: Predicting environmental concern from demographic and socio-economic characteristics only (N=204)

Variables	Environmental strategy	Environmental orientation
Gender (1 = male, 0 = female)	-0.134	-0.219
	(0.154)	(0.145)
Age of respondent	0.008	-0.001
	(0.006)	(0.006)
Education level of respondent	-0.006	0.093**
	(0.041)	(0.038)
Household size (number)	0.158**	0.096
	(0.066)	(0.062)
Live at the forest holding (1 = yes, 0 = no)	0.008	-0.076
	(0.144)	(0.135)
Size of forest land in hectares	0.000	-2.11e-06
	(0.000)	(0.000)
Dependence on forest income	0.075**	0.053*
	(0.029)	(0.028)
Diversified forestry holding (1 = yes, 0 = no)	0.256**	0.089
	(0.123)	(0.116)
Certified forestry holding (1 = yes, 0 = no)	0.208*	0.092
	(0.124)	(0.117)
Model Chi^2 (df)	27.54 (9)	21.55 (9)
Model *P*-value	0.001	0.010
***P*-value of Wald test**	0.001	0.010
R-sq	0.119	0.096

Note: **$p < 0.05$, *$p < 0.10$

In Model 2, we added the ten basic personal values dimensions as explanatory variables to Model 1. The results in Table 5.8 show that the inclusion of personal values in Model 2 contributed significantly to the improvement of model prediction. The R-sqr increased in Model 2 and the Wald test shows that the increase is statistically significant at 1% level of significance (P-value = 0.000 for environmental strategy and environmental orientation). The results suggest that adding personal values as explanatory variables to a model with only demographic and socio-economic characteristics explain 29.5 % of the variance in environmental strategy and 21.6 % of the variance in environmental orientation. Regarding the specific dimensions of personal values, while universalism and stimulation are positively related to environmental strategy, hedonism has a negative relationship with environmental strategy. On the other hand, universalism and independence are positively related to environmental orientation, while benevolence has a marginal negative relationship with environmental orientation.

Table 5.8 Model 2: Predicting environmental concern from demographic and socio-economic characteristics and personal values (N=204)

Variables	Environmental strategy	Environmental orientation
Demographic and socio economic variables	Yes	Yes
Conformity	-0.027	0.063
	(0.057)	(0.057)
Tradition	0.000	-0.049
	(0.043)	(0.044)
Benevolence	0.054	-0.082*
	(0.049)	(0.049)
Universalism	0.133***	0.117***
	(0.035)	(0.035)
Independence	-0.028	0.153**
	(0.061)	(0.061)
Stimulation	0.085**	-0.036
	(0.041)	(0.041)
Hedonism	-0.085*	-0.049
	(0.045)	(0.046)
Achievement	-0.022	-0.023
	(0.035)	(0.035)
Power	-0.010	-0.014
	(0.031)	(0.031)
Security	0.017	0.012
	(0.057)	(0.057)
Model Chi^2 (df)	76.00 (19)	50.27 (19)
Model *P*-value	0.000	0.000

***P*-value of Wald test**	0.000	0.000
R-sq	0.295	0.216

Note: *** p < 0.01, ***p* < 0.05, **p* < 0.10

Adding the Big five categories of personality traits in Model 3 further improved prediction significantly. The results in Table 5.9 show a statistically significant increase in R-sqr (P-values = 0.000). The inclusion of personality traits as additional explanatory variables in Model 3 explains 30.9 % of the variance in environmental strategy and 25.9 % of the variance in environmental orientation. The results of the Chi^2 test confirm these findings as the Chi^2 increases with the addition of personal values and personality traits to a model with only demographic and socio-economic characteristics. Hence, we find statistical support for our hypotheses regarding the significance of personal values and personality traits in explaining the environmental concern of NIPF owners. Regarding the specific categories of personality traits, while there is no statistically significant relationship between environmental strategy and the five personality traits, we find a statistically significant positive relationship between conscientiousness and environmental orientation.

Table 5.9 Model 3: Predicting environmental concern from demographic and socio-economic characteristics, personal values and personality traits (N=204)

Variables	Environmental strategy	Environmental orientation
Demographic and socio-economic variables	Yes	Yes
Conformity	-0.023	0.069
	(0.058)	(0.057)
Tradition	0.011	-0.038
	(0.043)	(0.043)
Benevolence	0.049	-0.085*
	(0.049)	(0.048)
Universalism	0.138***	0.123***
	(0.036)	(0.035)
Independence	-0.034	0.146**
	(0.061)	(0.060)
Stimulation	0.089**	-0.031
	(0.041)	(0.041)
Hedonism	-0.097**	-0.059
	(0.046)	(0.045)
Achievement	-0.015	-0.011
	(0.035)	(0.034)
Power	-0.007	-0.017

	(0.032)	(0.031)
Security	-0.005	-0.026
	(0.059)	(0.059)
Extraversion	0.014	0.015
	(0.076)	(0.075)
Agreeableness	0.115	0.036
	(0.107)	(0.106)
Conscientiousness	0.119	0.233***
	(0.075)	(0.074)
Neuroticism	0.049	0.103
	(0.076)	(0.075)
Openness	-0.022	-0.009
	(0.065)	(0.064)
Model Chi^2 (df)	81.61 (24)	63.91 (24)
Model *P*-value	0.000	0.000
***P*-value of Wald test**	0.000	0.000
R-sq	0.309	0.259

Note: *** p < 0.01, **p < 0.05, *p < 0.10

5.4.4 Personal values versus personality traits

In Section 5.4.3, we showed that the inclusion of personal values and personality traits improved model prediction of environmental concern over a model with only demographic and socio-economic characteristics. In this section, we assess which of the two personality aspects (values and traits) is stronger in predicting environmental concern. To assess this, we reverse the order of inclusion of the two facets of personality in the SUREG models by including personality traits before personal values to compare the resulting changes in the predictive power of the models. More specifically, we first include only demographic and socio-economic characteristics of NIPF owners in predicting their environmental concern (Model 1). Next, in Model 2 we add personality traits to Model 1. Finally, we add personal values to Model 2. The overall results in model improvement are shown in Table 5.10. The results show that adding personality traits to a model with only demographic and socio-economic characteristics increased the R-sqr from 11.9 % and 9.6 % for environmental strategy and environmental orientation respectively to around 18 %. This increase in R-sqr is smaller compared to the increase in R-sqr we had when we added personal values to a model with only demographic and socio-economic characteristics (29.5% for environmental strategy and 21.65 for environmental orientation, see Table 5.8). These suggest that personal values are stronger than personality traits in predicting environmental concern.

Table 5.10 SUREG models with personality traits added before personal values

Model	Model Chi^2 (df)	Model *P*-value	*P*-value of Wald test	R-sq
Model 1 With demographic and socio-economic characteristics only				
Environmental strategy	27.54 (9)	0.001	0.001	0.119
Environmental orientation	21.55 (9)	0.010	0.010	0.096
Model 2 Model 1 + personality traits				
Environmental strategy	40.25 (19)	0.000	0.000	0.181
Environmental orientation	40.42 (19)	0.000	0.000	0.182
Model 3 Model 2 + personal values				
Environmental strategy	81.61 (24)	0.000	0.000	0.309
Environmental orientation	63.91 (24)	0.000	0.000	0.259

5.5 Discussions and conclusions

This study explored environmental concern and examined the role of personal values and personality traits in predicting environmental concern of NIPF owners in Sweden, offering new insights into the dimensions of environmental concern and its antecedents. Based on the results from the factor analysis, we found a two-dimensional structure underlying the environmental concern of Swedish NIPF owners, (1) environmental orientation and (2) environmental strategy. While environmental orientation implies a general consideration of the environment in combination with other factors (such as economic benefits), environmental strategy takes the environment more explicitly and is more actively pro-environmental. Our results point out the importance of unbundling environmental concern as a theoretical construct and the need to take into account its dimensions to better understand the concept. This multi-dimensional nature of environmental concern has not been given attention in previous studies related to forest management. Our approach is a step in this direction and suggests a need for developing a standard scale for measuring environmental concern. Such a scale helps, for example, in avoiding misconceptions of treating environmental concern as synonymous with environmental awareness or knowledge. It is important to note that our measure of environmental concern is based on a relatively limited number of statements related to environmental considerations in forest management, which might not provide a complete coverage of all aspects of

environmental concern. Nevertheless, the two dimensions also reflect the outcomes of other studies, studying "corporate environmentalism" (such as Banerjee et al., 2003). Further research could, however, further explore the dimensions of environmental concern using a more elaborate scale (such as the one developed by Banerjee (2002) for "corporate environmentalism").

Our analysis of the influence of personal values and personality traits on environmental concern shows that both facets of personality significantly improved the prediction of environmental concern over a model with only socio-demographic characteristics. This means that both personal values and personality traits help in explaining the environmental concern of NIPF owners in their forest management and planning. Hence, both our hypotheses were confirmed. Furthermore, we found that personal values are stronger than personality traits in predicting environmental concern. This finding is in line with the findings of Caprara et al. (2006) who reported the primacy of values over traits in behaviors and choices that entail thoughtful weighing of alternatives, currently or in the past. This has also been reported in the works of Hansson et al. (2018) and Roccas et al. (2002) who postulated that values are likely to trump traits as predictors of behaviour that is under voluntary, intentional control.

Our analyses show that the influence of the dimensions of personal values and personality traits included in this study, vary significantly between the two dimensions of environmental concern. This again strengthens the outcome of this study that environmental concern exists out different dimensions. Only one variable (universalism) is influencing both environmental strategy and environmental orientation positively, indicating that this factor is of importance for both dimensions of environmental concern. This corresponds to many other studies (Katz-Gerro et al., 2017) emphasizing the importance of universalism in explaining environmental concern. Several studies also showed the importance of benevolence in influencing environmental concern. Harring et al. (2017), for example, reported that while pro-social individuals were found to have a high environmental concern, individuals who favor personal outcomes such as seeking pleasure, have a negative or insignificant link with environmental concern. What our study, however, shows, is that benevolence is only of influence for a part of environmental concern, i.e. environmental orientation. Other variables we found significantly related to one of the dimensions, are also in the literature reported being related to environmental concern in general. Conscientiousness, for example, is positively correlated with environmental orientation. This finding is line with the findings of Hirsh (2010), Borden and Francis (1978) and Milfont and Sibley (2012) who reported that more conscientious people tend to have a higher environmental concern. A possible explanation for this finding can be conscientious forest owners might be expected to strictly follow policy guidelines and social norms for appropriate environmentally friendly behaviour (Hirsh, 2010). Conscientiousness has also been linked to higher levels of social investment and prudent rule-adherence in general (Lodi-Smith & Roberts, 2007). However, none of these studies explicitly focus on the different dimensions of environmental concern, stressing again the need to further explore these dimensions. Our

results suggest that various dimensions of environmental concern are differently linked with personal values and personality traits.

Next to personal values and personality traits, several demographic and socio-economic variables are significantly related to the two factors, but interestingly enough, the differences between the factors are large. Environmental strategy is significantly and positively related to the variables household size, dependence on forest income and having a diversified and certified forest holding Educational level of forest owners and dependence on forest income are significantly and positively related to environmental orientation. The finding regarding the education level of forest owners can be explained by more educated owners having more knowledge and information about the role of environmental considerations in forest management.

Our results have implications for forest management practice and policy. First, our results regarding the two dimensions of environmental concern imply that both dimensions need to be considered in assessing environmental concern in forest management. Emphasizing environmental orientation without due regard for environmental strategy might lead to "green washing." Second, the results suggest that the individual personalities (personal values and personality traits) of forest owners, rather than their demographic and socio-economic characteristics alone are vital in shaping their environmental concern. This implies that both facets of individual personalities should be taken into account in designing, framing and targeting of tailor-made interventions to promote environmental considerations in forestry businesses. Third, our finding that personal values are stronger than personality traits in predicting environmental concern suggests that environmental concern in forest management is a voluntary behavior under the control of forest owners and hence can be influenced by interventions. Personal values are formed and influenced strongly by the environment of individuals, while personality traits are mostly considered to be endogenous variables (Olver and Mooradian, 2003). This has often also been the reason that these personality factors were not considered of relevance for policy change and interventions (Bleidorn et al., 2019). Bleidorn et al. (2019), however, argue that despite that personality traits are indeed relatively stable in nature, these traits can and do change throughout the life span. They, therefore, also argue that personality claims "are ideal targets for interventions." These interventions, however, require substantial shifts in the way these interventions should be conducted and evaluated. Further research in this respect seems to be important, considering not only interventions in terms of influencing personal values, but also and especially personality traits.

Funding: The data for the study were collected through a large survey where other data were simultaneously collected for a governmental commission on the impact of the Swedish land acquisition act. Funding for data collection from the Swedish government is gratefully acknowledged. The funder was not involved in the design of the study, data collection, analysis, interpretation of the results or writing of the paper. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the funder.

Appendix 3A

3A.1. Measurement items of personal values

Forest owners were asked the following questions to indicate the importance of the following 10 dimensions of personal values in their life (Based on Schwartz personality scale, short version (Lindeman & Verkasalo, 2005).

Please indicate the importance of each of the following as a guiding principle in your life.

(1= totally against my principles, 2 = not important … 9= very important)

Power

Achievement

Hedonism

Independence

Stimulation

Universalism

Benevolence

Tradition

Conformity

Security

3A.2. Measurement items of personality traits

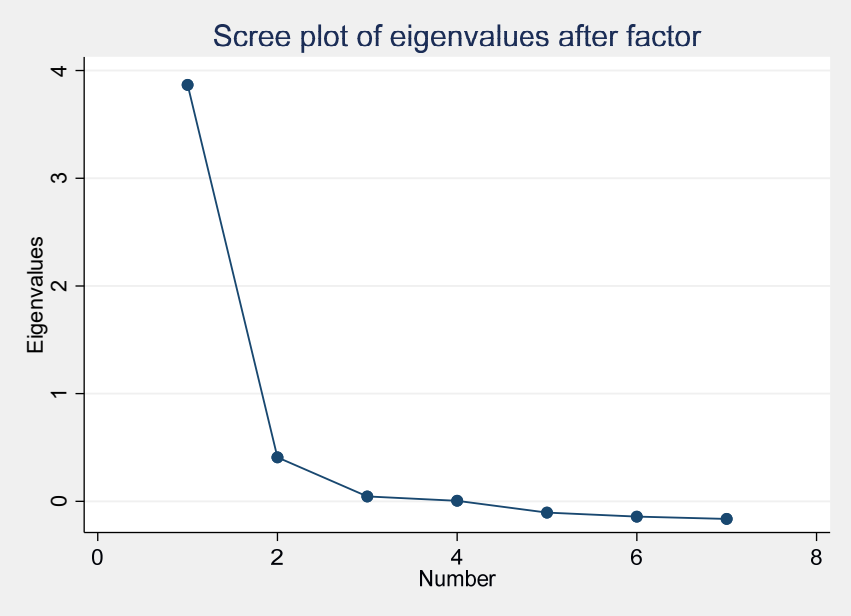
Here are a number of characteristics that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

1	2	3	4	5
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who…

1. _____ Tends to find fault with others
2. _____ Does a thorough job
3. _____ Is reserved
4. _____ Is relaxed, handles stress well.
5. _____ Has an active imagination
6. _____ Is generally trusting
7. _____ Tends to be lazy
8. _____ Values artistic, aesthetic experiences
9. _____ Is considerate and kind to almost everyone
10. _____ Is outgoing, sociable
11. _____ Gets nervous easily

3A.3. Scree plot of eigenvalues of factor analysis



CHAPTER 6

Discussion and Policy Implications

6.1 Introduction

Forests provide a wide array of services for life on earth and their sustainable management has been high on the agenda of the international community for quite some time. National and international efforts to achieve SFM have used diverse strategies and instruments. However, global changes such as population and income growth have increased the challenges of achieving SFM by increasing demand for forest products. The research in this thesis is motivated by three observations in the global forest sector and the literature on SFM. The first observation is the expansion of industrial forest plantations in the global south. The expansion of industrial forest plantations in developing countries has led to polarized perceptions regarding outcomes of plantations for communities residing nearby plantations. Industrial forest plantations are a form of foreign direct investment (FDI) that have been hailed by some as opportunities for development and slammed by others as the so-called 'land grab' or 'carbon colonialism' (Arttu et al., 2018; Baral et al., 2016; Gerber, 2011; Locher and Müller-Böker, 2014). Yet, too little is known about the factors that affect the socio-economic outcomes of forest plantations for local communities (Arttu et al., 2018). The second one is the emergence of forest certification in the 1990s as a market instrument to foster SFM. However, whether forest certification promotes SFM and enhances positive socio-economic outcomes of forests has been questioned in empirical studies (Ehrenberg-Azcárate and Peña-Claros, 2020; McCarthy, 2012; Stringer, 2006). Thirdly, the increase of private ownership of forests and increasing policy emphasis on the environmental services of private forests in Europe. Despite the importance of private forests in Europe, our understanding of the role of personal values and personality traits in influencing the environmental concern of NIPF owners is limited.

Against the aforementioned background, this thesis aims to broaden the literature on SFM by presenting key empirical contributions at the micro-level. First, the thesis assesses the correlation between private, FSC-certified forest plantations and socio-economic outcomes of plantations for local communities. To do so, I compared perceptions of households (about investments in infrastructure and social services and their experiences of participation in plantations' activities) in villages nearby private, FSC-certified forest plantations and a state-owned, non-certified plantation in Tanzania. In addition, I went a step further to assess the specific role of forest certification in enhancing community participation by comparing perceived community participation among households in villages nearby FSC-certified and non-certified, private plantations in Mozambique. Second, the thesis looked into whether the personal values and personality traits of NIPF owners predict their environmental concern in forest management. Regarding this, I explored the environmental concern of NIPF owners in Sweden and assessed the role of personal values and personality traits in influencing forest owners' environmental concern in forest management. In the following sections, I discuss the main findings of each chapter in relation to key debates in the literature on SFM and the implications and limitations of the findings for forest management policy and future research.

6.2 Key Findings

This thesis attempted to answer four research questions to achieve the overall objectives of the study.

The first research question is:

Do ownership and certification of forest plantations affect perceived changes in social services and infrastructure associated with investments by plantations?

In Chapter 2, I explored whether private ownership and certification of forest plantations affect perceived changes in social services and infrastructure associated with investments by plantations. A comparative approach was used to assess differences in household perceptions regarding changes in social services and infrastructure related to investments by plantations. I compared perceptions of households in villages nearby FSC-certified, private plantations and those nearby a non-certified, state-owned plantation. I find that on average the private, FSC-certified plantations were more likely than the non-certified, state-owned plantation to be associated with positive changes in social services and infrastructure in view of the perceptions of households living in the villages adjacent to the plantations. I further find that perceptions of households regarding the outcomes of plantations vary over demographic and socio-economic characteristics of households. The results show that on average richer and female-headed households are more likely than poorer and male-headed households to associate plantations with positive changes in social services and infrastructure.

The second research question is:

Do ownership and certification of forest plantations affect community participation in the management of forest plantations?

In Chapter 3, I assessed whether private ownership and FSC certification of forest plantations affect perceptions of households about their participation in activities of plantations. I compared the perceptions of households residing in villages adjacent to private, FSC-certified plantations with those residing in villages adjacent to a non-certified, state-owned plantation. I find that on average households in the villages nearby the private, certified plantations are more likely than households in the villages nearby the non-certified, state-owned plantation to report to participate in plantations' activities. The results further show that on average male-headed households and households of plantation employees are more likely than female-headed households and households without plantation employees to participate in plantations' activities.

The third research question is:

Does forest certification enhance weak community participation in the management of forest plantations?

In Chapter 4, I probed the specific role of forest certification in enhancing weak community participation in the management of forest plantations. Weak community participation refers to community consultation where communities do not have the power to influence decisions by plantation owners (Handberg, 2018). I compared the perceptions of households in villages adjacent to FSC-certified and non-certified, private forest plantations regarding their participation in the activities of plantations. I find that on average households in the villages adjacent to the certified plantations are more likely than households in the villages adjacent to the non-certified plantations to report to weakly participate in plantations' activities. I further find that on average male-headed households and households with plantation employees are more likely than others to weakly participate in plantations' activities.

The findings in Chapters 2 to 4 imply that private ownership and certification of forest plantations have statistically significant positive correlations with outcomes of SFM. In terms of the contributions of forest plantations for local development and in terms of plantations' engagement with communities, in Chapters 2 and 3, we learn that villagers adjacent to the private, FSC-certified plantations perceive the plantations more favorably as compared to those adjacent to the state-owned, non-certified plantation. Chapter 4 disentangles the role of forest certification from forest ownership. The findings confirm that forest certification is positively correlated with perceived community participation in plantations' management. These findings add interesting insights to at least three strands of literature: the literature on private provision of public goods, the literature on the role of forest certification in SFM and the literature on the effectiveness of FDI that rely on land acquisitions in developing countries. First, the findings suggest that profit-motives of private forest companies do not necessarily undermine SFM and rather market incentives may induce private forest owners to undertake pro-social investments that are commensurate with responsible investment (Besley and Ghatak, 2007; Starr, 2008). My findings add support to this hypothesis in the case of investment in forestry. Second, certification as a market-driven instrument may complement state-based national or international instruments aimed at promoting SFM in developing countries (Auld et al., 2008; Bass et al., 2001; Cashore et al., 2007; van der Ven and Cashore, 2018). Third, standards and guidelines of responsible investment can contribute to enhancing the socio-economic contributions of land-related FDI such as forestry in developing countries.

The studies in this thesis differ from previous studies on forest plantations in at least 3 aspects (Bleyer et al., 2016; Cubbage et al., 2010; Dare et al., 2011; Landry and Chirwa, 2011; Miteva et al., 2015; Rametsteiner and Simula, 2003; Szulecka et al., 2016; Tsanga et al., 2014). First, I uncover the role of ownership and certification of plantations in SFM by using a comparative approach rather than treating all types of forest plantations similar (e.g., Bleyer et al., 2016).

Second, I use data collected from a relatively large number of households which increases the representativeness of the findings. Third, I use a mixed-method approach where I triangulate the quantitative results with qualitative information from focus group discussions held in the study villages.

The fourth research question is:

Do personal values and personality traits of non-industrial forest owners (NIPF) predict forest owners' environmental concern in forest management?

In Chapter 5, I quantitatively explore the content and dimensionality of the environmental concern construct of NIPF owners and assessed the association between the environmental concern of forest owners and their personal values and personality traits. A principal factor analysis on data collected among 226 NIPF owners in Sweden resulted in a two-dimensional environmental concern consisting of environmental strategy and environmental orientation. According to Banerjee et al. (2003) environmental orientation refers to "the recognition by managers of the importance of environmental issues facing their firms" and environmental strategy is "the extent to which environmental issues are integrated with a firm's strategic plans." I find that personal values and personality traits predict environmental concern in forestry management of NIPF owners. Among the specific personal values, universalism (the value of understanding, appreciation, tolerance, and protection for the welfare of all people and for nature) was found to be positively correlated with both environmental strategy and environmental orientation facets of environmental concern. On the other hand, I find that benevolence (the value of preservation and enhancement of the welfare of people with whom one is in frequent personal contact) and the personality trait of conscientiousness (the trait related to the degree to which a person is willing to comply with conventional rules, norms and standards) were positively correlated with environmental orientation only. These results imply that individuals with pro-social and rule-adherence leanings are more likely to have a high environmental concern. Furthermore, I find that personal values contribute more than personality traits in predicting the environmental concern of forest owners.

The findings in this thesis are crucial. SFM will continue to receive increasing attention among stakeholders in forestry, given the continued challenges facing the global forest sector. In the next section, I discuss the implications of the findings for forest management practice and policy.

6.3 Policy Implications

The empirical findings presented in this thesis have several implications for forest management policy and practice. First, the findings in Chapters 2 and 3 suggest that private ownership and certification of plantations can potentially affect socio-economic outcomes of sustainable

management of forest plantations. More specifically, the results show that private, FSC-certified forest plantations are statistically associated with positive perceived changes in local infrastructure and social services (Chapter 2) by households living in villages adjacent to the plantations. Similarly, private, FSC-certified forest plantations are positively associated with community participation in plantations' activities (Chapter 3). Notwithstanding the difficulties of generalizing from a few cases, our findings imply that policies and strategies aimed at creating enabling environment for private investments in forest plantations in developing countries may facilitate SFM in terms of contributions of plantations to local development and plantations' engagement with villagers. Opinions about the contributions of land acquisitions for sustainable local development are divided. The studies in this thesis (Chapters 2 to 4) add useful insights to the debates on the socio-economic outcomes of land acquisitions, especially for forest plantations, by providing a comparative analysis of outcomes of plantations across different ownership and certification status. Extant research on land acquisitions suffers from a lack of a comparative approach (Purdon, 2013). Our findings point out the need for a case by case (sector by sector) analysis of outcomes of land acquisitions (e.g., for plantation agriculture, biofuel, forestry, mining etc.) under different ownership and certification status. The characteristics and challenges of land acquisitions may differ among investment ventures in various sectors and putting and labelling all land acquisitions in one basket may lead to distorted and incomplete information for land-use policy making. For example, forest plantations require a longer time period to reach maturity and yield economic returns and thus tie up land for many years as compared to farm plantations. Land is more than an economic asset in developing countries: it is part of the identity and culture of a community. So, it is important to take into account perceptions of communities in research on outcomes of land acquisitions. The studies in this thesis are a step in this direction. My findings show perceptions of households about outcomes of plantations differ along with household demographic and socio-economic characteristics. These findings indicate that interventions aimed at enhancing positive outcomes of plantations need to take into account the views of various socio-economic groups, especially those considered vulnerable such as women.

Even though my results do now show causal relations between plantations and local development outcomes, the results provide an important insight regarding the sustainability of land acquisitions in general and forest plantations in particular. When viewed from the purview of weak sustainability, my case-studies suggest that land acquisitions by private, FSC-certified plantations can contribute to sustainable development (Neumayer, 2003). Weak sustainability is defined as total utility derived from natural and man-made capital where man-made capital is capable of substituting for a decrease in natural capital (Neumayer, 2003). My comparative analysis suggests that investments by private, FSC-certified plantations in local infrastructure and social services (mand-made capital) can compensate for the loss of village land (natural capital) acquired by plantations of such ventures in developing countries. This is even more the case if forest plantations were established on village lands that are of low value, as is true in my study areas. The FSC-certified, private forest plantations of GR were established not on

productive agricultural lands but mainly hilly *Hyparrhenia* grassland with a few scattered trees and shrubs (Purdon, 2013).

Secondly, the results show a statistically significant positive relationship between forest certification and plantations' contributions to local development (Chapter 2) and community engagement (Chapters 3 and 4). These findings suggest that market-based forest governance mechanisms, such as forest certification and standards of responsible investment, can strengthen top-down approaches of state policy instruments of sustainable forest management (Bartley, 2007; Bernstein and Cashore, 2004). Market advantages of certified timber can reinforce compliance of forest owners with national standards of SFM. In this regard, governing forest plantations through markets can aid in fostering SFM.

