Exploring Local Realities of Carbon Offsetting

Environmental Justice in a Ugandan Carbon Forestry Project

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Abstract

In the quest to find a 'least cost solution' for climate change mitigation that do not interfere with business-as-usual, carbon trading and PES schemes were introduced. PES schemes with carbon forestry projects are implemented in the Global South as a win-win-win tool for climate change mitigation and sustainable development. In this thesis, the Ugandan carbon forestry project *Trees for Global Benefits* is used as a case study with the aim to analyse how it has unfolded at a local level. Interviews with project participants and non-participant community members were conducted in Kasese District, focusing on their food security, fuel security, and income stability.

Findings in this study, and in other studies of the TGB project, show that the project brings some beneficial outcomes for the project participants, such as increased food access and income generation activities, but at a cost of food stability and fuel self-subsistence for themselves and non-participant community members. These trade-offs and injustices, I argue, are products of the neo-classical conceptualisation of PES projects, where efficiency, cost-effectiveness and environmental additionality are prioritised over equity. Furthermore, many argue that efficiency and equity are intertwined in PES, and therefore this prioritisation on efficiency might in fact result in impermanence and low environmental additionality, and hence not fulfil the overall aim of PES – to be additional to business-as-usual. Therefore, in order to create a successful PES project, and not just an unjust illusion of action to climate change, one needs to change the current economic conceptualisation into one that is more integrated and participatory where the local context, with its socio-economic and socio-ecological relations, are taken into account.

Preface

It is the 31st of January and my plan was to be home in Sweden by now, but instead I'm in a matatu on my way from Masaka to Kasese to conduct some fieldwork for my thesis. It's hot. I don't know how hot, but it's hot. And dusty. But the dust is not the familiar red dust that I have come to love-hate after my five months in Masaka. This dust is more brown-grey, and the landscape is more arid and much steeper, but beautiful. Being on the road for 8.5 hours, changing from matatu to bus, to an overfull matatu and then to another matatu without any openable windows, I can finally see the Rwenzori mountains from a distance. It's a relief. I'm almost there now, in Kasese. Getting off the matatu and walking towards the hotel I see a lot of mzungus in Land Rovers, probably on a safari trip to the near-by Queen Elizabeth National Park. The locals don't really take notice of me, like they do in Masaka, no one's yelling "mzungu, muzungu!" when I walk by. I guess for them I'm just another tourist, there for a couple of days and then long gone; nothing out of the ordinary. When I reach the hotel, it has already gotten dark and the temperature has sunk well below t-shirt temperature. I take a shower to wash off the trip, my first hot water shower in 137 days (!), and then I go to bed. Tomorrow is a busy day.

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It's early morning, I'm on a boda-boda going out from the city, towards the sub-counties where I'm going to conduct my interviews. There are only gravel roads, narrow and curvy gravel roads crowded by boda-bodas, trucks, cows, goats, children and bikes on their way somewhere. When going 60 km/h along the mountains slopes, I need to close my eyes in order not to freak out about the lack of crash barriers, and I cross my fingers that we won't meet a truck. Or a herd of cows for that sake. After almost an hour ride, happy to be alive, I meet my first group of informants at the sub-county office in Bugoye. I introduce myself for the sub-county officials and some police officers sitting in a shed close-by, then my informants and I take a seat in the grass and start talking. They are all really friendly and excited about the fact that I want to hear their stories. After all the fuss and stress pre-fieldwork, I finally feel at ease and that everything will turn out just fine. I can't wait to delve deeper into the local realities of carbon offsetting.

Acknowledgements

Foremost, I would like to give a special thanks to Godfrey Zaake for being my support-system and inspirer throughout my internship and during the fieldwork. I was close to giving up, a lot of times, but you saying "it's *our* thesis, remember? You can't waste it" made me push through. Further, I would like to thank Amon Kulukuma for helping me find informants and for interpreting the interviews, without you the fieldwork would not have been possible. I would also like to thank all of my informants for giving me their time and their perceptions and insights of the project, I hope this thesis won't disappoint you. Finally, I would like to thank my family for supporting me throughout my six years at university. I know I don't show that much appreciation, but I can promise you that without your encouragement, I wouldn't be here today finishing a master's thesis. So thank you all.

Julia Hedberg
Malmö, Sweden
September 19th, 2016

Acronyms

CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CSR	Corporate Social Responsibility
ELD	Environmental load displacement
ES	Ecosystem services
ET	Emission trading
EU-ETS	European Union Emission Trading System
FAO	Food and Agriculture Organisation of the United Nations
GHG	Greenhouse gases
HDI	Human Development Index
ICAP	International Carbon Action Partnership
IUCN	International Union for Conservation of Nature
JI	Joint Implementation
$MtCO_2e$	Million metric tonne of carbon dioxide equivalent
NGO	Non-governmental organisation
PDD	Project Design Document
PES	Payment for Ecosystem/Environmental services
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SDG	Sustainable Development Goals
tCO_2e	Tonne of carbon dioxide equivalent
TGB	Trees for Global Benefits
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VCM	Voluntary Carbon Market
VER	Voluntary Emission Reduction
WWF	World Wildlife Fund

Keywords

Carbon offsets, carbon forestry, Trees for Global Benefits, PES, food security, fuel security, income stability, environmental justice, efficiency, equity

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1. Introduction

> To allow the market mechanism to be sole director of the fate of human beings and their natural environment […] would result in the demolition of society.
>
> (Polanyi [1944] 2001, 76)

Global climate change is today widely accepted as the world's biggest threat, foremost caused by anthropogenic pollution from burning of fossil fuels. Beginning as a result of the Kyoto negotiations in 1997, so-called 'carbon trading offset schemes' were introduced as mechanisms to regulate greenhouse gas (GHG) emissions in order to mitigate climate change (Bumpus & Liverman 2008, 128; Böhm & Dabhi 2009, 9). Initially, the carbon markets were set up in order to work as a *supplementary* mechanism to the primary efforts of reducing domestic emission (Eckersley 2009, 106), but since then carbon trading and offsetting have dominated the mitigation agenda and rather worked as substitutes to other measures (Böhm & Dabhi 2009, 5; Ervine 2013, 656). The main argument for the establishment of carbon markets was to find a 'least cost solution' to mitigate the increasing GHG emissions for the Global North[1] (Eckersley 2009, 102; Nel 2014, 10) that does not interfere with 'business-as-usual' (Böhm & Dabhi 2009, 18). Within these carbon schemes, three 'flexibility mechanisms' were developed, including *Emission Trading* (ET), *Clean Development Mechanism* (CDM), and *Joint Implementation* (JI) (Landell-Mills & Porras 2002, 72; Bumpus & Liverman 2008, 128; Eckersley 2009, 99). CDM is a commonly used mechanism and the most developed one when it comes to payment for ecosystem/environmental services (PES), where Northern countries establish so-called 'emission reduction projects', working for example with afforestation and reforestation in the Global South[2], in order to earn certified emission reduction (CER) credits which can be traded on the carbon market or used in the countries' efforts of meeting national emission targets (UNFCCC 2014). However, CDM is also the one mechanism that has received a lot of harsh criticisms (Eckersley 2009, 103) for exacerbating the injustices caused by climate change on local communities in the Global

[1] *Global North* refers to the countries that are considered 'developed' and have a Human Development Index (HDI) of 0.8 or above; e.g. the U.S., Canada, Western Europe, East Asia, Australia, and New Zealand. In total 64 countries (UNDP 2005).
[2] *Global South* refers to the 'developing' countries with a HDI below 0.8; i.e. countries in Africa, Asia, and South and Central America. In total 133 countries (UNDP 2005).

South (101), rather than fulfilling the "triple requirements of effectiveness, efficiency and environmental justice" (Eckersley 2009, 104) the mechanism claims to accomplish.

Similar to these mechanisms developed from the Kyoto negotiations is the Voluntary Carbon Market (VCM), an alternative to the more formal Kyoto-initiated carbon market. The VCM is not controlled by governmental or inter-governmental institutions, and was developed to create an offset market for everyone (corporations, NGOs, individuals) that want to offset their emissions by investing in what is portrayed as 'green projects' in the Global South (Böhm & Dabhi 2009, 13). One PES project connected to the VCM is *Trees for Global Benefits* (TGB[3]) initiated by EcoTrust[4], an environmental conservation organisation in Uganda. TGB is a community-based carbon offset scheme aiming to improve rural livelihoods by sustainable land-use practices, such as agroforestry, where the trees planted on the project participants' farmlands sequester carbon from the atmosphere that are later sold as Voluntary Emission Reductions (VERs) in order for them to earn an income (EcoTrust, n.d.). The project is renowned for being more sustainable than other carbon forestry projects, for example it won the UN SEED Award[5] in 2013 (SEED 2016b) with the motivation "TGB is an exceptional social and environmental low carbon enterprise […] with promising efforts to promote economic growth, social development and environmental protection in Uganda" (EcoTrust 2014, 5), and it has also been used as a "good example" for improving REDD+[6] projects (Mwayafu & Kimbowa 2011, 5) and PES projects in general (Forest Trends *et al*. 2008, 37). The TGB, in theory, sounds like a promising project that contributes to all of the three pillars of sustainable development through cost-effective climate change mitigation, community development and livelihood improvements, but is it realised in practice?

With this thesis, I aim to study socio-ecological and socio-economic implications of the carbon market and PES on local livelihoods, using the TGB project in Uganda as my case study. Drawing on my empirical findings, i.e. the data collected through focus groups and

[3] In some studies the acronym used for the project is instead 'TGFB', but I will use 'TGB' throughout this study.
[4] EcoTrust is the project coordinator and the intermediary, but there are other contributors to the project, e.g. ICRAF (International Centre for Research in Agroforestry/World Agroforestry Centre), NaFORRI (National Forestry Resources Research Institute), and USAID (United States Agency for International Development) (EcoTrust n.d.).
[5] The UN SEED Award was initiated by UNDP, UNEP and IUCN, and is annually assigned to a locally led enterprise working with social and environmental issues within a country of the Global South (SEED 2016a).
[6] REDD+ (Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries) is a forest management project initiated by FAO, UNDP and UNEP.

interviews in the field as well as secondary data from other studies of this particular project, the aim is to get an understanding of what impacts it has on the livelihoods of the project participants as well as their neighbouring non-participant community members, focusing on their *food security*, *fuel security*, and *income stability*. I will analyse my findings from a political ecology perspective, using concepts and theories concerning PES, market environmentalism, and environmental justice. My aim is not to evaluate the TGB project as such, my data is too scarce for that, but to highlight some of the issues my informants have put forward in order to get an understanding of how this market-based climate mitigation measure can unfold at a local level, as well as how my findings correlates with the 'win-win -win' (environment-carbon credit buyer-carbon farmer) scenario that is often portrayed in international discussions concerning carbon offsetting and PES.

1.1 Research Questions

How does the PES and carbon forestry project Trees for Global Benefits unfold at a local level?

- What implications do the TGB project have for the project participants, in connection to the three focus areas of food security, fuel security, and income stability?
- In what ways are the non-participant community members affected by the TGB project in terms of food and fuel security?
- What environmental justice issues are discovered, and how could they be avoided?
- Does the TGB project match the win-win-win narrative?

1.2 Structure of Thesis

Following this introductory section, is firstly a background in section 2 where the PES mechanism, the VCM market, market environmentalism, the TGB project, the three focus areas of this study as well as the study area are briefly described. The third section of this thesis is the theoretical framework where the epistemological standpoint chosen is briefly presented together with the overall approach of political ecology and environmental justice theory. In the fourth section, the methodology used for this thesis is thoroughly described containing the fieldwork and data analysis methods used. Under section 5, my empirical

findings are presented in connection to the focus areas, and compared to other studies of the same carbon forestry project. This presentation of the findings is followed by an analysis and discussion section (section 6), where the primary data is analysed and discussed through the frameworks explained in section 3, together with suggestions for the future. The thesis is then completed with a short concluding section (section 7).

2. Setting the Scene

In order to be able to understand this thesis fully, some concepts and background information need to be explained and described. Below the concepts of PES, VCM and market environmentalism will be briefly described in order to give an overview for the reader who might not be familiar with these concepts. Some background information about the TGB project as well as definitions of the themes of focus in this thesis are described along with a motivation for their selections.

2.1 Payments for Ecosystem Services

According to Forest Trends et al. (2008), 60% of the ecosystems in the world are being used in an unsustainable manner, meaning that they degrade faster than they can recover (i). As an incentive to reduce this destruction of the ecosystems that are vital for ours and the planet's survival, the United Nations Environment Programme (UNEP) launched the *PES scheme* in which all so-called ecosystem services get a monetised value that can be used to attract investment for restoration, maintenance and conservation of these ecosystems (Forest Trends *et al*. 2008, i; Wunder, Engel & Pagiola 2008, 834; Mahanty, Suich & Tacconi 2013, 38). There are a number of types of ecosystem services included in PES; *environmental goods*, *regulating services*, *supporting services*, and *cultural services* of the world's three largest ecosystems; *forests*, *oceans*, and *cultivated/agricultural land* (Forest Trends *et al*. 2008, 2; Wegner 2016, 618). A common definition of PES is "a payment to an agent for services provided to other agents (wherever they may be in space and time) by means of a deliberate action aimed at preserving, restoring or increasing an environmental service agreed by the parties" (Karsenty 2011, 1), for example payments for establishment of forestry projects for carbon sequestration. The fundamental objective of PES is that "the payment causes the benefit to occur where it would not have otherwise" (Forest Trends *et al*. 2008, 3), which means that it should be *additional* to business-as-usual (see figure 1). Therefore, PES schemes

has been identified as an important mechanism to climate change mitigation by reducing deforestation and supporting afforestation in the Global South and hence use the forests as *regulating services*, i.e. 'carbon stocks' and 'carbon sinks' for GHG emission, mostly emitted by the Global North (Mahanty, Suich & Tacconi 2013, 38; McDermott, Mahanty & Schreckenberg 2013, 422).

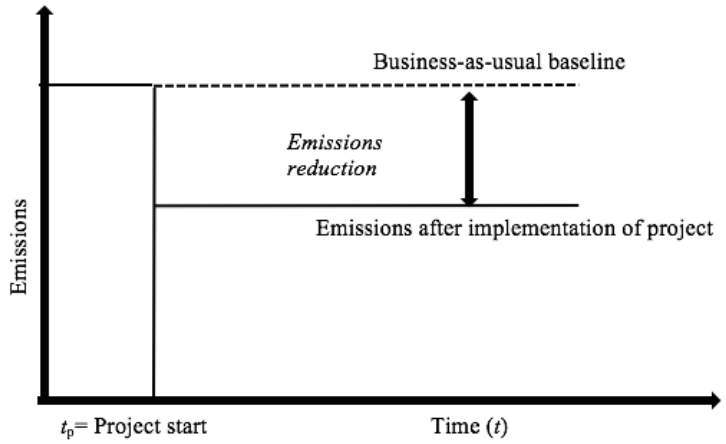

Figure 1. *A simplified principle of the baseline, showing the emission reduction result of a project implementation, i.e. the additionality to business-as-usual* (based on figure in Michaelowa 2005, 290).

Further, PES is also regarded by some of its proponents as "pro-poor", which means that the opportunities and benefits connected to PES can enable low-income people in the Global South to earn a monetary income as well as contribute to sustainable community development (Forest Trends *et al*. 2008, 24; Osborne 2015, 64). Pro-poor PES runs on the premises (the so-called Pareto principle) that "an economic intervention is efficient if it benefits at least one person without leaving any other person worse off" (Forest Trends *et al*. 2008, 48). Since most rural people depend on natural resources for their livelihoods, being a part of a PES project and getting paid to manage their natural resources in a more sustainable way, is consider to be a 'win-win-win' – for nature, the ES buyers, and the ES providers (Forest Trends *et al*. 2008, 24; McAfee & Shapiro 2010, 580; Lyons & Westoby 2014, 13).

