



# Socio-economic impacts of private land use investment on rural communities: Industrial forest plantations in Niassa, Mozambique



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## ABSTRACT

East Africa has experienced an increase of private land use investments in the past years. Rural households have consequently faced crucial changes in their livelihoods. This paper explores the socio-economic impacts of industrial forest plantations on rural communities in Niassa, Mozambique. According to our results private forest plantations have the potential to positively impact local people's wealth and well-being, if enough emphasis is given to minimizing the negative impacts. The household survey data of 218 observations from five villages were analyzed using binary and multinomial logistic regression analyses. The study shows that forest plantations have threatened the basis of traditional rural livelihoods by reducing the availability of natural resources and through the relocation of agricultural plots. However, investments have also supported the diversification of livelihood strategies in the communities by providing formal employment and by increasing business and trading activities. As growing population and traditional agricultural practices have led to the overexploitation of natural resources, non-natural resource-based livelihood strategies increase the resilience of a household. The majority of respondents reported plantations to have either no overall impact or a positive impact on the well-being of their household. According to our results, socio-economic household characteristics only marginally explain respondents' perceptions of the impacts of forest plantations but perceptions differ significantly between individual villages.

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## 1. Introduction

At the global level private forest plantations have become increasingly important for timber supply (Evans and Turnbull, 2004). According to the Food and Agriculture Organization of the United Nations (FAO (2010) there were 264 million hectares of planted forest worldwide in 2010 and the area is rapidly increasing. South America and South-East Asia have the largest areas of industrial forest plantations (Barua et al., 2014). However, interest toward Africa is significantly increasing due to vast land availability, low labor costs and incentives created by the governments (Barua et al., 2014). East Africa already faces increased land pressure due to a high number of transnational land deals in the past years targeted toward agricultural production as well as forest plantations (German et al., 2011; Anseeuw et al., 2012). Foreign

direct investments (FDI) have been found to be a major component for the growth and development of national economies (e.g., UNCTAD, 2012; Kurtishi-Kastrati, 2013). However, the knowledge of the socio-economic impacts of plantations financed through FDI on local livelihoods in the affected region is limited.

The socio-economic impacts of industrial forest plantations in general are widely discussed (Charnley, 2005; Maung and Yamamoto, 2008; Gerber, 2011). Most rural households in East Africa depend heavily on land and natural resources, especially water, firewood and non-wood forest products (NWFPs) (e.g. Heubach et al., 2011; Persha et al., 2011). Industrial forest plantations require large land areas, decrease land availability, and are thus likely to constrict agricultural activities and cause negative environmental and socio-economic impacts (e.g., Evans and Turnbull, 2004). On the other hand, large-scale forest investments provide the possibility of economic development and alternative income sources in the form of formal employment and infrastructure improvement (Carvalho et al., 2005; Schoneveld et al., 2011; Obidzinski et al., 2013).

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Many earlier studies examining plantation forestry have concentrated on land conflicts (Gerber, 2011; Kröger, 2012; Fairbairn, 2013). Gerber (2011) identified these conflicts as one of the major negative impacts on local communities caused by forest plantations worldwide, including the displacement of local households or their farm plots and limitations in access and control over natural resources. A severe case of the displacement of households and farmland due to a forest plantation project has been observed in South Africa (Tropp 2003) and, more recently, in Uganda where the displacement of households and violent land evictions have been reported (Lyons and Westoby, 2014). Ill-defined property and land use rights are one of the main underlying causes for these conflicts. The governments of many East African countries own the land and local communities use the land under traditional customary rights. Investments from external parties (national as well as foreign investors) thus disrupt traditional land and resource use (Gerber 2011; German et al., 2011; Derkyi et al., 2014). Reductions in agricultural activities could be offset by employment creation, making households less dependent on natural resources. Employment enables households to diversify their livelihood strategies and be less dependent on natural resources. Diversification of a household's livelihood with non-natural resource-based strategies makes the household less vulnerable and enables them to increase their standard of living (Ellis, 2000; Morris et al., 2002). In the general context of industrial forest plantations Tyynelä et al. (2002), Sitari (2005) and Schoneveld et al. (2011) have emphasized that although employment opportunities are offered by forest plantations, only few of the households benefit and are able to improve their livelihoods. Furthermore, Lyons and Westoby (2014) reported that positive impacts on employment were observed in their study, but local communities stated that the urge for agricultural land is more important and that employment cannot make up for degraded natural resources.