The findings in Chapter 5 regarding the role of personal values and personality traits in influencing environmental concern of NIPF owners have implications for forest management policy. First, both personal values and personality traits of forest owners need to be taken into account in designing, framing and targeting tailor-made interventions to promote environmental considerations in forest management. Second, my finding regarding the primacy of personal values over personality traits in predicting environmental concern suggests that environmental concern in forest management is a voluntary choice under the control of individuals and hence is amenable to change through interventions. It is important to note that the increase in private ownership of forests in Sweden is representative of the developments in the forest sector of countries in the temperate region more generally (Lindahl and Westholm, 2012). Hence, the results reported in Chapter 5 are likely to hold at least to some extent for other countries in the region.

6.4 Limitations and Implications for Future Research

Notwithstanding the importance of the findings, the studies presented in this thesis have a number of limitations. In this section, I discuss these limitations of the thesis and suggest ways forward for future research. I start with the limitations regarding the internal validity of the results in Chapters 2 to 4. One factor that affects the internal validity of the results reported in these chapters is the possible role of other observable and unobservable factors that could drive the results. The results reported in chapters 2 to 4 are based on cross-sectional data collected from a limited number of villages adjacent to forest plantations in Tanzania and Mozambique. Given the data limitations, the results speak of correlations, not causal relations, between the outcome variables and forest plantations. In chapters 2 and 3, I compared perceptions of households living in villages adjacent to FSC-certified, private plantations with those in villages adjacent to a non-certified, state-owned plantation. Despite the role of the study village selection procedure in identifying comparable villages, it is difficult to rule out other (un)observable differences between the villages that could be related to perceived changes in infrastructure and social services (Chapter 2) and community participation (Chapter 3). For

example, if the private, certified plantations were established in more impoverished villages with little or no access to infrastructure and social services compared to the villages nearby the state-owned plantation, the investments in community projects by the private plantations may be more noticeable and hence perceived more positively by households. In addition, ownership of plantations and the decision to get certified by plantations are not random and hence might be influenced by other administrative, socio-economic and policy factors. This implies that the ownership and certification status of plantations are endogenous. Thus, in my study settings it would be difficult to isolate the effects of factors other than ownership and certification of plantations that could potentially explain the findings. Future studies could make use of two or more rounds of panel data collected from a larger number of villages and employ quasi-experimental techniques (such as combining difference-in-difference and propensity score matching methods) to control for selection on (un)observables. In this regard, it is essential to avail baseline data on the socio-economic characteristics of study areas prior to the establishment of plantations. This would allow the use of quasi-experimental methods of causal analysis to be able to attribute observed changes to activities of plantations which is a promising research agenda. Another way to go about this would be the use of instruments to overcome the problem of endogeneity. Appropriate and valid instruments could help in addressing the problem of endogeneity and disentangling the role of ownership and certification in enhancing SFM.

In Chapter 4, I compared FSC-certified and non-certified private plantations in terms of experiences of community participation by households living nearby plantations. The analysis in this chapter is an improvement on the analyses in Chapters 2 and 3 because the analysis in Chapter 4 isolates the specific correlation between forest certification and community participation. Regardless of this, the analysis in Chapter 4 still suffers from the problem of endogeneity and it is not possible to rule out the role of other (un)observable differences between the study villages that may be correlated with certification of plantations and thus deriving the results.

Another source of concern regarding the internal validity of the studies reported in Chapters 2 to 4 is related to the definition and measurement of the outcome variables used in the analyses. The outcome variables in these chapters are based on perceptions of households. As subjective measures, perceptions are likely to be influenced by a number of factors not related to the variables of interest in the analyses. For example, perceptions regarding investments in community development by plantations may be influenced negatively by land-related conflicts between villagers and plantations. Further studies could add objective measures of outcome variables and triangulate the results with the subjective measures. For example, changes in kilometers of roads and the number of bridges constructed by plantations can be used to measure changes in quantity and/or quality of roads and bridges; changes in school enrolment can be measured by changes in total enrolment rates and enrolment rates of female students; changes in quantity and quality of health centers can be measured by changes in qualified health

personnel and access to health services (number of people who received health care in a given period). In chapters 3 and 4, the outcome variable was community participation. This variable was measured based on responses of households regarding whether they have a say in the activities of plantations. 'Having a say' is a polysemic term that can be interpreted in various ways by different people. Clearer conceptualization and accurate measures of community participation would be relevant for further studies. One way to go about this would be to use objective measures of community participation. For example, the frequency of meetings between villagers and plantations; the number of (women) participants in the meetings could provide a more accurate measure of community participation.

Another drawback of the studies reported in chapters 2 and 3 is related to the differences between the private and state-owned plantations. The private plantation is FSC-certified while the state-owned is not and this makes it difficult to isolate the specific role of ownership from certification in influencing the results. To link the outcome variables with ownership of plantations, ideally the only difference between the plantations should be their ownership. However, the plantations also differ in their certification status, making it difficult to conclude that the results are due to differences in ownership or certification status of the plantations. Further studies that compare private and state-owned plantations are warranted to understand clearly the role of ownership in influencing SFM given the increasing role of private ownership of forests in general and plantations in particular.

Another source of the drawback of the studies reported in chapters 2 to 4 is related to the external validity of the results. This is related to the question of whether we can generalize the results to plantations in other contexts. The results are based on a limited number of villages and forest plantations considered for the analyses and it is difficult to confirm whether the results also hold for other private, FSC-certified plantations in other regions under different contexts. In this regard, it would be necessary to expand the analyses in future studies by including a larger number of villages and plantations under various settings.

Despite the limitations discussed above, the studies reported in Chapters 2 to 4 of the thesis provide a stepping ground for future studies on sustainable management of forest plantations. Given the expansion of forest plantations and increased attention accorded to SFM in recent years, our understanding of the contexts and factors that influence the sustainable management of plantations need to be improved. Such an understanding will enable, among others, the scale up of successful cases elsewhere. A deeper understanding will also lead to the development of efficient and effective structures and mechanisms of forest management. I expect the results of the studies in this thesis to inform better decision making that will enhance the effectiveness of interventions aimed at promoting SFM.

Finally, it is important to note the following caveats of the study reported in Chapter 5. The first caveat is related to the conceptualization and measurement of environmental concern. The measure of environmental concern is based on a limited number of statements related to

environmental considerations by NIPF owners in forest management. The statements may not provide comprehensive coverage of complete aspects of environmental concern. It is plausible that personal values and personality traits may be differentially related to various aspects of environmental concern (Milfont & Duckitt, 2004; Schultz, 2001; Wiseman & Bogner, 2003). The survey did not measure the actual investments or behavior of forest owners to incorporate environmental aspects in forestry. The actual environmental performance of NIPF owners can be better measures of environmental concern than perception-based measures of environmental concern. Further research could develop more comprehensive measures of environmental concern and incorporate objective measures of environmental concern, such as investments in environmental friendly products for a more nuanced analysis. Second, personality traits were measured using the 11-item Big Five Inventory (BFI) model. These items may not necessarily encompass all aspects of personality traits. It is possible that various aspects of each Big Five domain would be differentially related to environmental concern. Future studies could incorporate additional items of the BFI model to get a more detailed picture of the role of personality traits in environmental concern.

Despite the limitations, the study reported in Chapter 5 is a step in the direction of quantitatively measuring environmental concern and assessing its correlation with personal values and personality traits of forest owners. As a latent construct, environmental concern has largely remained a black box in empirical studies and Chapter 5 was an attempt to uncover this black box.

Appendices

Appendix A1. Household Survey Questionnaires Tanzania

Household Survey Tanzania

2016

Green Resources Villages

0.1 To be filled by interviewers

0.11 **0.12**	Interviewer 1 name: Interviewer 2 name:	Interviewer 1 ID: Interviewer 2 ID:	
0.13	Date: / / 2016 (dd/mm)		
0.14	Country:	€ Mozambique € Tanzania	
0.15	Village name: **(Note: Make sure you have the right questionnaire!!!)** € *Green Resources village* € *Control village*	*Idete* *Mapanda*	
0.16	**Unique Household code:**		
0.17	**Language of interview**	English/ Kiswahili/Portuguese	
0.18	**Starting time (hh:mm)**		
	Introduction to household members: "My name is_____and my partner's name is_____. We are here to collect information about the impacts of forest plantations on the living conditions of people in the village, for a study by Sokoine University of Agriculture, Tanzania; Universidad Eduardo Mundane, Mozambique and Wageningen University in the Netherlands. Your household was selected to be part of this survey. I would like to speak to you (and your spouse/partner)." "The researchers will keep your responses confidential. Your full name will never be used anywhere to ensure confidentiality." "You are not obliged to answer questions if you do not want to and you are free to stop the interview at all times." "We hope that the research will benefit the village and the country by assisting us to understand better the impacts of forest plantations on the livelihoods of the people and inform the relevant bodies to improve the situation in the future." "You will not receive any direct benefit if you join this study, your participation is voluntary."	**0.19.**	GPS coordinates of the house of the respondent: H1 Latitude (_____°_____._____) H2 Longitude (_____°_____._____) H3 Altitude (_____ M.a.s.l.) **Note: One of the enumerators should start the introduction to the household using a paper version of the introduction while the second enumerator takes the GPS coordinates using the tablet!!!**

	"Do you have any questions for me? You may ask questions about this study at any time. a "The survey will take approximately 1 hour & 30 minutes." The above introduction translated into Kiswahili: Jina langu ni……., tuko hapa kwa ajili ya kukusanya taarifa kuhusu matokeo ya mashamba ya miti kwa maisha ya watu wa kijiji hiki. Utafiti huu unahusisha chuo cha kilimo Sokoine (Tanzania), Eduardo Mundane (Msumbiji) na Wageningen (Uholanzi). Kaya yako imechaguliwa kushiriki katika utafiti huu, hivyo tunaomba kuzungumza na wewe (na mwenzi wako). Taarifa utakazozitoa zitabaki kuwa siri na jina lako halitatumika mahali popote, wala kwa madhumuni mengine yoyote. Ushiriki wako katika mahojiano haya ni wa hiari. Uko huru kujibu maswali yetu, na kama kuna swali ambalo hutojisikia au hutolijua uko huru kutolijibu. Tuna imani utafiti huu utawanufaisha wanakijiji wote na nchi kwa ujumla kwa uelewa tutakao upata juu ya matokeo ya mashamba ya miti na maisha ya watu, lakini manufaa hayo hayatakuwa ya moja kwa moja kwenu ila taarifa zitakazopatikana zitapelekwa kwa mamlaka husika kwa ajili ya kuboresha mashamba haya kwa siku zijazo. Je, una swali lolote la kuniuliza juu ya utafiti huu? Mahojiano yetu yatachukua takribani saa moja na nusu.		
0.20	"Are you willing to participate?"	Yes No	
0.21 **0.22**	If No, why are you not willing to participate? *If Yes, who is the respondent?* *Is the respondent the household head?* € *Yes* € *No*	**Stop the interview and inform the field coordinator!!!** Name:	

PART 1. LAND USE, TENURE AND AGRICULTURE

Read "I would like to ask you about your household land ownership and agricultural activities."

SECTION 1: LAND TENURE & USE: THE FARM WALK

Note for enumerators ***In this part use the farm walk guide to ask the questions and fill in the responses in the tablet during the farm walk!!! Make sure that you have the hard copy of the farm walk guide and follow the instructions accordingly!!!***

1.1.1	Did your household use farmland or a garden in 2015? **If No, go to 1.4**	€ Yes € No € Do not want to answer
1.1.2	**If yes**, what is total size of the plot(s) your household used last year (2015)? (Write in hectares) **(Note: Use local term for hectare).**	
For each specific plot, ask the questions below (1.2.1- 1.2.8) during the farm walk. Ask for all the plots of the household including those that could not be visited during the farm walk!!! (See guide for the farm walk)		

1.2	**1.2.1**	**1.2.2**	**1.2.3**	**1.2.4**	**1.2.5**	**1.2.6**	**1.2.7**	**1.2.8**
Plot code	Size hectares *convert acres into hectares 1ha= 2.5 ac	Ownership **CODES**	How acquired? **CODES**	Since when? (year)	If rented, what is the type of the contractual arrangement?	How far is the plot from your house? (in walking minutes)	Land use **CODES**	List the 3 most important crops your household currently grow on each plot.
1								
2								
3								
4								
5								
6								
7								
8								
Codes 1.2.2			**1.2.3**		**1.2.5**		**1.2.7**	**1.2.8**

1= Personal/family plot 2= Rented/leased land 3= Free land/Squatter agreement 4= Community land 5= Other:	1=Bought 2=Rented 3=Inherited 4=Family land 5=In temporary use 6= Gifted 7= Other:	1= Sharecropping 2= Rent payment in cash 3= Rent payment in labor services 4= Others:	1= Arable/agricultural land 2= Grazing land 3= Natural trees/forest 4= Planted trees/woodlot 5= Swamp 6= Fallow land 7= Other:	1= Maize 2= Beans 3= Millet 4= Sorghum 5= Rice 6= Coffee 7= Tea 8= Cotton 9 = Wheat 10= Cassava 11= Irish Potatoes 12= Sweet potatoes 13= Banana 14 = Groundnut 15 = Vegetables 16 = Soya beans

1.3	Does your household use any purchased inputs in crop production in the current season? **If No, go to 1.4**			€ Yes € No € Do not want to answer		
1.3.1	**If Yes to 1.3,** what are the quantities & values of the three most important purchased inputs used in the current season?	Input name	Unit (see codes)	Price per unit	Quantity	Total Cost
1.3.2	If the respondent is not able to answer the use of purchased inputs per each input, ask for the total cost of purchased inputs.	Total Cost:				

1.4 **Livestock:** 1.4.1 What is the number of each of the following livestock your household owns currently?

Livestock	**Number (heads)**
Cattle	
Chicken	
Goats	
Sheep	
Pigs	
Donkeys	
Ducks	
Horses	
Turkey	

Other:		
1.4.2	Does your household use any purchased inputs for livestock production?	€ Yes € No
1.4.3	**If Yes to 1.4.2,** in your estimate, how much did your household spend on purchased inputs used in livestock production last year (2015) (only cash expenditures)?	
1.4.4	What is the main source of water for your crops and/or livestock?	€ River/ lake
		€ Rainwater
		€ Well
		€ Borehole
		€ Other:

PART 2. HOUSEHOLD CHARACTERISTICS AND ECONOMIC SITUATION

SECTION 2. DEMOGRAPHICS AND COMPOSITION : Read - "I would now like to ask you a few questions on the composition of your household"

2.1	**How many people live in your household?** _____ *Please list below by first name. Start with the head of the HH, then the spouse and complete the table for any other member.* *A household is defined as "a group of people **currently** eating from the same pot 'under the same roof" (or in same compound if the HH has 2 or more structures)."*								
	2.2	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**
HH member id	Name	Sex	Age	Relation to household old	Activity	Marital status	Highest completed education **SEE CODES**	Religion **See codes**	Status
01		M F							
02		M F							
03		M F							
04		M F							

05		M	F							
06		M	F							
07		M	F							
08		M	F							
09		M	F							
10		M	F							
11		M	F							
12		M	F							
13		M	F							
14		M	F							
15		M	F							

Codes 2.5	**Codes 2.6 (more than 1 option possible)**	**Codes 2.7**	**Codes 2.8**	**Codes 2.9**	**Codes 2.10**
1=Head 2=Spouse 3=Child 4=Parent 5=Sibling 6=Grand-child 7=Grand-parent 8=Orphan 9=Other relative 10=Foster child (no orphan) 11=No relation	1 = Working 2 = Helping in household 3 = Retired 4 = In school 5 = Other 99= Not applicable	1=Single 2=Married 3=Living together with partner 4=Divorced 5=Widow or widower 6=Married/together with partner, but partner is temporarily living elsewhere 99=Not applicable (<12 years old)	0= Kindergarten 1= Primary (1-7) 2= Secondary 3= College and above 99=No schooling	1=Christian 2=Muslim 3=Traditional 4=Other:	0= No status 1= Village chief 2= Elder 3= Youth leader 4= Women's leader 5= Religious leader 6= Tribal leader 7= Other:

SECTION 3. HOUSEHOLD STATUS :

Read "Now I would like to know about your place of origin."

3.1	Were you born in the village in which your household currently lives?	€ Yes € No

3.2	**If No to 3.1**, when did you move in to the village? (Write the year)	
3.3	**If No to 3.1,** why did you move in to the village?	€ In search of land € To work at plantations € In search of job € Other:
3.4	If your household moved in to work at plantations, please state at which plantation?	

SECTION 4. ECONOMIC SITUATION AND HOUSEHOLD ASSETS:

Read " I would now like to know about your household's house situation and asset ownership."

4.1	Does your household own or rent the dwelling/house you live in?		€ Own	
			€ Don't own but live for free	
			€ Rent	
			€ Other (specify)	
4.2	What is the main material of the roof of the house?		€ Straw / thatch € Zinc / Iron sheets € Plastic sheet (tarpaulin) € Wood € Other:	
4.3.1	What is the main source of drinking water for your household?	€ Tap in the compound	€ Unprotected well/borehole	€ Rainwater
		€ Public tap	€ Spring	€ Vendor / tank
		€ Protected well/borehole	€ Stream/lake	€ Other:
4.3.2	If the source of water is outside the compound, what is the distance to source of water used(in walking minutes)?			

4.4	What is the main source of lighting (power) for your household?	€ Electricity € Solar power € Batteries € Candles € Oil/petrol Lamps € Wood	
4.5	What is your main source of cooking fuel for your household?	€ Charcoal € Fire wood € Electricity € Solar power € Gas	
4.6	Does your household have a private toilet?	€ Yes € No € Do not want to answer	
4.7	Does your household **own** any of the following? **SELECT ALL THAT APPLY.WHILE ASKING, ALSO OBSERVE IF POSSIBLE.**	€ Bicycle	€ Car
		€ Motorbike	€ Truck
		€ Fridge	€ Cart
		€ Generator	€ Tractor
		€ Radio	€ TV
		€ Cellphone	€ Water tanks
		€ DVD player	€ Sofa

PART 3. FOREST INCOMES & IMPACTS OF PLANTATIONS

"Forests, which include natural forests and forest plantations, are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 %, which are not primarily under agricultural or urban land use. A natural forest is defined as 'forests composed of indigenous trees, not planted by humans'. Plantation forest, on the other hand, is defined as: 'Forest stands established by planting or/and seeding in the process of afforestation or reforestation.'

SECTION 5: USE OF FOREST PRODUCTS.

Read " I would now like to ask you about the use of forest products by your household."

"When we say Green Resources plantations in the remainder of the questionnaire, we specifically refer to the Idete and Mapanda plantations owned by Green Resources AS." "When we say government plantation in the remainder of the questionnaire, we refer to the Sao Hill Forest Reserve owned by the government."

5.1	Did your household collect any forest products in 2015? **If No go to, 5.2.**	€ Yes € No € Do not want to answer
	If Yes to 5.1, how many forest products did your household members collect from forest, grassland and woodlots for both own use and sale over the last year (January – December, 2015)?	

5.1.1 Timber & Non-timber Forest (*see code)*	5.1.2 Amount produced or collected in units (local units) (N1)	5.1.3 Who owns the land/forest? *See code*	5.1.4 Market Price per unit	5.1.5 Total Value (N1*N2)
1. Grass/thatch for roof 2. Medicinal plants 3. Firewood 4. Honey 5. Poles 6. Wild fruits 7. Bamboo 8. Ropes 9. Other:	1. Bundle 2. Sacks 3. Tins 4. Bucket 5. Poles 6. Liter bottle 7. Other	1. Community forest 2. Government plantations 3. Company Plantations 4. Own planted trees 5. Natural forests 6. Green Resources Plantation 7. Other: 8. Do not know		

5.2 Access to Forest Products

5.2.1	If your household does not collect forest products (firewood, medicinal plants etc.), what is the main reason for this?	
5.2.2	Have the forest plantations affected your household's access to forest products (firewood, medicinal plants, wild fruits, honey etc. in 2015?	€ Yes, improved € Yes, decreased € No
5.2.3	**If Yes, improved or Yes decreased,** which plantations have affected your access to forest products?	

SECTION 6. FOREST PLANTATIONS AND IMPACTS. "Now I would like to ask you about the forest plantations in/near your village owned by companies/government and their impacts on your village."

	(Read out)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Do not want to answer
6.1	To what extent do you agree with the following statement?: "My household had a problem of food availability in 2015"						
6.2	If agree or strongly agree, what do you think are the main causes for your food availability problem? (up to 3 causes)	1. 2. 3.					
6.3	To what extent do you agree with the following statement?: 'My household had a problem of water availability for domestic/agricultural use in 2015"	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Do not want to answer
6.4	If agree or strongly agree, what do you think are the main causes for your water availability problem in the last year (2015)? (up to 3 causes)	1. 2. 3.					
6.5	Are there forest plantations near your village?	€ Yes € No					
6.6	**If yes to 6.5,** who owns these plantations?	Codes: 1. Green Resources 2. Mufindi paper mill 3. Sao Hill /government 4. New forest Iringa 5. Private owner 6. Council 7. Other:					
6.7	**If yes to 6.5,** when did they start? (write the year)						
6.8	Are members of your household currently employed in the plantations owned by Green Resources? **If No, go to 6.10**.	€ Yes € No					
6.8.1	**If Yes to 6.8,** how many household members work at Green Resources? **And ask questions 6.7.2 – 6.8.9**						

6.8.2 Household Member *(code should match the code in 2.1)*	6.8.3 Contract Type	6.8.4 Kind of job	6.8.5 Salary per month 99=n/a	6.8.6 Does their salary cover their basic needs?	6.8.7 Is the household member satisfied with the working	6.8.8 Do the working members receive any of the following from Green Resources?	6.8.9 Did the working members receive any training in 2015?

			88= Do not know		conditions at Green Resources?	Social security means pensions and other benefits	
	0=Seasonal 1=Permanent	1. Plantations 2. Industrial 3. Other				Health care/ Insurance Social security 3. Other:	
				€ Yes € No € Don't know	€ Yes € No Don't know	€ Yes € No € DO not know	€ Yes € No € Do not know
				€ Yes € No € Don't know	€ Yes € No Don't know	€ Yes € No € Do not Know	€ Yes € No € Do not know
				€ Yes € No Don't know	€ Yes € No Don't know		€ Yes € No € Do not know
6.9	Which goods have you acquired or which changes have occurred in your household since members started to work for Green Resources? (More than one option possible)						€ Built/bought a house € Repaired/improved house € Bike € Motorbike € Furniture € Started a business € Education/schooling € Car € Other: € No change has occurred
6.10	Has your household ever been relocated or had to give up farm land? **If no, go to 6.11**						€ Yes € No € Do not want to answer
6.10.1	**If Yes to 6.10,** when was it? (Write the year the household was relocated/ gave up farm land)						
6.10.2	**If Yes to 6.10**, what was the reason?						€ Road construction € Government plantation € Green Resources plantation € Other company plantations

		€ Other:
6.10.3	**If Yes to 6.10** did you get compensation for the relocation or the land you gave up?	€ Yes € No € Do not want to answer
6.10.4	**If Yes to 6.10.3,** from whom did you get the compensation? (More than one answer possible)	€ Government € The other plantation company € Green Resources plantation € Other:
6.10.5	**If No to 6.10.3,** how did you deal with the situation?	€ Search new land € Share with family/friends € Rent land/house € Other:
6.11	To what extent are you satisfied with your dealings with Green Resources?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Not applicable € Do not want to answer
6.11.1	If very dissatisfied or dissatisfied, what are the main causes for the dissatisfaction? **(More than one answer possible)**	€ Conflicts with Green Resources € No/ too little compensation for land € The way complaints are dealt with € Speed at which complaints are dealt with € Promises not kept € Other: € Not applicable € Do not want to answer
6.11.2	If very satisfied or satisfied, what are the main causes for the satisfaction? **(More than one answer possible)**	€ Good Compensation € The way complaints are dealt with € Speed at which the issue was handled € Promises were kept € Other: € Not applicable € Do not want to answer
6.12	Do you think that the company responds to and addresses the complaints /grievances from the village?	€ Yes € No

		€ Do not want to answer € Not applicable
6.13	Has the availability of farm land for your household decreased in 2015?	€ Yes € No € Do not want to answer € Not applicable
6.13.1	**If yes to 6.13**, what is the main cause for this?	€ Land taken by private plantation companies € Land taken by government plantations € The household sold land € Other:
6.13.2	If the household sold land in 2015, to whom was the land sold?	
6.14	To what extent are you satisfied with the amount of water for your domestic and agricultural use?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.15	Do you think that the other companies like tea plantations, paper mills have changed the availability of water for your domestic or agricultural farm use?	€ Yes € No € Do not want to answer € Not applicable
6.16	**If Yes to 6.15**, how has it changed?	€ Increased € Decreased € Do not want to answer

6.17	How do you assess the current situation/level in each of the following?	Very Low	Low	Medium	High	Very High	Not applicable	Do not know
	a. Soil quality							
	b. Ground water quantity							
	c. Ground water quality							
	d. Number of wild plants and animals in the forests							
	e. Number of wild plants and animals in the plantations							
	f. Number of wild plants and animals in your fields							

	g. Number of eucalyptus trees found off plantation							
	h. Number of pine trees found off plantation							
	i. Number of landslides							
	j. Number/frequency of soil erosion							
	k. Number/frequency of floods							
	L. Deforestation/ illegal logging on natural and community forests							

6.18	Has your household benefited from any community development projects undertaken by Green Resources?	€ Yes € No € Do not want to answer € Not applicable
6.19	**If yes to 6.18,** indicate the types of Green Resources community development projects your household benefitted from? (More than one answers are possible)	€ School(s) € Road(s) € Bridge(s) € Water well(s) € Community hall(s) € Agricultural outgrower programme € Tree Seedlings programme € Other:
6.19.1	If the household participated in seedlings programme, how many seedlings does your household have from the Green Resources programme so far?	
6.19.2	In which year were they planted?	
6.19.3	Did you sell any trees from the seedlings you got from the Green Resources seedling programme in 2015?	€ Yes € No € Do not want to answer € No applicable
6.19.4	**If Yes to 6.19.3**, how much money did you receive for your trees?	
6.20	To what extent are you satisfied with the community development projects undertaken by Green Resources?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.21	Has Green Resources helped you obtain a land title (register land)?	€ Yes € No € Not applicable
6.22	**If yes to 6.21,** how much land did they help you register? (Write in hectares)	

6.23	Do you have a say in Green Resources activities?	€ Yes € No € Do not want to answer
6.23.1	**If yes to 6.23**, how do you have your say in Green Resources activities? (More than 1 answer possible)	€ In meetings € Through letters € I'm a representative € As a worker € Through the council € Through the village chief € Through village development committee € Other:
6.23.2	**If yes to 6.23**, to what extent are you satisfied about your say in Green Resources activities?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
6.24	Have there been any development projects undertaken by the government in your community? **If No, go to 6.25.**	€ Yes € No
6.24.1	**If Yes to 6.24**, has your household benefitted from any community development projects undertaken by the government?	€ Yes € No € Do not want to answer € Not applicable
6.24.2	**If yes to 6.24**, to what extent are you satisfied about these government community development projects?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
6.25	Have your trees or farm land or house been affected by fires in 2015? **If No go to 6.26**	€ Yes € No € Not applicable
6.25.1	**If Yes to 6.25**, what was the main cause for the fire?	€ A farmer (clearing fields) € A hunter € Children € Accident

		€ Arson € Lightening € Green Resources activities /works € Government plantation activities/works € Don't know € Other
6.25.2	**If Yes to 6.25**, how do you assess the severity of the damage?	€ Very severe € Severe € Medium € Low € Very low € Do not know € Do not want to answer
6.25.3	**If Yes to 6.25,** did you receive any compensation for the damages?	€ Yes € No € Do not want to answer
6.25.4	**If Yes to 6.25.3,** from whom did you receive the compensation?	€ Green Resources € Government € Other private companies € Other
6.25.5	How do you rate the effectiveness of Green Resources in firefighting in 2015?	€ Very low € Low € Medium € High € Very high € No applicable € Do not know € Do not want to answer
6.26	Has your household lost any crops or animals due to chemicals run off in to lakes and rivers?	€ Yes € No
6.26.1	**If Yes to 6.26,** what was the main source of the chemicals? *(give 1 main source)*	
6.26.2	**If Yes to 6.26**, did you receive any compensation for the damage?	€ Yes € No € Do not want to answer

6.26.3	**If Yes to 6.26.2**, from whom did you receive the compensation?	€ Green Resources € Government € Other private companies € Other
6.27	Has Green Resources helped any of your household members get a birth certificate/ID?	€ Yes € No € Not applicable
6.27.1	**If Yes to 6.27**, do you think that the birth certificates/IDs have benefitted your household?	€ Yes € No
6.27.2	**If Yes to 6.27.1,** what have you benefitted exactly?	