2.2 Voluntary Carbon Market

As mentioned briefly in the introduction, there are two different kinds of carbon markets; the official international carbon market for governments and public authorities, and the voluntary carbon market that is open for basically everyone (NGOs, corporations, individuals). The international carbon market, or the so-called *International Carbon Action Partnership* (ICAP), is controlled by the United Nations Framework Convention on Climate Change (UNFCCC), consists of a number of national and sub-national systems, the European Union Emission Trading System (EU-ETS) being one of them, and it acts as a forum where emission trading systems (ETS) are supported and implemented (EC 2016; ICAP 2016). The VCM, on the other hand, is not controlled by any governmental or inter-governmental organ, do not have any unified, over-arching regulations or rules (however, there are different established mechanisms and certifications standards, such as the Plan Vivo Standard, so the VCM is not completely free and without regulation), are described to contribute to sustainable development, and is open for everyone, companies and individuals alike, where they can offset their emissions, for example as part of a company's corporate social responsibility (CSR) (Böhm & Dabhi 2009, 14; Lovell, Bulkeley & Liverman 2009, 2362; Nel 2014, 12). These carbon offsets are created, for example, through PES projects, commonly initiated by NGOs (which then act as intermediaries), and are then sold as VERs on the VCM. On the African continent there are currently carbon offsetting projects operating in 21 countries, Uganda being one of the countries hosting a larger number of projects (Hamrick *et al*. 2015, 29). In 2014, carbon offsets of 87 $MtCO_2e$ (million metric tonne of carbon dioxide equivalent) were traded on the VCM, and the voluntary demand for carbon offsets is steadily increasing for every year (9).

2.3 Market Environmentalism

Addressing and mitigating environmental problems, which are consequences of accumulation and, what proponents of PES calls, "markets failures", with new market-based mechanisms, have received a lot of critique (O'Neill 2001, 695; Van Hecken & Bastiaensen 2010, 785; Muradian *et al*. 2013, 275). PES are embedded in the ideology of 'market environmentalism' which regard the market to be the solution of the world's environmental and development problems (McAfee 2012, 109). This neoliberalisation of nature put a monetary exchange-value on ecosystem services, following the idea that we should "sell nature to save it" (McAfee 1999, 146), which results in leaving out the spatial and the complex eco-social

system these ecosystem services are embedded in (151), as well as excluding the non-monetary intrinsic values of nature (Villagómez-Cortés, Alfredo & del-Ángel-Pérez 2013, 280). Since PES schemes claim to stimulate conservation of nature along with development, local intermediaries, like EcoTrust, need to be enrolled in order to implement PES projects that also contributes to community development. However, due to already existing power structures and inequalities within society, conflicts and clashes often arise when trying to fit local realities into "the neo-classically based economic discourse that frames neoliberal PES" (McAfee & Shapiro 2010, 581). This in turn can deepen socio-environmental inequities (Bakker 2010, 715), which resulting implications will be discussed later on in this thesis.

2.4 Case study: Trees for Global Benefits

Trees for Global Benefits (TGB)[7] is a community-based tree planting carbon offset project, initiated in 2003 by EcoTrust, a Ugandan environmental conservation NGO, and has since then spread to ten districts in Uganda, most of them in the western part of the country, along the so-called Albertine rift, an ecoregion with the most diverse fauna and flora on the African continent. The project is to operate as a market solution (PES) to reduce the exploitation of forest resources in nature reserves, and at the same time offer an income to rural farmers by producing and selling VERs. In order to sequester the carbon to be able to sell the VERs and earn an income, individual small-scale farmers and community groups are involved in land-use activities, such as afforestation, reforestation, and agroforestry, where indigenous and/or naturalised tree species are planted on their farmlands. The project is designed according to the Plan Vivo system and approved by the Plan Vivo Standard, and is through Plan Vivo Foundation connected to the VCM. The project is generating so-called "ex-ante carbon" which means that the carbon reductions are planned and paid for but not yet achieved. The trees planted within the project need to be kept for 20-25 years before they can be harvested in order to sequester the sold amount of carbon (EcoTrust n.d.).

The TGB project is growing for every year with increasing numbers of farmers and buyers joining the project. According to the annual report for the activity year of 2015, 4608 farmers plus 40[8] community groups were currently involved (EcoTrust 2015, 2), and 257,842 tCO_2e (tonnes of carbon dioxide equivalent) were sold to various buyers (EcoTrust 2015, 17). Most

[7] From hereon referred to as 'TGB project'.

[8] 39 of them established during last year, partly due to EcoTrust's Collaborative Forest Management initiative (EcoTrust 2015, 26).

of the buyers are companies based in Europe, and a number of them are Swedish, for example Max Hamburgare who was the project's largest buyer in 2011, 2012 and 2013 with a total of 194,390 tCO_2e (EcoTrust 2015, 31).

Apart from the income generation through the carbon payments, TGB aims to contribute to income stability, food security, as well as fuel security at a community level (EcoTrust n.d.). This thesis aims to study the impacts of the TGB project on the farmers involved in the project but also on neighbouring community members, focusing specifically on these three areas (food security, fuel security, and income stability).

2.4.1 Project Design & Requirements

As presented above, the TGB project is designed according to the Plan Vivo system and approved by the Plan Vivo Standard. This standard has a number of principles; (i) the project needs to directly engage and benefit smallholders and community groups, (ii) generate ecosystem service benefits and maintain or enhance biodiversity (e.g. by only planting naturalised and/or native tree species), (iii) demonstrate community ownership which means that the participants participate meaningfully through the design and implementation of land management plans (so-called *plan vivos*) that address local needs and priorities, and (iv) demonstrate positive livelihood and socio-economic impacts (Plan Vivo 2013, 5).

Further, more specific requirements set by EcoTrust that farmers need to fulfil in order to be able to participate in the TGB project, are that they need to have (i) long-term ownership/right to the land used in the project (EcoTrust n.d.), have (ii) at least 1 hectare of land for planting of the carbon trees, which means that they need to have around 4 hectare of land in total in order for the project not to interfere with household subsistence, (iii) plant a minimum of 400 trees (which is about 1 ha) with appropriate spacing in either a woodlot or mixed with other crops (agroforestry), (iv) be able to purchase the tree seedlings for planting (buying on credit is possible), and (v) keep the trees for the contract length of 25 years before harvesting them (Fisher 2011, 55). The payments per tCO_2e is differing depending on when the contract was signed with the project participant and with the carbon buyer, but the price has approximately been $5-10 per tCO_2e (Schreckenberg, Mwayafu & Nyamutale 2013, 29), and 1 hectare of carbon trees is estimated to sequester 226 tCO_2e during the contract period of 25 years (EcoTrust n.d.). From the amount paid per tCO_2e, the project participants receive 60% (minus 10% for risk buffer and 10% for Carbon Community Fund) whereas the rest is used for

administrative costs (EcoTrust 2009, 6). The payments are received five times over a 10-year period if the targets set are fulfilled (see table 1) (EcoTrust n.d.; Carter 2009, 36; Schreckenberg, Mwayafu & Nyamutale 2013, 11).

Table 1. *Table of the payment schedule with monitoring target and percentage of the carbon payment made each year.*

Year	Monitoring target	Payment in %
0	50% of the trees in the contract are planted	30
1	All trees in the contract planted	20
3	85% survival of the trees	20
5	Average DBH[9] not less than 10 cm	10
10	Average DBH not less than 20 cm	20

2.5 Focus Areas

As mentioned above, the areas chosen to be studied within the TGB project is *food security*, *fuel security*, and *income stability*. The reasons for selecting these particular areas, are that they are stated in the Project Design Document (PDD) of the TGB project and also on Plan Vivo Foundation's website as being the main additional benefits to the direct payments, and also beneficial at a community level:

> In addition to farmers' direct payments for planting trees and sequestering carbon, the project aims to contribute to food security, fuel security, and income stability at community level.
>
> (Plan Vivo Foundation n.d.)

[9] Diameter at Breast Height (DBH) is a standard method for measuring tree growth where one measures the diameter of a standing trees trunk/bole (EcoTrust 2008).

Therefore, I found it interesting to study these more closely from the perspectives of both project participants and non-participant community members. However, the focus area of *income stability* will not be evaluated for non-participant community members since they do not receive any carbon payments. Since I have not found any definitions made by EcoTrust or Plan Vivo Foundation of the additional benefits that are the focus areas for this study, I have drawn on previous literature instead.

2.5.1 Food Security

When creating my questions regarding food security for my focus group discussions and my individual interviews, I used the definition put forward at the 1996 World Food Summit by the Food and Agricultural Organisation of the United Nations (FAO):

> Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.
>
> (FAO 2008)

Within this definition of 'food security', there are four different dimensions; *availability* which refers to food supply that is determined by food production and stock levels, *access* includes both the economic and physical accessibility to an adequate food supply by either buying or producing it, *utilisation* of food is when the food includes all the nutrients needed, and *stability* is determined by having an adequate access to food over a period of time (FAO 2008, 1). For this thesis, the focus will be on three of the four dimensions; availability, access, and stability.

Further, when conducting the individual interviews with the project participants and the non-participants, I asked them to describe what 'food security' was for them before I asked further question regarding that subject, in order for me to get a better understanding of how to interpret and analyse their answers. Most of my informants gave the description that 'food security' for them is when they "have received high enough yields to feed their whole family without having to buy more food at the market", i.e. to be self-subsistent on food. When analysing the data connected to food security, I will bear in mind their definitions as well.

2.5.2 Fuel Security

In Uganda, 93% of the energy is derived from biomass, mostly wood but also charcoal and agricultural residue, and is used for cooking and heating in households, institutions, and

industries alike (Government of Uganda n.d.). In this thesis, the 'fuel' in *fuel security* will be defined as firewood and 'security' as a stable availability and access to firewood for household purposes. When asking my informants to define 'fuel security', most of them described it as "having enough firewood on your land or close-by for cooking and heating without having to buy it".

2.5.3 Income Stability

According to my informants, 'income stability' for them is when they "have a stable source of income, an income that is reliable and that pays enough so one is able to pay for different fees, such as school fees, labour hire, tree maintenance, and other necessities". This is the definition used in this thesis with the focus on reliability and if the amount is enough to pay for the maintenance of the project while still having a surplus for other fees.

2.6 Study Area

The study area chosen for this thesis is the two sub-counties of Bugoye and Maliba in Kasese District (reasons motivated under 4.1 Location). Kasese District is located in the far western part of Uganda[10] (see figure 2 and 3), bordering the Democratic Republic of the Congo, with a land area of 3389.8 km^2 where 63% is occupied by nature and wildlife conservation (some of it reserved for Queen Elizabeth National Park and Rwenzori Mountains National Park) as well as government projects (KDLG 2009, 2). 702,029 people live within the district which gives a population density of 183 persons/km^2 (450 persons/km^2 land available for farming and settlement). More than 85% of the population are small-scale, subsistent farmers (KDLG 2015) involved in crop production, animal rearing and lake fishing (Renno, Twinamasiko & Mugisa 2012, 53). 55.2% of the population within the district live below the poverty line (27), but the sub-counties of Bugoye and Maliba have more self-sufficient and "wealthy" households (Bugoye: 72.3%; Maliba: 68.4%) than poor households (38). However, only 2.8% in Bugoye and 4.4% in Maliba fulfil the basic household needs and the 'deprivation index' of ownership of (i) two sets of clothes, (ii) ownership of one pair of shoes, (iii) availability of bathing soap, (iv) weekly intake of sugar, and (v) education for all household children (26). The most significant effect of poverty is food insecurity. Within the whole district, 54.6% of the households experience food shortages during one or more

[10] Uganda is a land-locked country located in Eastern Africa, with a HDI of 0.48 which puts the country in the *Low Human Development* category (UNDP 2015), and hence is a country of the *Global South* according to UNDP:s definition explained above under [2].

seasons, while 8.3% are food insecure during all four seasons (97). In Bugoye about 70% of the households have food shortages in one or more seasons, and in Maliba it is 30% (104). The main reason for poverty and food insecurity is shortage of land for cultivation (30).

Figure 2. *Map of Africa, indicating the location of Uganda* (Wikimedia Commons 2015). Permission granted by GNU Free Documentation License, version 1.2 (2016-09-28).

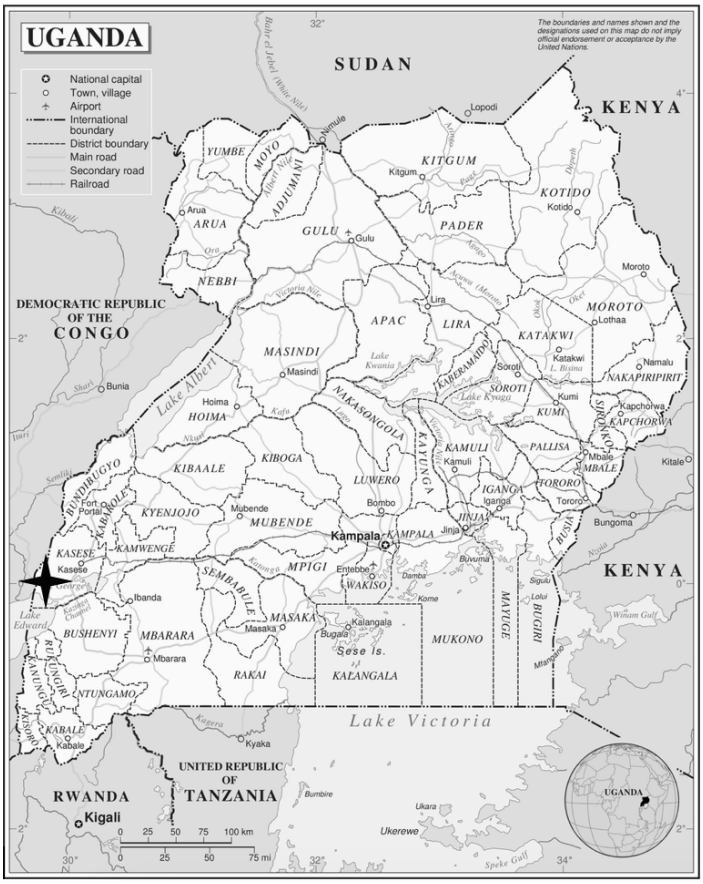

Figure 3. *Map of Uganda, indicating the location of Kasese District* (based on map from UN 2003). Permission granted by The Geospatial Information Section (2016-09-28).

3. Theoretical Framework

In this section, my theoretical framework for the thesis is presented. I will take a critical realist epistemological standpoint, looking at the phenomena studied through a political ecology lens, and analyse my findings using environmental justice theory.

3.1 Critical Realism

This thesis takes a *critical realist* standpoint where its ontology (reality/existence) is dominated and separated from its epistemology (knowledge). The ontological standpoint of critical realism is that reality exists independently from our experiences and perceptions of it, while its epistemology, i.e. knowledge, is created by uncovering natural and social causal mechanisms, albeit always fallible (Sayer 2000, 11). Therefore, a critical realist philosophy "seeks to understand ecological change through epistemological scepticism but ontological

realism to underlying biophysical processes" (Forsyth 2007, 147), meaning that existing explanations models "reflect the agendas of the society that created them" (Forsyth 2007, 146), and might therefore not represent the interest of marginalised social groups, such as those in the Global South (Forsyth 2007, 146). This conceptualisation of reality is suitable for this study since I regard climate change and its consequences as real phenomena, while questioning the politically dominating concepts of carbon forestry and PES.