Besides the displacement of agricultural plots, studies have also reported a decline of other natural resources e.g., firewood and NWFPs caused by deforestation and transformation of natural forests with forest plantations (Gerber, 2011; Nahuelhual et al., 2012; Nube et al., 2012; Obidzinski et al., 2012; Heilmayr, 2014). Especially; in cases where natural habitats are changed toward monocultures households are forced to walk further distances to collect products from the forest or completely lose the benefit from ecosystem services (McElwee 2009; Kröger, 2012). Plantations may also impact water, which is crucial for rural communities (see e.g., Bowyer, 2001; Gerber, 2011; Obidzinski et al., 2012). Gerber et al. (2009) stated that forest plantations in Cameroon and Ecuador were reported by locals to have caused the pollution of local water streams.

To most effectively mitigate the negative impacts of plantations, the identification of the most vulnerable population groups is important. Women in general and single mothers in particular, elders, the least educated and the poorest are often identified as part of this group (McElwee, 2009). Concerning impacts of plantations e.g., Vihervaara et al. (2012) found differences between female and male respondents in Uruguay despite the majority of households in a study stating a positive opinion concerning forest plantations. According to Tyynelä et al. (2002) wealthier households have a higher likelihood to benefit from forest investments, as they have better access to education, and hence higher chances to be employed. A case study by Sitari (2005) in Zanzibar showed that especially females struggle to adapt to the changes brought by the forest plantations and are often unable to benefit from them. As situations are very different in different parts of the world, country- and region-specific studies on these impacts are needed.

However, despite this growing interest the knowledge concerning the actual socio-economic impacts on rural communities beyond land conflicts is still insufficient. This study contributes to

the literature by examining the impacts of existing forest plantations on the wealth and livelihoods of local people in selected rural communities in Niassa, northern Mozambique. New insights into perceived changes in ecosystem services and livelihood strategies are provided and factors affecting the perception on the impacts of forest plantations are examined. Results and recommendations from this study will help to improve the implementation of forest investments and collaboration between stakeholders.

Over the past years several private forest companies have allocated land concessions for plantation projects in the province of Niassa with a planned investment volume of approximately US\$ 70 million (Nhantumbo et al., 2013). Reasons for the investments in this province include good soil and good climatic conditions for silviculture and a scarce population (DNTF, 2012). Land in Mozambique is owned by the state and forest investors acquire land use rights (DUATs) from the government, which allows them to occupy and use a certain area for 50 years, with the option of extending this right for another 50 years. If the areas granted to the investors are overlaid with community land, the forest companies are required to hold consultations to negotiate with communities on areas to be allocated and on compensation. Although the legal framework forms a basis for protecting the land use rights of local communities, the implementation of land use rights is weak in reality (e.g., Siteo, 2009; German et al., 2011).

Prior to our study, Landry and Chirwa (2011) analyzed the perception of local communities on planned forest plantations. According to their study, improvements in infrastructure and employment were anticipated by local communities as a result of the introduction of forest plantations close by. The overall expectations were positive, as respondents stated that sufficient land would be available for the forest plantations. The study captured only the expectations of local communities, but presented no results on actual impacts. Nube et al. (2012) evaluated the impacts of the establishment of industrial forest plantations in the Lichinga, Lago and Sanga districts of the Niassa province. They found that forest plantations have increased the well-being of local communities through better employment and trading opportunities. However, they examined the perception of forest plantation impacts only on a general basis and did not further analyze the factors and reasons causing negative or positive responses. Other studies (Norfolk and Tanner, 2007; Siteo, 2009; Lemos, 2011; Siteo et al., 2012; German et al., 2011) contrastingly reported conflicts over land caused mainly due to the weak implementation of land use rights for the local population.

In our study we examine villagers' perceptions of the impacts of plantations on the availability of natural resources (land, water, firewood, NWFPs). We examine how households have perceived the overall impact of plantations on their livelihood. We further analyze whether any groups have been impacted more than others. We also analyze the link between different livelihood strategies and the impacts of forest plantations. Our main hypotheses are the following: (i) local households perceive the impact of forest plantations on natural resources negatively, (ii) forest plantations have positively impacted the livelihood diversification of households, (iii) the introduction of forest plantations is perceived more negatively by poorer households and more positively by wealthier households.

## 2. Data and methods

### 2.1. Study area

Our study was carried out in five villages in Niassa, Mozambique: Malulu, Ligogolo, Colongo, Mapaco and Mussafa. The main criterion for village selection was proximity to a forest plantation. Malulu,

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