SECTION 7. PERCEPTIONS OF IMPACTS OF PLANTATIONS

Read "Now I would like to know your perceptions about the impacts of the plantations on your village"

7.1	To what extent do you think that the forest plantations have changed the following situations in your village in the last year (2015)?						
	Impact	Decreased greatly	Decreased	No Change	Increased	Increased greatly	Do not know
7.1.1	Number of jobs in the village						
7.1.2	Length/ number and conditions of roads or bridges						
7.1.3	Access to & services provided by the government						
7.1.4	Number of conflicts about land						
7.1.5	Number of People moving out of the village						
7.1.6	Number of People moving into the village						
7.1.7	Number and type of Health care facilities						
7.1.8	Quality of education children receive						
7.1.9	Number of children going to school						
7.1.10	Number and type of shops/markets						
7.1.11	Level of food Prices						
7.1.12	Level of firewood and charcoal price						
7.1.13	Availability of feed for livestock						
7.1.14	Other:						

To what extent do you agree with the following statements?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Do not want to answer
7.2	"My household has in general benefited from the Green Resources plantation."							
7.3	"My household has in general benefited from other forest plantations."							
7.4	"Green Resources is a 'friendly' good neighbor."							
7.5	Name up to three most important aspects that you think Green Resources could do to improve the situation in your village.	1. 2. 3.						

PART 4. SAVINGS, INVESTMENT AND TOTAL INCOME

Read "Now, I want to ask you about any significant investments made by your household member in 2015."

SECTION 8. Types, amounts and sources of investment in 2015

8.1	Did your household make any significant investment in 2015?	€ Yes € No
8.1.1	**If Yes to 8.1,** what was the most important (only ONE) investment you made?	1. Bought livestock 2. Bought gold 3. Bought land 4. Cash savings 5. Started business 6 Education for children/self 7 Other:
8.1.2	How much was the investment?	
8.1.3	Did Green Resources help you finance the investment?	€ Yes € No € Do not want to answer
8.1.4	**If No to 8.1.3,** how did you finance the investment?	€ Sold assets (sold land. livestock, surplus crops) € Loans from microfinance € Loans from commercial banks € Loans from friends/relatives € Other:

SECTION 9. Total income and share of different income sources

Read "I would now like to ask you about your (estimated) total income and the shares of different income sources in 2015."

9.1	According to your estimation, what was your total household income in 2015?				
9.2	What were the shares of each of the following income sources in your total income in 2015? (Ask in percentage terms)		**Income source**		**Share (in %)**
			Agriculture		
			Business		
			Off-farm income		
			Forest Income		
			Remittances		
			Other:		
9.3	Is your household involved in any business?		€ Yes € No		
9.3.1	**If Yes to 9.3**, in how many businesses is your household involved?				
	Ask the following for each business activity. Code: 1=shop/trade; 2=handicraft 3=carpentry; 4=other forest based; e.g. baskets/mats; 5=other skilled labor; 6=transport (car, boat,…);	7=lodging/restaurant; 8=brewing; 9=brick making; 10=landlord/real estate; 11=quarrying; 12= contracted work (cleaning/maintenance); 13=renting out equipment; 14=Other:	**Business name (Enter code)**	**How many months worked in 2015?**	**Estimated gross income per month**
9.4	Did you sell any timber in 2015?		€ Yes € No € Do not want to answer		
9.4.1	**If Yes to 9.4**, to whom did you sell?		1. Green Resources		
			2. Government		
			3. Other plantation companies		
			4. Private individuals		
			5. Other:		
9.4.2	How much income (in currency terms) did your household obtain from the sale of timber in 2015?				

PART 5. WELFARE PERCEPTIONS AND SOCIAL CAPITAL

SECTION 10: Welfare Perceptions and social capital

Read "Now I would like to ask the last questions about your life in general. "

10.1	All things considered, to what extent are you satisfied with your life?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
10.2	How well-off was your household in 2015 compared with the situation in 2014?	€ Less well-off € About the same € Better off now € Do not want to answer
10.3	To what extent do you agree with the following statement: " My village (community) is a good place to live."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer
10.4	To what extent do you agree with the following statement: " I trust the people in my village /community)."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer
10.5	To what extent do agree with the following statement: "I can get help from people in the village when I am in need, for example, if I need to borrow money because someone in my family is sick."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer

To be filled by the interviewers:

Read "This is the end of the interview & thank you very much for participating and for your time ."			
"Do you have any questions for me before I leave? "		***Take the time to answer any questions.***	
Observations of the enumerator. Do not read the following questions. Simply record your impressions!			
A	Ending time	_ _ : _ _ (hh:mm)	
B	How would you judge the respondent's understanding of the questions during the survey?	1	Displayed no problems
		2	Displayed a little difficulty
		3	Displayed moderate difficulty
		4	Displayed serious problems
C	How did the thought process of the respondent appear to you during the survey?	1	Logical and sensible
		2	Somewhat Unclear
		3	Unclear, insensible
		4	Totally disoriented

Space for additional remarks

To be completed by Field coordinator:

I confirm that the questionnaire is fully and correctly completed.

Date: / / 2016 (dd/mm)

Signature of field coordinator: _____

Household Survey Tanzania
2016
Comparison Villages

0.1 To be completed by Interviewers

0.11 **0.12**	Interviewer 1 name: Interviewer 2 name:	Interviewer 1 ID: Interviewer 2 ID:
0.13	Date: / / 2016 (dd/mm)	
0.14	Country:	Mozambique Tanzania
0.15	Village name: **(Note: Make sure you have the right questionnaire!!!)** € Green Resources Village € Control village	€ Kihanga € Nzivi
0.16	**Unique Household code:**	
0.17	**Language of interview**	English/ Kiswahili/Portuguese
0.18	**Starting time (hh:mm)**	

Introduction to household members:

"My name is_____. and my partners name is _____.We are here to collect information about the impacts of forest plantations on the living conditions of people in the village ,for a study by Sokoine University of Agriculture, Tanzania; Universidad Eduardo Mundane, Mozambique and Wageningen University in the Netherlands. Your household was selected to be part of this survey. I would like to speak to you (and your spouse/partner)."

"The researchers will keep your responses confidential. Your full name will never be used anywhere to ensure confidentiality."

"You are not obliged to answer questions if you do not want to and you are free to stop the interview at all times."

"We hope that the research will benefit the village and the country by assisting us to understand better the impacts of forest plantations on the livelihoods of the people and inform the relevant bodies to improve the situation in the future."

"You will not receive any direct benefit if you join this study, your participation is voluntary."

"Do you have any questions for me? You may ask questions about this study at any time."

"The survey will take approximately 1hour & 30 minutes."

The above introduction translated into Kiswahili:

Jina langu ni……., tuko hapa kwa ajili ya kukusanya Taarifa kuhusu matokeo ya mashamba ya miti kwa maisha ya watu wa kijiji hiki. Utafiti huu unahusisha Chuo Kikuu cha Sokoine (Tanzania), Eduardo Mundane (Msumbiji) na Wageningen (Uholanzi). Kaya yako imechaguliwa kushiriki katika utafiti huu, hivyo tunaomba kuzungumza na wewe (na mwenzi wako).
Taarifa utakazozitoa zitabaki kuwa siri na jina lako halitatumika Mahali popote, wala kwa Madhumuni mengine yoyote.

GPS coordinates of the house of the respondent:

H1 Latitude (_____°_____._____)
H2 Longitude (_____°_____._____)
H3 Altitude (_____ M.a.s.l.)

Note: One of the enumerators should start the introduction to the household using a paper version of the introduction while the second enumerator takes the GPS coordinates using the tablet!!!

	Ushiriki wako katika mahojiano haya ni wa hiari. Uko huru kujibumaswaliyetu, nakamakunaswaliambalohutojisikia au hutolijuaukohurukutolijibu. Tuna imaniutafitihuuutawanufaishawanakijijiwotenanchikwaujumlakwauelewatutakaoupatajuuyamatokeoyamashambayamitinamaishayawatu, lakinimanufaahayohayatakuwayamojakwamojakwenuilataarifazitakazopatikanazitapelekwakwamamlakahusikakwaajiliyakuboreshamashambahayakwasikuzijazo. Je, unaswalilolote la kuniulizajuuyautafitihuu? Mahojianoyetuyatachukuatakribanisaamoja na nusu.		
0.20	"Are you willing to participate?"	€ Yes € No	
0.21	If No, why are you not willing to participate? ***If Yes, go to part 1.***		

PART 1. LAND USE, TENURE AND AGRICULTURE

Read "I would like to ask you about your household land ownership and agricultural activities."

SECTION 1: LAND TENURE & USE: THE FARM WALK

Note for enumerators ***In this part use the farm walk guide to ask the questions and fill in the responses in the tablet during the farm walk!!! Make sure that you have the hard copy of the farm walk guide and follow the instructions accordingly!!!***

1.1.1	Did your household use farm land or a garden in 2015? **If No, go to 1.4**	€ Yes € No € Do not want to answer
1.1.2	**If yes**,what is total size of the plot(s)your household used last year (2015)? (Write in hectares) **(Note: Use local term for hectare).**	
For each specific plot, ask the questions below (1.2.1- 1.2.8) during the farm walk. Ask for all the plots of the household including those that could not be visited during the farm walk!!! (See guide for the farm walk)		

1.2	**1.2.1**	**1.2.2**	**1.2.3**	**1.2.4**	**1.2.5**	**1.2.6**	**1.2.7**	**1.2.8**
Plotcode	Size in hectares *convert acres into hectares 1ha= 2.5 ac	Ownership **CODES**	Howacquired? **CODES**	Sincewhen ?(year)	Ifrented, what is the type of the contractual arrangement?	How far is the plot from your house?(in walking minutes)	Land use **SEE CODES**	List the 3 most important crops your household currently grow on each plot.
1								
2								

3							
4							
5							
6							
7							
8							

Codes1.2.2	**1.2.3**	**1.2.5**	**1.2.7**	**1.2.8**
1=Personal/family plot 2=Rented/leased land 3= Free land/Squatter agreement 4=Community land 5=Other:	1=Bought 2=Rented 3=Inherited 4=Family land 5=In temporary use 6=Gifted 7=Other:	1= Sharecropping 2= Rent payment in cash 3= Rent payment in labor services 4= Others:	1= Arable/agriculture land 2= Grazing land 3= Natural trees/forest 4= Planted trees/woodlot 5= Swamp 6= Fallow land 7= Other:	1= Maize 2= Beans 3= Millet 4= Sorghum 5= Rice 6= Coffee 7= Tea 8= Cotton 9 = Wheat 10= Cassava 11= Irish Potatoes 12= Sweet potatoes 13= Banana 14 = Groundnut 15 = Vegetables 16 = Soya beans 17 = Other:

1.3	Does your household use any purchased inputs in crop production in the current season? **If No, go to 1.4**			€ Yes € No € Do not want to answer		
1.3.1	**If Yes to 1.3,** what are the quantities & values of the three most important purchased inputs used in the current season?	Input name	Unit	Price per unit	Quantity	Total Cost
1.3.2	If the respondent is not able to answer the use of purchased inputs per each input, ask for the total cost of purchased inputs.	Total Cost:				

1.1 Livestock: 1.4.1 What is the number of each of the following livestock your household owns currently?

Livestock	**Number (heads)**
Cattle	
Chicken	
Goats	
Sheep	
Pigs	
Donkeys	
Ducks	
Horses	

Turkey	
Other:	

1.4.2	Does your household use any purchased inputs for livestock production?	€ Yes € No
1.4.3	**If Yes to 1.4.2,** in your estimate, how much did your household spend on purchased inputs used in livestock production last year (only cash expenditures)?	
1.4.4	What is the main source of water for your crops and/or livestock?	€ River/ lake
		€ Rainwater
		€ Well
		€ Borehole
		€ Other:

PART 2. HOUSEHOLD CHARACTERISTICS AND ECONOMIC SITUATION

SECTION 2. DEMOGRAPHICS AND COMPOSITION : Read - "I would now like to ask you a few questions on the composition of your household"

2.1	**How many people live in your household?**_____ *Please list below by first name. Start with the head of the HH, then the spouse and complete the table for any other member.* *A household is defined as "a group of people **currently** eating from the same pot' under the same roof' (or in same compound if the HH has 2 or more structures)."*									
	2.2	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**
HHMemberCode	Name	Sex	Age	Relation onto Head **SEECODES**	Activity **SEECODES**	Marital status **SEECODES**	Highest completed education **SEE CODES**	Religion **SEECODES**	Status
01		M F							
02		M F							
03		M F							
04		M F							
05		M F							
06		M F							
07		M F							
08		M F							
09		M F							
10		M F							
11		M F							

12		M	F							
13		M	F							
14		M	F							
15		M	F							

Codes2.5	**codes 2.6 (more than 1 option possible)**	**Codes2.7**	**Codes2.8**	**Codes2.9**	**Codes 2.10**
1=Head 2=Spouse 3=Child 4=Parent 5=Sibling 6=Grand-child 7=Grand-parent 8=Orphan 9=Other relative 10=Foster child(no orphan) 11=No relation	1 = Working 2 = Helping in household 3 = Retired 4 = In school 5 = Other 99= Not applicable	1=Single 2=Married 3=Living together with partner 4=Divorced 5=Widow or widower 6=Married/together with partner ,but partner is temporarily living elsewhere 99=Not applicable(<12 years old)	0= Kindergarten 1= Primary (1-7) 2= Secondary 3= College and above 99=No schooling	1=Christian 2=Muslim 3=Traditional 4=Other	0= No status 1= Village chief 2= Elder 3= Youth leader 4= Women's leader 5= Religious leader 6= Tribal leader 7= Other

SECTION 3. HOUSEHOLD STATUS :

Read "Now I would like to know about your place of origin

3.1	Were you born in the village in which your household currently lives?	€ Yes € No
3.2	**If No to 3.1**, when did you move in to the village? (Write the year)	
3.3	**If No to 3.1,** why did you move in to the village?	€ In search of land € To work at plantations € In search of job € Other:
3.4	If your household moved in to work at plantations, please state at which plantation?	

SECTION 4. ECONOMIC SITUATION AND HOUSEHOLD ASSETS:

Read " I would now like to know about your household's house situation and asset ownership."

		€ Own

4.1	Does your household own or rent the dwelling/house you live in?		€ Don't own but live for free	
			€ Rent	
			€ Other (specify)	
4.2	What is the main material of the roof of the house?		€ Straw / thatch € Zinc / Iron sheets € Plastic sheet (tarpaulin) € Wood € Other:	
4.3.1	What is the main source of drinking water for your household?	€ Tap in the compound	€ Unprotected well/borehole	€ Rainwater
		€ Public tap	€ Spring	€ Vendor / tank
		€ Protected well/borehole	€ Stream/lake	€ Other:
4.3.2	If the source of water is outside the compound, what is the distance to source of water used(in walking minutes)?			
4.4	What is the main source of lighting (power) for your household?		€ Electricity € Solar power € Batteries € Candles € Oil/petrol Lamps € Wood € None	
4.5	What is your cooking fuel for your household?		€ Charcoal € Fire wood € Electricity € Solar power € Gas € Other:	
4.6	Does your household have a private toilet?		€ Yes € No € Do not want to answer	
4.7	Does your household **<u>own</u>** any of the following? **SELECT ALL THAT APPLY.WHILE ASKING, ALSO OBSERVE IF POSSIBLE.**		€ Bicycle	€ Car
			€ Motorbike	€ Truck
			€ Fridge	€ Cart
			€ Generator	€ Tractor
			€ Radio	€ TV
			€ Cellphone	€ Water tanks
			€ DVD player	€ Sofa

PART 3. FOREST INCOMES & IMPACTS OF PLANTATIONS

"Forests, which include natural forests and forest plantations, are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 %, which are not primarily under agricultural or urban land use. A natural forest is defined as 'forests composed of indigenous trees, not planted by humans'. Plantation forest, on the other hand, is defined as: 'Forest stands established by planting or/and seeding in the process of afforestation or reforestation.'

SECTION 5: USE OF FOREST PRODUCTS.

Read: " I would now like to ask you about the use of forest products by your household." "When we say Green Resources plantations in the remainder of the questionnaire, we specifically refer to the Idete and Mapanda plantations owned by Green Resources AS. And when we say government plantation in the remainder of the questionnaire, we refer to the Sao Hill Forest plantation owned by the government."

5.1	Did your household collect any forest products in 2015? **If No go to, 5.2.**	€ Yes € No € Do not want to answer
	If Yes to 5.1, how many forest products did your household members collect from forest, grassland and woodlots for both own use and sale over the last year (January – December, 2015)?	

5.1.1 Timber & Non-timber Forest (*see code)*	5.1.2 Amount produced or collected in units (local units) (N1)	5.1.3 Who owns the land/forest? *See code*	5.1.4 Market Price per unit	5.1.5 Total Value (N1*N2)
1. Grass/thatch for roof 2. Medicinal plants 3. Firewood 4. Honey 5. Poles 6. Wild fruits 7. Bamboo 8. Ropes 9. Other:	1.Bundle 2. Sacks 3. Tins 4. Bucket 5. Poles 6. Liter bottle 7. Other:	1. Community forest 2. Government plantations 3. Company Plantations 4. Own planted trees 5. Natural forests 6. Green Resources Plantation 7. Other: 8. Do not know		

5.2 Access to Forest Products

5.2.1	If your household does not collect forest products (firewood, medicinal plants etc.), what is the main reason for this?	
5.2.2		€ Yes, improved

	Have the forest plantations affected your household's access to forest products (firewood, medicinal plants, wild fruits, honey etc. in 2015?	€ Yes, decreased € No
5.2.3	**If Yes, improved or Yes decreased,** which plantations have affected your access to forest products?	

SECTION 6. FOREST PLANTATIONS AND IMPACTS.

Read "Now I would like to ask you about the forest plantations in/near your village owned by companies/government and their impacts on your village."

	(Read out)	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Do not want to answer**
6.1	To what extent do you agree with the following statement?: "My household had a problem of food availability in 2015"						
6.2	If agree or strongly agree, what do you think are the main causes for your food availability problem? (Write up to a maximum of 3 causes)	1. 2. 3.					
6.3	To what extent do you agree with the following statement?: 'My household has a problem of water availability for domestic/agricultural use in 2015"	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Do not want to answer
6.4	If agree or strongly agree, what do you think are the main causes for your water availability problem? (Write up to maximum of 3 causes)	1. 2. 3.					
6.5	Are there forest **plantations** near your village?	€ Yes € No					
6.6	If yes to 6.5, who owns these **plantations**?						
6.7	If yes to 6.5, when did they start? (write the year)						
6.8	Are members of your household currently employed in the plantations owned by the **government**? **If No, go to 6.10.**	€ Yes € No					
6.8.1	**If Yes to 6.8,**how many household members work at the government plantation? **And ask questions 6.8.2 – 6.8.9**						

6.8.2 Household Member *(code should match the code in 2.1)*	6.8.3 Contract Type	6.8.4 Kind of job	6.8.5 Salary per month	6.8.6 Does their salary cover their basic needs?	6.8.7 Is the household member satisfied with the working conditions at Green Resources?	6.8.8 Do the working members receive any of the following from the government plantation? Social security means pensions and other benefits	6.8.9 Did the working members receive any training in 2015?
	0=Seasonal 1=Permanent	1. Plantations 2. Industrial 3. Other	99 =n/a 88 =do not know			4. Health care insurance 5. Social security 6. Other:	
				€ Yes € No € Don't know	€ Yes € No € Don't know	☐ Yes ☐ No ☐ DO not know	€ Yes € No € Do not know
				€ Yes € No € Don't know	€ Yes € No € Don't know	☐ Yes ☐ No ☐ DO not know	€ Yes € No € Do not know
				€ Yes € No € Don't know	€ Yes € No € Don't know	☐ Yes ☐ No ☐ DO not know	€ Yes € No € Do not know

6.9	Which items have you acquired or which changes have occurred in your household since members started to work on the government forest plantations? (More than one option possible)	€ Built/bought a house € Repaired/improved house € Bike € Motorbike € Furniture € Started a business € Education/schooling € Car € Other: € No change has occurred
6.10	Has your household ever been relocated or had to give up farm land? **If NO, go to 6.11**	€ Yes € No € Do not want to answer
6.10.1	If Yes to 6.10, when was it? **(Write the year the household was relocated/ gave up farm land)**	
6.10.2	If Yes to 6.10, what was the reason?	€ Road construction € Government plantation € Green Resources plantation € Other company plantations € Other:
6.10.3	If Yes to 6.10 did you get compensation for the relocation or the land you gave up?	€ Yes € No

		€ Do not want to answer
6.10.4	If Yes to 6.10.3, from whom did you get the compensation? **(More than one answer possible)**	€ Government € The other plantation company € Green Resources plantation € Other:
6.10.5	If No to 6.10.3, how did you deal with the situation?	€ Search new land € Share with family/friends € Rent land/house € Other:
6.11	To what extent are you satisfied with your dealings with the government plantation?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Not applicable € Do not want to answer
6.11.1	If very dissatisfied or dissatisfied, what are the main causes for the dissatisfaction? **(More than one answer possible)**	€ Conflicts with government plantation € No/ too little compensation for land € The way complaints are dealt with € Speed at which complaints are dealt with € Promises not kept € Other: € Not applicable € Do not want to answer
6.11.2	If very satisfied or satisfied, what are the main causes for the satisfaction? **(More than one answer possible)**	€ Good compensation € The way complaints are dealt with € Speed at which the issue was handled € Promises were kept € Other: € Not applicable € Do not want to answer
6.12	Do you think that the government plantation responds to and addresses the complaints /grievances from the community?	€ Yes € No € Do not want to answer
6.13	Has the availability of farm land for your household decreased in 2015?	€ Yes € No € Not applicable
6.13.1	If yes to 6.13, what is the main cause for this?	€ Land taken by private plantation companies € Land taken by government plantations € The household sold land € Other:
6.13.2	If the household sold land in 2015, to whom was the land sold?	

6.14	To what extent are you satisfied with the amount of water for your domestic and agricultural use?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.15	Do you think that the other companies like tea plantations, paper mills have changed the availability of water for your domestic or agricultural farm use?	€ Yes € No € Do not want to answer € Not applicable
6.16	If Yes to 6.15, how has it changed?	€ Increased € Decreased

6.17	How do you assess the current situation/level in each of the following?	Very Low	Low	Medium	High	Very High	Not applicable	Do not know
	l. Soil quality							
	m. Ground water quantity							
	n. Ground water quality							
	o. Number of wild plants and animals in the forests							
	p. Number of wild plants and animals in the plantations							
	q. Number of wild plants and animals in your fields							
	r. Number of eucalyptus trees found off plantation							
	s. Number of pine trees found off plantation							
	t. Number of landslides							
	u. Number/frequency of soil erosion							
	v. Number/frequency of floods							
	L. Deforestation/ illegal logging on natural and community forests							

6.18	Has your household benefited from any community development projects undertaken by the government plantations?	€ Yes € No € Do not want to answer € Not applicable
6.19	If yes to 6.18, indicate the types of community development projects by the government plantation from which your household benefitted? (More than one answers are possible)	€ School(s) € Road(s) € Bridge(s) € Water well(s) € Community hall(s) € Agricultural outgrower programm € Tree Seedlings programme € Other:
6.19.1	If the household participated in the government plantation seedlings programme, how many seedlings does your household have from government plantation programme so far?	
6.19.2	In which year were they planted?	
6.19.3	Did you sell any trees from the government plantation seedling programme in 2015?	€ Yes

		€ No € Not applicable
6.19.4	If Yes to 6.19.3, how much money did you receive for your trees?	
6.20	To what extent are you satisfied with the community development projects undertaken by the government plantation?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.21	Has the government plantation helped you obtain a land title (register land)?	€ Yes € No
6.22	If yes to 6.21, how much land did they help you register? (Write in hectares)	
6.23	Do you have a say in the activities of the government plantation?	€ Yes € No € Do not want to answer
6.23.1	If yes to 6.23, how do you have your say in the activities of the government plantation? (More than 1 answer possible)	€ In meetings € Through letters € I'm a representative € As a worker € Through the council € Through the village chief € Through village development committee € Other:
6.23.2	If yes to 6.23, to what extent are you satisfied about your say in the activities of the government plantation?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.24	Have there been any development projects undertaken by the **government** in your community? If No, go to 6.25. **(NOTE: This is different from projects by the government plantations!!!).**	€ Yes € No
6.24.1	If Yes to 6.24, has your household benefitted from any community development projects undertaken by the **government**? **(NOTE: This is different from projects by the government plantations!!!).**	€ Yes € No € Do not want to answer € Not applicable
6.24.2	If yes to 6.24, to what extent are you satisfied about these **government** community development projects? **(NOTE: This is different from projects by the government plantations!!!).**	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer

6.25	Have your trees or farm land or house been affected by fires in 2015?	€ Yes € No € Not applicable
6.25.1	**If Yes to 6.25**, what was the main cause for the fire?	€ A farmer (clearing fields) € A hunter € Children € Accident € Arson € Lightening € Green Resources activities /works € Government plantation activities/works € Don't know € Other
6.25.2	**If Yes to 6.25**, how do you assess the severity of the damage?	€ Very severe € Severe € Medium € Low € Very low € Do not know € Do not want to answer
6.25.3	**If Yes to 6.25**, did you receive any compensation for the damages?	€ Yes € No € Do not want to answer
6.25.4	**If Yes to 6.25.3,** from whom did you receive the compensation?	
6.25.5	How do you rate the effectiveness of the government plantation in firefighting in 2015?	€ Very low € Low € Medium € High € Very high € No applicable € Do not know € Do not want to answer
6.26	Has your household lost any crops or animals due to chemicals run off in to lakes and rivers?	€ Yes € No
6.26.1	**If Yes to 6.26**, what was the main source of the chemicals?**(Ask only 1 main source)**	
6.26.2	**If Yes to 6.26,** did you receive any compensation for the damage?	€ Yes € No € Do not want to answer
6.26.3	**If Yes to 6.26.2**, from whom did you receive the compensation?	
6.27	Has the government plantation helped any of your household members get a birth certificate/ID?	€ Yes € No

		€ Not applicable
6.27.1	**If Yes to 6.28,** do you think that the birth certificates/IDs have benefitted your household?	€ Yes € No
6.27.2	**If Yes to 6.28.1,** what have you benefitted exactly?	