3.2 Political Ecology

This thesis will take a political ecology approach. Political ecology is not a theory neither a uniform method, but an outset of how to approach and study the world. Political ecologist mean that environmental change and ecological conditions are all products of political processes, and hence need to be interpreted as such (Robbins 2011, 20). Further, they "accept the idea that costs and benefits associated with environmental change are for the most part distributed among actors unequally … [which inevitably] reinforces or reduces existing social and economic inequalities … [which holds] political implications in terms of the altered power of actors in relation to other actors" (Bryant & Bailey 1997, 28-29 in Robbins 2011, 20). Their aim is to "expose flaws in dominant approaches to the environment favored by corporate, state, and international authorities, working to demonstrate the undesirable impacts of policies and market conditions, especially from the point of view of local people, marginal groups, and vulnerable populations" (Robbins 2011, 99). This outlook suits my subject of study well since I am interested in the cross-scalar interactions that are central in PES, and the justice issues that comes along with it. Political ecologists also usually offer both a "hatchet" and a "seed" by critically examining and highlighting politically problematic and unequal processes, while also putting forward alternatives that can grow into new socio-ecologies (Robbins 2011, 98), and this I also, in some way and on a small scale, wish to do through suggestions for future development.

3.3 Environmental Justice

According to Roberts and Parks (2007), global warming and climate change is "all about inequality" (Roberts & Parks 2007, 194) since the ones least responsible for it are the ones most severely affected by it, i.e. the people in the Global South (Smith 2007, 26; Nel 2014, 2). With that, the primary injustice of climate change is the inverse relationship between vulnerability and responsibility (Eckersley 2009, 100), and since international carbon trading is often portrayed to provide "the most flexible and cost-effective means of reducing global

aggregate emissions" (Eckersley 2009, 100-101), it could help redress the injustices imposed by climate change. Ideally, carbon trading should satisfy the three requirements of *effectiveness*, *efficiency*, and *environmental justice* (104), but in reality, however, many case studies of carbon offset and PES projects have shown that justice tends to be overlooked[11] (119). There actually might even arise so-called "secondary injustices" when carbon trading schemes are employed as the policy tools to address the primary injustices (101). One of the reason for this, is that the mitigation and sequestering projects are established in the Global South, which are then facing a responsibility to operate as carbon sinks for the Global North while at the same time trying to adapt to the ever changing climate they have contributed very little to (Bachram 2004, 1; Wittman & Caron 2009, 711; McAfee 2012, 108; McDermott, Mahanty & Schreckernberg 2013, 422).

Environmental justice[12] and its movements "explore, represent, and demand justice — fair distribution [of resources as well as of environmental goods and risks], recognition, capabilities, and functioning — for communities as well as for individuals" (Schlosberg 2007, 5). Environmental justice is commonly explained as multi-dimensional, consisting of four different dimensions (see figure 4); *distributive justice* which concerns the distribution of environmental costs and benefits between people at different scales, *procedural justice* which refers to the participation in decision-making and implementation, thirdly the *recognition* of people's differing identities and cultures, and lastly *contextual justice* where the surrounding social conditions influence peoples' ability to achieve the other three dimensions of environmental justice (McDermott, Mahanty & Schreckenberg 2013, 416; Sikor 2013, 7; Pascual *et al*. 2014, 1028).

[11] See for example studies on these projects: AES-CARE in Guatemala; Green Resources in Bukaleba and Kachung, Uganda; Scolel Té in Mexico.

[12] Justice, equity and fairness all mean "fair treatment or due reward" (Schroeder & Pisupati 2010, 13), and will be used interchangeably in this thesis.

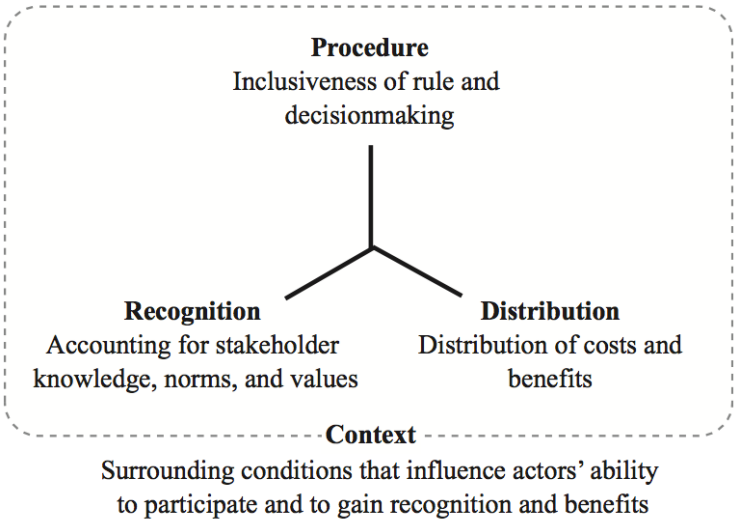

Figure 4. *The different dimensions of the environmental justice framework* (Pascual *et al*. 2014, 1028). Permission granted by Elsevier and Copyright Clearance Center (2016-11-10).

All of these dimensions are intertwined, overlapping and equally important; procedural justice (participation) and recognition are often explained as preconditions that need to be met in order to be able to achieve distributional justice (Schlosberg 2004, 520; Suiseeya & Caplow 2013, 969), and they are all influenced by the social context in which they are applied, i.e. contextual justice (Pascual *et al*. 2014, 1028). However, in the analysis of this thesis the focus will lay on the two dimensions of procedural and distributive justice, with some reference to contextual justice. The reason for focusing on these dimensions, is that the aim of this thesis is to study socio-ecological and socio-economic implications and trade-offs on the project participants and non-participant community members, i.e. the *distribution* of project benefits and disadvantages, and how this distribution can partly be explained by the *participation*, or lack thereof, of the project participants' and non-participant community members in the TGB project implementation, as well as by the *context* into which the project is implemented. Therefore, the dimension of recognition, i.e. the acknowledgment of the target population's distinct identities and cultural environment (Sikor 2013, 2), is outside the scope of this thesis. Consequently, sufficient distributive and procedural justice, or a lack of it, within the TGB project, revealed from the findings of this study, might partly be explained by the extent of the project's recognition of the social and cultural context, but this will not be researched or analysed in this study.

Along with using a justice perspective comes the problem of formulating a universal definition of what justice is (Suiseeya & Caplow 2013, 969). What is just for some people,

might be considered unjust for other geographically, politically, and socially distinct people (Ishiyama & TallBear 2001, 9; Sikor 2013, 2), and this depends of what notion of justice one has (Sikor 2013, 13). There are a number of differing views and notions of justice; *Utilitarian justice* is a consequence-based notion of justice which aim is to maximise utility for the majority, and is achieved when the outcomes result in the least overall risk (Clayton 1998, 164; Shrader-Frechette 2002, 29), however, there can still be unequal distribution if it is for "the greater good" (McDermott, Mahanty & Schreckenberg 2013, 418), *libertarian justice* focuses on equal rights (McDermott, Mahanty & Schreckenberg 2013, 418) and is achieved when the outcomes are results of voluntarily actions made by individuals (Clayton 1998, 164), *egalitarian justice* is achieved when all rewards are divided equally among the ones affected and when the outcomes minimises already existing inequalities (Clayton 1998, 164; Pascual *et al*. 2010, 1239; McDermott, Mahanty & Schreckenberg 2013, 418), *merit-based justice* is achieved when outcomes are distributed in accordance with peoples' individual contributions and sacrifices, and *needs-based justice* focuses on outcomes according to need, and targets the marginalised people of society (McDermott, Mahanty & Schreckenberg 2013, 418). Even though it is a highly contested concept to construct a specific, universal definition of what one means with 'environmental justice', it is needed in order to be able to evaluate environmental justice issues (McDermott, Mahanty & Schreckenberg 2013, 417; Schroeder & McDermott 2014). In this thesis, I will use an egalitarian and needs-based notion of environmental justice with a multidimensional approach, focusing on the justice dimensions stated above.

4. Methodology

For this thesis three different qualitative methods were chosen; focus group and qualitative semi-structured interviews for data collection, and qualitative content analysis for analysing the primary data. The primary data collection for this thesis was conducted in Kasese District, Uganda, between the 31st of January and 14th of February 2016. I started out with conducting four focus group discussions with 20 farmers involved in the TGB project in the sub-counties of Bugoye and Maliba, to then narrow it down to 12 project participants for my individual qualitative semi-structured interviews. I also conducted semi-structured interviews with 8 non-participant community members. After the interviews, all of the material was analysed

using qualitative content analysis in order to get into the depth of the data and decipher patterns, tendencies and themes for further analysis and discussion.

4.1 Location

After having chosen to focus on the TGB project (reasons explained in the introduction), I researched where in Uganda this project is operating as well as where former studies concerning this project has been conducted (see e.g. Carter 2009; Fisher 2011; Finighan 2011; German *et al*. 2011; Masiga, Mwima & Kiguli 2012; Schreckenberg, Mwayafu & Nyamutale 2013; Nel 2014). Since I was living in Masaka in the south-western part of the country when researching for this thesis, I wanted to conduct fieldwork somewhere relatively close-by. I found out that the project is operating in five different districts in the western part of Uganda (ten districts in total), Kasese District being one of them (EcoTrust 2014, 5), and since I did not find any other TGB studies conducted in Kasese District, I thought it would be interesting to conduct my study there. Due to my local interpreter's familiarity with the sub-counties of Bugoye and Maliba, I chose to conduct my study in those two sub-counties. Within these sub-counties, I conducted my focus groups and interviews in four different villages; Katooke and Ndugutu in Bugoye sub-county, and Mubuku and Maliba Two in Maliba sub-county.

4.2 Sample

According to Palys (2008) one needs to choose a sampling method depending on the research objectives and the context in which one works, since there is no "best sampling strategy" (Palys 2008, 697). The sampling method chosen for the focus groups and the individual interviews with carbon farmers for this study was *criterion sampling*. When using a purposive sampling method, the researcher selects the units (people, cases, organisations etc.) which will best answer the research questions. The aim is not to make generalisations but to study perceptions and attitudes of a chosen few which was suitable since that was the aim of this study. With criterion sampling, cases or individuals that fulfil a certain criterion is selected (697). This sampling method was suitable for selecting informants for the focus groups and the individual interviews with project participants since I (i) wanted farmers living in Maliba or Bugoye, (ii) that have been involved in the TGB project for at least 2 years, and (iii) that have agriculture as their main source of livelihood. The reason for setting the criterion that the farmers need to be living in Maliba or Bugoye was the simple reason that those sub-counties were the location chosen for my study. Being involved in the TGB project and having been

involved for at least two years were required in order for them to have gain some experience of being involved in the project, have received carbon payments, and also for the trees to have grown a bit, since then they would be able to give me a better picture of how growing these trees has affected their supply of food and firewood, as well as if the payments have contributed to income stability, all connected to my focus areas for this study. The project participants for the individual interviews were also required to grow their trees intercropped and not in a woodlot in order to see the impacts on food-growing more significantly, and the reasons for wanting them to have agriculture as their main source of income because then farming and their land is their most important asset.

Since, as mentioned above, the TGB project aims to contribute to food security, fuel security and income stability at a community level as well as since PES commonly use the so-called 'Pareto principle' that "an economic intervention is efficient if it benefits at least one person without leaving any other person worse off" (Forest Trends *et al*. 2008, 48), I wanted to include non-project participant community members in the study in order to get an understanding if the project has had any impacts on them. For the individual interviews with community members, the same sampling method (criterion sampling) was used. The criteria set up for the non-participants were the requirements to (i) neighbour (i.e. have their farmland next to) a farmer involved in the TGB project, (ii) have some knowledge about the TGB project, as well as (iii) having agriculture as their main source of livelihood. The reasons for these requirements were that my purpose was to study if the project had impacted their food and fuel security. To be able to find these community members, I used a referral process called *snowball sampling* where one informant gives the researcher a name of another potential informant, who in turn gives a name of a third informant and so forth (Atkinson & Flint 2001; Robinson 2014, 37). In my case, after the interview with a project participant, I asked her/him to find a neighbouring non-participant who fulfilled my criteria and were willing to conduct an interview. In order to avoid bias and influence on the non-participant by the project participant, the latter was asked not to stay for the interview.

My sample size for this study was 20 project participants for the focus groups, 12 project participants for individual interviews (all of them having partaking in the focus groups), and 8 non-participant community members. According to Flowerdew and Martin (2005), a focus group should consist of 4-10 participants (131), and my intention was to conduct two different focus groups with 10 participants in each, making it 20 in total. For the individual interviews,

the idea was to conduct individual interviews with all the project participants from the focus groups which fulfilled my criteria, i.e. 20 farmers, and with the same number of non-participant community members. However, due illness and time constraints, only 12 interviews with project participants and 8 interviews with non-participant community members were conducted.

4.3 Questionnaires

Before conducting interviews one should prepare an interview guide/questionnaire where one formulates the questions and reflect upon possible difficulties that might occur during the interviews, in order to have a comfortable interaction with the informant (Doody & Noonan 2013, 30). I made three different questionnaires for my interviews, one for the focus groups, one for the individual interviews with the project participants as well as one for the individual interviews with non-participant community members. The focus group questionnaire (see appendix 1) was influenced by the knowledge I had gained from reading EcoTrust's annual reports as well as academic articles regarding the project and other carbon forestry projects, and the aim was to get a better understanding of the project from the farmers' perspectives and give a voice to the ones practically involved in the project. The questionnaire for the individual interviews with the project participants (see appendix 2) was influenced by the knowledge and input I gained from the focus groups and focused primarily on the three areas of interest for this study (food security, fuel security, and income stability) but also somewhat on benefit-sharing connected to the community. The focus of the questionnaire for the interviews with non-participant community members was *impacts*, both negative and positive, of the project on their livelihoods, foremost connected to food and fuel security.

When formulating the questions for the questionnaire, I tried to formulate them in a neutral way in order to avoid leading and loaded questions (Flowerdew & Martin 2005, 89; Doody & Noonan 2013, 30). I started out with more easily answered questions and saved the questions regarding the topics that might be perceived as difficult or sensitive to the end of the interview, since I thought that then the informants might feel more comfortable with the whole situation and I had hopefully gained their trust. Some of the main questions were followed up by probes to encourage the informants to elaborate and explain more thoroughly, in order for me to get a deeper understanding (Doody & Noonan 2013, 30).

4.4 Focus Groups

For the collection of my primary data, I decided to first conduct focus groups with farmers involved in the TGB project in Bugoye and Maliba sub-county. Focus groups can be used to help generate interview questions for further studies (Flowerdew & Martin 2005, 132) and that is the reason to why I chose to conduct focus groups in the beginning of my research; to get an understanding of the farmers' perception of the project, with its benefits and challenges, in order to make my focus more specific for my individual interviews. My intention was to conduct two focus groups with 20 farmers, one in Bugoye sub-county and one in Maliba sub-county, but due to lack of transportation for the farmers, I ended up conducting four different focus groups, two in each sub-county, with 5 participants in each, which also changed my focus to four villages instead of two as set in the beginning. I started the focus group discussions with presenting myself, my research assistant and interpreter, and explained my study and why I was interested in getting their perceptions and opinions regarding the TGB project. Further, I had a questionnaire with semi-structured, open-ended questions which the informants discussed (see appendix 1).

For some informants it might be easier to explain their perceptions and attitudes when they hear other people's opinions, which is one of the reasons I thought that conducting focus groups could be a suitable method to start my fieldwork with, while for other informants it will feel uncomfortable and overwhelming to raise their opinions in a group situation, which might lead to them under-reporting views and opinions they think might be controversial or too personal to talk about in a group setting (Flowerdew and Martin 2005, 132-3). Therefore, I also conducted individual interviews with 12 of the 20 farmers that partook in the focus groups.