SECTION 7. PERCEPTIONS OF IMPACTS OF PLANTATIONS:

Read "Now I would like to know your perceptions about the impacts of the plantations on your village"

7.1	To what extent do you think that the forest **plantations** have changed the following situations in your community in the last year?						
	Impact	**Decreased greatly**	**Decreased**	**No Change**	**Increased**	**Increased greatly**	**Do not know**
	7.1.1 Number of jobs in the village						
	7.1.2 Length/ number and conditions of roads or						
	7.1.3 Access to & Services provided by the						
	7.1.4 Number of conflicts about land						
	7.1.5 Number of People moving out of the village						
	7.1.6 Number of People moving into the village						
	7.1.7 Number and type of Health care facilities						
	7.1.8 Quality of education children receive						
	7.1.9 Number of children going to school						
	7.1.10 Number and type of shops/markets						
	7.1.11 Level of food Prices						
	7.1.12 Level of firewood and charcoal price						
	7.1.13 Availability of feed for livestock						
	7.1.14 Other:						

	To what extent do you agree with the following statements?	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Do not want to answer
7.2	"My household has in general benefited from the government plantations."							
7.3	"My household has in general benefited from the other forest plantations."							

7.4	"The government plantation is a 'friendly' good neighbor."							
7.5	Name up to three most important aspects that you think the government plantation could do to improve the situation in your village.	1. 2. 3.						

PART 4. SAVINGS, INVESTMENT AND TOTAL INCOME: Read "Now, I want to ask you about any significant investments made by your household member in 2015."

SECTION 8. Types, amounts and sources of investment in 2015.

8.1	Did your household make any significant investment in 2015?	€ Yes € No
8.1.1	**If Yes to 8.1,** what was the most important (only ONE) investment you made?	5. Bought livestock 6. Bought gold 7. Bought land 8. Cash savings 5. Started business 8 Education for children/self 9 Other: G Education for children/self
8.1.2	How much was the investment?	
8.1.3	Did Sao Hill/government plantation help you finance the investment?	€ Yes € No € Do not want to answer
8.1.4	**If No to 8.1.3,** how did you finance the investment?	€ Sold assets (sold land. livestock, surplus crops) € Loans from microfinance € Loans from commercial banks € Loans from friends/relatives € Other:

SECTION 9. Total income and share of different income sources
Read "I would now like to ask you about your (estimated) total income and the shares of different income sources in 2015."

9.1	According to your estimation, what was your total household total income in 2015?		
9.2	What were the shares of each of the following income sources in your total income in 2015? (Ask in percentage terms)	**Income source**	**Share (in %)**
		Agriculture	
		Business	
		Off-farm income	

		Forest Income			
		Remittances			
		Other:			
9.3	Is your household involved in any business?	€ Yes € No			
9.3.1	**If Yes to 9.3**, in how many businesses is the household involved?				
	Code for each business activity 1=shop/trade; 2=handicraft 3=carpentry; 4=other forest based; e.g. baskets/mats; 5=other skilled labor; 6=Transport (car, boat,…);	7=lodging/restaurant; 8=brewing; 9=brick making; 10=landlord/real estate; 11=quarrying; 12= contracted work (cleaning/maintenance); 13=renting out equipment; 14=Other:	**Business name (Enter code)**	**How many months worked in 2015?**	**Estimated gross income per month**
9.4	Did you sell any timber in 2015?		€ Yes € No € Do not want to answer		
9.4.1	**If Yes to 9.4**, to whom did you sell?		6. Green Resources		
			7. Government		
			8. Other plantation companies		
			9. Private individuals		
			10. Other:		
9.4.2	**If Yes to 9.4,** How much income (in currency terms) did your household obtain from the sale of timber in 2015?				

PART 5. WELFARE PERCEPTIONS AND SOCIAL CAPITAL

SECTION 10: Welfare Perceptions and social capital

Read "Now I would like to ask the last questions about your life in general. "

10.1	All things considered, to what extent are you satisfied with your life?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
10.2	How well-off was your household in 2015 compared with the situation in 2014?	€ Less well-off € About the same € Better off now € Do not want to answer

10.3	To what extent do you agree with the following statement: " My village (community) is a good place to live."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer
10.4	To what extent do you agree with the following statement: " I trust the people in my village /community)."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer
10.5	To what extent do agree with the following statement: "I can get help from people in the village when I am in need, for example, if I need to borrow money because someone in my family is sick."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer

To be filled by the interviewers:

Read "This is the end of the interview & thank you very much for participating and for your time ." **"Do you have any questions for me before I leave?"** ***Take the time to answer any questions.***			
Observations of the enumerator. Do not read the following questions. Simply record your impressions!			
A	Ending time	_ _ : _ _(hh:mm)	
B	How would you judge the respondent's understanding of the questions during the survey?	1	Displayed no problems
		2	Displayed a little difficulty
		3	Displayed moderate difficulty
		4	Displayed serious problems
C	How did the thought process of the respondent appear to you during the survey?	1	Logical and sensible
		2	Somewhat Unclear
		3	Unclear, insensible
		4	Totally disoriented

Space for additional remarks

To be completed by Field coordinator:

Additional Remarks from notes

I confirm that the questionnaire is fully and correctly completed.

Date: / / 2016 (dd/mm)

Signature of field coordinator: _____

_____

_____

Appendix A2. Household Survey Questionnaires Mozambique

Household Survey Mozambique
2016
Green Resources Villages

0.1 To be completed by Interviewers

0.11 **0.12**	Interviewer 1 name: Interviewer 2 name:	Interviewer 1 ID: Interviewer 2 ID:
0.13	Date: / / 2016 (dd/mm)	
0.14	Country:	€ Mozambique € Tanzania
0.15	Village name: **(Note: Make sure you have the right questionnaire!!!)** € *Green Resources village* € *Control village*	
0.16	**Unique Household code:**	
0.17	**Language of interview**	English/ Kiswahili/Portuguese
0.18	**Starting time (hh:mm)**	
	Introduction to household members: "My name is_____and my partner's name is_____. We are here to collect information about the impacts of forest plantations on the living conditions of people in the village, for a study by Sokoine University of Agriculture, Tanzania; Universidad Eduardo Mundane, Mozambique and Wageningen University in the Netherlands. Your household was selected to be part of this survey. I would like to speak to you (and your spouse/partner)." "The researchers will keep your responses confidential. Your full name will never be used anywhere to ensure confidentiality." "You are not obliged to answer questions if you do not want to and you are free to stop the interview at all times." "We hope that the research will benefit the village and the country by assisting us to understand better the impacts of forest plantations on the livelihoods of the people and inform the relevant bodies to improve the situation in the future." "You will not receive any direct benefit if you join this study, your participation is voluntary." "Do you have any questions for me? You may ask questions about this study at any time. a "The survey will take approximately 1 hour & 30 minutes."	**0.19.** GPS coordinates of the house of the respondent: H1 Latitude (_____°_____._____) H2 Longitude (_____°_____._____) H3 Altitude (_____ M.a.s.l.) **Note: One of the enumerators should start the introduction to the household using a paper version of the introduction while the second enumerator takes the GPS coordinates using the tablet!!!**
0.20	"Are you willing to participate?"	€ Yes

		€ No
0.21	**If Yes to 0.20,** what is the name of the respondent?	
0.22	**If Yes to 0.20,** is the respondent the household head?	€ Yes € No
0.23	**If No**, why are you not willing to participate?	**Stop the interview and inform the field coordinator!!!**

PART 1. LAND USE, TENURE AND AGRICULTURE

Read "I would like to ask you about your household land ownership and agricultural activities."

SECTION 1: LAND TENURE & USE: THE FARM WALK

Note for enumerator: ***In this part use the farm walk guide to ask the questions and fill in the responses in the tablet during the farm walk!!! Make sure that you have the hard copy of the farm walk guide and follow the instructions accordingly!!!***

1.1.1	Did your household use farmland or a garden in 2015? **If No, go to 1.4**	€ Yes € No € Do not want to answer
1.1.2	**If yes to 1.1.1**, what is total size of the plot(s) your household used last year (2015)? (Write in hectares) ***convert acres into hectares: 1ha= 2.5 ac** **(Note: Use local term for hectare)**	
For each specific plot, ask the questions below (1.2.1- 1.2.8) during the farm walk. Ask for all the plots of the household including those that could not be visited during the farm walk!!! (See guide for the farm walk)		

1.2	**1.2.1**	**1.2.2**	**1.2.3**	**1.2.4**	**1.2.5**	**1.2.6**	**1.2.7**	**1.2.8**
Plot code	Size hectares *convert acres into hectares 1ha= 2.5 ac	Ownership **CODES**	How acquired? **CODES**	Since when? (year)	If rented, what is the type of the contractual arrangement?	How far is the plot from your house? (in walking minutes)	Land use **CODES**	List the 3 most important crops your household currently grow on each plot.
1								
2								
3								
4								

5								
6								
7								
8								

Codes 1.2.2	**1.2.3**	**1.2.5**	**1.2.7**	**1.2.8**
1= Personal/family plot 2= Rented/leased land 3= Free land/Squatter agreement 4= Community land 5= Other:	1=Bought 2=Rented 3=Inherited 4=Family land 5=In temporary use 6= Gifted 7= Other:	1= Sharecropping 2= Rent payment in cash 3= Rent payment in labor services 4= Other:	1= Arable/agricultural land 2= Grazing land 3= Natural trees/forest 4= Planted trees/woodlot 5= Swamp 6= Fallow land 7= Other:	1= Maize 2= Beans 3= Millet 4= Sorghum 5= Rice 6= Coffee 7= Tea 8= Cotton 9 = Wheat 10= Cassava 11= Irish Potatoes 12= Sweet potatoes 13= Banana 14 = Groundnut 15 = Vegetables 16 = Soya beans 17 = Other:

1.3	Does your household use any purchased inputs in crop production in the current season? **If No, go to 1.4**	€ Yes € No € Do not want to answer

1.3.1	**If Yes to 1.3,** what are the quantities & values of the three most important purchased inputs used in the current season?	Input name	Price per unit	Quantity	Total Cost
1.3.2	If the respondent is not able to answer the use of purchased inputs per each input, ask for the total cost of purchased inputs. (From 1.3.1, add the total cost for the three inputs used.)	Grand total Cost:			

0.1 Livestock: 1.4.1 What is the number of each of the following livestock your household owns currently?

Livestock	**Number (heads)**
Cattle	
Chicken	

Goats		
Sheep		
Pigs		
Donkeys		
Ducks		
Horses		
Turkey		
Other:		
1.4.2	Does your household use any purchased inputs for livestock production? **If No, go to 1.4.1**	€ Yes € No
1.4.3	**If Yes to 1.4.2,** in your estimate, how much did your household spend on purchased inputs used in livestock production last year (2015) (only cash expenditures)?	
1.4.4	What is the main source of water for your crops and/or livestock?	€ River/ lake
		€ Rainwater
		€ Well
		€ Borehole
		€ Other:

PART 2. HOUSEHOLD CHARACTERISTICS AND ECONOMIC SITUATION

SECTION 2. DEMOGRAPHICS AND COMPOSITION : Read - "I would now like to ask you a few questions on the composition of your household"

2.1	**How many people live in your household?** _____ *Please list below by first name. Start with the head of the HH, then the spouse and complete the table for any other member.* *A household is defined as "a group of people **currently** eating from the same pot 'under the same roof' (or in same compound if the HH has 2 or more structures)."*								
	2.2	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**
HH member code	Name	Sex	Age	Relation to household head	Activity	Marital status	Highest completed education **SEE CODES**	Religion **See codes**	Status
01		M F							
02		M F							
03		M F							
04		M F							
05		M F							
06		M F							
07		M F							
08		M F							
09		M F							
10		M F							
11		M F							
12		M F							
13		M F							
14		M F							
15		M F							

Codes 2.5	Codes 2.6 (more than 1 option possible)	Codes 2.7	Codes 2.8	Codes 2.9	Codes 2.10
1=Head 2=Spouse 3=Child 4=Parent 5=Sibling 6=Grand-child 7=Grand-parent 8=Orphan 9=Other relative 10=Foster child (no orphan) 11=No relation	1 = Working 2 = Helping in household 3 = Retired 4 = In school 5 = Other 99= Not applicable	1=Single 2=Married 3=Living together with partner 4=Divorced 5=Widow or widower 6=Married/together with partner, but partner is temporarily living elsewhere 99=Not applicable (<12 years old)	1= Kindergarten 2= Primary (1-7) 3= Secondary 4= College and above 99=No schooling	1=Christian 2=Muslim 3=Traditional 4=Other:	1= No status 2= Village chief 3= Elder 4= Youth leader 5= Women's leader 6= Religious leader 7= Tribal leader 8= Other:

SECTION 3. HOUSEHOLD STATUS :

Read "Now I would like to know about your place of origin."

3.1	Was the household head born in the village in which your household currently lives? **If Yes, go to 4.1**	€ Yes € No
3.2	**If No to 3.1,** when did the household (head) move to the village? **(Write the year)**	
3.3	**If No to 3.1**, why did the household (head) move to the village?	€ In search of land € To work at plantations € In search of other job € Other:
3.4	If your household (head) moved to work at plantations, please state at which plantation?	

SECTION 4. ECONOMIC SITUATION AND HOUSEHOLD ASSETS:

Read "I would now like to know about your household's house situation and asset ownership."

4.1	Does your household own or rent the dwelling/house you live in?	€ Own
		€ Don't own but live for free
		€ Rent
		€ Other :

4.2	What is the main material of the roof of the house?		€ Straw / thatch € Zinc / Iron sheets € Plastic sheet (tarpaulin) € Wood € Other:	
4.3.1	What is the main source of drinking water for your household?	€ Tap in the compound	€ Unprotected well/borehole	€ Rainwater
		€ Public tap	€ Spring	€ Vendor / tank
		€ Protected well/borehole	€ Stream/lake	€ Other:
4.3.2	If the source of water is outside the compound, what is the distance to source of water used (in walking minutes)? **(If the source of water is inside the compound, write 99)**			
4.4	What is the main source of lighting (power) for your household?		€ Electricity € Solar power € Batteries € Candles € Oil/petrol Lamps € Wood € None	
4.5	What is your household's main source of energy for cooking?		€ Charcoal € Fire wood € Electricity € Solar power € Gas € Other:	
4.6	Does your household have a private toilet?		€ Yes € No € Do not want to answer	
4.7	Does your household **<u>own</u>** any of the following? **SELECT ALL THAT APPLY.WHILE ASKING, ALSO OBSERVE IF POSSIBLE.**	€ Bicycle	€ Car	
		€ Motorbike	€ Truck	
		€ Fridge	€ Cart	
		€ Generator	€ Tractor	
		€ Radio	€ TV	
		€ Cellphone	€ Water tanks	
		€ DVD player	€ Sofa	

PART 3. FOREST INCOMES & IMPACTS OF PLANTATIONS

"Forests, which include natural forests and forest plantations, are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 %, which are not primarily under agricultural or urban land use. A natural forest is defined as 'forests composed of indigenous trees, not planted by humans'. Plantation forest, on the other hand, is defined as: 'Forest stands established by planting or/and seeding in the process of afforestation or reforestation.'

SECTION 5: USE OF FOREST PRODUCTS.

Read " I would now like to ask you about the use of forest products by your household."

"When we say Green Resources plantations in the remainder of the questionnaire, we specifically refer to the Lurio and Niassa plantations owned by Green Resources AS." "When we say Floresta De Niassa plantation in the remainder of the questionnaire, we refer to the plantation owned by Floresta De Niassa."

5.1	Did your household collect any forest products in 2015? **If No go to, 5.2.1**	€ Yes € No € Do not want to answer
	If Yes to 5.1, how many forest products did your household members collect from forest, grassland and woodlots for both own use and sale over the last year (January – December, 2015)?	

5.1.1 Timber & Non-timber Forest (*see code)*	5.1.2 Amount produced or collected in units (local units) (N1)	5.1.3 Who owns the land/forest? *See code*	5.1.4 Market Price per unit	5.1.5 Total Value (N1*N2)
1. Grass/thatch for roof 2. Medicinal plants 3. Firewood 4. Honey 5. Poles 6. Wild fruits 7. Bamboo 8. Ropes 9. Other:	1. Bundle 2. Sacks 3. Tins 4. Bucket 5. Poles 6. Liter bottle 7. Other	1. Community forest 2. Government plantations 3. Company Plantations 4. Own planted trees 5. Natural forests 6. Green Resources 7. No ownership 8. Do not know 9. Other:		

5.2 Access to Forest Products

5.2.1	**If No to 5.1,** what is the main reason for this? **And Go to 6.1**	
5.2.2	Have the forest plantations affected your household's access to forest products (e.g., firewood, medicinal plants, wild fruits, honey etc. in 2015?	€ Yes, improved € Yes, decreased

		€ No
5.2.3	**If Yes, improved or Yes decreased to 5.2.2,** which plantations have affected your access to forest products?	

SECTION 6. FOREST PLANTATIONS AND IMPACTS. "Now I would like to ask you about the forest plantations in/near your village owned by private companies/government and their impacts on your village."

	(Read out)		
6.1	To what extent do you agree with the following statement?: "My household had a problem of food availability in 2015"	€ Strongly agree € Agree € Neutral € Disagree € Strongly disagree € Do not want to answer	
6.2	If agree or strongly agree, what do you think are the main causes for your food availability problem? (Write up to a maximum of 3 causes)	1. 2. 3.	
6.3	To what extent do you agree with the following statement?: 'My household had a problem of water availability for domestic/agricultural use in 2015"	€ Strongly agree € Agree € Neutral € Disagree € Strongly disagree € Do not want to answer	
6.4	If agree or strongly agree, what do you think are the main causes for your water availability problem in the last year (2015)? (Write up to a maximum of 3 causes)	1. 2. 3.	
6.5	Are there forest plantations near your village?	€ Yes € No	
6.6	**If yes to 6.5,** who owns these plantations?	Name of plantation	Name of owner
6.7	**If yes to 6.5,** when did they start? (write the year)	Name of plantation	Year of start
6.8	Are members of your household currently employed in the plantations owned by Green Resources? **If No, go to 6.10**.	€ Yes € No	
6.8.1	**If Yes to 6.8,** how many household members work at Green Resources?		

	And ask questions 6.7.2 – 6.9	

6.8.2 Household Member *(code should match the code in 2.1)*	6.8.3 Contract Type	6.8.4 Kind of job	6.8.5 Salary per month or Wage/ week 99=n/a 88= Do not know	6.8.6 Does their salary cover their basic needs?	6.8.7 Is the household member satisfied with the working conditions at Green Resources?	6.8.8 Do the working members receive any of the following from Green Resources? **Social security means pensions and other benefits**	6.8.9 Did the working members receive any training in 2015?
	0=Seasonal 1=Permanent	1. Plantations 2. Industrial 3. Other				7. Health care/ Insurance 8. Social security 9. Other:	
				€ Yes € No € Do not want to answer € Don't know	€ Yes € No € Do not want to answer € Don't know	€ Yes € No € DO not know	€ Yes € No € Do not know
				€ Yes € No € Do not want to answer € Don't know	€ Yes € No € Do not want to answer € Don't know	€ Yes € No € Do not Know	€ Yes € No € Do not know
				€ Yes € No € Do not want to answer Don't know	€ Yes € No € Do not want to answer € Don't know		€ Yes € No € Do not know

6.9	Which goods have you acquired or which changes have occurred in your household since members started to work for Green Resources? **(More than one option possible)**	€ Built/bought a house € Repaired/improved house € Bike € Motorbike € Furniture € Started a business € Education/schooling € Car

		€ Other: € No change has occurred
6.10	Has your household ever been relocated or had to give up farm land? **If no, go to 6.11**	€ Yes € No € Do not want to answer
6.10.1	**If Yes to 6.10,** when was it? (Write the year the household was relocated/ gave up farm land)	
6.10.2	**If Yes to 6.10**, what was the reason?	€ Road construction € Government plantation € Green Resources plantation € _____ company plantations € Other:
6.10.3	**If Yes to 6.10** did you get compensation for the relocation or the land you gave up? **If No, go to 6.10.5**	€ Yes € No € Do not want to answer
6.10.4	**If Yes to 6.10.3,** from whom did you get the compensation? (More than one answer possible)	€ Government € _____ plantation company € Green Resources plantation € Other:
6.10.5	**If No to 6.10.3,** how did you deal with the situation?	€ Search new land € Share with family/friends € Rent land/house € Other:
6.11	To what extent are you satisfied with your dealings with Green Resources?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Not applicable € Do not want to answer
6.11.1	If very dissatisfied or dissatisfied, what are the main causes for the dissatisfaction? **(More than one answer possible)**	€ Conflicts with Green Resources € No/ too little compensation for land € The way complaints are dealt with € Speed at which complaints are dealt with € Promises not kept € Other: € Not applicable € Do not want to answer
6.11.2	If very satisfied or satisfied, what are the main causes for the satisfaction? **(More than one answer possible)**	€ Good Compensation € The way complaints are dealt with € Speed at which the issue was handled € Promises were kept € Other: € Not applicable € Do not want to answer

6.12	Do you think that Green Resources AS responds to and addresses the complaints /grievances from the village?	€ Yes € No € Do not want to answer € Not applicable
6.13	Has the availability of farm land for your household decreased in 2015? **If No, go to 6.14**	€ Yes € No € Do not want to answer € Not applicable
6.13.1	**If yes to 6.13**, what is the main cause for this?	€ Land taken by private plantation companies, specify: € Land taken by government plantations € The household sold land € Other:
6.13.2	If the household sold land in 2015, to whom was the land sold?	
6.14	To what extent are you satisfied with the amount of water for your domestic and agricultural use?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.15	Do you think that the other companies like tea plantations, paper mills have changed the availability of water for your domestic or agricultural farm use?	€ Yes € No € Do not want to answer € Not applicable
6.16	**If Yes to 6.15**, how has it changed?	€ Increased € Decreased € Do not want to answer

6.17	How do you assess the current situation/level in each of the following in your village?	Very Low	Low	Medium	High	Very High	Not applicable	Do not know
	w. Soil quality							
	x. Ground water quantity							
	y. Ground water quality							
	z. Number of wild plants and animals in the forests							
	aa. Number of wild plants and animals in the plantations							
	bb. Number of wild plants and animals in your fields							
	cc. Number of eucalyptus trees found off plantation							
	dd. Number of pine trees found off plantation							
	ee. Number of landslides							
	ff. Number/frequency of soil erosion							
	gg. Number/frequency of floods							
	L. Deforestation/ illegal logging on natural and community forests							

6.18	Has your household benefited from any community development projects undertaken by Green Resources? **If No, go to 6.20.**	€ Yes € No € Do not want to answer € Not applicable
6.19	**If yes to 6.18,** indicate the types of Green Resources community development projects your household benefitted from? (More than one answer possible)	€ School(s) € Road(s) € Bridge(s) € Water well(s) € Community hall(s) € Agricultural outgrower programme € Tree Seedlings programme € Other:
6.20	To what extent are you satisfied with the community development projects undertaken by Green Resources?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.21	Has your household participated in the Green Resources plantation seedlings programme? **If No, go to 6.22**	
6.21.1	**If Yes to 6.21**, how many seedlings did your household receive from the Green Resources plantation programme so far?	
6.21.2	**If Yes to 6.21,** in which year were they planted?	
6.21.3	Did you sell any trees in 2015 from the seedlings you got from the Green Resources seedling programme?	€ Yes € No € Do not want to answer € No applicable
6.21.4	**If Yes to 6.21.3**, how much money did you earn from selling your trees?	
6.22	Has Green Resources helped you obtain a land title (register land)?	€ Yes € No € Not applicable
6.23	**If yes to 6.22,** how much land did they help you register? (Write in hectares)	
6.24	Do you have a say in Green Resources activities? **If No, go to 6.25**	€ Yes € No € Do not want to answer
6.24.1	**If yes to 6.24**, how do you have your say in Green Resources activities? (More than 1 answer possible)	€ In meetings € Through letters € I'm a representative € As a worker

		€ Through the council € Through the village chief € Through village development committee € Other:
6.24.2	**If yes to 6.24**, to what extent are you satisfied about your say in Green Resources activities?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
6.25	Have there been any development projects undertaken by the government in your community? **If No, go to 6.26**	€ Yes € No
6.25.1	**If Yes to 6.25**, has your household benefitted from any community development projects undertaken by the government?	€ Yes € No € Do not want to answer € Not applicable
6.25.2	**If Yes to 6.25**, to what extent are you satisfied about these government community development projects?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
6.26	Have your trees or farm land or house been affected by fires in 2015? **If No go to 6.27**	€ Yes € No € Not applicable
6.26.1	**If Yes to 6.26** what was the main cause for the fire? **(Ask only one major cause!)**	€ A farmer (clearing fields) € A hunter € Children € Accident € Arson € Lightening € Green Resources activities € _____ plantation activities € Don't know € Other
6.26.2	**If Yes to 6.26**, how do you assess the severity of the damage?	€ Very severe € Severe € Medium € Low € Very low € Do not know € Do not want to answer
6.26.3	**If Yes to 6.26,** did you receive any compensation for the damages?	€ Yes € No € Do not want to answer

6.26.4	**If Yes to 6.26.3,** from whom did you receive the compensation?	€ Green Resources € Government € Floresta De Niassa plantation company € Other
6.26.5	How do you rate the effectiveness of Green Resources in firefighting in 2015?	€ Very low € Low € Medium € High € Very high € No applicable € Do not know € Do not want to answer
6.27	Has your household lost any crops or animals due to chemicals run off in to lakes and rivers?	€ Yes € No
6.27.1	**If Yes to 6.27,** what was the main source of the chemicals? ***(Ask only 1 main source)***	
6.27.2	**If Yes to 6.27**, did you receive any compensation for the damage?	€ Yes € No € Do not want to answer
6.27.3	**If Yes to 6.27.2**, from whom did you receive the compensation?	€ Green Resources € Government € Floresta De Niassa plantation company € Other
6.28	Has Green Resources helped any of your household members get a birth certificate/ID?	€ Yes € No € Not applicable
6.28.1	**If Yes to 6.28**, do you think that the birth certificates/IDs have benefitted your household?	€ Yes € No
6.28.2	**If Yes to 6.28.1,** what have you benefitted exactly?	

SECTION 7. PERCEPTIONS OF IMPACTS OF PLANTATIONS

Read "Now I would like to know your perceptions about the impacts of the plantations in your village"

7.1	To what extent do you think that the forest **plantations** have changed the following situations in your village in the last year (2015)?						
	Impact	Decreased greatly	Decreased	No Change	Increased	Increased greatly	Do not know
7.1.1	Number of jobs in the village						

7.1.2	Length/ number and conditions of roads or bridges						
7.1.3	Access to & services provided by the government						
7.1.4	Number of conflicts about land						
7.1.5	Number of People moving out of the village						
7.1.6	Number of People moving into the village						
7.1.7	Number and type of Health care facilities						
7.1.8	Quality of education children receive						
7.1.9	Number of children going to school						
7.1.10	Number and type of shops/markets						
7.1.11	Level of food Prices						
7.1.12	Level of firewood and charcoal price						
7.1.13	Availability of feed for livestock						
7.1.14	Other:						

To what extent do you agree with the following statements?		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Do not want to answer
7.2	"My household has in general benefited from the Green Resources plantation."							
7.3	"My household has in general benefited from other forest plantations."							
7.4	"Green Resources is a 'friendly' good neighbor."							
7.5	Name up to three most important aspects that you think Green Resources could do to improve the situation in your village.	1. 2. 3.						

PART 4. SAVINGS, INVESTMENT AND TOTAL INCOME

Read "Now, I want to ask you about any significant investments made by your household member in 2015."

SECTION 8. Types, amounts and sources of investment in 2015

8.1	Did your household make any significant investment in 2015? **If No, go to 9.1**	€ Yes € No
8.1.1	**If Yes to 8.1,** what was the most important (**only ONE!)** investment you made?	9. Bought livestock
		10. Bought gold
		11. Bought land
		12. Cash savings

		5. Started business 10 Education for children/self 11 Other:
8.1.2	How much was the investment?	
8.1.3	Did Green Resources help you finance the investment?	€ Yes € No € Do not want to answer
8.1.4	**If No to 8.1.3,** how did you finance the investment?	€ Sold assets (sold land. livestock, surplus crops) € Loans from microfinance € Loans from commercial banks € Loans from friends/relatives € Own savings € Other:

SECTION 9. Total income and share of different income sources

Read "I would now like to ask you about your (estimated) total income and the shares of different income sources in 2015."

9.1	According to your estimation, what was your total household income in 2015? **(This is only NET income!!!)**				
9.2	What were the shares of each of the following income sources in your total income in 2015? (Ask in percentage terms)		**Income source**		**Share (in %)**
			Agriculture		
			Business		
			Off-farm income		
			Forest Income		
			Remittances		
			Other:		
9.3	Is your household involved in any business? **If No, go to 9.4**		€ Yes € No		
9.3.1	**If Yes to 9.3**, in how many businesses is your household involved?				
	Ask the following for each business activity. Code: 1=shop/trade; 2=handicraft 3=carpentry; 4=other forest based; e.g. baskets/mats; 5=other skilled labor; 6=transport (car, boat,…);	7=lodging/restaurant; 8=brewing; 9=brick making; 10=landlord/real estate; 11=quarrying; 12= contracted work (cleaning/maintenance); 13=renting out equipment; 14=Other:	**Business name (Enter code)**	**How many months worked in 2015?**	**Estimated gross income per month**
9.4	Did you sell any timber in 2015? **(This is different from the sale of trees from the seedling programme of Green Resources!!!)**		€ Yes € No € Do not want to answer		
9.4.1	**If Yes to 9.4**, to whom did you sell?		11. Green Resources		

		12. Government
		13. _____ plantation company
		14. Private individuals
		15. Other:
9.4.2	How much income (in currency terms) did your household obtain from the sale of timber in 2015?	

PART 5. WELFARE PERCEPTIONS AND SOCIAL CAPITAL

SECTION 10: Welfare Perceptions and social capital

Read "Now I would like to ask the last few questions about your life in general. "

10.1	All things considered, to what extent are you satisfied with your life?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
10.2	How well-off was your household in 2015 compared with the situation in 2014?	€ Less well-off € About the same € Better off € Do not want to answer
10.3	To what extent do you agree with the following statement: " My village (community) is a good place to live."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer € Not applicable
10.4	To what extent do you agree with the following statement: " I trust the people in my village /community)."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer € Not applicable
10.5	To what extent do agree with the following statement: "I can get help from people in the village when I am in need, for example, if I need to borrow money because someone in my family is sick."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer € Not applicable

To be filled by the enumerators:

Read	**"This is the end of the interview & thank you very much for participating and for your time ."**		
	"Do you have any questions for me before I leave? "		***Take the time to answer any questions.***
Observations of the enumerator. Do not read the following questions. Simply record your impressions!			
A	Ending time	_ _ : _ _(hh:mm)	
B	How would you judge the respondent's understanding of the questions during the survey?	1	Displayed no problems
		2	Displayed a little difficulty
		3	Displayed moderate difficulty
		4	Displayed serious problems
C	How did the thought process of the respondent appear to you during the survey?	1	Logical and sensible
		2	Somewhat Unclear
		3	Unclear, insensible
		4	Totally disoriented

Space for additional remarks

To be completed by Field coordinator:

Additional Remarks from notes

I confirm that the questionnaire is fully and correctly completed.

Date: / / 2016 (dd/mm)

Signature of field coordinator: _____

_____

_____

Household Survey Mozambique
2016
Comparison Villages

0.1 To be completed by Interviewers

0.11 **0.12**	Interviewer 1 name: Interviewer 2 name:	Interviewer 1 ID: Interviewer 2 ID:	
0.13	Date: / / 2016 (dd/mm)		
0.14	Country:	Mozambique Tanzania	
0.15	Village name: **(Note: Make sure you have the right questionnaire!!!)** € Green Resources Village € Control village		
0.16	**Unique Household code:**		
0.17	**Language of interview**	English/ Swahili/Portuguese	
0.18	**Starting time (hh:mm)**		
	Introduction to household members: "My name is_____. and my partners name is _____.We are here to collect information about the impacts of forest plantations on the living conditions of people in the village ,for a study by Sokoine University of Agriculture, Tanzania; Universidad Eduardo Mundane, Mozambique and Wageningen University in the Netherlands. Your household was selected to be part of this survey. I would like to speak to you (and your spouse/partner)." "The researchers will keep your responses confidential. Your full name will never be used anywhere to ensure confidentiality." "You are not obliged to answer questions if you do not want to and you are free to stop the interview at all times." "We hope that the research will benefit the village and the country by assisting us to understand better the impacts of forest plantations on the livelihoods of the people and inform the relevant bodies to improve the situation in the future." "You will not receive any direct benefit if you join this study, your participation is voluntary." "Do you have any questions for me? You may ask questions about this study at any time." "The survey will take approximately 1hour & 30 minutes."	**0.19**	GPS coordinates of the house of the respondent: H1 Latitude (_____ °_____._____) H2 Longitude (_____ °_____._____) H3 Altitude (_____ M.a.s.l.) **Note: One of the enumerators should start the introduction to the household using a paper version of the introduction while the second enumerator takes the GPS coordinates using the tablet!!!**
0.20	"Are you willing to participate?"	€ Yes € No	
0.21	**If Yes to 0.20,** what is the name of the respondent?		
0.22	**If Yes to 0.20,** is the respondent the household head?	€ Yes € No	

0.23	**If No,** why are you not willing to participate?	**STOP THE INTERVIEW AND INFORM THE FIELD COORDINATOR!**

PART 1. LAND USE, TENURE AND AGRICULTURE

Read "I would like to ask you about your household land ownership and agricultural activities."

SECTION 1: LAND TENURE & USE: THE FARM WALK

Note for enumerator: ***In this part use the farm walk guide to ask the questions and fill in the responses in the tablet during the farm walk!!! Make sure that you have the hard copy of the farm walk guide and follow the instructions accordingly!!!***

1.1.1	Did your household use farmland or a garden in 2015? **If No, go to 1.4**	€ Yes € No € Do not want to answer
1.1.2	**If yes to 1.1.1**, what is total size of the plot(s)your household used last year (2015)? (Write in hectares) ***convert acres into hectares: 1ha= 2.5 ac** **(Note: Use local term for hectare).**	
For each specific plot, ask the questions below (1.2.1- 1.2.8) during the farm walk. Ask for all the plots of the household including those that could not be visited during the farm walk!!! (See guide for the farm walk!!!)		

1.2	**1.2.1**	**1.2.2**	**1.2.3**	**1.2.4**	**1.2.5**	**1.2.6**	**1.2.7**	**1.2.8**
Plot code	Size in hectares *convert acres into hectares 1ha= 2.5 ac	Ownership **CODES**	How acquired? **CODES**	Since when? (year)	If rented, what is the type of the contractual arrangement?	How far is the plot from your house?(in walking minutes)	Land use **SEE CODES**	List the 3 most important crops your household currently grow on each plot.
1								
2								
3								
4								
5								
6								

7								
8								

Codes1.2.2	**1.2.3**	**1.2.5**	**1.2.7**	**1.2.8**
1=Personal/family plot 2=Rented/leased land 3= Free land/Squatter agreement 4=Community land 5=Other:	1=Bought 2=Rented 3=Inherited 4=Family land 5=In temporary use 6=Gifted 7=Other:	1= Sharecropping 2= Rent payment in cash 3= Rent payment in labor services 4= Others:	1= Arable/agricultural land 2= Grazing land 3= Natural trees/forest 4= Planted trees/woodlot 5= Swamp 6= Fallow land 7= Other:	1= Maize 2= Beans 3= Millet 4= Sorghum 5= Rice 6= Coffee 7= Tea 8= Cotton 9 = Wheat 10= Cassava 11= Irish Potatoes 12= Sweet potatoes 13= Banana 14 = Groundnut 15 = Vegetables 16 = Soya beans 17 = Other:

1.3	Does your household use any purchased inputs in crop production in the current season? **If No, go to 1.4**			€ Yes € No € Do not want to answer	
1.3.1	**If Yes to 1.3,** what are the quantities & values of the three most important purchased inputs used in the current season?	Input name	Price per unit	Quantity	Total Cost
1.3.2	If the respondent is not able to answer the use of purchased inputs per each input, ask for the total cost of purchased inputs. (From 1.3.1, add the total cost for the three inputs used.)	Grand total Cost:			

0.1 Livestock: 1.4.1 What is the number of each of the following livestock your household owns currently?

Livestock	**Number (heads)**
Cattle	
Chicken	
Goats	
Sheep	
Pigs	
Donkeys	

Ducks	
Horses	
Turkey	
Others:	

1.4.2	Does your household use any purchased inputs for livestock production? **If No, go to 1.4.4.**	€ Yes € No
1.4.3	**If Yes to 1.4.2,** in your estimate, how much did your household spend on purchased inputs used in livestock production last year (only cash expenditures)?	
1.4.4	What is the main source of water for your crops and/or livestock?	€ River/ lake
		€ Rainwater
		€ Well
		€ Borehole
		€ Other:

PART 2. HOUSEHOLD CHARACTERISTICS AND ECONOMIC SITUATION

SECTION 2. DEMOGRAPHICS AND COMPOSITION : Read - "I would now like to ask you a few questions on the composition of your household"

2.1 **How many people live in your household?** _____

Please list below by first name. Start with the head of the HH, then the spouse and complete the table for any other member.
*A household is defined as "a group of people **currently** eating from the same pot' under the same roof' (or in same compound if the HH has 2 or more structures)."*

HH Member Code	**2.2** Name	**2.3** Sex	**2.4** Age	**2.5** Relation onto Head **SEECODES**	**2.6** Activity **SEECODES**	**2.7** Marital status **SEECODES**	**2.8** Highest completed education **SEE CODES**	**2.9** Religion **SEECODES**	**2.10** Status
01		M F							
02		M F							
03		M F							
04		M F							
05		M F							
06		M F							
07		M F							
08		M F							
09		M F							
10		M F							

11		M	F							
12		M	F							
13		M	F							
14		M	F							
15		M	F							

Codes2.5	Codes 2.6 (more than 1 option possible)	Codes 2.7	Codes2.8	Codes2.9	Codes 2.10
1=Head 2=Spouse 3=Child 4=Parent 5=Sibling 6=Grand-child 7=Grand-parent 8=Orphan 9=Other relative 10=Foster child(no orphan) 11=No relation	1 = Working 2 = Helping in household 3 = Retired 4 = In school 5 = Other 99= Not applicable	1=Single 2=Married 3=Living together with partner 4=Divorced 5 =Widow or widower 6=Married/together with partner ,but partner is temporarily living elsewhere 99=Not applicable(<12 years old)	1= Kindergarten 2= Primary (1-7) 3= Secondary 4= College and above 99=No schooling	1=Christian 2=Muslim 3=Traditional 4=Other:	1= No status 2= Village chief 3= Elder 4= Youth leader 5= Women's leader 6= Religious leader 7= Tribal leader 8= Other:

SECTION 3. HOUSEHOLD STATUS :

Read "Now I would like to know about your place of origin."

3.1	Was the household head born in the village in which your household currently lives? **If Yes, go to 4.1.**	€ Yes € No
3.2	**If No to 3.1**, when did the household (head) move to the village? (Write the year)	
3.3	**If No to 3.1,** why did the household (head) move to the village?	€ In search of land € To work at plantations € In search of other job € Other:
3.4	If your household (head) moved to work at plantations, please state at which plantation?	

SECTION 4. ECONOMIC SITUATION AND HOUSEHOLD ASSETS:

Read " I would now like to know about your household's house situation and asset ownership."

4.1	Does your household own or rent the dwelling/house you live in?		€ Own	
			€ Don't own but live for free	
			€ Rent	
			€ Other:	
4.2	What is the main material of the roof of the house?		€ Straw / thatch € Zinc / Iron sheets € Plastic sheet (tarpaulin) € Wood € Other:	
4.3.1	What is the main source of drinking water for your household?	€ Tap in the compound	€ Unprotected well/borehole	€ Rainwater
		€ Public tap	€ Spring	€ Vendor / tank
		€ Protected well/borehole	€ Stream/lake	€ Other:
4.3.2	If the source of water is outside the compound, what is the distance to source of water used (in walking minutes)? **(If the source of water is inside the compound, write 99)**			
4.4	What is the main source of lighting (power) for your household?		€ Electricity € Solar power € Batteries € Candles € Oil/petrol Lamps € Wood € None	
4.5	What is your household's main source of energy for cooking?		€ Charcoal € Fire wood € Electricity € Solar power € Gas € Other:	
4.6	Does your household have a private toilet?		€ Yes € No € Do not want to answer	
4.7	Does your household **<u>own</u>** any of the following? **SELECT ALL THAT APPLY.WHILE ASKING, ALSO OBSERVE IF POSSIBLE.**		€ Bicycle	€ Car
			€ Motorbike	€ Truck
			€ Fridge	€ Cart
			€ Generator	€ Tractor
			€ Radio	€ TV
			€ Cellphone	€ Water tanks

		€ DVD player	€ Sofa

PART 3. FOREST INCOMES & IMPACTS OF PLANTATIONS

For the enumerator:

"Forests, which include natural forests and forest plantations, are lands of more than 0.5 hectares, with a tree canopy cover of more than 10 %, which are not primarily under agricultural or urban land use. A natural forest is defined as 'forests composed of indigenous trees, not planted by humans'. Plantation forest, on the other hand, is defined as: 'Forest stands established by planting or/and seeding in the process of afforestation or reforestation.'

SECTION 5: USE OF FOREST PRODUCTS.

Read: " I would now like to ask you about the use of forest products by your household." "When we say Green Resources plantations in the remainder of the questionnaire, we specifically refer to the Lurio and Niassa plantations owned by Green Resources AS. And when we say Floresta De Niassa plantation in the remainder of the questionnaire, we refer to the plantation owned by Floresta De Niassa."

5.1	Did your household members collect any forest products in 2015? **If No go to, 5.2.1**	€ Yes € No € Do not want to answer
	If Yes to 5.1, how many forest products did your household members collect from forest, grassland and woodlots for both own use and sale over the last year (January – December, 2015)?	

5.1.1 Timber & Non-timber Forest product (*see code)*	5.1.2 Amount produced or collected in units (local units) (N1)	5.1.3 Who owns the land/forest? *See code*	5.1.4 Market Price per unit (N2)	5.1.5 Total Value (N1*N2)
1. Grass/thatch for roof 2. Medicinal plants 3. Firewood 4. Honey 5. Poles 6. Wild fruits 7. Bamboo 8. Ropes 9. Other:	1.Bundle 2. Sacks 3. Tins 4. Bucket 5. Poles 6. Liter bottle 7. Other:	1. Community forest 2. Government plantations 3. Company Plantations 4. Own planted trees 5. Natural forests 6. Green Resources 7. No ownership 8. Do not know 9. Other:		

5.2 Access to Forest Products

5.2.1	**If No to 5.1,** what is the main reason for this? **And Go to 6.1**	
5.2.2	**If Yes to 5.1**, have the forest plantations affected your household's access to forest products (e.g., firewood, medicinal plants, wild fruits, honey etc. in 2015?	€ Yes, improved € Yes, decreased € No
5.2.3	**If Yes , improved or Yes, decreased to 5.2.2,** which plantations have affected your access to forest products?	

SECTION 6. FOREST PLANTATIONS AND IMPACTS.

Read "Now I would like to ask you about the forest plantations in/near your village owned by private companies/government and their impacts on your village."

	(Read out)		
6.1	To what extent do you agree with the following statement?: "My household had a problem of food availability in 2015"	€ Strongly agree € Agree € Neutral € Disagree € Strongly disagree € Do not want to answer	
6.2	**If agree or strongly agree,** what do you think are the main causes for your food availability problem? (Write up to a maximum of 3 causes)	1. 2. 3.	
6.3	To what extent do you agree with the following statement?: 'My household had a problem of water availability for domestic/agricultural use in 2015"	€ Strongly agree € Agree € Neutral € Disagree € Strongly disagree € Do not want to answer	
6.4	**If agree or strongly agree,** what do you think are the main causes for your water availability problem? (Write up to a maximum of 3 causes)	1. 2. 3.	
6.5	Are there forest **plantations** near your village?	€ Yes € No	
6.6	**If yes to 6.5**, who owns these **plantations**?	Name of plantation	Owner
6.7		Name of plantation	Year of Start

	If yes to 6.5, when did they start? (write the year)		
6.8	Are members of your household currently employed in the plantations owned by _____? **If No, go to 6.10.**	€ Yes € No	
6.8.1	**If Yes to 6.8,**how many household members work at the _____ plantation? **And ask questions 6.8.2 – 6.9**		

6.8.2 Household Member *(code should match the code in 2.1)*	6.8.3 Contract Type	6.8.4 Kind of job	6.8.5 Salary per month 0r wage/ week	6.8.6 Does their salary cover their basic needs?	6.8.7 Is the household member satisfied with the working conditions at Green Resources?	6.8.8 Do the working members receive any of the following from the government plantation? ***Social security means pensions and other benefits.***	6.8.9 Did the working members receive any training in 2015?
	0=Seasonal 1=Permanent	1. Plantations 2. Industrial 3. Other	99 =n/a 88 =do not know			10. Health care insurance 11. Social security 12. Other:	
				€ Yes € No € Don't want to answer € Do not know	€ Yes € No € Do not want to answer € Don't know	☐ Yes ☐ No ☐ DO not know	€ Yes € No € Do not know
				€ Yes € No € Do not want to answer € Don't know	€ Yes € No € Do not want to answer € Don't know	☐ Yes ☐ No ☐ DO not know	€ Yes € No € Do not know
				€ Yes € No € Do not want to answer € Don't know	€ Yes € No € Do not want to answer	☐ Yes ☐ No ☐ DO not know	€ Yes € No € Do not know

					€ Don't know		
6.9	Which items have you acquired or which changes have occurred in your household since members started to work on the _____ forest plantations? **(More than one option possible)**					€ Built/bought a house € Repaired/improved house € Bike € Motorbike € Furniture € Started a business € Education/schooling € Car € Other: € No change has occurred	
6.10	Has your household ever been relocated or had to give up farm land? **If NO, go to 6.11**					€ Yes € No € Do not want to answer	
6.10.1	**If Yes to 6.10,** when was it? **(Write the year the household was relocated/ gave up farm land)**						
6.10.2	**If Yes to 6.10**, what was the reason?					€ Road construction € Government plantation € Green Resources plantation € Floresta De Niassa plantation € Other:	
6.10.3	**If Yes to 6.10**, did you get compensation for the relocation or the land you gave up? **If No to 6.10.3, go to 6.10.5.**					€ Yes € No € Do not want to answer	
6.10.4	**If Yes to 6.10.3,** from whom did you get the compensation? **(More than one answer possible)**					€ Government € The Floresta De Niassa plantation company € Green Resources plantation € Other:	
6.10.5	**If No to 6.10.3,** how did you deal with the situation?					€ Search new land € Share with family/friends € Rent land/house € Other:	
6.11	To what extent are you satisfied with your dealings with the _____ plantation?					€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Not applicable € Do not want to answer	
6.11.1	If very dissatisfied or dissatisfied, what are the main causes for the dissatisfaction? **(More than one answer possible)**					€ Conflicts with government plantation € No/ too little compensation for land € The way complaints are dealt with	

		€ Speed at which complaints are dealt with € Promises not kept € Other: € Not applicable € Do not want to answer
6.11.2	If very satisfied or satisfied, what are the main causes for the satisfaction? **(More than one answer possible)**	€ Good compensation € The way complaints are dealt with € Speed at which the issue was handled € Promises were kept € Other: € Not applicable € Do not want to answer
6.12	Do you think that the _____ plantation responds to and addresses the complaints /grievances from the community?	€ Yes € No € Do not want to answer € Not applicable
6.13	Has the availability of farm land for your household decreased in 2015?	€ Yes € No € Do not want to answer € Not applicable
6.13.1	**If yes to 6.13**, what is the main cause for this?	€ Land taken by private plantation companies, specify: € Land taken by government plantations € The household sold land € Other:
6.13.2	If the household sold land in 2015, to whom was the land sold?	
6.14	To what extent are you satisfied with the amount of water for your domestic and agricultural use?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.15	Do you think that the other companies like tea plantations, paper mills have changed the availability of water for your domestic or agricultural farm use? **If No, go to 6.17.**	€ Yes € No € Do not want to answer € Not applicable
6.16	**If Yes to 6.15**, how has it changed?	€ Increased € Decreased

6.17	How do you assess the current situation/level in each of the following in your village?	Very Low	Low	Medium	High	Very High	Not applicable	Do not know
	hh. Soil quality							
	ii. Ground water quantity							
	jj. Ground water quality							
	kk. Number of wild plants and animals in the forests							

	ll. Number of wild plants and animals in the plantations							
	mm. Number of wild plants and animals in your fields							
	nn. Number of eucalyptus trees found off plantation							
	oo. Number of pine trees found off plantation							
	pp. Number of landslides							
	qq. Number/frequency of soil erosion							
	rr. Number/frequency of floods							
	L. Deforestation/ illegal logging on natural and community forests							

6.18	Has your household benefited from any community development project undertaken by the _____ plantation company? **If No, go to 6.20**	€ Yes € No € Do not want to answer € Not applicable
6.19	**If yes to 6.18**, indicate the types of community development projects by the _____ plantation from which your household benefitted? **(More than one answer possible)**	€ School(s) € Road(s) € Bridge(s) € Water well(s) € Community hall(s) € Agricultural outgrower program € Tree Seedlings programme € Other:
6.20	To what extent are you satisfied with the community development projects undertaken by the _____ plantation Company?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer Not applicable
6.21	Has your household participated in the _____ plantation seedlings programme?	€ Yes € No € Do not want to answer € Not applicable
6.21.1	**If Yes to 6.21**, how many seedlings did your household receive from the_____ plantation programme so far?	
6.21.2	**If Yes to 6.21,** In which year were they planted?	
6.21.3	Did you sell any trees from the _____ plantation seedling programme in 2015?	€ Yes € No € Do not want to answer € Not applicable
6.21.4	**If Yes to 6.21.3,** how much money did you earn from selling the trees?	
6.22	Has the government plantation helped you obtain a land title (register land)?	€ Yes € No
6.23	**If yes to 6.22**, how much land did they help you register? (Write in hectares)	
6.24	Do you have a say in the activities of the _____ plantation?	€ Yes

		€ No € Do not want to answer € Not applicable
6.24.1	**If yes to 6.24,** how do you have your say in the activities of the government plantation? **(More than 1 answer possible)**	€ In meetings € Through letters € I'm a representative € As a worker € Through the council € Through the village chief € Through village development committee € Other:
6.24.2	**If yes to 6.24**, to what extent are you satisfied about your say in the activities of the government plantation?	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer € Not applicable
6.25	Have there been any development projects undertaken by the **government** in your community? If No, go to 6.26. **(NOTE: This is different from projects by the government plantations!!!).**	€ Yes € No
6.25.1	**If Yes to 6.25**, has your household benefitted from any community development projects undertaken by the **government**? **(NOTE: This is different from projects by the government plantations!!!).**	€ Yes € No € Do not want to answer € Not applicable
6.25.2	**If yes to 6.25**, to what extent are you satisfied about these **government** community development projects? **(NOTE: This is different from projects by the government plantations!!!).**	€ Very dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
6.26	Have your trees or farm land or house been affected by fires in 2015? **If No, go to 6.26.5**	€ Yes € No € Do not want to answer € Not applicable
6.26.1	**If Yes to 6.26**, what was the main cause for the fire? **(Ask only one major cause!)**	€ A farmer (clearing fields) € A hunter € Children € Accident € Arson € Lightening € Green Resources activities € _____plantation activities € Don't know € Other

6.26.2	**If Yes to 6.26**, how do you assess the severity of the damage?	€ Very severe € Severe € Medium € Low € Very low € Do not know € Do not want to answer
6.26.3	**If Yes to 6.26**, did you receive any compensation for the damages?	€ Yes € No € Do not want to answer € Not applicable
6.26.4	**If Yes to 6.26.3,** from whom did you receive the compensation?	☐ Government ☐ The _____ plantation company, specify: ☐ Green Resources € Other:
6.26.5	How do you rate the effectiveness of the government plantation in firefighting in 2015?	€ Very low € Low € Medium € High € Very high € No applicable € Do not know € Do not want to answer
6.27	Has your household lost any crops or animals due to chemicals run off in to lakes and rivers?	€ Yes € No
6.27.1	**If Yes to 6.27**, what was the main source of the chemicals? **(Ask only 1 main source)**	☐ Government ☐ The _____ plantation company, specify: ☐ Green Resources plantation € Other:
6.27.2	**If Yes to 6.27,** did you receive any compensation for the damages?	€ Yes € No € Do not want to answer
6.27.3	**If Yes to 6.27.2**, from whom did you receive the compensation?	
6.28	Has the government plantation helped any of your household members get a birth certificate/ID?	€ Yes € No € Not applicable
6.28.1	**If Yes to 6.28,** do you think that the birth certificates/IDs have benefitted your household?	€ Yes € No
6.28.2	**If Yes to 6.28.1,** what have you benefitted exactly?	