4.5 Qualitative Interviews

Qualitative interviews are what Eyles (1988) call "conversations with a purpose" (cited in Flowerdew & Martin 2005, 111). For this study, semi-structured qualitative interviews were chosen since the purpose was to get a deeper understanding of the project participants' and the non-participant community members' perceptions of the project and its impacts, and this could not have been fulfilled through mere surveys. The questionnaire had open-ended questions (see appendix 2 & 3) in order to open up for follow-up questions and further discussion. When conducting qualitative interviews, it is important to remember that the

answers are context dependent and experiences and perceptions of individuals, and therefore not generalizable nor representative for the whole group or project as such (Flowerdew & Martin 2005, 111).

Where the interview is conducted is an important consideration since it might affect the relationship between the researcher and the informant, and hence the data collected. It is preferable to conduct the interviews in a setting where the informant feel comfortable in order for the interview to be a stress-free conversation (Flowerdew & Martin 2005, 118; Doody & Noonan 2013, 31). Reflecting upon this, the individual interviews with the project participants and the non-participant community members were conducted in their homes. This also gave me a chance to see the trees planted within the project. The focus group discussions were conducted at the so-called "trading spots" of the four villages because it was the most convenient place for them all to come together.

4.6 Ethical Considerations

When conducting interviews in different cultural contexts from one's own, especially in the Global South, one needs to be precautious and sensitive to existing power relations between the researcher and the informants (Flowerdew & Martin 2005, 124-5). One has to remember that fieldwork can be regarded as a violation, however sensitive one may be to the informants, and that the researcher is an uninvited guest that will leave at the end of the study, while the informants will be left behind (Davies & Spencer 2010, 57). The fieldwork and the presence of the researcher are an intrusion into the everyday life of the informants and their system of relationships, which can evoke certain emotions. Ethnographic methods, such as interviews, compared to more positivist, abstract and objective research methods, are therefore far more dangerous and exploitative for the informants (Stacey 1988, 24). The exploitative aspect of fieldwork is unavoidable since the information the informants share is for the researcher "just data" that will be turned into knowledge, while for the informants it is their whole life and reality (23).

4.6.1 Reflexivity & Positionality

Since I conducted my study in Uganda, that is a country of the Global South with a different cultural context than my own, it was important to be aware of my privileged position as a university student from the Global North, and to recognise that my research "is embedded in the context of colonialism" (Flowerdew & Martin 2005, 114) in order not to perpetuate

"relations of domination and control" (Sultana 2007, 375). Having lived in Uganda for more than five months before conducting the fieldwork was beneficial since I was familiar with the cultural context and I had a general understanding of what was appropriate and not, however the underlying power dynamics between me and the informants were still present.

During my interviews, I reflected upon my privileges and my positionality as an outsider coming into an unfamiliar environment, asking people to give me some of their time. In order to undertake as ethical a fieldwork as possible (Sultana 2007, 374), I questioned and challenged my expectations, opinions, and actions in order to listen to the informants' perspectives with an open mind. However, the analysis of the informants' answer will be done by me and hence biased by my positionality as a privileged outsider.

4.6.2 Consent

It is important that the informants understand the purpose of the study and their rights as an informant. In the beginning of the interviews, I began by telling the informants a bit about myself and my study, and explaining why I was interested in interviewing them. I explained that I was there to get their perceptions and experiences of the project and that there therefore are no right or wrong answers. I put a lot of emphasise on the fact that I was there solely as a student and that I had no connection to EcoTrust, any other organisation, or someone connected to the project whatsoever, in order for me to gain their trust and establish rapport, and for them to feel comfortable with answering honestly without it affecting them or their involvement in the project in any way (Doody & Noonan 2013, 31). Due to my privileged position and the unequal power relation, informants may feel obliged to cooperate with me (Flowerdew & Martin 2005, 124), and therefore I found it important to make the informants understand that their participation was completely voluntary and that they could refuse to answer any of the questions as well as ending their participation at any time during the interview. I did not have them signing any consent forms since I felt that signing a document might just confuse them, make them unsecure or suspicious about my intention and what I would use the data for, so instead I asked for an oral consent.

When processing the data collection, according to O'Reilly (2009), it is always best to get permission to use the informants' real names and details (O'Reilly 2009, 62). Most of my informants told me that they were okay with me using their names in the thesis, but since I do not feel that that would contribute to the study in any way, I decided to name all the project

participants simply “project participant” and all the non-participant community members “non-participant community member” together with a number from the order in which I interviewed them.

Before visiting the farmers at their homes, I first went to the sub-county offices. There I briefed the officials about my intention of my study in order to get their approval to go into the villages and conduct interviews.

4.6.3 Payment

One ethical issue when conducting interviews is whether to offer the informants a financial incentive as a thank you for participating. One problem with offering monetary incentives, especially when conducting interviews with low-income populations, is that their need for money might make them consent to participate even if they do not feel comfortable with it (McNeill 1997, 391). Offering money can also affect the informants’ answers in the way that they will give the answer they think the researcher wants in order to receive the money (Robinson 2014, 37). However, some also argue that giving payments to the informant “serves to overcome some of the power imbalance between the researcher and the researched so that the former isn’t the only one in the relationship to benefit directly” (Head 2009, 337). After having discussed this dilemma with my interpreter and field assistant, I decided to give my informants sodas as a refreshment since the interviews were quite long, at least for the project participants, and the weather was hot. I also offered them to take part of the thesis, through my interpreter, when it is finished.

4.7 Qualitative Content Analysis

Qualitative content analysis is one of many research methods used to analyse a text. The purpose of this analysing method is to decipher the meaning of a text in order to “provide knowledge and understanding of the phenomenon under study” (Downe-Wamboldt 1992, 314 quoted in Hsieh & Shannon 2005, 1278). There are three different types of content analysis, *conventional analysis* being the one used for this study. With conventional analysis the data are collected through interviews with open-ended questions, and without pre-determined categories or theoretical perspectives, which makes the method suitable for this study. Usually when using content analysis as a method, the text/transcripts are read through thoroughly in order to derive codes, which are later sorted into categories (Hsieh & Shannon 2005, 1279). However, I used this method more freely and did not code or categories my material. Instead, I went through the text thoroughly and broke it down in order to find patterns, tendencies,

differing views, tensions, recurring themes and subjects (see section 5. Findings) which I later analysed and discussed using my theoretical frameworks (see section 6. Analysis & Discussion).

4.8 Limitations

Due to the qualitative nature of this study, the findings are rather examples than generalised truths. The attempt is not use this primary data to draw generalised conclusions about the project as such, but to uplift the perceptions of a few farmers involved in order to discuss some tendencies in connection to former studies.

One of the limitations to my sample of project participants is that some of them have not been involved in the project for so long, and therefore it has sometimes been difficult for them to discuss the project's impacts on their food security, fuel security, and income stability. Many of the farmers put forward that they *think* that their food security will be negatively affected by the project when the trees grow too big for intercropping (after approximately 5 years), and that their fuel security will increase when the trees grow bigger, but these are mere speculations. It might have been better to have had conducted interviews with project participants that had been involved in the project for at least 5 years, in order to better evaluate the impacts, but due to limited time and the fact that I had trouble selecting a focus until the very last minute, this was not possible.

5. Findings

In this section, the findings of the content analysis of the focus groups and individual interviews for both project participants and non-participant community members are presented in connection to the three focus areas. These findings are also compared to secondary data regarding the TGB project, as well as discussed in connection to the project PDD.

Since the sample size of this study is small, one cannot draw any generalised conclusions from these findings, but one can use them in an attempt to elucidate the various socio-ecological and socio-economic implications the TGB project have on the informants' livelihoods in this study.

5.1 Characteristics of the Project participants

Before presenting the results, some background information of the project participants will be presented regarding the total size of their farmlands, the number of hectares of land occupied by trees, number of trees planted within the project and how many of them have died, as well as how many years they have been involved in the TGB project (see table 2).

Table 2. *Project participant characteristics*.

Project participants (P)	Hectares of land	Hectares for carbon trees	Number of trees planted (died)	Number of years involved
P1	4.5 *	3 *	1,000 (200)*	3
P2	1.5	1 *	500 (10)*	3
P3	1	1 *	400 (12)*	3
P4	1.5	1 *	300 (100)	4
P5	1.5	0.5	400 (100)*	2
P6	1.5	1 *	800 (~all)*	2
P7	8 *	1.5 *	600 (-)*	5
P8	1	0.5	100 (“some”)	4
P9	2	0.5	400 (“some”)*	3
P10	3.5	1 *	400 (0)*	2
P11	1.5	1 *	400 (“some”)*	2
P12	3.5	1.5 *	400 (55)*	2

In table 2, the asterisk (*) indicates enough land according to the EcoTrust’s subsistence requirements of 1 hectare of land for trees and a minimum 4 hectares in total. Only two of the project participants have the required size of land of 4 hectares, while most of them have the required size of land of 1 hectare for the carbon trees on which most of them have planted 400 carbon trees or more. Further, for almost all of them some of the trees planted within the

project have died due to a number of reasons; pests, sunshine, poor soils, and lack of maintenance (mostly due to lack of finance) being the most common threats. This information about the informants can be interesting to have when presenting, analysing, and discussing the findings.

5.2 Food Security in TGB

Below are the data regarding food security presented. This data is also compared to some other studies on this project, conducted by Finighan (2011), Fisher (2011), and German et al. (2011).

5.2.1 Food Security for Project participants

As stated in the PDD, the TGB project claims to improve food security at a community level, foremost through an introduction of different land-use activities, such as agroforestry, which supposedly will lead to improved soil fertility and hence increased yields of food crops (EcoTrust n.d.).

All of my informants are small-scale farmers, with land holdings ranging between 1 and 4.5 hectare/s (see table 2) on which they grow local food crops such as beans, cassava, groundnuts and matoke (cooking banana), mostly for household consumption. However, most of them claim not to be self-subsistent on food due to a number of reasons:

> No, I am not [self-subsistent on food] because some food dries out due to too much sunshine. Also poor harvests are a problem.
>
> (Project participant 3)

> The food output is low because we use elementary tools.
>
> (Project participant 10)

But the most common reason that most of them put forward, is the lack of enough land for growing food:

> We don't have enough food because the land is not enough.

(Project participant 11)

Further, regarding the impacts the TGB project has had on the project participants' food security, half of the informants say that their food security has increased since joining the project. The *availability* of food has increased since intercropping food crops with the carbon trees has resulted in higher yields, and the *access* to food has also increased since the carbon payments can be used for buying food:

> Yes, yes [the food supply has increased] because the crops we plant under the trees, they seem to be yielding better.
>
> (Project participant 1)

> The trees have contributed to increased food supply through increased yields due to climatic changes.
>
> (Project participant 2)

> Yes, it [the access to food] has increased because when we get the payments, we buy food, like beans for example.
>
> (Project participant 3)

These findings correspond with the findings of Finighan (2011), who has conducted a study on food security in connection to the TGB project, where he also shows an increase in food *availability* due to increased yields from improved soil fertility and also an increased economic *access* to food through the carbon payments (Finighan 2011, 2). However, these improvements are mostly for what he refers to as "wealthy farmers", whereas "poor farmers" have experienced a decrease in food security as a result of the project due to lack of land available for food crop cultivation (3). German et al. (2011) also put forward that due to the carbon trees occupying land that was formerly used for growing food crops, the participants' food security has decreased (German *et al*. 2011, 171). In my study, for some project participants, the project has not had any impact on their food security, neither positive or negative, since they regard the trees to be too young and hence too small to have an impact,

but for a number of project participants their food security has decreased due to similar obstacles put forward by Finighan (2011) and German et al. (2011):

> The amount of land for growing food crops has reduced, because now there are trees there.
>
> (Project participant 6)

> Some food crops have died because they got shade from the trees.
>
> (Project participant 10)

In order to meet subsistent needs and not jeopardise food security, EcoTrust stipulates that a farmer need to have at least 4 hectares of land where 1 hectare minimum will be allocated for 400 carbon trees in order to participate in the project (Fisher 2011, 55). When asking my informants, all of them said that EcoTrust required them to have "enough land", but few of them knew how much exactly:

> You need to have 1 hectare of land.
>
> (Project participant 8)

> You need to have land. When you have land, you can get trees. But there was no limit [to how much land you need to have] but it is best if you have a very large piece of land.
>
> (Project participant 9)

> [You need to have] 1 hectare at least, from 1 hectare and above. If you have 5 or 10, that is fine.
>
> (Project participant 4)

> It was not about how much land you had but it was about spacing and that they [the carbon trees] are planted in lines.
>
> (Project participant 1)

As presented in in table 2, few of my informants have enough total land according to the project requirements, but most of them have still allocated the required 1 hectare of land for the carbon trees. These findings correspond with the findings of German et al. (2011), where 26% of their informants had 3 hectares of land or less. Just as Fisher (2011) points out, this requirement "appeared to be variably applied, each case on its own merits, rather than an inflexible rule" (Fisher 2011, 130). Also, Fisher argues that "payments will always be hard to resist in cash-poor communities, whether or not the activity is beneficial on balance" (Fisher 2011, 175) which is confirmed by an informant in the study conducted by German et al. (2011) that points out that if there is money involved, one might have to say that one has enough land even though one does not (German *et al*. 2011, 174).

Further, when asking about the long-term implications of the project on their food security, connected to the dimension of *food stability*, almost all of my informants fear that their food supply, and hence their food security, will decrease because of scarcity of land when they cannot intercrop food crops with the carbon trees any longer (after approximately 3-5 years), and it will therefore be a challenge to produce sufficient amount of food:

> It will be a problem, because the crops will not be growing well under those big trees.
>
> (Project participant 1)

> It will be a challenge because when the trees are growing bigger, their roots will grow too big and then it will be no space to plant food crops. There will be no food security when the trees are big.
>
> (Project participant 3)

> It will be a challenge because what? – because it will affect my food crops because of shade. The cassava is also planted there [close to the trees] but they can't grow when the trees are too big.
>
> (Project participant 9)

> Yes, of course it will reduce the supply of food because most of the land will be occupied by trees. We will be having no land to cultivate!
>
> (Project participant 6)

German et al. (2011) have studied project participants that have been involved in the TGB project for many years, and their findings show that some of the fears of the future that my informants have put forward, for example reduce yields due to not being able to intercrop and hence decreased food availability, have been realised; "some households expressed concern that as trees mature they have begun to outcompete cropland with implications for food availability" (German *et al*. 2011, 175) and "households that have attempted to intercrop with bananas or annuals claim that, within a few years, the trees outcompete the crops and intercropping is no longer viable" (German *et al*. 2011, 171).

However, a small number of the farmers, the ones with the required size of land, do not regard that there will be a challenge to produce sufficient food when they cannot intercrop any longer:

> It will not be a challenge because I have enough land so a piece of land will be left for the crops. The land which are for the trees, I will leave it, then have other land for food crops, because I have a lot of land.
>
> (Project participant 10)

While some find it difficult to comprehend how big the carbon trees will grow:

> I don't know [if it will affect my food stability] because I haven't realised yet how big the trees will be.
>
> (Project participant 7)

When asking for how long the farmers need to keep their trees before they can harvest them, most of them do not exactly know and answers 10 to 15 years when they regard the trees to be mature and only one of them answers 25 years, which is the requirement set by EcoTrust (n.d.), even though the trees mature after 15-20 years depending on species. Fisher (2011) also put forward this confusion about the contract length where some informants answered 30

years or more (160) and some said the trees need to be kept for less than 20 years (161). However, most of my informants recognise that they need to keep the trees for a long period of time which might affect their food availability:

> The food supply will reduce because some part of the land will not be used for growing crops. It will be occupied by trees for a long time.
>
> (Project participant 1)

> It will reduce [food supply/security] because where those trees are I will not be planting any more crops there for a very long time.
>
> (Project participant 12)

The confusion about the required time to keep the trees is not surprising considering the fact that few of my informants know the overall aim of the TGB project, i.e. to sequester carbon that can be sold as VERs on the VCM, and hence do not understand the reason to keep the trees for a certain number of years:

> They [EcoTrust] said that the overall aim is just the ozone layer - that too much sunshine destroys the ozone layer, so that if we don't plant trees, with time, we shall have hot weather and much sunshine. That is why they encourage us to plant trees. And they [the carbon trees] also gives us the carbon dioxide that helps EcoTrust, so that the [local] area remains good.
>
> (Project participant 1)

> [The reasons for planting trees within this project are] rainfall attraction and to have fresh air.
>
> (Project participant 2)

> For us [project participants] to sell the timber and get money, and also to get timber for construction and firewood.
>
> (Project participant 3)

> The overall objective is for climatic changes, but also for fresh air, firewood, timber for construction… and for trapping carbon!
>
> (Project participant 4)

> It is to trap the carbon from the air.
>
> (Project participant 5)

> One [reason] was because we are neighbouring Hima factory so the dust that comes from there, the pollution, affects the lives of people. So when we plant more trees, then we can reduce the pollution. Yeah. Then another one [reason] was to… after the trees have matured, the one who owns them [the carbon trees], is the one who can sell [the trees]. It [the project aim] was also to get [us – the local farmers] involved in [tree] planting.
>
> (Project participant 6)

> Conservation of the environment.
>
> (Project participant 7 & 8)

> Trapping carbon [from the atmosphere].
>
> (Project participant 12)

Only four of my twelve informants mention carbon sequestration, which shows that few of the informants actually have knowledge of the overall aim of the TGB project. These findings correspond with Fisher's findings that 62% of her informants do not know the purpose of the project (Fisher 2011, 124). Her informants have stated similar project aims and purposes as my informants, such as rainfall attraction, fresh air, as well as mitigating locally derived pollution, from for example factories (125).

Further, having to keep the trees for that long a period, most of the participants fear that the trees will have a negative effect on the soil quality, which indirectly will effect their food stability in the future:

> Growing trees might result in soil exhaustion because the trees will be kept there on that piece of land for a number of years, and when we want to plant food crops there

> they might not grow well. We will have very low yields of [food] crops, and that may result in hunger.
>
> (Project participant 1)

> It will have a very negative impact [on the soil] because trees like Grevillea[13], where it is grown, when it has grown bigger, the soil will become dry.
>
> (Project participant 12)

> When cutting them [the carbon trees] down, the stumps will reduce the space of land. Where the stamp is, you cannot plant anything.
>
> (Project participant 6)

> Yes, it will have an effect. We want the trees, but we have a small what? – small land. That's why we plant it on the what? – on the land among other crops. When the tree has grown up, when you have been growing some crops there, like cassava, like bananas, these roots [of the carbon tree] have grown very big. Then that will bring an [negative] effect to grow another what? – another crop.
>
> (Project participant 9)

However, some of the participants argue that the soil will not be affected, or it might even be more fertile than before after having being occupied by trees for a long period of time:

> These trees will reduce soil erosion and even the shedding of leaves will also contribute with humus. It also makes it easier to work the soil; easier to dig, to cultivate.
>
> (Project participant 2)

This improvement in soil fertility and reduction in soil erosion have been experienced by some informants in both Finighan's (2011, 2) and Fisher's study (2011, 180).

When asking how they will handle this eventual shortage of food when they do not have enough land for food self-subsistence, some of them say that they will need to buy the food from the local market, and in order to get money for food, some of the participants say that they will harvest the carbon trees pre-mature to sell:

[13] Grevillea is a naturalised agroforestry tree planted within the project by almost all of the informants in this study.

> When the trees grow bigger, like after 10 years, and we need money to buy food and other stuff, I will cut them down.
>
> (Project participant 5)

Some informants in Fisher's study also put forward that they would harvest the trees prematurely if they experienced an urgent need for money or building materials (2011, 161).

To conclude the findings concerning the TGB project's implications on food security for the project participants, some of the participants in this study and in Finighan's study have experienced increased food *availability* due to higher yields from intercropping and improved soil fertility. The (economic) *access* to food for some participants has also increased through the carbon payments which have been used to buy food at the local market (Finighan 2011, 2). There is an ongoing debate about carbon offset projects, especially REDD+ projects, regarding the relationship between carbon forestry and food security and whether it is a win-win or a trade-off situation. Finighan briefly discusses this relationship and argues that "the findings from TGB indicate that planting trees on agricultural land need *not* come at the cost of food security" (Finighan 2011, 3; my emphasis), hence not a trade-off. He also put forward that the debate is too one-sided, only focusing on food *availability*, forgetting about food *access* which, through the carbon payments, can increase the participants' economic access to food (Finighan 2011, 4). From his findings, he concludes that "TGB was found to have a small but positive impact on food security for participating households" (Finighan 2011, 2). Compared to my findings, his findings correspond somewhat regarding availability and access to food, which shows that it is not a complete trade-off, but this only applies for some of my informants, the ones with larger lands. However, the food security dimension of *stability* is forgotten and hence not evaluated in his study, and considering the length of the TGB project, i.e. that the project participants need to keep the trees for 25 years but are only paid during the first 10 years, I found this dimension to be significantly important to discuss and emphasise.

From my findings regarding the *stability* dimension of food security, it is difficult to predict a stability since the trees for most of the project participants are not yet grown, but considering the findings of German et al. (2011) there is an high risk that a stable availability of and access to food in the future will diminish as the trees grow big. This risk is due to a number of

reasons, such as limited space for growing food crops as well as soil exhaustion, which will affect the project participants' food security negatively. As a result, some of the project participants in both my study and Fisher's study say that they are willing to harvest the carbon trees pre-mature in order to sell them if they need money for food or other expenses, which means that those trees will not have sequestered the amount of carbon required by the TGB project, hence a risk for impermanence[14].

5.2.2 Food Security for Non-participant community members

Most of the non-participant community members that were interviewed for this study, are not self-subsistent on food and therefore food insecure. For some of them, the TGB project has decreased their ability to grow food crops on their farmlands:

> The problem is that when you are neighbouring a person with these trees, food crops may dry up. That is because the trees are heavy feeders. This affects my food supply negatively and decreases my food security.
>
> (Non-participant 2)

> Food crops cannot survive well close the boundaries where these trees are planted. They take all the water and all the nutrients from the soil.
>
> (Non-participant 4)

> There are challenges from being neighbour with the ones who plant these trees. The roots come directly to my soil and where the roots are, the crops can't grow well.
>
> (Non-participant 6)

German et al. (2011) as well as Schreckenberg, Mwayafu and Nyamutale (2013) briefly discuss some implications and costs that the TGB project has on non-participant community members. Both studies put forward a number of negative effects the tree growing within the project have on non-participants' farmlands, such as long roots, shade (Schreckenberg, Mwayafu & Nyamutale 2013, 31), and loss of nutrients and moist in the soil (German *et al*. 2011, 177), which are the same implications put forward by my informants. These effects

[14] Permanence is when the carbon sinks, in this case the carbon trees, store the amount of carbon accounted for even beyond the payment period, in order to fulfil a net reduction of CO_2 (Engel, Pagiola & Wunder 2008, 671).

decrease the non-participants' ability to grow food, and might therefore also decrease their food security.

To conclude, some of the neighbouring community members have experienced challenges with growing food crops as a direct result of the implementation of the TGB project and the planting of carbon trees by their neighbours. Since most of the non-participant community members interviewed have small plots of farmland, most of them less than 1 hectare, poor harvests as a direct result of the TGB project, can severely affect their food security negatively.

5.3 Fuel Security in TGB

In this section, the findings concerning fuel security are presented and compared to other studies of the TGB project conducted by Fisher (2011), German et al. (2011), Masiga, Mwima and Kiguli (2012), and Schreckenberg, Mwayafu and Nyamutale (2013).

5.3.1 Fuel Security for Project participants

Fuel security in this study means "to be self-subsistent on firewood (i.e. having enough firewood) for cooking and heating without buying it", as explained under 2.5.2. Half of my informants say that they are self-subsistent on firewood, while half of them are not. Some of those self-subsistent on firewood, state that they are so due to their involvement in the TGB project, while the rest have not experienced any impacts on fuel security or access to firewood as a result of the project:

> I am self-subsistent on firewood because now I have more firewood on my land. Most of the time before we needed to buy firewood, but now we can cut the branches [of the carbon trees] and use as firewood.
>
> (Project participant 4)

> My fuel security has increased [since joining the TGB project] because after pruning the trees, I get some firewood.
>
> (Project participant 5)

> No, I do not have enough firewood… yet.

(Project participant 6)

One of the reasons the informants put forward as to why the project has not increased their fuel security and access to firewood, is because the trees are still young. However, most of them believe that their access to firewood will increase as the trees grow bigger, and result in fuel security:

> Our trees are still young so we don't entirely depend on them for firewood because they are just three years. But we hope that in the future they will provide us with enough firewood to be self-subsistent.
>
> (Project participant 1)

> I am not yet self-subsistent on firewood, but when the trees grow bigger I can harvest [firewood] from them and then it will be enough.
>
> (Project participant 2)

Not much were found in other studies concerning fuel security and the access to firewood for the project participants. In the studies conducted by Fisher (2011) and German et al. (2011), the impact of the TGB project on fuel security and access to firewood are only briefly discussed, where they present an increased availability of firewood as a result of the TGB project (Fisher 2011, 152; German *et al*. 2011, 171). Some other studies, for example Schreckenberg, Mwayafu & Nyamutale (2013) and Masiga, Mwima & Kiguli (2012), suggested a possible positive contribution to firewood access and household fuel self-subsistence as a result of the TGB project, but no assessments were conducted.

According to the PDD, fuel security will increase at a community level, i.e. beyond the project participants, since the agroforestry trees planted within the project will also contribute to a heightened access to firewood for fuel consumption in the local area (EcoTrust n.d.). However, how this will benefit the larger community is not explained. The findings of this study show that there has been an increase in firewood for some of the project participants, but also that a number of the informants are not currently self-subsistent on firewood and has not experienced an increase in fuel security since they joined the TGB project due to the trees

still being young and hence not fully grown with many branches, and the inadequate payments. Most of them, on the other hand, have their faith in the future and that they will be self-subsistent on firewood from pruning when the trees have grown bigger. A number of these informants mentioned that one of the main reasons for joining this project, was to get increased access to firewood on their farmlands.

5.3.2 Fuel Security for Non-participant community members

Regarding fuel security and access to firewood, none of the non-participant community members interviewed are self-subsistent on firewood, which corresponds to Fisher's findings where only 16 % of a sample of 38 non-participants regard themselves as self-subsistent on firewood (Fisher 2011, 123). Half of the informants in this study have experienced a decrease in firewood and hence increased fuel insecurity due to the TGB project:

> Where we used to collect firewood for free, they have replaced the trees with these [carbon] trees. We used to get firewood in the forest reserve[15], but now there are these [carbon] trees planted there.
>
> (Non-participant 4)

> Yes, it [the TGB project] has reduced my access to firewood. Where I used to fetch firewood, for example from my neighbour, there are now trees from this project, so I can't access any firewood anymore.
>
> (Non-participant 8)

These findings match the findings of German et al. (2011) regarding access to firewood where informants put forward that their access has decrease since the land where they use to collect firewood has now been replaced by carbon trees (German *et al*. 2011, 177).

This decrease in firewood access has resulted in the need for these community members to buy firewood from neighbours or at the local market instead. However, this can be problematic since they then need a monetary income:

[15] Trees within the TGB project should not be planted within the forest reserve, but two of the project participants stated that they have rented land in the forest reserve to grow food and to plant some of their carbon trees within this project.

> We don't have access to firewood in the forest reserve anymore, so now we need to buy firewood. To get money, I do some construction work but it's difficult to find jobs.
>
> (Non-participant 4)

To conclude, no one in my study and very few in Fisher's study of the non-participant community members are fuel secure. Further, informants in this study as well as in the study conducted by German et al. (2011) have experienced a decrease in availability of and access to firewood as a direct result of the TGB project. This forces them to buy firewood at the local market, which can be difficult without a monetary income. Being fuel insecure and lacking a stable availability and access to firewood can, in general, lead to people cooking less or eating undercooked food and un-boiled water in order to save firewood, which might result in malnutrition and illness (Kikafunda, Agaba & Bambona 2014, 2094), which are serious implications.

5.4 Income Stability in TGB

The findings regarding income stability for the project participants are presented below and compared to the following studies; Fisher (2011), German et al. (2011), Masiga, Mwima and Kiguli (2012), and Rainforest Alliance (2013).

5.4.1 Income Stability for Project participants

The carbon payments are at the centre of this project, it is after all a PES scheme, and according to the PDD, the TGB project will contribute to income stability at a community level. The findings in this study shows that for most of the project participants, their participation in the TGB project has contributed to income stability:

> Yes, it has because of the slashes we bought, the hoes we bought, and the food we bought [with the carbon payments]. This would have been bought by my own money, but now we could use this [project/carbon] income to buy these stuff. It has saved my own money, and now I can use them for something else.
>
> (Project participant 1)

> Yes, it has. And now I can pay school fees for my children.
>
> (Project participant 2)

> Yes, it has contributed to income stability through this motorcycle for example that we bought [with the carbon payments], and it [the payment] was also used for making bricks. Now we can drive to the market and sell bricks.
>
> (Project participant 3)

However, for a few the income stability has decrease, or at least not improved:

> No, it has reduced actually because most of the money goes to maintaining the trees.
>
> (Project participant 4)

> No, it hasn't because the trees are still young. They haven't achieved much; they're still spending.
>
> (Project participant 6)

> It's not a stable income [laughing], it's just an extra income.
>
> (Project participant 12)

> It's just a "support fund", you can't rely on it.
>
> (Project participant 1)

These same complaints have also been put forward by Schreckenberg, Mwayafu and Nyamutale (2013), that the costs of establishing and maintaining the trees are too high. Some of their informants even said that they have gone into debt because of tree maintenance (Schreckenberg, Mwayafu & Nyamutale 2013, 30).

Further, even though, as is portrayed above, the TGB project has resulted in income stability for some of the project participants, for most of them it has not been from the carbon payments per se, but indirectly from self-initiated income generation activities contributed to by the carbon payments:

> When it [EcoTrust/the TGB project] gives us money we can buy the hoes, and we can use those hoes when planting other crops. When we sell those crops, we get money, additional money.
>
> (Project participant 2)

> Because of the increased yields I can sell some of the food and earn some money.
>
> (Project participant 2)

> We sell firewood from the trees and then get money.
>
> (Project participant 3)

> Yes, intercropping with these trees has increased the yields of coffee.
>
> (Project participant 7)

> Through the money I got, I bought two goats and they are giving out kids and then I sell the kids to earn some money.
>
> (Project participant 11)

> We have been getting some trainings. As they [EcoTrust] train us, we apply that knowledge, that skill on our land, and then from that application, we now get an income from increased yields.
>
> (Project participant 9)

Income generation activities as indirect benefits of the project can also be found in the study conducted by German et al. (2011), where EcoTrust has initiated nature-based enterprises, such as beekeeping and cultivation of passion fruit, for some of the project participants (171). However, no one of my informants have had any nature-based enterprises established.