SECTION 7. PERCEPTIONS OF IMPACTS OF PLANTATIONS:

Read "Now I would like to know your perceptions about the impacts of the plantations in your village"

7.1	To what extent do you think that the forest **plantations** in your village have changed the following situations in your community in 2015?						
	Impact	**Decreased greatly**	**Decreased**	**No Change**	**Increased**	**Increased greatly**	**Do not know**
	7.1.1 Number of jobs in the village						
	7.1.2 Length/ number and conditions of roads or bridges						
	7.1.3 Access to & Services provided by the government						
	7.1.4 Number of conflicts about land						
	7.1.5 Number of People moving out of the village						
	7.1.6 Number of People moving into the village						
	7.1.7 Number and type of Health care facilities						
	7.1.8 Quality of education children receive						
	7.1.9 Number of children going to school						
	7.1.10 Number and type of shops/markets						
	7.1.11 Level of food Prices						
	7.1.12 Level of firewood and charcoal price						
	7.1.13 Availability of feed for livestock						
	7.1.14 Other:						

	To what extent do you agree with the following statements?	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Do not want to answer
7.2	"My household has in general benefited from the government plantations."							
7.3	"My household has in general benefited from the Floresta De Niassa forest plantations."							
7.4	"The Floresta De Niassa plantation is a 'friendly' good neighbor."							
7.5	Name up to three most important aspects that you think the government plantation could do to improve the situation in your village.	1. 2. 3.						

PART 4. SAVINGS, INVESTMENT AND TOTAL INCOME: Read "Now, I want to ask you about any significant investments made by your household member in 2015."

SECTION 8. Types, amounts and sources of investment in 2015.

8.1	Did your household make any significant investment in 2015? **If No, go to 9.1.**	€ Yes € No
8.1.1	**If Yes to 8.1,** what was the most important (**only ONE!**) investment you made?	13. Bought livestock 14. Bought gold 15. Bought land 16. Cash savings 5. Started business 12 Education for children/self 13 Other:
8.1.2	How much was the investment you made?	
8.1.3	Did the Floresta De Niassa company help you finance the investment?	€ Yes € No € Do not want to answer € Not applicable
8.1.4	**If No to 8.1.3,** how did you finance the investment?	€ Sold assets (sold land. livestock, surplus crops etc.) € Loans from microfinance € Loans from commercial banks € Loans from friends/relatives € Own savings € Other:

SECTION 9. Total income and share of different income sources

Read "I would now like to ask you about your (estimated) total income and the shares of different income sources in 2015."

9.1	According to your estimation, what was your total household income in 2015? **(This is only NET income!!!)**		
9.2	What were the shares of each of the following income sources in your total income in 2015? (Ask in percentage terms)	**Income source**	**Share (in %)**
		Agriculture	
		Business	
		Off-farm income	
		Forest Income	
		Remittances	
		Other:	
9.3	Is your household involved in any business? **If No, go to 9.4**	€ Yes € No	

<table>
<tr><td>9.3.1</td><td colspan="5">If Yes to 9.3, in how many businesses is the household involved?</td></tr>
<tr><td rowspan="4"></td><td colspan="2" rowspan="4">Code for each business activity
1=shop/trade;
2=handicraft
3=carpentry;
4=other forest based; e.g. baskets/mats;
5=other skilled labor;
6=Transport (car, boat,…);
7=lodging/restaurant;
8=brewing;
9=brick making;
10=landlord/real estate;
11=quarrying;
12= contracted work (cleaning/maintenance);
13=renting out equipment;
14=Other:</td><td>Business name (Enter code)</td><td>How many months worked in 2015?</td><td>Estimated gross income per month</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>9.4</td><td colspan="2">Did you sell any timber in 2015?
(This is different from the sale of trees from the seedling programme of the company!!!)</td><td colspan="3">€ Yes
€ No
€ Do not want to answer
€ Not applicable</td></tr>
<tr><td rowspan="5">9.4.1</td><td colspan="2" rowspan="5">If Yes to 9.4, to whom did you sell?</td><td colspan="3">16. Green Resources</td></tr>
<tr><td colspan="3">17. Government</td></tr>
<tr><td colspan="3">18. _____plantation company</td></tr>
<tr><td colspan="3">19. Private individuals</td></tr>
<tr><td colspan="3">20. Other:</td></tr>
<tr><td>9.4.2</td><td colspan="2">If Yes to 9.4, How much income (in currency terms) did your household obtain from the sale of timber in 2015?</td><td colspan="3"></td></tr>
</table>

PART 5. WELFARE PERCEPTIONS AND SOCIAL CAPITAL

SECTION 10: Welfare Perceptions and social capital

Read "Now I would like to ask the last few questions about your life in general. "

10.1	All things considered, to what extent are you satisfied with your life?	€ Very Dissatisfied € Dissatisfied € Neutral € Satisfied € Very satisfied € Do not want to answer
10.2	How well-off was your household in 2015 compared with the situation in 2014?	€ Less well-off € About the same € Better off € Do not want to answer
10.3	To what extent do you agree with the following statement: " My village (community) is a good place to live."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer € Not applicable
10.4	To what extent do you agree with the following statement: " I trust the people in my village /community)."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer € Not applicable
10.5	To what extent do agree with the following statement: "I can get help from people in the village when I am in need, for example, if I need to borrow money because someone in my family is sick."	€ Strongly disagree € Disagree € Neutral € Agree € Strongly agree € Do not want to answer € Not applicable

To be filled by the interviewers:

Read	**"This is the end of the interview & thank you very much for participating and for your time ."** **"Do you have any questions for me before I leave?"** ***Take the time to answer any questions.***		
Observations of the enumerator. Do not read the following questions. Simply record your impressions!			
A	Ending time	_ _ : _ _(hh:mm)	
		1	Displayed no problems

B	How would you judge the respondent's understanding of the questions during the survey?	2	Displayed a little difficulty
		3	Displayed moderate difficulty
		4	Displayed serious problems
C	How did the thought process of the respondent appear to you during the survey?	1	Logical and sensible
		2	Somewhat Unclear
		3	Unclear, insensible
		4	Totally disoriented

Space for additional remarks

To be completed by Field coordinator:

Additional Remarks from notes

I confirm that the questionnaire is fully and correctly completed.

Date: / / 2016 (dd/mm)

Signature of field coordinator: _____

_____

_____

Appendix A3. Focus Group Discussion Questionnaire
Village Level Survey
Tanzania and Mozambique

The focus group should be composed of people from different backgrounds and socio-economic status. At least 5 people are needed for the discussion (village chief, village elders, extension officer, religious leader, school teacher, members of outgrowers groups, members of saving clubs, leaders of youth groups, shop owners, village executive officers, housewives etc.).

A: General information (To be filled by the enumerator)

1.	Date of focus group discussion	___ - ___ - 2016 Starting time: (hh:mm)
2.	Name and ID of facilitator and enumerator	Name of facilitator: I.D.: Name of enumerator: I.D.:
3.	Village name and code	Village name:
4.	Total number of people in the Focus Group	

B. Demographics

5.	In what year was the village established?	
6.	How many (approximately) households[20] currently live in the village?	
7.	Is there any change in the number of (people) in the village in the past two years?	€ Yes € No

[20] *A household (HH) is defined as "a group of people **currently** eating from the same pot 'under the same roof' (or in same compound if the HH has 2 or more structures)."*

8.	What do you think is the cause of (any) changes in community size?		
9.	Which different groups (tribes) live in the village?		
10.	What do you think is the cause of (any) changes in tribes?		
11.	Do you think the plantations have had an effect on migration in/out of the village?	In migration	€ Yes € No
		Outmigration	€ Yes € No

C. **Infrastructure**

12.	How many households (approximately) in the village had access to electricity (from public or private suppliers) in 2015?	
13.	How many households (approximately) in the village had tap water in 2015?	
14.	Was there a well/borehole where the village can access potable water in 2015?	€ Yes € No
15.	How many households (approximately) in the village used river water for potable water in 2015?	
16.	How many (approximately) formal credit (micro finance, government or commercial banks) institutions were operating in the village in 2015?	
17.	How many (approximately) *informal* credit institutions (savings clubs and money lenders) operated in the village in 2015?	
18.	How many health centres were there in the village in 2015?	
19.	Was there a functioning school in the village in 2015? what level?	€ Yes € No
		Level:

20.	Is the village connected to at least one road useable by cars in all seasons? ***If 'yes', go to 21***	€ Yes € No	
21.	**If 'no to 20':** what is the distance in kilometers to the nearest road usable during all seasons?	*km*	
22.	Which services is the local council ***UNABLE*** to provide?[21]		
23.	What is the distance from the village center to the nearest **(in *km* and in *minutes* by *most common means of transport*)**		**In km** / **In minutes**
		1. Village market	
		2. Town market	

D. **Forest, land cover & use**

Note for the facilitator/ enumerator: In this section, use an administrative map (if available) or ask the participants to draw a rough map of the village and locate the different types of land categories in the village[22] (and ask for approximate area in hectares or shares and distance from some defining features or landmarks in the village such as rivers, water pumps, schools, forest, roads, etc.). Use pen/pencil and paper or local materials like stones and ask them to draw on the land. Make sure that everyone participates actively!!! Do not forget to take a photo of the finished map!!!

	1. Land category	**2. Total area** (hectares) or percentage	**Ownership** (in hectares or percentage)				**7. Distance**	
			3. State	**4. Community**	**5. Private**	**6. Open access**	**kms**	**Minutes**
	Forest:							
24	Natural forest							
25	Managed plantations (large scale)							
	Agricultural land:							
26	Cropland							
27	Pasture (natural or planted)							
28	Small holder plantations							

[21] Water, electricity, health etc.

[22] "A village is defined as the lowest administrative unit in an area, normally under the jurisdiction of a village leader/council."

29	Fallow							
	Other land categories:							
30	Grassland							
31	Residential areas, infrastructure							
32	Wetland							
33	Other, specify:							
34	*Total land*							

35.	Has the amount of land used by people in the village for farming/woodlots/livestock changed in the last 2 years?	€ Yes € No
36.	**If Yes to 35**, what was the change?	1= Increased 2= Decreased
37.	**If Yes**, what were the **3 main causes**?	1. 2. 3.

E. **Agricultural and Forest resource base**

38.	What are the **five most important products** (MIP)[23] (forest and agricultural) for the livelihood of the people in the village? **(Please rank them)**	*Most important*	*Rank (up to 5)*
		1= Fire- wood or charcoal	
		2= Timber or other wood	
		3= Food from the forest	
		4= Medicine from the forest	
		5= Forage from the forest	
		6= Agricultural crops	
		7= Livestock	
		8= Other:	

[23] "Most important" is defined as the most important for the wellbeing of the village, whether it be through direct use in the home, or through sale for cash, or both.

39.	How has availability of these most important products (MIP) changed over the past 2 years?	1.	€ Increased € No change € Decreased
		2.	€ Increased € No change € Decreased
		3.	€ Increased € No change € Decreased
		4.	€ Increased € No change € Decreased
		5.	€ Increased € No change € Decreased
39.1	If the availability of the MIPs has **declined**, what are the *three most important* reasons for this? **Please rank them**.	1.	
		2.	
		3.	
39.2	If the availability of the MIPs has **increased**, what are the *three most important* reasons for this? **Please rank them.**	1.	
		2.	
		3.	

F. **Forest Plantations**

40.	Are there forest plantations near your village?	€ Yes € No
40.1	**If yes to 40**, state the names of the plantations found near your village?	
40.2	Were village members consulted before the forest plantations started in your village?	€ Yes € No
40.3	How did the village first came to know about the plantations?	1= Announcement by village chief
		2= Announcement by the company
		3= Announcement from central/district government

		4= When the company started planting trees and operations (No announcement)	
		5= Announcement by NGOs	
		6= Other:	
40.4	What was the land use type and ownership status of the sites before the plantations started?	*Land use type*	*Ownership*
		1= Agricultural land	1= Open access
		2= Woodland	2= State owned
		3= Forest	3= Communal
		4= Grass land	4= Private
		5= Residential areas	5= Other
		6= Other:	
41.	What are the major changes that forest plantations have caused in your village**? (Record 5 major changes and ask them to prioritize)**	1.	
		2.	
		3.	
		4.	
		5.	
42.	Has there been any fire damage in the village resulting from the plantation activities in 2015?	€ Yes € No	
43.	**If yes to 42,** has any compensation been paid to those affected?	€ Yes € No	
44.	Have any people moved to the village in search of job at the plantations and forest based industrial activities?	€ Yes € No	
45.	How many households (approximately) in the village supply timber to the plantations?		
46.	How many households (approximately) in the village supply other products or services (e.g. food) to the plantations ?		
47.	How many households (approximately) in the village have their own woodlots?		
48.	Have any people in your village had to move from their land due to the plantation activities?	€ Yes € No	

48.1	**If Yes to 48**, when? **(Write the year)**	
48.2	**If Yes to 48**, how many (approximately)?	
48.3	**If Yes to 48**, how many (approximately) received compensation?	
49.	Have there been individual or community conflicts with the plantations?	€ Yes € No
49.1	**If Yes to 49**, when?	
49.2	**If yes to 49,** concerning what?	
50.	Which community development projects have been undertaken by the plantation companies in the village? (Ask to name the 4 most important community development projects)	1.
		2.
		3.
		4.
51.	Does the village has a say in the projects implemented by the plantations?	€ Yes € No
52.	Do you think that the village has benefited from these projects?	€ Yes € No
53.	Which groups of people in the village have benefited most from these projects? (i.e. men, women, children, the youth, the old, the poor, the rich, all)	1.
		2.
		3.
54.	Do you think in general that the village has benefitted from the activities and investments of the plantation companies?	€ Yes € No
55.	What are the positive effects of the large scale plantation(s) on your village? **(Name up to 3)**	1.
		2.
		3.
56.	What are the negative effects of the large scale plantation(s) on your village? **(Name up to 3)**	1.
		2

		. 3.
57.	Have trees from the plantations spread in to the farms and fields in the village?	€ Yes € No
58.	Do you think this is a problem?	€ Yes € No

Challenges and recommendations

59.	What are your top 5 recommendations to the plantations in/ near your village? **(N.B.: Prioritized by the community or by different stakeholder groups if no consensus can be reached)**	1.
		2.
		3.
		4.
		5.

For the facilitator and enumerator:

This is the end of the focus group discussion. Thank the participants for their time & participation & answer if they have any questions or doubts!

Ending time: _____ (HH:MM)

General Remarks:

_____
_____
_____
_____

References

AFF, 2011. Forest Plantations And Woodlots In Tanzania, African Forest Forum Working Paper Series. African Forest Forum, Nairobi.

Agarwal, B., 2001. Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. World Development 29, 1623-1648.

Agrawal, A., Chhatre, A., Hardin, R., 2008. Changing governance of the world's forests. Science 320, 1460-1462.

Agrawal, A., Gupta, K., 2005. Decentralization and participation: the governance of common pool resources in Nepal's Terai. World Development 33, 1101-1114.

Ajzen, I., 1991. 'The Theory of Planned Behavior', Organizational Behavior and Human Decision Processes, 50(2), pp. 179–211. doi: 10.1016/0749-5978(91)90020-T.

Angelstam, P., Naumov, V., Elbakidze, M., Manton, M., Priednieks, J. and Rendenieks, Z., 2018. Wood production and biodiversity conservation are rival forestry objectives in Europe's Baltic Sea Region. Ecosphere, *9*(3), p.e02119.

Arnstein, S.R., 1969. A ladder of citizen participation. Journal of the American Institute of Planners 35, 216-224.

Arrow, K.J., Dasgupta, P., Goulder, L.H., Mumford, K.J., Oleson, K., 2012. Sustainability and the measurement of wealth. Environment and Development Economics 17, 317‑353.

Arts, B., 2014. Assessing forest governance from a 'Triple G' perspective: Government, governance, governmentality. Forest Policy and Economics 49, 17-22.

Arts, B., Visseren-Hamakers, I., 2012. Forest governance: A state of the art review, Forest-people interfaces. Springer, pp. 241-257.

Arvola, A.; Brockhaus, M.; Kallio, M.; Pham, T.T.; Chi, D.T.; Long, H.T.; Nawir, A.A.; Phimmavong, S.; Mwamakimbullah, R.; Jacovelli, P., 2020. What drives smallholder tree growing? Enabling conditions in a changing policy environment. Forest Policy and Economics116, 102–173.

Auld, G., Gulbrandsen, L.H., McDermott, C.L., 2008. Certification schemes and the impacts on forests and forestry. Annual Review of Environment and Resources 33, 187‑211.

Aykol, B. and Leonidou, L.C., 2015. Researching the green practices of smaller service firms: A theoretical, methodological, and empirical assessment. Journal of Small Business Management, 53(4), pp.1264-1288.

Banerjee, S.B., 2002. Corporate environmentalism: The construct and its measurement. Journal of business research, 55(3), pp.177-191.

Banerjee, S. B., Iyer, E. S., and Kashyap, R. K., 2003.'Corporate Environmentalism: Antecedents and Influence of Industry Type', Journal of Marketing **67**(2), 106-122.

Baral, H., Guariguata, M.R. and Keenan, R.J., 2016. A proposed framework for assessing ecosystem goods and services from planted forests. Ecosystem Services, 22, pp.260-268.

Bardi, A and Schwartz, SH.**,** 2003. Values and behavior: Strength and structure of relations. Personality and Social Psychology Bulletin 29: 1207-1219. https://doi.org/10.1177/0146167203254602.

Barrow, E.G., Clark J., Grundy I., Kamugisha-Ruhombe J & Tessema Y., 2002. Analysis of stakeholder power and responsibilities in community involvement in forest management in Eastern and Southern Africa. Forest and Social Perspectives in Conservation No. 9. IUCN. Nairobi. p.167.

Bartley, T., 2007. How foundations shape social movements: The construction of an organizational field and the rise of forest certification. Social Problems 54, 229-255.

Bass, S., 2001. Introducing Forest Certification. A report prepared by the Forest Certification Advisory Group (FCAG) for DGVIII of the European Commission. European Forest Institute Discussion Paper 1, Joensu, Finland.

Bass, S., Thornber, K., Markopoulos, M., Roberts, S., Grieg-Gran, M., 2001. Certifications Impacts on Forests, Stakeholders and Supply Chains, Instruments for Sustainable Private Sector Forestry Series. International Institute for Environment and Development, London.

Bergstrom, T., Blume, L., Varian, H., 1986. On the private provision of public goods. Journal of Public Economics 29, 25‑49.

Berkes, F., Folke, C., Colding, J., 2000. Linking social and ecological systems: management practices and social mechanisms for building resilience. Cambridge University Press Cambridge, UK.

Bernstein, S., Cashore, B., 2004. Non-state global governance: is forest certification a legitimate alternative to a global forest convention, in: Kirton, J.J. and Trebilcock, M.J. (Eds.), Hard choices, soft law: Voluntary standards in global trade, environment and social governance, (33-63), Aldershot, Ashgate.

Besley, T., Ghatak, M., 2007. Retailing public goods: The economics of corporate social responsibility. Journal of Public Economics 91, 1645-1663.

Blackman, A., Rivera, J., 2011. Producer-level benefits of sustainability certification. Conservation Biology 25, 1176-1185.

Bleidorn, W., Hill, P.L., Back, M.D., Denissen, J.J., Hennecke, M., Hopwood, C.J., Jokela, M., Kandler, C., Lucas, R.E., Luhmann, M. and Orth, U., 2019. The policy relevance of personality traits. American Psychologist, 74(9), p.1056.

Bleyer, M., Kniivilä, M., Horne, P., Sitoe, A., Falcão, M.P., 2016. Socio-economic impacts of private land use investment on rural communities: industrial forest plantations in Niassa, Mozambique. Land Use Policy 51, 281‐289.

Bluwstein, J., 2017. Creating ecotourism territories: Environmentalities in Tanzania's community-based conservation. Geoforum 83, 101-113.

Boone, C., 2015. Land tenure regimes and state structure in rural Africa: implications for forms of resistance to large-scale land acquisitions by outsiders. Journal of Contemporary African Studies, 33(2), 171-190.

Borden, R.J. and Francis, J.L., 1978. Who cares about ecology? Personality and sex differences in environmental concern 1. Journal of Personality, 46(1), pp.190-203.

Botchway, K., 2001. Paradox of empowerment: reflections on a case study from Northern Ghana. World Development 29, 135-153.

Bragg, E.A., 1996. Towards ecological self: Deep ecology meets constructionist self-theory. Journal of Environmental Psychology, 16(2), pp.93-108.

Brandstätter, H., 2011. Personality aspects of entrepreneurship: A look at five meta-analyses. Personality and Individual Differences, 51(3), pp.222-230.

Byakagaba, P., Muhiirwe, R., 2017. Industrial forest plantations in Uganda: local adjacent community perspectives. Journal of Sustainable Forestry 36, 375‐387.

Capistrano, D., 2010. Gouvernance forestière et décentralisation en Afrique. Enjeux et tendances. , in: German, L.A., Karsenty, A., Tiani, A.-M. (Eds.), Gouverner les forêts africaines à l'ère de la mondialisation (pp. 426-446). CIFOR, Bogor, Indonesia.

Caprara, G.V. and Cervone, D., 2000. Personality: Determinants, dynamics, and potentials. Cambridge University Press.

Caprara, G.V., Schwartz, S., Capanna, C., Vecchione, M. and Barbaranelli, C., 2006. Personality and politics: Values, traits, and political choice. Political Psychology, *27*(1), pp.1-28.

Carlson, A., Palmer, C., 2016. A qualitative meta-synthesis of the benefits of eco-labeling in developing countries. Ecological Economics 127, 129-145.

Casaburi, L., Glennerster, R., Suri, T., 2013. Rural Roads and Intermediated Trade: Regression Discontinuity Evidence From Sierra Leone.

Cashore, B., 2002. Legitimacy and the privatization of environmental governance: How non–state market-driven (NSMD) governance systems gain rule-making authority. Governance 15, 503-529.

Cashore, B., Auld, G., Bernstein, S., McDermott, C., 2007. Can non-state governance 'ratchet up' global environmental standards? Lessons from the forest sector. Review of European, Comparative & International Environmental Law 16, 158-172.

CEPF, 2019. EU forests in the European Green Deal. **http://www.cepf-eu.org/news/eu-forests-european-green-deal** (accessed 10 July 2020).

Cerutti, P.O., Lescuyer, G., Tacconi, L., Eba'a Atyi, R., Essiane, E., Nasi, R., Tabi Eckebil, P.P., Tsanga, R., 2017. Social impacts of the Forest Stewardship Council certification in the Congo basin. International Forestry Review 19, 50-63.

Charnley, S., 2005. Industrial plantation forestry: do local communities benefit? J. Sustain. For. 21, 35‑57.

Churchill, G. A., Jr., 1979. A paradigm for developing better measures of marketing constructs. Journal of Marketing Research, 16, 64–73. https://doi.org/10.2307/3150876.

Collier, P., Cust, J., 2015. Investing in Africa's infrastructure: financing and policy options. Annual Review of Resource Economics 7, 473‑493.

Cornes, R., Sandler, T., 1996. The Theory of Externalities, Public Goods, and Club Goods. Cambridge University Press, New York.

Cubbage, F., Diaz, D., Yapura, P., Dube, F., 2010. Impacts of forest management certification in Argentina and Chile. Forest Policy and Economics 12, 497-504.

Cubbage, F., Mac Donagh, P., Balmelli, G., Olmos, V.M., Bussoni, A., Rubilar, R., De La Torre, R., Lord, R., Huang, J., Hoeflich, V.A., 2014. Global timber investments and trends, 2005-2011. New Zealand Journal of Forestry Science 44, 1-12.

Dare, M.L., Schirmer, J., Vanclay, F., 2011. Does forest certification enhance community engagement in Australian plantation management? Forest Policy and Economics 13, 328-337.

DeVellis, R.F., 2016. Scale development: Theory and applications (Vol. 26). Sage publications.

De Vos, R., Köhne, M., Roth, D., 2018. "We'll turn your water into Coca-Cola": The atomizing practices of oil palm plantation development in Indonesia. Journal of Agrarian Change 18, 385-405.

Degnet, M.B., van der Werf, E., Ingram, V., Wesseler, J., 2018. Forest plantations' investments in social services and local infrastructure: An analysis of private, FSC certified and state-owned, non-certified plantations in rural Tanzania. Land Use Policy 79, 68–83.

Degnet, M.B., van der Werf, E., Ingram, V., Wesseler, J.H., 2020. Do locals have a say? Community experiences of participation in governing forest plantations in Tanzania. Forests 11, 782.

Dietz, T., Fitzgerald, A. and Shwom, R., 2005. Environmental values. Annual Review of Environment and Resources, 30, pp.335-372.

Dietz, T., Stern, P.C. and Guagnano, G.A., 1998. Social structural and social psychological bases of environmental concern. Environment and Behavior, *30*(4), pp.450-471.

Dhubháin, Á.N. and Greene, R., 2009. How much do Irish private forest owners know about forestry?. Small-scale forestry, *8*(3), pp.249-262.

Duffy-Deno, K.T., Eberts, R.W., 1991. Public infrastructure and regional economic development: a simultaneous equations approach. Journal of Urban Economics 30, 329‑343.

Dunlap, R.E. and Jones, R.E., 2002. Environmental concern: Conceptual and measurement issues. Handbook of Environmental Sociology, 3(6), pp.482-524.

Edelman, M., Oya, C., Borras Jr, S.M., 2013. Global Land Grabs: historical processes, theoretical and methodological implications and current trajectories. Third World Quarterly 34, 1517‑1531.

Eggers, J., Lämås, T., Lind, T. and Öhman, K., 2014. Factors influencing the choice of management strategy among small-scale private forest owners in Sweden. Forests, 5(7), pp.1695-1716.