The recurring reasons in other studies to why the carbon payments per se do not result in income stability are, for example, delays in payments (German *et al*. 2011, 175; Schreckenberg, Mwayafu & Nyamutale 2013, 25), the payments are to less to be regarded as

a stable income, and also too less to cater for the trees (Rainforest Alliance 2013, 15; Schreckenberg, Mwayafu & Nyamutale 2013, 30), the same reasons put forward by my informants:

> We have found out that the money we are getting cannot even cater for managing the trees.
>
> (Project participant 5)

> The payments are too small. They keep deducting from the amount that was said at first.
>
> (Project participant 5)

> Sometimes there are delays. They [EcoTrust] said that I would get paid in February but the payment came in August.
>
> (Project participant 2)

> I haven't gotten any payments yet even though I've been involved for almost two years.
>
> (Project participant 9)

When asking my informants if they know what and who decides on how large the carbon payments are, and if they are part of that decision, no one says that they are a part of that decision, and only two informants know on what basis the price of carbon, and hence how the payments, are set, i.e. measurement on how many tCO_2e the trees planted sequester which gives a certain amount of money:

> The price [and the carbon payments] is put according to the number of trees you have, and on the carbon. They [EcoTrust] came to measure how much carbon that the trees sequester. That's one of the factors, and how many carbon trees you have in that particular area. Then it may increase your money or reduce it.
>
> (Project participant 1)

> For them [EcoTrust], they decide on the number of trees planted and also they depend on that, on the number [of trees planted] and then they pay you that amount… I don't know how it works.
>
> (Project participant 2)

However, these two informants do not know or understand how the amount of carbon sequestered is measured.

According to other studies, the carbon payments are used for paying school fees (German *et al*. 2011, 169; Schreckenberg, Mwayafu & Nyamutale 2013, 2), medical bills, purchase of seedlings and livestock, but a large amount is also used to maintain the trees (German *et al*. 2011, 169). However, according to my informants, the carbon payments are foremost used for tree maintenance and not for paying other fees or productive investments, which most of the project participants expected when joining the project:

> Most of the money goes to maintaining the trees. Not so much left for other fees.
>
> (Project participant 4)

> [The money is used] for tree maintenance, and the balance, if there is any, is used for paying school fees.
>
> (Project participant 2)

> The money I get can cater for the labourers that I hire for weeding the trees and the other crops that are intercropped with the trees.
>
> (Project participant 10)

As can be read in table 2, many of the trees planted by my informants have died. When trees die due to natural disasters, such as drought and fire, they are to be replaced by new seedlings provided by EcoTrust for free (EcoTrust 2011, 19). However, this has not been the case for all of my informants who have lost trees:

> I need to pay for them again, on credit. They are supposed to be given for free without deduction, but they're not.
>
> (Project participant 5)

> Yeah, I need to pay for them myself and then I plant them again.
>
> (Project participant 7)

> I pay for myself if they die in the second phase.
>
> (Project participant 12)

New tree seedlings for replacement in case of loss are to be paid for by a fund to which 10% of all the farmers' carbon payments are deducted, the so-called Carbon Community Fund[16] (EcoTrust n.d.; EcoTrust 2011, 19), but when asking my informants of this fund, no one knew that it existed. The fact that no one knew of it, but it is there and is deducting 10% of the carbon payments, might be an explanation to why some of my informants experience that EcoTrust keeps on deducting from their payments without them understanding why, as stated for example by project participant 5 above. This need to purchase new seedlings if some die is an additional cost that needs to be covered by the carbon payments or with the project participants' own money if the carbon payments are not adequate, which can be a peril to their income stability.

Further, Fisher (2011) raises the issue of the payment schedule (see table 1.) where the project participants get paid five times during a 10-year period even though they need to keep the trees standing for 25 years. Due to this, some informants in Fisher's study admitted that they would harvest the trees pre-maturely if they had an urgent requirement of building materials or money, and also if they found other more beneficial uses of the land (Fisher 2011, 161). Harvesting the trees pre-maturely was also indicated by Rainforest Alliance[17] (2013, 17). This issue about the payment schedule was not raised by my informants, but when asking them how many payments they will receive and for how long a time, none of them could give a

[16] In EcoTrust's annual report for the year of 2015, they declare that the 10% deducted for the Carbon Community Fund instead was used for buying motor bikes for farmer coordinators (EcoTrust 2015, 21).
[17] Rainforest Alliance is the third party validator of the TGB project.

certain answer. This might be connected to the fact that, as stated earlier, most of my informants do not know that they need to keep the trees standing for 25 years, which might be a potential risk to permanence.

However, even though most of the project participants in this study expected more money from the carbon payments to pay for other expenses, only two of them said that the main reason to why they joined the project was for the carbon payments. When asking the reasons for them joining the project as well as the most important benefits they receive from the project, most of them put forward the environmental and climatic benefits of planting trees:

> When we plant trees we receive reliable rainfall, the rain comes at the time it is expected. But if we have no trees, then we have unreliable rainfall. You may be expecting rain, but it does not come. You may be expecting sunshine, but it does not come. So they [the trees] are helping us. And they are helping us in another way – those people that planted such trees early, for example there is a forest here, those trees, when it rains, the rainclouds remain there [above the trees] even when the rain is gone, compared to other parts who does not possess those trees. That shows us that if we plant trees it might help us to get rain.
>
> (Project participant 1)

> There are many reasons to why I joined. Firstly, planting trees can be beneficial in the future. Secondly, to help with poverty eradication, help to pay school fees, to get firewood that I can sell.
>
> (Project participant 2)

> There was almost some kind of desert here, no trees, so I wanted to grow trees for some change in climate. And also for some fresh air and some rain.
>
> (Project participant 4)

> Fresh air from the trees, rainfall attraction, and to trap pollution. You know, Hima [local factory close-by] have dust and the trees trap that.
>
> (Project participant 5)

Many of them also said that they joined the project as a sort of investment; to plant trees that in the future can be sold as timber and firewood in order to earn an income:

> We joined the project for the usefulness of the trees, so that in the future the trees can grow and we can harvest them for timber. They [EcoTrust] told us that those trees can do well with crops, you can still plant crops when the trees are there. And the trees will provide shade to the other crops which is good.
>
> (Project participant 1)

> By getting money from selling the timber, I can invest in education for my children. That can eradicate poverty.
>
> (Project participant 4)

> [I joined the project] because I wanted to plant trees to later sell timber and get money, and also timber for construction and firewood at home.
>
> (Project participant 3)

These motivations for joining the project differ from the motivations raised by Fisher (2011) and German et al. (2011), where the primary motivation to join the TGB project as well as the main benefit received from the project is in fact the carbon payments (Fisher 2011, 150; German *et al*. 2011, 169) since it enables the participants to make sizeable purchases and investments otherwise difficult for poor rural households to make (German *et al*. 2011, 169).

According to Masiga, Mwima and Kiguli (2012), the TGB project gives the project participants "cash in hand" through the carbon payments, and this is claimed to give a financial stability which is otherwise difficult to find within these rural project areas (Masiga, Mwima & Kiguli 2012, 14). However, the findings in this study show upon another reality where the carbon payments per se do not contribute to income stability for most of the informants, only indirectly by investments in other income generation activities, since the amount is inadequate. Further, the TGB project encourage the project participants to use their payments "positively", for example by paying for school fees (14), but since most of the payments are needed for tree maintenance, this is rarely possible.

5.5 Concluding Remarks of Findings

My findings together with findings from other studies have shown how this PES scheme has unfolded at a local level and some of the resulting implications. On the one hand, for most project participants there have been some benefits from participating in the project, for example increased food availability and access, increased access to firewood, income generating activities, as well as beneficial climatic changes. On the other hand, some shortcomings and trade-offs have also been put forward in all studies, such as decreased land availability and hence decreased food security, and decreased income stability due to inadequate payments and high tree maintenance costs. Some of the reasons for these disadvantages, are the length of the contract and the inadequate land size which interfere with self-subsistence.

The findings concerning the non-participant community members also show that there have been some trade-offs for them when it comes to food and fuel security. Many of the non-participant community members have experienced negative effects of the TGB project on their ability to grow food for self-subsistence as well as on their access to firewood, which was already limited on beforehand.

To conclude, considering these findings, with some negative effects on project participants and non-participant community members, the project cannot be regarded to completely fulfil the stated benefits put forward by EcoTrust; to increase food security, fuel security, and income stability at a community level. Coming to this conclusion, however, is not unexpected since the TGB project is a PES, a market-based mechanism designed to address environmental problems, where efficiency will always be put at the forefront with a risk of overlooking socio-ecological and socio-economic implications on the ES providers and their community members. These implications of the TGB project stated by my informants will in the next section be analysed and discussed from an environmental justice perspective, together with a discussion on whether it is sufficient to use PES schemes, such as carbon forestry projects, as a tool for pro-poor community development, and also whether it is a suitable tool for climate mitigation, or just an illusion of action.

6. Analysis & Discussion

> The idealised portrayal of these projects is not always matched by the reality of the situation, either in terms of their effectiveness in reducing emissions or, more importantly, of their harmful impacts upon local communities.
>
> (Smith 2007, 7)

PES schemes can seem appealing at first, especially if portrayed as win-win-win situations. However, there are a lot of underlying problems and weaknesses that comes along with using this mechanism to mitigate climate change, conserve nature and contribute to sustainable development. In this section I will analyse and discuss how and why PES projects are problematic in connection to environmental justice. To conclude, I will also include a brief discussion on whether it is suitable from a climate perspective to use carbon trading and PES projects as climate change mitigation mechanisms.

6.1 Environmental Justice in PES & Carbon Forestry

A lot of critiques have been put forward against forest conservation projects with a "fortress approach", i.e. where trees are protected in existing forests reserves or tree plantations with clear boundaries and sanctions for encroachment (Fletcher 2012, 295; Leach & Scoones 2015, 7), regarding the inequalities and injustices that have emerged as a result of their implementations. Partly in response of these critiques, more participatory forest projects that incorporate the local community have been developed. However, there are still claims of injustices and trade-offs for local communities involved in PES and carbon forestry projects (Suiseeya & Caplow 2013, 969). The TGB project is a project where rural farmers are involved instead of being shut out. Nevertheless, my findings show some justice issues, and these will be discussed below.

6.1.1 Procedural Justice in TGB

As mentioned earlier, the environmental justice dimensions of recognition, participation, and distribution, are intertwined and participation can be regarded as a pathway towards distributional justice (Suiseeya & Caplow 2013, 969). Some claim that including local community members and project participants in the design and implementation of projects can improve the efficiency and overall success of the project, while also resulting in better social and environmental outcomes (Suiseeya & Caplow 2013, 968; Wegner 2016, 629).

Others argue that the logic on which PES projects are based is not compatible with (egalitarian or needs-based) equity and community development, and that these projects are therefore always "structurally skewed *against* the interests and welfare of local actors" (Mahanty, Suich & Tacconi 2013, 39; my emphasis), which more often than not results in injustices. My findings show that the TGB project has some justice issues concerning the distribution of benefits and disadvantages/trade-offs. Some of these might stem from the lack of procedural justice, while others are just results of the nature of the project itself.

The project participants put forward many different issues that show their lack of inclusion in the design and decision-making process. First of all, very few of the project participants know that the overall aim of the TGB project is to sell the carbon sequestered by the trees they plant on their farmlands. This knowledge gap results in further misunderstandings concerning the length of the project and the payment schedule which states that they need to keep the trees for 15 more years after the payments have ceased, something none of my informants knew about. Due to this timescale of the project, issues might arise when the land is inherited by the project participants' children since they then also inherit the contractual obligations, which can come to be limiting. Further, regarding the payments, my informants did not have any knowledge about the so-called Carbon Community Fund, a fund to which 10% of the carbon payments are deducted in order to be used for capacity building and development projects within the project participants' communities as well as to act as a buffer in case of unforeseen losses of any carbon trees. This unawareness is an additional evidence of the lack of inclusion in the project implementation, and this is problematic, especially since the amount is deducted from their individual payments and is to be used for community development, driven by the project participants together with the non-participant community members. From this, one can make the assumption that the fund is not used for any community projects, and hence does not fulfil its purpose or the purpose of the TGB project to "create a spill over of carbon benefits to the community" (EcoTrust n.d.).

This procedural injustice and lack of knowledge of the project is further problematic since then it is questionable whether the project participants can give consent and make an informed decision to join the project, especially if they do not even know its overall aim, and this goes against the "fairness of participation" principle of procedural justice (Martin *et al*. 2014, 169). The assumption usually is that the people will rationally evaluate and compare the advantages and disadvantages to participate in a project as well as in comparison to other land-use

activities, however this is rarely done in practice. Along with this comes the issue of offering money to a cash-poor population, as put forward by both Fisher (2011, 175) and German et al. (2011, 174) above, and whether they can act on their best behalf and with their opportunity costs in mind. This makes one question whether it is at all appropriate and justifiable to implement PES projects in poor rural areas in the Global South. Further, lacking knowledge about this particular project but having experience of other development projects implemented by EcoTrust and also by World Wildlife Fund (WWF), as many of my project participants put forward that they have, they might think that the TGB project is another benevolent development project with only benefits, and therefore join (Fisher 2011, 155). This perception of the TGB project was presented by Fisher (2011, 140) and was also apparent in the discussions with my informants, where they to a large extent expect and are reliant on support from EcoTrust in order to participate in the project, even though EcoTrust presents it as a 'self-reliant business venture' (EcoTrust 2011, 47; Fisher 2011, 124), meaning that the project participants themselves are expected to maintain and care for the trees without any monetary support from EcoTrust, apart from the carbon payments, as well as establish development activities within their communities (Fisher 2011, 139). This have been problematic for some of my informants since lacking the financial assets to properly maintain the tree seedlings has led to loss of some of them, which in turn meant that they needed to wait until the next rain season to plant new seedlings, which resulted in them not fulfilling the set targets for that year and hence not receiving the carbon payments they were counting on for their livelihoods.

Additionally, according to Clayton's definition of procedural justice, procedural justice is achieved if "all parties who will be affected by a decision have had a chance to participate in the decision-making process and to influence the final outcome" (Clayton 1998, 164). When analysing my findings with this definition, particularly the findings regarding the non-participant community members, one can clearly see the injustices. Half of the non-participant community members in this study have experienced some negative effects as a direct consequence of the implementation of the TGB project. Nevertheless, they have not been invited to any project meeting or informed of any possible negative effects that comes with the project. This is unfortunate since all of my informants are already poor, and with this project they get even more marginalised, without receiving any of the benefits that the project participants, after all, do.

Procedural justice and participation in decision-making and project design for the project participants and non-participant community members maybe could have decreased the disadvantages and trade-offs that my findings reveal. If the project participants had had more knowledge about the project; the contract length, the required land size, the high tree maintenance, the amount and number of payments etc., some of them might not have joined. Further, if the non-participant community members had been invited to discussions about the project, they could have stressed that the project should not encourage project participants to plant trees close to land boundaries, and they could also have made an agreement about access to firewood, which probably would have resulted in less disadvantages for them in connection to their food and fuel security.

6.1.2 Distributional Justice in TGB

Distributive justice, the distribution of benefits and trade-offs, has been one of the main focuses of this study. The TGB project has brought with it some benefits for the project participants, but also a number of disadvantages and trade-offs. For some of the project participants, their food availability and access as well as their fuel security have increased due to the project. The carbon payments have also contributed to an increase in income through investments in income generation activities, which has been beneficial for the participants. However, a large number of disadvantages and trade-offs have been put forward in my findings and in findings made by others. The negative effects of the project experienced this far are foremost the inadequate and delayed payments as well as the high tree maintenance need and cost.

Additionally, as confirmed by German et al. (2011, 171), there is a large risk that in the future, the length of the project, the inability of intercropping and hence lack of available farmland, as well as soil degradation due to the carbon trees planted for a long period of time, will negatively effect and decrease the project participants' self-subsistence, mostly when it comes to food, at least for the project participants with smaller farmlands, and this can lead to impermanence due to premature harvest of the carbon trees (see 6.3.1).

For the non-participant community members, the project has only resulted in disadvantages and trade-offs. Many of the project participants, both in my study and the studies conducted by Fisher (2011) and German et al. (2011) put forward an inability of growing food crops, failed harvests, and lack of access to firewood as direct results of the TGB project (Fisher

2011, 123; German *et al*. 2011, 177). This will have severe negative impacts on their livelihoods. These negative effects could might have been avoided, or at least reduced, with stronger procedural justice. If the non-participant community members had been invited to a discussion regarding the project and its implementation, and that the arisen concerns had been taken into consideration.

Since most of the project participants and non-participant community members already are food, fuel, and cash insecure, this project, with its disadvantages and trade-offs, have had some negative impacts on their livelihoods and not only improvements, which is the aim of the project. Further, since they are already battling with adapting to the effects of climate change, one might question whether the TGB project, instead of decreasing environmental injustices, has created what Eckersley (2009) refers to as "secondary injustices" (101). This makes one wonder if they would have been better off without the project, even if the project participants then would have lost out on the project benefits.

6.1.3 Efficiency vs. Equity

These procedural and distributional injustices put forward in my findings, can be connected to the debate about 'efficiency versus equity' in PES. Efficiency often comes at the expense of equity in PES, at least equity and justice from the viewpoint taken in this thesis, i.e. an egalitarian and needs-based notion of justice, since it is based on neo-classical economics which ethical framework is utilitarianism (Villagómez-Cortés, Alfredo & del-Ángel-Pérez 2013, 279; Wegner 2016, 617). A utilitarian notion of justice focuses foremost on utility maximisation and regards cost-effective solutions to be just solutions "since everyone is worse off in the absence of aggregate net benefits" (Roberts & Parks 2007, 201). This approach tends to overlook socio-economic and equity factors (both procedural and distributive) which are important in order to create a viable PES project where existing inequalities are not extended (Wegner 2016, 625).

Pascual et al. (2010) present seven different *economic fairness criteria* which can be used to determine the potential interdependency between efficiency and equity in PES projects, and they all have differing implications in the PES design and on the justice in its outcomes (1243). Table 3 illustrates the definitions of these different economic fairness criteria in connection to how payments are made.

Table 3. *Fairness criteria for PES schemes* (based on table in Pascual *et al*. 2010, 1240). Permission granted by Oxford University Press and Copyright Clearance Center (2016-11-10).

Fairness criterion	Design implications (payments)
Compensation	Payments should compensate landholders for the forgone benefits related to the provision of ES. Payments are differentiated according the cost of provision.
Common goods	Payments should be invested in common goods, so all providers benefit indirectly and according to their relative use of the common goods in question. Payments are not differentiated (no direct payments).
Egalitarian	Design should distribute the fund equally among all the providers (e.g. per unit of land), independently of the level and cost of ES provision. Payments are not differentiated.
Maxi-min	Payments aim to maximise the net benefit to the poorest landholders, even at a cost of efficiency loss. Payments are differentiated according to the income of providers.
Actual provision	The allocation of funds among landowners corresponds to the *actual* outcome level of provision of ES. Payments are differentiated according to the actual provision of the service.
Expected provision	Payments to landholders depend on the *expected* level of provision of services for a given land use. Payments are differentiated according to the expected provision of ES. These payments compensate landholders to particular land use changes or practices expected to enhance the provision of ES.
Status quo	Payments should maintain the previous level of relative distribution of income among providers. Payments are differentiated according to its impact on income inequality.

When designing a PES project, choosing an economic fairness criterion is rarely considered, but by looking at the design and implementation of payments in a project, one can decipher its implicit criterion (Pascual *et al*. 2010, 1239). I am not quite sure what focus the TGB project has taken in connection to these criteria sinceI have not found any explicit statement of this, probably because they have not considered it, but my interpretation is that the two criteria of *expected provision*, which is when the payments are given according to the expected level of the environmental service, and *actual provision*, which is when the payments correspond with actual provision of the environmental service (1240), match up with my understanding and

findings of the TGB project since the project participants receive payments for the carbon the trees planted are *expected* to sequester while there are also certain demands the project participants need to fulfil within every payment period in order to verify that carbon will *actually* be sequestered (see table 1.). As can be seen in figure 4 below, these two criteria emphasise efficiency on the expense of equity, since their focus is foremost on *environmental additionality* (Pascual *et al*. 2010, 1241; Nel 2014, 228), i.e. that the promised amount of carbon is sequestered in order to create net emission reductions (which is also what determines the carbon payments) and not to create beneficial outcomes for the project participants (Pascual *et al*. 2010, 1241).

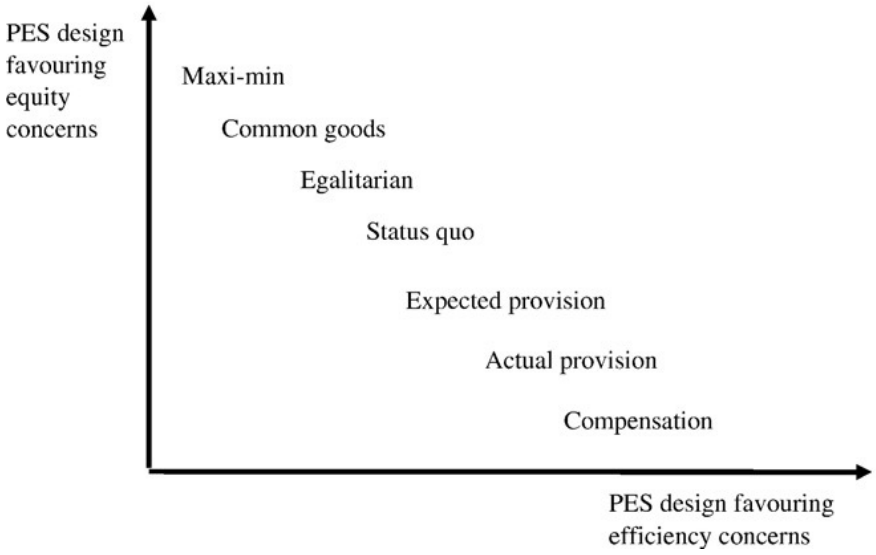

Figure 5. *Economic fairness criteria and the emphasis of equity and efficiency concerns in PES design* (Pascual *et al*. 2010, 1241). Permission granted by Oxford University Press and Copyright Clearance Center (2016-11-10).

This emphasise on efficiency is apparent through my findings where the focus is on performance and conditionality by, first of all, presenting it as a self-reliant business venture foremost carried out by the project participants (including the community development part of the project) without developing an understanding of the overall aim of the TGB project, and then by making the project participants plant a certain number of trees, according to a pre-set spacing arrangement, that need to grow to a certain size and be kept for a specific number of years in order to sequester the pre-determined tCO_2e without EcoTrust having to invest a lot of money in implementation, even if it comes at the expense of procedural injustices and self-subsistence for the project participants, as discussed above. For example, only 2 of 12 project

participants in this study have the required land size in order not to interfere with food growing, while almost all of them have allocated the land size and planted the number of trees required by the project (see table 2). This, I argue, shows upon that EcoTrust considers efficiency; to implement a carbon forestry project at a low cost[18] that can sequester a certain amount of carbon which are sold as VERs on the VCM at an attractive price, is prioritised over the resulting outcomes for the project participants.

Further, when evaluating the outcomes of a PES project, the focus is usually on the monetary compensation and the increase in income for the ES providers since the conceptualisation of PES and distributional justice, as explained above, is based on neo-classical economics which argue that "PES schemes can be considered just if the beneficiaries of environmental management compensate those who bear additional costs" (Sikor 2013, 13). However, this can be misleading since an increase in income does not equal a positive increase in livelihood, well-being and community development (Pascual *et al*. 2010, 1240). Additionally, carbon projects tend to focus on short-term impacts and outcomes, leaving out the long-term socio-ecological changes and trade-offs that might come with it (Benessaiah 2012, 3). This discrepancy is shown in my findings where the project participants have experienced an increase in monetary income, which surely has brought with it some benefits, for example contributing to different income generating activities, but these benefits have been asymmetrical and have, to some extent, and will potentially, come at a cost of long-term implications and trade-offs (Nel 2014, 212), such as the length of the contract, reduced soil fertility, high maintenance costs, and decreased food stability, which could negatively impact their self-subsistence and hence their livelihoods and well-being.

Therefore, from a justice perspective, the three fairness criteria *maxi-min*, *common gods* and *egalitarian* (see table 3) would be the preferably ones since then the focus is on making the project participants the largest beneficiaries even if it comes at the cost of decreased efficiency and hence decreased environmental additionality (Pascual *et al*. 2010, 1240). However, these criteria and outlooks on PES projects are much harder and costlier to apply than the *expected provision* and *actual provision* criteria since they go against the fundamental objective of PES and carbon offsetting. It would therefore probably not be viable

[18] Incorporating project participants and non-participant community members in decision-making and project design, i.e. have a higher level of procedural justice, would be costlier and is therefore not cohesive with most PES projects which main focus is efficiency and additionality.

to implement carbon forestry projects designed according to those criteria because carbon offset projects are just projects to offset carbon emissions, and carbon offset credit buyers would probably not invest in a project with low efficiency and environmental additionality since they want assured value (offsets) for their money. This can make one question whether it is even possible to create a just and equal carbon forestry project with only beneficial outcomes, when PES schemes are designed to offset as much carbon to a low a price as possible.

6.1.4 Pro-poor PES

Many conservation and development organisations have been attracted by the win-win-win narrative of carbon forestry projects where environmental conservation is synergised with poverty eradication (Benessaiah 2012, 3; McAfee & Shapiro 2010, 580; Van Hecken & Bastiaensen 2010, 785; Lyons & Westoby 2014, 14; Osborne 2015, 64). However, Pagiola, environmental economist at the World Bank, among others have emphasised that PES projects should not incorporate pro-poor development goals since it will reduce the environmental efficiency (Wunder, Engel & Pagiola 2008, 850); "the PES approach was conceptualized and undertaken as a mechanism to improve efficiency of natural resource management, and *not* as a mechanism for poverty reduction" (Pagiola, Arcenas & Platais 2005, 239; my emphasis). To have poverty reduction as the ultimate focus in PES projects would therefore be self-defeating since when subordinating carbon sequestration to poverty reduction, the level of environmental additionality is lower and hence less attractive for ES buyers (Pagiola, Arcenas & Platais 2005, 249). Therefore, as McAfee argues, "market efficiency criteria very frequently clash with poverty-reduction priorities" (McAfee 2012, 107) since pro-poor PES depends on contradictory objectives (McAfee 2012, 107).

Further, when discussing and evaluating PES projects and whether and, if so, how they contribute to poverty alleviation, one needs to consider for whom it might do so. McDermott, Mahanty and Schreckenberg (2013) question poverty alleviation in PES since projects are often directed towards "moderately poor" people, leaving out the poorest people, the ones with small or no farmland. One also needs to consider how justice and poverty alleviation goals are defined. If poverty alleviation means to raise the collective income, incorporating the moderately poor of a community in PES projects can decrease the overall poverty, but at the same time *in*crease the wealth gap between community members, as well as increasing distributive injustices since it does not deal with relative poverty (424).

The TGB project claims to work according to a rights-based, pro-poor approach focusing on participation and benefit-sharing (Schreckenberg, Mwayafu & Nyamutale 2013, 3; EcoTrust 2014, 25). In the PDD, the aim of the project is to "combine carbon sequestration with *rural livelihood improvements*" (EcoTrust n.d.; my emphasis). Plan Vivo Foundation has also recently started to incorporate 7 of the 17 Sustainable Development Goals (SDG) (Porras 2015), whereas the TGB project claims to actively work with 3 of them; No poverty (SDG 1), Climate Action (SDG 13), and Life on Land (SDG 15) (Plan Vivo Foundation n.d.). The carbon payments in Plan Vivo projects claim to contribute to short-term poverty alleviation while long-term poverty alleviation comes from timber products and firewood generated by the project (Porras 2015). The short-term and long-term poverty alleviation contributions put forward by Porras (2015) correspond with my findings concerning the project participants, and could possibly demonstrate a net poverty reduction. However, whether the TGB project contributes to poverty alleviation for the poorest in a community have been questioned since having requirements such as proof of long-term land tenure, at least 1 hectare farmland for carbon trees, and money for tree maintenance and other costs, limit the possibility for the poorest to join the project (Fisher 2011, 55). This exclusion of the poorest of the poor was the reason to why CARE, a NGO focusing on social marginalisation and poverty alleviation that co-founded TGB with EcoTrust, have withdrawn from the project (135). Further, distributive injustices, felt by the non-participant community members in this study, most of them poorer than the project participants[19], have increased. If the goal is to reduce poverty for everyone, even the poorest in a community, one needs to deal with the procedural and distributional justice issues as well (McDermott, Mahanty & Schreckenberg 2013, 424).

Additionally, in connection to the discussion on 'efficiency versus equity' and the fairness criteria of *expected* and *actual provision* in the TGB project, Fisher (2011) argues that considering how the TGB project is administered, where the main interaction between EcoTrust and project participants is when monitoring the performance of the trees, the obvious focus of the TGB project is environmental additionality and conditionality, and not poverty eradication (123). Further, as seen through my findings, the carbon payments that is promoted to act as a short-term poverty alleviation tool in the TGB project, is not realised due

[19] The non-participant community members in this study had farmlands that ranged between 0.1 and 2.8 hectares. Compare with the project participants' farmland sizes in table 2.

to the inadequate payments (which inadequacy stems from the fact that the payments are based on input costs and projected market value rather than opportunity costs) and its negative effect on self-subsistence, and as put forward by Schreckenberg, Mwayafu and Nyamutale (2013) above, some project participants have even gone into debt, hence become poorer (30). Whether the TGB project contributes to long-term poverty alleviation from future sales of timber products and firewood is impossible to answer since the project has only been operating for 13 years and hence no contract has ended and no timber products been (allowably) sold. Selling timber products and firewood might in the future contribute to poverty alleviation, but hoping for something that *might* come in the future, does not help the project participants nor the non-participant community members in their battle of obtaining a livelihood today.

To conclude, combining justice and poverty reduction goals with environmental conservation can be problematic since PES projects "framed by market-efficiency criteria alone are likely to bypass small-scale farmers" (McAfee & Shapiro 2010, 583). It is also questionable if it is even possible to have the dual goal of environmental additionality and poverty alleviation that the TGB project claims to have, one of them will probably always have the upper hand, at least within the current conceptualisation of PES. Nevertheless, there are evidence that PES projects can bring beneficial *side effects* in connection to poverty alleviation (Pagiola, Arcenas & Platais 2005, 248), but a PES project should not be seen as a "silver bullet for solving the century's global challenges of climate change *and* Third World poverty" (Osborne 2015, 65; my emphasis).

6.2 Illusion of Action

Proponents of carbon trading, offsetting and PES projects argue that these mechanisms are efficient and invaluable in the quest to mitigate climate change. However, on the other side of the political spectrum there are critics that claim that these mitigation mechanisms, besides perpetuating environmental injustices and shifting the responsibility from the Global North to the Global South, actually do not deal with climate change mitigation effectively anyway, that they just legitimise a continuation of consumerism and burning of fossil fuels. This will be briefly discussed below.

6.2.1 Permanence

> […] what happens "on the ground" influences what happens in the atmosphere.
>
> (Wittman & Caron 2009, 723)

Considering that the fundamental aim of PES schemes is to create an environmental beneficial activity that is additional to business-as-usual (Forest Trends *et al*. 2008, 3), the issue of permanence is significantly important. Fisher's (2011) informants put forward that the most important benefit and motivation of the TGB project is the carbon payments, and therefore the largest risk to permanence is the lack of money when the carbon payments cease after 10 years, creating a "no pay, no care" situation (181). On the contrary, for my informants the carbon payments are *not* the largest benefit or motivation, which could make one think that the risk of impermanence would be lower. However, some of my informants put forward that they might cut down the carbon trees premature, hence resulting in impermanence, not because of lack of money, but because of lack of *food* since their farmland is occupied by carbon trees. This tension between "the permanence criterion [of PES] which requires a certain contract length, *and* the social viability of the contract" (Fisher 2011, 36; my emphasis) illustrates that the trade-offs in food security, which is a distributive justice issue that partly stems from lack of procedural justice as well as the emphasise on efficiency over equity in the TGB project design, can result in environmental inefficiency, and hence not fulfil the overall aim of PES – to be additional to business-as-usual through net emission reductions. This shows, just as Muradian et al. (2010) argue, that efficiency and equity are intertwined in PES and in order to create a successful and long-lasting project, one needs to take equity matters into consideration (1205). This environmental inefficiency fuels a discussion on whether PES projects and carbon offsetting is a solution and a suitable mechanism to net emission reductions, or nothing more than an illusion of action.