Ehrenberg-Azcárate, F., Peña-Claros, M., 2020. Twenty years of forest management certification in the tropics: Major trends through time and among continents. Forest Policy and Economics 111, 102050.

Ellis, F., 2000. Rural Livelihoods and Diversity in Developing Countries. Oxford University Press, Oxford; UK.

European Commission, 2010. Regulation EU No 995/2010 of the European Parliament and of the Council laying down the obligations of operators who place timber and timber products on the market, 995/2010, Brussels.

European Commission, 2019. European Innovation Partnership 'Agricultural Productivity and Sustainability'. https://ec.europa.eu/eip/agriculture/en/european-innovation-partnership-agricultural (accessed 07 September 2019).

Evans, J. and Turnbull, J.W., 2004. Plantation forestry in the tropics: The role, silviculture, and use of planted forests for industrial, social, environmental, and agroforestry purposes (No. 3. ed.). Oxford University Press.

FAO, 2009. State of the World's Forests 2009. Rome.

FAO, 2011. Framework for assessing and monitoring forest governance. The Program on Forests (PROFOR) Food and Agriculture Organization of the United Nations, Rome.

FAO, 2015. Global Forest Resources Assessment 2015 Country Report Mozambique. Food and Agriculture Organization of the United Nations, Rome, Italy.

FAO, 2015. Global Forest Resources Assessment 2015: How Are the World's Forests Changing? FAO: Rome, Italy.

FAO, 2018. Global Forest Products Facts and Figures 2018. Rome.

FAO, 2018. Making Forest Concessions in the Tropics Work to Achieve the 2030 Agenda: Voluntary Guidelines. FAO Forestry Paper No. 180, Rome, Italy.

FAO, 2018. Rethinking forest concessions. Improving the allocation of state-owned forests for better economic, social and environmental outcomes. Rome.

FAO, 2020. Forest Governance. Forest governance contribute to SDGs. Food and Agriculture Organization of the United Nations, Rome, Italy.

FAO and UNEP, 2020. The State of the World's Forests 2020. Forests, biodiversity and people. Rome. https://doi.org/10.4060/ca8642en

Fayolle, A., Liñán, F. and Moriano, J.A., 2014. Beyond entrepreneurial intentions: values and motivations in entrepreneurship. International Entrepreneurship and Management Journal, 10(4), pp.679-689.

Ficko, A., Lidestav, G., Dhubhain, A.N., Karppinen, H., Zivojinovic, I. and Westin, K., 2019. European private forest owner typologies: A review of methods and use. Forest Policy and Economics, 99, pp.21-31.

Finance Alliance for Sustainable Trade, 2014. Impact Indicators for Sustainable Forestry, Market Research for Sustainable Investment, Montreal.

FinnFund, 2017. Why sustainable forestry is good business? Chris Burchmore from FSC® Africa explains., Helsinki.

Fischer, A.P., Bliss, J., Ingemarson, F., Lidestav, G. and Lönnstedt, L., 2010. From the small woodland problem to ecosocial systems: the evolution of social research on small-scale forestry in Sweden and the USA. Scandinavian Journal of Forest Research, 25(4), pp.390-398.

Flake, J.K., Pek, J. and Hehman, E., 2017. Construct validation in social and personality research: Current practice and recommendations. Social Psychological and Personality Science, 8(4), pp.370-378.

FMO, 2017. Investing in local prosperity. The Dutch Entrepreneurial Development Bank, The Hague, The Netherlands.

Forest Europe, 2015. State of Europe's Forests 2015 Report. Madrid.

Freeman, R.E., 2010. Strategic management: A stakeholder approach. Cambridge university press, New York.

FSC, 2012. FSC Principles and Criteria for Forest Stewardship. Forest Stewardship Council, Bonn, Germany.

FSC, 2014. FSC and Plantations, in FSC's Position on Plantations; Forest Stewardship Council: Bonn, Germany.

FSC, 2015. FSC Principles and Criteria for Forest Stewardship. Forest Stewardship Council, Bonn, Germany. Available at: https://fsc.org/en. accessed on 10 March 2020.

FSC, 2018a. FSC Facts & Figures. Forest Stewardship Council, Bonn, Germany.

FSC, 2018b. The FSC National Forest Stewardship Standard for Tanzania Mainland. [Available at https://ic.fsc.org/en/document-center/id/339 accessed 11.07.19].

FSC, 2019. FSC Facts & Figures. Forest Stewardship Council, Bonn, Germany.

FSC, 2020. FSC Facts & Figures. Forest Stewardship Council, Bonn, Germany.

Garforth, M., Landell-Mills, N., Mayers, J., 2013. Plantation development and management: drivers, governance and changing roles, in: Plantations Privatization Poverty and Power, (pp. 55-100). Routledge.

Geiser, K. and Crul, M., 1996. 'Greening of Small and Medium-sized Firms: Government, Industry, and NGO Initiatives'. The Greening of Industry Resource Guide and Bibliography, Island, Washington DC, pp.213-244.

Gerber, J.F., 2011. Conflicts over industrial tree plantations in the South: who, how and why? Global Environmental Change 21, 165-176.

Gerber, J.F., Veuthey, S., 2010. Plantations, resistance and the greening of the agrarian question in coastal Ecuador. Journal of Agrarian Change10, 455‑481.

German, L., Mandondo, A., Paumgarten, F., Mwitwa, J., 2014. Shifting rights, property and authority in the forest frontier:'Stakes' for local land users and citizens. Journal of Peasant Studies 41, 51-78.

Giessen, L., Buttoud, G., 2014. Defining and Assessing Forest Governance. Forest Policy and Economics 49, pp. 1–3.

Global Forest Watch, 2020. Global Tree Cover Loss Data. Available at: https://www.wri.org/blog/2020/06/global-tree-cover-loss-data-2019. [Accessed 15 August 2020]

Green Resources AS, 2009. Reforestation in grassland areas of Idete, Mufindi District, Iringa Region, Tanzania. [Available at http://theredddesk.org/sites/default/files/ccba_pdd_idete_21th_may_2009.pdf; accessed 18.08.16].

Green Resources AS, 2013. Climate, community and biodiversity standards project design document form for afforestation and reforestation project activities (CCB-AR-PDD)(Second edition) Niassa Forest Project. 28 March 2013.

Green Resources AS, 2015a. Annual Report 2014/2015: 48 [Available at http://www.greenresources.no/Portals/0/pdf/Annual_Report_1415.pdf accessed 18.11.17].

Green Resources AS, 2015b. Environmental and Social Impact Report July– Dec 2014: 16. [Available at http://www.busoga-forestry.com/Reports/Semi-Annual%20GR%20Environmental%20and%20Social%20Impact%20Report%202015.pdf; accessed 18.08.16].

Green Resources AS, 2016a. Annual Report 2014/2015., London, UK.

Green Resources AS, 2016b. Environmental and Social Impact Report July – December 2015: 60 13/04/2016 [Available at http://www.busoga-forestry.com/Reports/Semi-Annual%20GR%20Environmental%20and%20Social%20Impact%20Report%202015.pdf; accessed 18.11.17].

Green Resources AS, 2017. Environmental and Social Impact Report January-December 2016.

Green Resources AS, 2019. GR (Mozambique) Forest Management Plan 2018 – 2022 (version July 2019). Retrieved 25 August 2020 from https://greenresources.no/wp-content/uploads/2019/10/GR-Mozambique-Forest-Management-Plan-2018-2022-public-summary.pdf

Handberg, Ø.N., 2018. No sense of ownership in weak participation: a forest conservation experiment in Tanzania. Environment and Development Economics 23, 434-451.

Hair, J.F., W.C. Black, B.J. Babin and R.E. Anderson, 2010. "Multivariate Data Analysis: A Global Perspective." Multivariate Data Analysis: A Global Perspective. Pearson Education.

Hansla, A., Gamble, A., Juliusson, A. and Gärling, T., 2008. The relationships between awareness of consequences, environmental concern, and value orientations. Journal of Environmental Psychology, 28(1), pp.1-9.

Hansson, H. and Lagerkvist, C.J., 2012. Measuring farmers' attitudes to animal welfare and health. British Food Journal.

Hansson, H., and C.J. Lagerkvist., 2015. "Identifying use and non-use values of animal welfare: Evidence from Swedish dairy agriculture." Food Policy 50:35-42.

Hansson, H., and C.J. Lagerkvist., 2016. "Dairy farmers' use and non-use values in animal welfare: Determining the empirical content and structure with anchored best-worst scaling." Journal of Dairy Science 99:579-592.

Hansson, H.; Lagerkvist, C.J.; Vesala, K.M, 2018. Impact of personal values and personality on motivational factors for farmers to work with farm animal welfare: a case of Swedish dairy farmers. Animal Welfare 27, 133–145.

Harring, N., Jagers, S.C. and Matti, S., 2017. Public support for pro-environmental policy measures: Examining the impact of personal values and ideology. Sustainability, 9(5), p.679.

Haugen, K., Karlsson, S. and Westin, K., 2016. New forest owners: Change and continuity in the characteristics of Swedish non-industrial private forest owners (NIPF owners) 1990–2010. Small-scale Forestry, 15(4), pp.533-550.

Hedlund, T., 2011. The impact of values, environmental concern, and willingness to accept economic sacrifices to protect the environment on tourists' intentions to buy ecologically sustainable tourism alternatives. Tourism and Hospitality Research, 11(4), pp.278-288.

Hertog, I.M., Brogaard, S. and Krause, T., 2019. The Swedish forestry model: intensifying production for sustainability? https://innoforest.eu/blog/the-swedish-forestry-model-intensifying-production-for-sustainability/ (Accessed 10 August 2020).

Hetemäki, L., 2020. The Green Deal and the EU Forest Sector. Preprint at file:///C:/Users/degne001/Downloads/Hetemki_EmbassyofSwedenHelsinki_12Feb2002_BackgroundDocument.pdf.

Hirsch, F. and Schmithüsen, F.J., 2010. Private forest ownership in Europe (Vol. 26). ETH Zurich.

Hirsh, J.B., 2010. Personality and environmental concern. Journal of Environmental Psychology, 30(2), pp.245-248.

Hirsh, J.B. and Dolderman, D., 2007. Personality predictors of consumerism and environmentalism: A preliminary study. Personality and individual differences, 43(6), pp.1583-1593.

Howley, P., 2013. Examining farm forest owners' forest management in Ireland: The role of economic, lifestyle and multifunctional ownership objectives. Journal of Environmental Management, 123, pp.105-112.

Husseini, R., Kendie, S. B., & Agbesinyale, P., 2016. Community participation in the management of forest reserves in the Northern Region of Ghana. International Journal of Sustainable Development & World Ecology, *23*(3), 245-256.

Hyle, M.A.; Devkota, B.P.; Mustalahti, I., 2019. From Blueprints to Empowerment of Disadvantaged Groups in Natural Resource Governance: Lessons from Nepal and Tanzania. International Journal of Commons, 13, 2.

Indufor, 2011. Private Forestry and Carbon Trading Project: Timber Market Dynamics in Tanzania and in Key Export Markets: Market Study; Ministry of natural resources and tourism of Tanzania: Dar es Salaam, Tanzania.

Indufor, 2012a. Opportunities for Forest Plantation Investments in Africa. Presentation in the Conference on Boosting Investments in Sustainable Forestry, Forest Carbon and Renewable Energy, Accra, Ghana, 5 September 2012.

Indufor, 2012b. Strategic Review on the Future of Forest Plantations in the World. Forest Stewardship Council, Helsinki, Finland.

Ingemarson, F., Lindhagen, A. and Eriksson, L., 2006. A typology of small-scale private forest owners in Sweden. Scandinavian Journal of Forest Research, 21(3), pp.249-259.

Ingram, V., van der Werf, E., Kikulwe, E., Wesseler, J.H.H., 2016. Evaluating the impacts of plantations and associated forestry operations in Africa - methods and indicators. International Forestry Review 18, 44‑55.

Jacovelli, P., 2014. The future of plantations in Africa. International Forestry Review 16, 144-159.

Jarvis, C.B., MacKenzie, S.B. and Podsakoff, P.M., 2003. A critical review of construct indicators and measurement model misspecification in marketing and consumer research. Journal of Consumer Research, 30(2), pp.199-218.

John, O.P., Donahue, E.M. and Kentle, R.L., 1991. Big five inventory. Journal of Personality and Social Psychology.

John, OP, Naumann, LP and Soto CJ., 2008. Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In: John OP, Robins RW and Pervin LA (eds) Handbook of Personality: Theory and Research pp 114-158. Guilford Press: New York, NY, USA.

Joyce, S., Thomson, I., 2000. Earning a social license to operate: social acceptability and resource development in Latin America. Cana. Min. Metall. Bull. 93 (1037), 49‑52.

Juutinen, A., Tolvanen, A. and Koskela, T., 2020. Forest owners' future intentions for forest management. Forest Policy and Economics, 118, p.102220.

Kalonga, S.K., Kulindwa, K.A., 2017. Does forest certification enhance livelihood conditions?

Empirical evidence from forest management in Kilwa District, Tanzania. For. Policy Econ. 74, 49‑61.

Katz-Gerro, T., Greenspan, I., Handy, F. and Lee, H.Y., 2017. The relationship between value types and environmental behaviour in four countries: Universalism, benevolence, conformity and biospheric values revisited. Environmental Values, 26(2), pp.223-249.

Kotey, B. and Meredith, G.G., 1997. Relationships among owner/manager personal values, business strategies, and enterprise performance. Journal of small business management, 35, pp.37-64.

Kull, C. A., 2002. Empowering pyromaniacs in Madagascar: ideology and legitimacy in community-based natural resource management. Development and Change, 33(1), 57-78.

Lacuna-Richman, C.; Devkota, B.P.; Richman, M.A., 2016. Users' priorities for good governance in community forestry: Two cases from Nepal's Terai Region. Forest Policy and Economics 65, 69–78.

Landry, J., Chirwa, P.W., 2011. Analysis of the potential socio-economic impact of establishing plantation forestry on rural communities in Sanga district, Niassa province, Mozambique. Land Use Policy 28, 542-551.

Lange, F. and Dewitte, S., 2019. Measuring pro-environmental behavior: Review and recommendations. Journal of Environmental Psychology, 63, pp.92-100.

Lawson, S., MacFaul, L., 2010. Illegal Logging and Related Trade. Indicators of the Global Response (p.154). London: Chatham House.

Lazdinis, M., Angelstam, P. and Pülzl, H., 2019. Towards sustainable forest management in the European Union through polycentric forest governance and an integrated landscape approach. Landscape Ecology, 34(7), pp.1737-1749.

Leonidou, L. C., Christodoulides, P., Kyrgidou, L. P., & Palihawadana, D., 2017. Internal drivers and performance consequences of small firm green business strategy: The moderating role of external forces. Journal of Business Ethics, 140(3), 585-606.

Leutner, F., Ahmetoglu, G., Akhtar, R. and Chamorro-Premuzic, T., 2014. The relationship between the entrepreneurial personality and the Big Five personality traits. Personality and Individual Differences, 63, pp.58-63.

Liao, C., Jung, S., Brown, D.G. and Agrawal, A., 2016. Insufficient research on land grabbing. Science, 353(6295), p.131.

Li, T. M., 2015. Transnational farmland investment: A risky business. Journal of Agrarian Change, 15(4), 560-568.

Liere, K.D.V. and Dunlap, R.E., 1980. The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. Public opinion quarterly, 44(2), pp.181-197.

Lindahl, K.B. and Westholm, E., 2012. Future forests: Perceptions and strategies of key actors. Scandinavian Journal of Forest Research, 27(2), pp.154-163.

Lidestav, G., Dhubhain, A.N. and Karppinen, H., 2015. Forest owner types in Europe: diversity and trends. Concepts, methods and findings.

Lindeman, M. and Verkasalo, M., 2005. Measuring values with the short Schwartz's value survey. Journal of personality assessment, 85(2), pp.170-178.

Locher, M., Müller-Böker, U., 2014. "Investors are good, if they follow the rules" -power relations and local perceptions in the case of two European forestry companies in Tanzania. Geographica Helvetica 69, 249.

Locher, M., Sulle, E., 2013. Foreign Land Deals in Tanzania: an Update and a Critical View on the Challenges of Data (re) Production.

Locher, M., Sulle, E., 2014. Challenges and methodological flaws in reporting the global land rush: observations from Tanzania. Journal of Peasant Studies 41, 569-592.

Lodi-Smith, J. and Roberts, B.W., 2007. Social investment and personality: A meta-analysis of the relationship of personality traits to investment in work, family, religion, and volunteerism. Personality and social psychology review, 11(1), pp.68-86.

Lyons, K., Westoby, P., 2014. Carbon colonialism and the new land grab: Plantation forestry in Uganda and its livelihood impacts. Journal of Rural Studies 36, 13-21.

Malkamäki, A., D'Amato, D., Hogarth, N. J., Kanninen, M., Pirard, R., Toppinen, A., & Zhou, W., 2018. A systematic review of the socio-economic impacts of large-scale tree plantations, worldwide. Global Environmental Change, *53*, 90-103.

Marcus, J. and Roy, J., 2019. In search of sustainable behaviour: The role of core values and personality traits. Journal of Business Ethics, 158(1), pp.63-79.

Mayers, J., Landell-Mills, N. and Garforth, M., 2013. Plantation Development and Management: Drivers, Governance and Changing Roles. In Plantations Privatization Poverty and Power (pp. 55-100). Routledge.

McCarthy, J.F., 2012. Certifying in contested spaces: private regulation in Indonesian forestry and palm oil. Third World Quarterly 33, 1871-1888.

Meglino, B.M. and Ravlin, E.C., 1998. Individual values in organizations: Concepts, controversies, and research. Journal of management, 24(3), pp.351-389.

Meijer, S. S., Catacutan, D., Ajayi, O. C., Sileshi, G. W., & Nieuwenhuis, M., 2015. The role of knowledge, attitudes and perceptions in the uptake of agricultural and agroforestry innovations among smallholder farmers in sub-Saharan Africa. International Journal of Agricultural Sustainability, 13(1), 40-54.

Meijer, S. S., Catacutan, D., Sileshi, G. W., & Nieuwenhuis, M., 2015. Tree planting by smallholder farmers in Malawi: Using the theory of planned behaviour to examine the relationship between attitudes and behaviour. Journal of Environmental Psychology, *43*, 1-12.

Milfont, T.L. and Duckitt, J., 2004. The structure of environmental attitudes: A first-and second-order confirmatory factor analysis. Journal of Environmental Psychology, 24(3), pp.289-303.

Milfont, T.L. and Sibley, C.G., 2012. The big five personality traits and environmental engagement: Associations at the individual and societal level. Journal of Environmental Psychology, 32(2), pp.187-195.

Mitani, Y. and Lindhjem, H., 2015. Forest owners' participation in voluntary biodiversity conservation: what does it take to forgo forestry for eternity?. Land Economics, 91(2), pp.235-251.

Miteva, D.A., Loucks, C.J., Pattanayak, S.K., 2015. Social and environmental impacts of forest management certification in Indonesia. PloS one 10, e0129675.

Mozzato, D., Gatto, P., Defrancesco, E., Bortolini, L., Pirotti, F., Pisani, E. and Sartori, L., 2018. The role of factors affecting the adoption of environmentally friendly farming practices: can geographical context and time explain the differences emerging from literature?. Sustainability, 10(9), p.3101.

MNRT, 1998. National forest policy. Government of Tanzania, Dar es Salaam.

Mustalahti, I., Lund, J.F., 2009. Where and how can participatory forest management succeed? Learning from Tanzania, Mozambique, and Laos. Society & Natural Resources 23, 31-44.

Naumov, V., Manton, M., Elbakidze, M., Rendenieks, Z., Priednieks, J., Uhlianets, S., Yamelynets, T., Zhivotov, A. and Angelstam, P., 2018. How to reconcile wood production and biodiversity conservation? The Pan-European boreal forest history gradient as an "experiment". Journal of environmental management, 218, pp.1-13.

NBS, 2013. Mufindi District Council socio-economic profile 2013. National Bureau of Statistics, Dar es Salaam.

Neumayer, E., 2003. Weak versus strong sustainability: exploring the limits of two opposing paradigms. Edward Elgar Publishing.

Nordlund, A.M. and Garvill, J., 2002. Value structures behind proenvironmental behavior. Environment and behavior, 34(6), pp.740-756.

Nordlund, A., & Westin, K., 2010. Forest values and forest management attitudes among private forest owners in Sweden. Forests 2: 30–50.

Nube, T.G., Santos, A.S.J., Timofeiczyc Junior, R., Silva, I.C., 2016. ImpactosSocioeconômicos das Plantações Florestais no Niassa, Moçambique. Floresta e Ambiente 23 (1), 52–60.

Nussbaum, R., Simula, M., 2013. The forest certification handbook. Taylor & Francis, London.

Obidzinski, K., Andriani, R., Komarudin, H., Andrianto, A., 2012. Environmental and social impacts of oil palm plantations and their implications for biofuel production in Indonesia. Ecol. Soc. 17 (1), 25.

Olver, JM. and Mooradian, TA.**,** 2003. Personality traits and personal values: A conceptual and empirical integration. Personality and Individual Differences *35:* 109-125. https://doi.org/10.1016/S01 91-8869(02)00145-9.

Oreg, S. and Katz-Gerro, T., 2006. Predicting proenvironmental behavior cross-nationally: Values, the theory of planned behavior, and value-belief-norm theory. Environment and behavior, 38(4), pp.462-483.

Oskamp, S., 2000. A sustainable future for humanity? How can psychology help?. American Psychologist, 55(5), p.496.

Overdevest, C., 2010. Comparing forest certification schemes: the case of ratcheting standards in the forest sector. Socio-economic Review 8, 47-76.

Parks, L. and Guay, R.P., 2009. Personality, values, and motivation. Personality and individual differences, 47(7), pp.675-684.

Parks-Leduc, L., Feldman, G. and Bardi, A., 2015. Personality traits and personal values: A meta-analysis. Personality and Social Psychology Review, 19(1), pp.3-29.

Payn, T., Carnus, J.-M., Freer-Smith, P., Kimberley, M., Kollert, W., Liu, S., Orazio, C., Rodriguez, L., Silva, L.N., Wingfield, M.J., 2015. Changes in planted forests and future global implications. Forest Ecology and Management 352, 57-67.

PEFC, 2019. PEFC Annual Review 2019. the Programme for the Endorsement of Forest Certification, Geneva, Switzerland.

Peluso, N. L., & Lund, C., 2011. New frontiers of land control: Introduction. Journal of Peasant Studies, *38*(4), 667-681.

Pettus, A.M. and Giles, M.B., 1987. Personality characteristics and environmental attitudes. Population and Environment, 9(3), pp.127-137.

Phimmavong, S.; Maraseni, T.N.; Keenan, R.J.; Cockfield, G., 2019. Financial returns from collaborative investment models of Eucalyptus agroforestry plantations in Lao PDR. Land Use Policy 87, 104060.

Pirard, R., Petit, H., Baral, H., 2017. Local impacts of industrial tree plantations: an empirical analysis in Indonesia across plantation types. Land use policy 60, 242‑253.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. Journal of applied psychology, 88(5), p.879.

Pott, R. M., 1997. Plantation forestry in South Africa and its impact on biodiversity and water. Southern African Forestry Journal, 180(1), 45-48.

Private Forestry Programme, 2017. Forest Plantation Mapping of the Southern Highlands. Final Report. Iringa, Tanzania.

Purdon, M. 2013. Land Acquisitions in Tanzania: strong sustainability, weak sustainability and the importance of comparative methods. Journal of Agricultural and Environmental Ethics, 26(6), 1127-1156.

Ragin, C.C., 2014. The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies. Univ of California Press, California.

Rametsteiner, E., Simula, M., 2003. Forest certification—an instrument to promote sustainable forest management? Journal of Environmental Management 67, 87-98.

Rammstedt, B. and John, O.P., 2007. Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of research in Personality*, *41*(1), pp.203-212.

Ribot, J.C., Agrawal, A., Larson, A.M., 2006. Recentralizing while decentralizing: how national governments reappropriate forest resources. World Development 34, 1864-1886.

Ribot, J.C., Lund, J.F., Treue, T., 2010. Democratic decentralization in sub-Saharan Africa: its contribution to forest management, livelihoods, and enfranchisement. Environmental Conservation, 35-44.

Ribot, J.C., Peluso, N.L., 2003. A theory of access. Rural sociology 68, 153-181.

Richards, C., Lyons, K., 2016. The new corporate enclosures: plantation forestry, carbon markets and the limits of financialised solutions to the climate crisis. Land use policy 56, 209-216.

Rift Valley Corporation. 2016. Forestry. Retrieved 16 November 2016 http://www.riftvalley.com/forestry-2/

Roccas S, Sagiv L, Schwartz S and Knafo A., 2002. The Big Five personality factors and personal values. Personality and Social Psychology Bulletin 28: 789-801. https://doi.org/10.1177/0146167202289008.

Rokeach M., 1973. The nature of human values. N.Y. The Free Press.

Romero, C., Putz, F.E., Guariguata, M.R., Sills, E.O., Cerutti, P.O., Lescuyer, G., 2013. AnOverview of Current Knowledge About the Impacts of Forest Management Certification: a Proposed Framework for Its Evaluation. CIFOR: Occasional paper 91, Bogor, Indonesia.

Romero, C., Sills, E.O., Guariguata, M., Cerutti, P.O., Lescuyer, G., Putz, F.E., 2017. Evaluation of the impacts of Forest Stewardship Council (FSC) certification of natural forest management in the tropics: a rigorous approach to assessment of a complex conservation intervention. International Forestry Review 19, 36-49.

Romero, M., Wollni, M., Rudolf, K., Asnawi, R., & Irawan, B., 2019. Promoting sustainable land use choices in Indonesia: Experimental evidence on the role of changing mindsets and structural barriers (No. 25). EFForTS Discussion Paper Series.

Rossiter, J.R., 2002. The C-OAR-SE procedure for scale development in marketing. International journal of research in marketing, 19(4), pp.305-335.

Saunders, C.D., 2003. The emerging field of conservation psychology. Human ecology review, pp.137-149.

Schirmer, J., 2006. Socio economic impacts of land use change to plantation forestry: a review of current knowledge and case studies of Australian experience. 2006 IUFRO Forest Plantations Meeting.

Schoneveld, G.C., 2014. The geographic and sectoral patterns of large-scale farmland investments in sub-Saharan Africa. Food Policy 48, 34-50.

Schoneveld, G.C., 2017. Host country governance and the African land rush: 7 reasons why large-scale farmland investments fail to contribute to sustainable development. Geoforum 83, 119-132.

Schoneveld, G., German, L., Nutakor, E., 2011. Land-based investments for rural development? A grounded analysis of the local impacts of biofuel feedstock plantations in Ghana. Ecology and Society 16(4).