6.2.2 Problem not Solution

> Responsibility for over-consumptive lifestyles of those in richer nations is pushed onto the poor, as the South becomes a carbon dump for the industrialised world.
>
> (Bachram 2004, 7)

When carbon offsetting and carbon markets were first created, the overall aim was to find the most cost-effective mechanism for climate change mitigation (Böhm & Dabhi 2009, 11; Eckersley 2009, 102). Therefore, "as it does not matter to the climate where emission reductions are achieved" (UNEP 2005, 4), most of the carbon offsetting and PES projects were and still are directed to countries in the Global South where the land, labour, opportunity and transaction costs are lower than in the Global North (Bumpus & Liverman 2008, 133; Eckersley 2009, 101; Lovell, Bulkeley & Liverman 2009, 2367; Muradian *et al*. 2010, 1203; McAfee 2012, 125; Reynolds 2012, 543; Osborne 2015, 65; Wegner 2016, 622), which in turn are results of existing inequalities where the ES providers do not have the power or influence needed to demand an equal exchange. By focusing on finding a 'least-cost solution' abroad instead of regulating domestic emissions, the countries of the Global North transfer their responsibility to the poor people of the Global South, encouraging them to use their lands as carbon sinks (Martinez-Alier 2002, 213; Böhm & Dabhi 2009, 16; Eckersley 2009, 102; Wittman & Caron 2009, 711). Appropriating land for carbon sinks in countries of the Global South can be regarded to be an environmental load displacement (ELD) (Hermele 2010, 13; Hornborg 2011, 54) where the Global North uses the lands of the Global South as "carbon dumps" for their over-accumulation and over-consumptive lifestyles (Bachram 2004, 7), while at the same time saving time and space at home and supporting further consumption (Ervine 2013, 654) as well as economic and technological expansion (Hornborg 2011, 14). This is made possible due to the current world system of uneven development and power structures where the Core (Global North) has a hierarchical position and hence a disproportionate access to global environmental space, including natural resources and sink-capacity (Rice 2007a, 1369). This ELD has socio-economic and ecological implications for the Periphery (Global South), limiting utilisation opportunities needed for a sustainable development (Rice 2007b, 46). Further, it also consolidates and extends the injustices within the world system, injustices and underdevelopment that are, certainly, vital for the existence of cheap carbon offsets; "carbon offsets are premised on North-South inequity, you have to

have a developing world if you're going to get your cheap carbon offsets" (Bumpus 2006 in Smith 2007, 27).

This appropriation of land in the Global South from marginalised people for carbon forestry can further be seen to represent a new discourse of colonialism – 'carbon colonialism' (Bachram 2004, 6; Böhm & Dabhi 2009, 198; Wittman & Caron 2009, 711; Lyons & Westoby 2014, 13; Osborne 2015, 65) – where "powerful actors benefit at the expense of disempowered communities" (Bachram 2004, 16) in the Global South by turning the current ecological crisis into another profitable market opportunity (Bachram 2004, 16; Böhm & Dabhi 2009, 88), legitimised by the win-win-win and sustainable development rhetoric (Böhm & Dabhi 2009, 197).

Apart from those substantial issues, as raised above, these market-based mechanisms have received a lot of critique for not fulfilling its overall environmental purpose (Smith 2007, 7; Leach & Scoones 2015, 40), some even argue that they are counterproductive and rather increase GHG emissions than reduce them, and considering the risk of impermanence in the TGB project discussed above, this critique is legitimate. By buying cheap carbon offsets from PES projects instead of reducing emissions at the source of pollution, i.e. in the Global North, a continuation of business-as-usual is enabled and legitimised (Böhm & Dabhi 2009, 17; Robbins 2011, 249), which in turn leads to more accumulation – accumulation by decarbonisation (Bumpus & Liverman 2008, 142). Further, when focusing on carbon offsetting as the foremost mechanism to GHG emission reductions, the root causes of climate change, i.e. over-accumulation, consumption, and burning of fossil fuels, stay untouched (Muradian et al. 2013, 275). Instead of re-examining the fundamentals of the current economic and political system and demand necessary structural and political changes in the quest to mitigate climate change, so-called 'technical fixes' that fits within the current system and preserves the status quo, are emphasised and promoted (McAfee 1999, 135; Lohmann 2001, 8; Gilbertson & Reyes 2009, 90; Wittman & Caron 2009, 723). This, in turn, tends to "pile inequality on inequality" (Lohmann 2001, 8) and create secondary injustices instead of mitigating climate change and contributing to sustainable development in the Global South.

6.3 Suggestions for the Future

Since capitalism, neoliberalism and market-based solutions are dominating the climate mitigation agenda, and probably will continue to dominate in the future, it is, unfortunately, safe to say that PES schemes are here to stay (Eckersley 2009, 104). Therefore, it is important to try to improve them in order for them to be less harmful to marginalised people, while also mitigating climate change more effectively. Taking off from a political ecology standpoint in this thesis, I would not like to only offer a "hatchet" by critiquing the current market-based approach to climate change mitigation through carbon offsetting, carbon forestry and PES, without contributing with a small "seed", that is, giving suggestions for an alternative outlook and future development.

As seen through the findings in this study, there are tensions between the theoretical foundation of PES and the practical realities into which they are implemented, resulting in equity-efficiency trade-offs as well as risks of impermanence and hence low environmental additionality. Therefore, in order to develop PES schemes that are more successful, one needs to first change the neo-classical economics conceptualisation of PES to a more flexible, participatory, and integrated economic conceptualisation (Muradian *et al*. 2010, 1205; Wegner 2016, 618) where local socio-economic, socio-ecological, and cultural relations are taken into account (Muradian *et al*. 2010, 1204-1207; Pascual *et al*. 2014, 1033), and the maximisation of economic efficiency is not put as the ultimate goal (Wegner 2016, 638). Further, due to the implementation of a large number of PES projects in poor communities, PES projects should always be a part of a multi-goal strategy for community development and poverty alleviation, and not solely used as an economic and environmental efficient tool, since "rural development cannot be reduced to an efficiency problem" (Muradian *et al*. 2010, 1205). It is also important to incorporate the multiple dimensions of environmental justice into the PES framework and evaluate them continuously (Pascual *et al*. 2014, 1033) in order not to create and/or extend existing injustices (Wegner 2016, 625). To fulfil local needs and priorities, one also needs to customise the PES framework in accordance to the local context, to integrate project participants in the implementation, as well as to acknowledge their local knowledge and capacities (Muradian *et al*. 2010, 1204; Pascual *et al*. 2014, 1035; Wegner 2016, 639). By targeting community groups of farmers instead of foremost single farmers, it would be possible for the poorest farmers to participate without negatively interfering with self-subsistence or environmental efficiency and additionality.

7. Conclusion

In this thesis, I have analysed and discussed PES and carbon forestry using the Trees for Global Benefits project in Uganda as my case study. The aim for this thesis was to get an understanding of how this project has unfolded at a local level, focusing on the claimed additional project benefits of improved food security, fuel security, and income stability. This study mainly confirms the findings of other studies in connection to *food security*; increased food access and availability but decreased food stability for some project participants, and decreased food security for some non-participant community members, to *fuel security*; low level of fuel self-subsistence for both project participants and non-participant community members but a possible future increase in firewood availability for project participants, as well as to *income stability*; increased income stability through income generation activities, but increased expenses due to inadequate payments and high tree maintenance costs. To conclude, the TGB project has brought with it some benefits for the project participants but at the cost of a number of procedural and distributive injustices, and can, based on the findings in this study, therefore not be regarded to have completely fulfilled the aim "to contribute to food security, fuel security, and income stability at community level" (Plan Vivo Foundation n.d.), neither the pro-poor PES Pareto principle criteria of not leaving anyone worse off in relation to the initial baseline (Forest Trends *et al*. 2008, 48). These environmental injustices put forward in this study mostly stem from the current conceptualisation of PES and justice, where efficiency, cost-effectiveness and environmental additionality are prioritised, and the utilitarian notion of justice regards projects to be just if the ES providers are compensated. Therefore, it is questionable if it would even be possible to avoid these trade-offs experienced and create a (from an egalitarian and needs-based notion of justice) just PES and carbon forestry project within the current outlook.

Additionally, these environmental justice issues are not only a matter of how the implementation, design and outcome of the carbon offsetting scheme are in connection to justice, but also on its ability of and contribution to climate change mitigation. Caney (2010) argues, along with many others mentioned earlier, that climate change is contributing to disproportionately distributed injustices, and in order to emend these there is a need to reverse climate change. Therefore, operating a climate change mitigation scheme that does not contribute to net emission reductions, could be seen as unjust on its own (199). Considering the disadvantages, trade-offs and injustices put forward in this and other studies, along with

the unsure environmental additionality as well as the retaining of the environmental disastrous status quo, the rhetorically powerful win-win-win narrative of PES and carbon forestry is challenged.

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8.2 Interviews

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9. Appendices

9.1 Appendix 1: Questionnaire for Focus Groups

QUESTIONNAIRE – Focus Group Discussion

with carbon farmers in Bugoye & Maliba, Kasese District

1. Please introduce yourselves; name, your family, your life as a farmer

2. How long have you been involved in the project Trees for Global Benefits (TGB)?

3. What made you decided to participate in the project?

4. Do you feel that the project is what you expected?
    a. If not, what has been different from your expectations?

5. Do you feel that the project has been beneficial for you?
    a. If so, what are those benefits?

6. Has the project resulted in any challenges or problems for you?

7. Do you know about the Carbon Community Fund (CCF) that is a part of the TGB project?
    a. If so, do you know if the money in that fund has been used for any community projects?

8. What is you overall impression of the TGB project this far?

9. Would anyone like to add or say something more?

9.2 Appendix 2: Questionnaire for Interviews with Carbon Farmers

QUESTIONNAIRE – INDIVIDUAL INTERVIEWS

with carbon farmers in Bugoye & Maliba, Kasese District

Introduction

1. Can you tell me a little bit about yourself, your family, your life as a farmer?
    a. Is farming your main source of livelihood?

Project information

2. How long have you been involved in the project Trees for Global Benefits (TGB)?
    a. Did you join as part of a group or individually?
    b. What as the **main** reason to why you joined the project?

3. What were the requirements for you to be able to join the project?

4. Do you know what the overall aim is for the TGB project?
    a. What are your thoughts about climate change?

Trees

5. How many acres of farmland do you have?
    a. How much of your farmland is planted with trees?

6. How many trees have you planted within this project?
    a. Are these trees intercropped or in a woodlot?
        i. Why did you choose to plant them in that way?
    b. What tree species do you have?
        i. Did you choose the tree species yourself?
    c. How do you receive the tree seedlings?

7. How long do you need to keep these trees standing before you can harvest them?
    a. Do you know why you need to keep them for that long?
    b. What will you do with the trees after harvest?

c. What are you planning on using the land for after harvesting the trees?

Maintenance

8. Is there a lot of work to keep the trees in good condition?

9. Who conducts and/or pay for the maintenance of the trees?

10. What are the biggest threats to the trees to grow well?

11. Have any of your trees died?

- **a.** If so, what was the reason?
- **b.** When some of your trees die, what do you do?
- **c.** If you need to replant any of the trees, will you pay for that yourself?

12. How is the monitoring of the trees conducted? (by EcoTrust, farmers involved, volunteers etc.)

- **a.** Have you gotten any training in monitoring?

Payment

13. How much are you paid to grow and keep these trees within the project?

- **a.** What and who decide on how much you get paid?
  - **i.** Are you a part of that decision?
- **b.** How often do you receive your payments? For how long?
- **c.** Are you paid as much as you expected when you joined the project?
- **d.** How do you receive your payments? (e.g. regional bank, SACCOS)
- **e.** Did you plant your trees before you received your first payment?

14. For what do you use the money you receive through the project?

15. What is 'income stability' for you?

- **a.** Has the money you receive through the project contributed to income stability?

Outcomes

16. Have you experienced any benefits from being involved in the project?

a. If so, which are the 3 most important benefits? (please rank the benefits according to how beneficial you think they are – the most beneficial is the first one)

17. What is 'fuel security' for you?

a. Would you consider yourself self-subsistent on firewood?

b. Has the project increased your access to firewood?

i. If so, in what way? (e.g. more firewood on your land, more money to buy firewood)

c. From where do you collect most of your firewood?

18. On how much of your farmland do you grow food crops?

a. Would you consider yourself self-subsistent on food?

b. What is 'food security' for you?

i. Has the project contributed to increased food supply/security for you?

19. Has EcoTrust held any trainings or seminars as part of the project?

a. If so, on what topics were these trainings/seminars?

b. Have these trainings been accessible to the whole village/community, or only to the farmers involved in the project?

20. Have any enterprises been established through the project?

a. Have any "nature based enterprises" been established through the project? (e.g. beekeeping, fruit selling) which can work as an alternative income when the payments have ceased?

i. If so, what kind if enterprises?

ii. How have these been beneficial for you and your village/community?

b. Has any savings and credit co-operative societies (SACCOS) been established in the community through this project?

i. If so, how have these been beneficial for you and your village/community?

21. Has the project contributed to any income generation activities for you?

22. Do you know if there is any community fund where all farmers in the project save some of the money they earn from the project?

- **a.** If so, what is this fund used for?

23. Do you consider the project to bring any benefits for the whole village/community and not only to the individual farmers involved in the project?

- **a.** If so, in what ways?

Challenges

24. Do you have enough land to grow food crops?

- **a.** When the trees grow big, will you still be able to grow food crops?

25. Do you think that growing these trees can have any negative impact on the soil in the future?

- **a.** If so, how might this affect you?

26. Do you think that growing and keeping these trees for [insert number of years the interviewee said the trees need to stand for] will affect your food supply/security?

- **a.** If so, in what way?

27. (If applicable) When you think about the project, what outweighs the other; the benefits or the challenges/problems?

- **a.** Why do you think that way?

28. Would you recommend other farmers to join the project?

Other

29. Is there anything else you would like to add or say?

9.3 Appendix 3: Questionnaire for Interviews with Community Members

QUESTIONNAIRE – INTERVIEWS

with community members in Bugoye & Maliba, Kasese District

1. Do you know about the carbon offset project Trees for Global Benefits initiated by EcoTrust?
    - **a.** What are your thoughts about the project?
    - **b.** Why have you not joined the project?

2. Do you know any farmers in your village/community which are involved in the project?

3. Has any trainings or seminars been held as part of the project?
    - **a.** If so, did you join any of them?

4. Do you consider the project bringing any benefits to you and your village/community?
    - **a.** If so, in what way?

5. Has the project resulted in any challenges or problems for you and/or your village/community?
    - **a.** If so, what challenges or problems?
        - **i.** How has these been solved?

6. How many acres of farmland do you have?
    - **a.** What do you grow on your land?
    - **b.** What is 'food security' for you?
    - **c.** Do you consider yourself self-subsistent in food?
        - **i.** Has the project affected your ability to grow food?
    - **d.** What is 'fuel security' for you?
    - **e.** Do you consider yourself self-subsistent on firewood?
        - **i.** Has the project affected your access to firewood?
    - **f.** Do you have enough land to graze your animals?
        - **i.** Has the project affected your ability to graze your animals?

7. Is there anything else you would like to add or say?