Schwartz, SH., 1992. Universals in the content and structure of values: Theory and empirical tests in 20 countries. In: Zanna M (ed) Advances in Experimental Social Psychology, Volume 25 pp 1-65. Academic Press: New York, USA.

Schwartz, SH., 2011. An overview of the Schwartz theory of basic values. Oneline Readings in Psychology and Culture 2: 11.

Schwartz, S.H., 2012. An overview of the Schwartz theory of basic values. Online readings in Psychology and Culture, 2(1), pp.2307-0919.

Shivan, G.C. and Mehmood, S.R., 2010. Factors influencing nonindustrial private forest landowners' policy preference for promoting bioenergy. Forest Policy and Economics, 12(8), pp.581-588.

Schultz, P.W., 2000. New environmental theories: Empathizing with nature: The effects of Perspective taking on concern for environmental issues. Journal of social issues, 56(3), pp.391-406.

Schultz, P.W., 2001. The structure of environmental concern: Concern for self, other people, and the biosphere. Journal of environmental psychology, *21*(4), pp.327-339.

Schultz, P.W. and Zelezny, L., 1999. Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. Journal of environmental psychology, 19(3), pp.255-265.

Schultz, P.W., Gouveia, V.V., Cameron, L.D., Tankha, G., Schmuck, P. and Franěk, M., 2005. Values and their relationship to environmental concern and conservation behavior. *Journal of cross-cultural psychology*, *36*(4), pp.457-475.

Secco, L., Da Re, R., Pettenella, D.M., Gatto, P., 2014. Why and how to measure forest governance at local level: A set of indicators. Forest Policy and Economics 49, 57-71.

Simpson, M., Taylor, N., & Barker, K., 2004. Environmental responsibility in SMEs: does it deliver competitive advantage?. Business strategy and the environment, 13(3), 156-171.

Siry, J.P., Cubbage, F.W. and Ahmed, M.R., 2005. Sustainable forest management: global trends and opportunities. Forest policy and Economics, *7*(4), pp.551-561.

Sitoe A.A., 2008. Ecological identification and characterization of the ecosystems of the Sanga area held by Malonda Tree Farms. Departamento de Engenharia Florestal, Universidade Eduardo Mondlane.

Sitoe A, Guedes B., Awasse A., Nacamo E., 2009. Ecological Survey of the Reforestation sites in Nampula Province. FINAL REPORT. Study prepared for Lurio Green Resources. Maputo, November 2009.

Skogsstyrelsen 2017. Strukturstatistik RAPPORT 2018/12 Statistik om skogsägande 2017. Skogsstyrelsen, Jönköping, Sweden. https://www.skogsstyrelsen.se/globalassets/om-

oss/publikationer/2018/rapport-2018-12-strukturstatistik-statistik-om-skogsagande-2017.pdf. (accessed 22 October 2020).

Skogsvårdslagen/The Forestry Act/, 2020. https://www.skogsstyrelsen.se/en/laws-and-regulations/.(accessed 22 October 2020).

Smalley, R., Corbera, E., 2012. Large-scale land deals from the inside out: findings from Kenya's Tana Delta. J. Peasant Stud. 39, 1039‑1075.

Soliño, M. and Farizo, B.A., 2014. Personal traits underlying environmental preferences: A discrete choice experiment. PloS one, 9(2), p.e89603.

Sotirov, M., Blum, M., Storch, S., Selter, A. and Schraml, U., 2017. Do forest policy actors learn through forward-thinking? Conflict and cooperation relating to the past, present and futures of sustainable forest management in Germany. Forest Policy and Economics, 85, pp.256-268.

Soto CJ, John OP, Gosling SD. and Potter J.**,** 2011. Age differences in personality traits from 10 to 65: Big Five domains and facets in large cross-sectional sample. Journal of Personality and Social Psychology 100: 330-348. https:// doi.org/10.1037/a0021717.

Starr, M.A., 2008. Socially responsible investment and pro-social change. Journal of Economic Issues 42, 51‑73.

Steg, L., De Groot, J.I., Dreijerink, L., Abrahamse, W. and Siero, F., 2011. General antecedents of personal norms, policy acceptability, and intentions: The role of values, worldviews, and environmental concern. Society and Natural Resources, 24(4), pp.349-367.

Stern, P.C. and Dietz, T., 1994. The value basis of environmental concern. Journal of social issues, 50(3), pp.65-84.

Stern, P.C., Dietz, T. and Kalof, L., 1993. Value orientations, gender, and environmental concern. Environment and behavior, 25(5), pp.322-348.

Stern, P.C., Kalof, L., Dietz, T. and Guagnano, G.A., 1995. Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects 1. Journal of applied social psychology, 25(18), pp.1611-1636.

Stringer, C., 2006. Forest certification and changing global commodity chains. Journal of Economic Geography 6, 701-722.

Swedish Forest Agency, 2019. Statistikansvarig myndighet: Skogsstyrelsen 2020.

Szulecka, J., Obidzinski, K., Dermawan, A., 2016. Corporate–society engagement in plantation forestry in Indonesia: Evolving approaches and their implications. Forest Policy and Economics 62, 19-29.

Takács-Sánta, A., 2007. Barriers to environmental concern. Human ecology review, pp.26-38.

Takala, T., Hujala, T., Tanskanen, M., Tikkanen, J., 2017. Forest owners' discourses of forests: Ideological origins of ownership objectives. Journal of Rural Studies 51, pp. 1-14.

Thaler, R. H., 2016. Behavioral economics: Past, present, and future. American Economic Review, 106(7), 1577-1600.

Toivonen, R., Järvinen, E., Lindroos, K., Rämö, A.K. and Ripatti, P., 2005. The challenge of information service development for private forest owners: the Estonia and Finland cases. Small-scale Forest Economics, Management and Policy, 4(4), pp.451-469.

Tricallotis, M., Gunningham, N., Kanowski, P., 2018. The impacts of forest certification for Chilean forestry businesses. Forest Policy and Economics 92, 82-91.

Triviño, M., Juutinen, A., Mazziotta, A., Miettinen, K., Podkopaev, D., Reunanen, P. and Mönkkönen, M., 2015. Managing a boreal forest landscape for providing timber, storing and sequestering carbon. Ecosystem Services, 14, pp.179-189.

Tsanga, R., Lescuyer, G., Cerutti, P.O., 2014. What is the role for forest certification in improving relationships between logging companies and communities? Lessons from FSC in Cameroon. International Forestry Review 16, 14-22.

Tumlinson, J., Morgan, J., 2013. Corporate Provision of Public Goods. In Academy of Management Proceedings (Vol. 2013, No. 1, p. 13507). Briarcliff Manor, NY 10510: Academy of Management.

Uggla, Y., 2018. Negotiating responsible forestry: forest owners' understanding of responsibility for multiple forest values. Environmental Sociology, 4(3), pp.358-369.

UN, 2007. Non-legally binding instrument on all types of forests. Available at: https://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/62/98. Accessed on 6 April, 2020.

United Nations, 2015. Sustainable Development Goals. New York, USA.

United Nations, 2020. Sustainable Development Goals Knowledge Platform. Forests. Available at: https://sustainabledevelopment.un.org/topics/forests. [Accessed 07 August 2020]

UNDP, 2009. A users' guide to measuring local governance. United Nations Development Programme. Oslo Governance Center, Oslo.

UNECE/FAO, 2014. Rovaniemi Action Plan for the Forest Sector in a Green Economy. https://www.unece.org/fileadmin/DAM/timber/publications/SP-35-Rovaniemi.pdf (accessed 10 July 2020).

URT, 1998. National Forest Policy. United Republic of Tanzania Government Printer, Dar es Salaam.

URT, 2001. National Forest Programme in Tanzania 2001-2010. United Republic of Tanzania Government Printer, Dar es Salaam.

URT, 2002. The Forest Act. United Republic of Tanzania Government printer, Dar es Salaam, Tanzania.

URT, 2013a. Mufindi District Council Socio-economic Profile 2013. Ministry of Finance and Economic Affairs, National Bureau of Statistics and Mufindi District Council, Dar es Salaam.

URT, 2013b. Sao Hill forest plantation division 1 (Irundi) management plan (2013/14-2017/18). Tanzania Forestry Services Agency, Dar es Salaam.

URT, 2015. Intended nationally determined contributions (INDCs). Government of Lao PDR, Dar es Salaam, Tanzania.

URT, 2015. Mufindi District Council Annual Plan FY 2015/16. District Executives Director's Office Works Department, Mafinga.

van der Arend, S., Behagel, J., 2011. What participants do. A practice based approach to public participation in two policy fields. Critical Policy Studies 5, 169-186.

van der Ven, H., Cashore, B., 2018. Forest certification: the challenge of measuring impacts. Current Opinion in Environmental Sustainability 32, 104-111.

Van Der Meer Simo, A.; Kanowski, P.; Barney, K., 2020. Economic returns to households participating in different models of commercial tree plantations in Lao PDR. International Forestry Review 22, 132–152.

Van Wilgen, B.W., Richardson, D.M. 2012. Three centuries of managing introduced conifers in South Africa: benefits, impacts, changing perceptions and conflict resolution. Journal of Environmental Management 106: 56–68.

Vedel, S.E., Jacobsen, J.B. and Thorsen, B.J., 2015. Forest owners' willingness to accept contracts for ecosystem service provision is sensitive to additionality. Ecological Economics, 113, pp.15-24.

Verbeek, M. 2012. A Guide to Modern Econometrics, fourth ed. Wiley, Chichester.

Watts, S., 2008. Institutional constraints on interactive community participation in forest conservation in Mozambique. Journal of Sustainable Forestry, 26(4), 301-327.

Weiss, G., Lawrence, A., Hujala, T., Lidestav, G., Nichiforel, L., Nybakk, E., Quiroga, S., Sarvašová, Z., Suarez, C. and Živojinović, I., 2019. Forest ownership changes in Europe: State of knowledge and conceptual foundations. Forest Policy and Economics, 99, pp.9-20.

Wiersum, K.F., Elands, B.H. and Hoogstra, M.A., 2005. Small-scale forest ownership across Europe: characteristics and future potential. Small-scale Forest Economics, Management and Policy, 4(1), pp.1-19.

Wiley, L., Mbaya, S., 2001. Land, People, and Forests in Eastern and Southern Africa at the Beginning of the 21st Century: the Impact of Land Relations on the Role of Communities in Forest Future. No. 7. IUCN-EARO. Nairobi.

Williams, K.J., 2014. Public acceptance of plantation forestry: implications for policy and practice in Australian rural landscape. Land use policy 38, 346‑354.

Wiseman, M. and Bogner, F.X., 2003. A higher-order model of ecological values and its relationship to personality. Personality and Individual differences, 34(5), pp.783-794.

Wolfslehner, B., Pülzl, H., Kleinschmit, D., Aggestam, F., Winkel, G., Candel, J., Eckerberg, K., Feindt, P., McDermott, C., Secco, L., Sotirov, M., Lackner, M., Roux, J.-L. 2020. European forest governance post-2020. From Science to Policy 10. European Forest Institute.

Wood, R.G., 2011. Carbon Finance and Pro-Poor Co-Benefits: The Gold Standard and Climate, Community and Biodiversity Standards Vol. 4 IIED.

Wooldridge, J.M., 2010. Econometric Analysis of Cross Section and Panel Data. MIT press, Cambridge, Massachusetts.

World Bank, 1983. Project Performance Audit Report. Tanzania sao Hill Forestry Project (LOAN 1307-TA). Report no. 4548. World Bank, Washington D.C.

World Bank, 2008. Forests Sourcebook: Practical Guidance for Sustaining Forests in Development Cooperation. World Bank, Washington D.C.

World Bank, 2018. Mozambique Country Forest Note, Washington DC, USA.

World Rain Forest Movement, 2018. Green Resources Mozambique: More False Promises! Available at: https://wrm.org.uy/articles-from-the-wrm-bulletin/section1/green-resources-mozambique-more-false-promises/ accessed on 10 June 2020.

World Resources Institute, 2020. Forests. Sustaining forests for people and planet. Available at: https://www.wri.org/our-work/topics/forests. [Accessed 15 August 2020]

Ziegenspeck, S., Härdter, U. and Schraml, U., 2004. Lifestyles of private forest owners as an indication of social change. Forest Policy and Economics, 6(5), pp.447-458.

Zivin, J.G., Small, A., 2005. A Modigliani-Miller theory of altruistic corporate social responsibility. The BE Journal of Economic Analysis & Policy, 5 (1).

Živojinović, I., Weiss, G., Lidestav, G., Feliciano, D., Hujala, T., Dobšinská, Z., Lawrence, A., Nybakk, E., Quiroga, S. and Schraml, U., 2015. Forest land ownership change in Europe. *COST Action FP1201 FACESMAP Country Reports, Joint Volume. EFICEEC-EFISEE Research Report. University of Natural Resources and Life Sciences, Vienna (BOKU), Vienna, Austria*, *693*.

Zhao, H., Seibert, SE., 2006. The big five personality dimensions and entrepreneurial status: A meta-analytical review. Journal of Applied Psychology. Mar;91(2):259.

Zhao, H., Seibert, S.E. and Lumpkin, G.T., 2010. The relationship of personality to entrepreneurial intentions and performance: A meta-analytic review. Journal of management, 36(2), pp.381-404.

Zulu, L.C., 2008. Community forest management in southern Malawi: solution or part of the problem? Society and Natural resources 21, 687-703.

Summary (English)

Global and regional changes are affecting the forest sector in many countries and the sustainable management of forests is a priority agenda in development policies. In the global south, forest plantations are considered a quick-fix to fill in the gap between the dwindling supply of forest products from natural forests and the growing demand for forest products. This has resulted in the expansion of forest plantations in developing countries in the global south. However, our understanding of the determinants of sustainable forest management (SFM) of plantations is incomplete. SFM aims at maximizing the economic, social and environmental values of forests. In the global north, private ownership of forests is on the rise and forest management decisions are largely in the hands of individual forest owners. However, research on the role of personality attributes of forest owners in forest management is limited. This thesis is a step in addressing the aforementioned research gaps. I explored the role of ownership and certification of plantations in SFM in East Africa. In addition, I assessed the role of personal values and personality traits in environmental concern in forest management of non-industrial private forests (NIPF) in Sweden. In Chapter 1, I set the stage for the thesis. The chapter introduces key concepts and theoretical underpinnings of the research, outlines the main research questions and the research methodology of the studies which constitute the core chapters of the thesis.

Chapter 2 sheds light on the relation between private ownership and certification of forest plantations and perceived changes in infrastructure and social services associated with investments by plantations. I was able to confirm the hypothesis that ownership and certification of plantations matter for SFM. In particular, I showed that private, FSC-certified plantations are more likely than a non-certified, state-owned plantation to be associated by households with positive changes in infrastructure and social services. The results offer tentative evidence that private and FSC-certified plantations are statistically correlated with SFM. The findings contribute additional insights to the literature on SFM and land acquisitions by highlighting the role of ownership and certification in influencing the outcomes of different forms of forest management and associated forested land-related investments. In addition, the results provide preliminary evidence regarding the private provision of public goods, in line with recent findings in experimental economics studies.

In Chapter 3, I assessed the correlations between private ownership and certification of forest plantations and experiences of community participation in plantation management. The results show that households nearby private, FSC-certified plantations were more likely to participate in plantation management than households adjacent to a non-certified, state-owned plantation. Based on the findings, I contend that private ownership and certification of plantations can foster community participation in forest management.

Chapter 4 builds on the results in Chapter 3 and goes a step further to assess the specific relationship between forest certification and experiences of community participation in plantation management. I find that households in villages nearby certified plantations were more likely than households nearby non-certified plantations to participate in plantation

management. Taken together, the results in Chapters 3 and 4 suggest that forest certification influences community participation in plantation management.

Chapter 5 deals with the role of personal values and personality traits of non-industrial private forest (NIPF) owners in influencing their environmental concern in forest management. I confirmed the hypothesis that personal values and personality traits predict environmental concern in forest management of NIPF owners in Sweden. I also showed that personal values trump personality traits in predicting environmental concern. The results add interesting insights to the literature on the environmental concern of individuals. Based on the findings, I contend that both personal values and personality traits need to be considered in assessing environmental motivations in forest management. The finding that personal values are stronger than personality traits in predicting environmental concern suggests that environmental concern is a voluntary behavior and thus is malleable through relevant interventions.

The final chapter provides a synthesis of the core chapters and discusses the broader implications, limitations of the research findings of this thesis and ways forward for future research. Overall, this thesis shows that type of ownership and certification of forest plantations make a difference in SFM. The findings suggest that market-based forest governance mechanisms, such as forest certification and standards of responsible investment, can strengthen top-down approaches of state policy instruments of sustainable forest management. Unlike previous studies, the research in this thesis uses a comparative approach to uncover the role of ownership and certification of plantations in SFM by focusing on forest plantations that fall under different forms of management and certification status. Moreover, the research is based on data collected from a relatively large number of households which increases the representativeness of the findings. In addition, the results suggest personal values and personality traits have a role to play in the environmental concern of NIPF owners.

The debate in the literature on land-acquisitions in general and forest plantations in the global south, in particular, is polarized with proponents hailing land acquisitions as opportunities for development while opponents consider them as a menace for development. There is a need for comparative analysis of land-related investments, such as forest plantations, that have different ownership and certification status. In addition, there is a need to understand the diversity and complexity of factors, such as stages of operation and alternative land use categories, that may affect the outcomes of land-related investments in various sectors. And lastly, the increasing incidence of private ownership of forests and the policy emphasis on environmental values of forests in Europe call for a better conceptual development and measure of environmental concern, personal values and personality traits. Such conceptual developments help to understand the interplay between the personality of private forest owners and environmental concern in forest management.

Samenvatting (Dutch)

Mondiale en regionale veranderingen hebben gevolgen voor de bossector in veel landen en het duurzaam beheer van bossen is een prioriteitsagenda in het ontwikkelingsbeleid. In het mondiale zuiden worden bosplantages beschouwd als een snelle oplossing om de kloof te dichten tussen het slinkende aanbod van bosproducten uit natuurlijke bossen en de groeiende vraag naar bosproducten. Dit heeft geresulteerd in de uitbreiding van bosplantages in ontwikkelingslanden in het zuiden van de wereld. Ons begrip van de determinanten van duurzaam bosbeheer (SFM) van plantages is echter onvolledig. SFM streeft naar het maximaliseren van de economische, sociale en ecologische waarden van bossen. In het noorden van de wereld neemt het privébezit van bossen toe en zijn beslissingen over bosbeheer grotendeels in handen van individuele boseigenaren. Onderzoek naar de rol van persoonlijkheidskenmerken van boseigenaren in bosbeheer is echter beperkt. Dit proefschrift is een stap om de eerder genoemde hiaten in het onderzoek aan te pakken. Ik onderzocht de rol van eigendom en certificering van plantages in SFM in Oost-Afrika. Daarnaast heb ik de rol van persoonlijke waarden en persoonlijkheidskenmerken in de zorg voor het milieu bij bosbeheer van niet-industriële particuliere bossen (NIPF) in Zweden onderzocht. In hoofdstuk 1 heb ik de weg geëffend voor het proefschrift. Dit hoofdstuk introduceert sleutelconcepten en theoretische onderbouwing van het onderzoek, en schetst de belangrijkste onderzoeksvragen en de onderzoeksmethoden in de kernhoofdstukken van het proefschrift.

Hoofdstuk 2 belicht de relatie tussen particulier eigendom en certificering van bosplantages en waargenomen veranderingen in infrastructuur en sociale diensten die verband houden met investeringen door plantages. Ik kon de hypothese dat eigendom en certificering van plantages belangrijk zijn voor SFM bevestigen. Ik heb in het bijzonder laten zien dat het meer waarschijnlijk is dat particuliere, FSC-gecertificeerde plantages door huishoudens worden geassocieerd met positieve veranderingen in infrastructuur en sociale diensten, dan een niet-gecertificeerde plantage in staatseigendom. De resultaten bieden voorlopig bewijs dat particuliere en FSC-gecertificeerde plantages positief statistisch gecorreleerd zijn met SFM. De bevindingen leveren aanvullende inzichten aan de literatuur over SFM en landaankopen, door de rol van eigendom en certificering bij het beïnvloeden van de resultaten van verschillende vormen van bosbeheer en bijbehorende bosgrond-gerelateerde investeringen te benadrukken. Bovendien bieden de resultaten voorlopig bewijs met betrekking tot de particuliere verstrekking van publieke goederen, in lijn met recente bevindingen in experimentele economische studies.

In hoofdstuk 3 heb ik de correlaties tussen privé-eigendom en certificering van bosplantages enerzijds, en ervaringen met gemeenschapsparticipatie in plantagebeheer anderzijds, onderzocht. De resultaten tonen aan dat huishoudens in de buurt van particuliere, FSC-gecertificeerde plantages meer geneigd waren deel te nemen aan plantagebeheer dan huishoudens die grenzen aan een niet-gecertificeerde plantage in staatseigendom. Op basis van de bevindingen ben ik van mening dat de combinatie van particulier eigendom en certificering van plantages de participatie van de gemeenschap in bosbeheer kan bevorderen.

Hoofdstuk 4 bouwt voort op de resultaten in hoofdstuk 3 en gaat een stap verder om de specifieke relatie tussen boscertificering en ervaringen met gemeenschapsparticipatie in plantagebeheer te beoordelen. Ik vind dat huishoudens in dorpen in de buurt van FSC-gecertificeerde plantages meer kans hadden om deel te nemen aan plantagebeheer dan huishoudens in de buurt van niet-gecertificeerde plantages. Alles bij elkaar genomen suggereren de resultaten in de hoofdstukken 3 en 4 dat boscertificering de deelname van de gemeenschap aan plantagebeheer beïnvloedt.

Hoofdstuk 5 behandelt de rol van persoonlijke waarden en persoonlijkheidskenmerken van eigenaren van niet-industriële privébossen (NIPF) in hun zorg voor het milieu bij bosbeheer. Ik bevestigde de hypothese dat persoonlijke waarden en persoonlijkheidskenmerken de zorg voor het milieu voorspellen bij bosbeheer van NIPF-eigenaren in Zweden. Ik heb tevens aangetoond dat persoonlijke waarden de persoonlijkheidskenmerken overtreffen bij het voorspellen van bezorgdheid over het milieu. De resultaten voegen interessante inzichten toe aan de literatuur over milieuproblemen van individuen. Op basis van de bevindingen ben ik van mening dat zowel persoonlijke waarden als persoonlijkheidskenmerken in overweging moeten worden genomen bij het beoordelen van milieumotivaties in bosbeheer. De bevinding dat persoonlijke waarden sterker zijn dan persoonlijkheidskenmerken bij het voorspellen van bezorgdheid over het milieu, suggereert dat zorg voor het milieu vrijwillig is en dus kneedbaar door middel van relevante interventies.

Het laatste hoofdstuk geeft een synthese van de kernhoofdstukken en bespreekt de bredere implicaties, beperkingen van de onderzoeksresultaten van dit proefschrift en wegen voorwaarts voor toekomstig onderzoek. Al met al laat dit proefschrift zien dat het type eigendom en de certificering van bosplantages een verschil maken in SFM. De bevindingen suggereren dat markt-gebaseerde mechanismen voor bosbeheer, zoals boscertificering en normen voor verantwoorde investeringen, de top-downbenaderingen van staatsbeleid voor duurzaam bosbeheer kunnen versterken. In tegenstelling tot eerdere studies, gebruikt het onderzoek in dit proefschrift een vergelijkende benadering om de rol van eigendom en certificering van plantages in SFM bloot te leggen door zich te concentreren op bosplantages die onder verschillende vormen van beheer en certificeringsstatus vallen. Bovendien is het onderzoek gebaseerd op gegevens die zijn verzameld bij een relatief groot aantal huishoudens, wat de representativiteit van de bevindingen vergroot. Daarnaast suggereren de resultaten dat persoonlijke waarden en persoonlijkheidskenmerken een rol spelen bij de zorg voor het milieu van NIPF-eigenaren.

Het debat in de literatuur over landaankopen in het algemeen en bosplantages in het zuiden van de wereld in het bijzonder is gepolariseerd met voorstanders die landaankopen beschouwen als kansen voor ontwikkeling, terwijl tegenstanders ze beschouwen als een bedreiging voor ontwikkeling. Er is behoefte aan een vergelijkende analyse van land-gerelateerde investeringen, zoals bosplantages met verschillende eigendoms- en certificeringsstatus. Daarnaast is er behoefte aan inzicht in de diversiteit en complexiteit van factoren, zoals bedrijfsfasen en

alternatieve landgebruikscategorieën, die van invloed kunnen zijn op de resultaten van landgerelateerde investeringen in verschillende sectoren. Ten slotte vragen de toename van particulier bosbezit en de beleidsmatige nadruk op milieuwaarden van bossen in Europa om een betere conceptuele ontwikkeling en meting van zorg voor het milieu, persoonlijke waarden en persoonlijkheidskenmerken. Dergelijke conceptuele ontwikkelingen helpen de wisselwerking tussen de persoonlijkheid van particuliere boseigenaren en de zorg voor het milieu bij bosbeheer te begrijpen.

Mohammed Besher Degnet
Wageningen School of Social Sciences (WASS)
Completed Training and Supervision Plan

Wageningen School of Social Sciences

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
Advanced Microeconomics, ECH-51806	WUR	2016	6
Advanced Macroeconomics, ENR-51306	WUR	2018	6
Impact Assessment of Policies and Programmes, DEC-32806	WUR	2017	6
Summer school on Behavioral Economics	Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden	2019	3
B) General research related competences			
WASS Introduction course	WASS	2015	1
PhD Research Proposal writing	WUR	2015	6
Information Literacy PhD including EndNote Introduction	Wageningen University Library	2017	0.6
Reviewing scientific papers	World Development	2019	2
'Do locals have a say? Community experiences of participation in governing forest plantations in Tanzania'	8th PhD Workshop of the EAAE, Uppsala, Sweden	2019	1
'Do locals have a say? Community participation in governance of forest plantations in Tanzania and Mozambique'	IAAE 30th International Conference of Agricultural Economists (ICAE), Vancouver, British Columbia, Canada	2018	1
'Do certified private forest plantations increase the provision of and access to social services for local communities?'	IUFRO 125th Anniversary congress 2017, 18-22 September 2017, Freiburg, Germany	2017	1
C) Career related competences/personal development			
The Essentials of Scientific Writing and Presenting	Wageningen in'to Languages	2017	1.2
Project and Time Management	WGS	2018	1.5
Scientific Writing	Wageningen in'to Languages	2018	1.8
Teaching: Life Science Economics and Policies (AEP-32806)	WUR	2017-2020	1
Supervision: 2 MSc theses	WUR	2016-2017	1
Total			**40.1**

*One credit according to ECTS is on average equivalent to 28 hours of study load

The research described in this thesis was financially supported by the Netherlands Development Bank (FMO). Financial support from the Agricultural Economics and Rural Policy group (AEP) of Wageningen University is gratefully acknowledged.