

**COMMUNITY-BASED SOCIO-ECONOMIC SUSTAINABILITY
ASSESSMENT OF GABA AND ROSSBACH GOVERNMENT
PLANTATIONS IN LIMPOPO PROVINCE, SOUTH AFRICA**

by

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DECLARATION

I hereby certify that this seminar is my own work, except where duly acknowledged. I also certify that no plagiarism was committed in writing this thesis.

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ABSTRACT

Sustainable forest management (SFM) principles emphasize the need for generation of socio-economic benefits for neighbouring communities, minimization of adverse effects and maintenance of good relations with the communities. Small scale plantations, such as category B and C state plantations in South Africa, contribute very little to the national economy. However, they have the potential to contribute significantly to livelihoods of rural communities through provision of wood, other non-timber products as well as generation of income through employment and participation in income generating activities. Assessing the socio-economic sustainability therefore provides the basis for monitoring compliance with SFM principles and prescription of appropriate interventions. Considering that state plantations have been scheduled for transfer to community-based entities, determination of the potential of alternative management types is vital. This study therefore assess the socio-economic sustainability of current management strategies in state plantations at Gaba and Rossbach in Limpopo province with the view of determining appropriate alternative management regimes using perceptions of local communities. Summated rating scales principles were applied by using likert scaling to acquire the perceptions of local communities through scoring of the indicators and verifiers. While the local community for Rossbach plantation was content with all indicators of socio-economic sustainability, the local community for Gaba plantation was discontent with provision of products and the plantation's contribution to their livelihoods. Both communities perceived joint forest management to be the optimal plantation management regime across all indicators of socio-economic sustainability while expressing total lack of confidence in managing the plantations communally. Although effective community engagement facilitates participation of local communities in plantation activities, the actual contribution to livelihoods depends on provision of tangible benefits particularly firewood from the plantations. Optimal socio-economic sustainability in the post-transfers era can be achieved through joint decision-making and formalized sharing of responsibilities and benefits between the communities and government.

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LIST OF ABBREVIATIONS

FSC	Forestry Stewardship Council
ITTO	International Timber Trade Organization
DAFF	Department of Agriculture Forestry and Fisheries
CIFOR	Center for International Forestry Research
SFM	Sustainable forest management
C&I	Criteria and indicators of SFM
DWAF	Department of Water Affairs and Forestry
PFM	Participatory forest management
CSFM	Committee for Sustainable Forest Management
MCA	Multi-criteria analysis
CFUG	Community forest user group

CHAPTER 1: INTRODUCTION

1.1 Background

According to Hickey (2008), sustainable forest management (SFM) is whereby forests are utilized and maintained so as to obtain and maintain ecological, economic and social functions in present and in the future. The concept of SFM has become a dominant paradigm worldwide forming the basis of modern forest policy and law in most countries. It emanated from the principles of sustainable development which were globally adopted in the early 1990s. Sustainable development is any form of development that meets today's needs without compromising the ability of future generations to meet their own needs (WCED, 1987). Other modern definitions have assumed a "triple bottom line approach" with needs of the people being categorized into social, economic and environmental. The United Nations Conference on Environment and Development (UNCED) of 1992 produced "Agenda 21" which was the first global non-legally binding commitment by countries to uphold, promote and implement principles of sustainable development (Mendoza & Prabhu, 2000). Among others, there were forest principles on which the concept of SFM is based. From then onwards, governments worldwide, South Africa included, have integrated the sustainability concept into their policies and legislation.

The concept of SFM has increasingly become more relevant due to the need to alleviate poverty within rural communities where the forests are situated as well as provide wood to such local communities. Wise *et al.* (2011) reported that since the late 19th century the demand for wood resources in South Africa has significantly surpassed the availability from natural forests and woodlands. Banks *et al.* (1996) indicated that fuelwood is the main source of energy in rural areas of Africa as a whole. In South Africa, three quarters of the rural households use fuelwood for energy provision to varying extents with other energy sources being less preferred because of higher costs and the low income nature of the rural households (Madubansi & Shackleton, 2006). Plantation forests can therefore play a significant role in improving rural livelihoods through provision of wood products and socio-economic benefits such as employment and business contracts.

Restructuring of state-owned plantations in South Africa resulted in categorization of the forests into category A, category B and category C based on their location, accessibility, size, productivity and prevalence of conflicts (DWAF, 2005b). Category A plantations were transferred between 1999 and 2001 into the South African Forest Company Limited (SAFCOL), a state-owned enterprise (DWAF, 2005b). The remaining category B and C plantations which were smaller, marginal and less productive remained under the ownership and management of the Department of Agriculture Forestry and Fisheries (DWAF, 2005b). Category A plantations were about 390 000ha in size whereas category B and C were about 150 000 ha in total (DWAF, 2004). Category B and C, being under DAFF management within the former homeland areas (DWAF, 2005b) are thus more closely associated with local communities.

The National Forest Action Programme of 1997, driven by principles of sustainable development focused strongly on sustainable utilization of forest resources for the benefit of local communities and previously disadvantaged persons and groups (Andrew *et al.*, 2000). Hence, category B and C plantations have been scheduled for transfer of ownership and management from state ownership to local community-oriented beneficiaries (DWAF, 2005b). Category B plantations are scheduled to be transferred to local investors, previously disadvantaged investors or community entities with the process to be largely influenced by community participation whereas category C plantations are scheduled for transfer to local communities (DWAF, 2004).

1.2 Rationale of the study

The concept of SFM has been widely adopted in terms of forest policies and legislation. However, evaluation and monitoring is of paramount importance in order to ensure compliance with the SFM principles. Therefore, this study seeks to contribute towards SFM by assessing the socio-economic sustainability of state plantations as well as assessing the potential of alternative management options. Establishing the current status of socio-economic sustainability provides vital information that can then be used

to develop interventions to increase the socio-economic benefits and prevent or reduce the negative aspects.

Assessment of alternative management regimes serves to determine the optimal management regime with regard to achievement of sustainability from a community perspective thereby eliminating the potential problems associated with top-down approaches. This is of paramount importance considering that DAFF has already committed to transferring category B and C plantations from government ownership to community-oriented beneficiaries (DWAF, 2005b). It is noteworthy that the earlier woodlot development programmes which were established to provide wood to communities failed because of the top-down exclusionary approach that led to lack of participation by the local people (Ham & Theron, 1999). In that regard the post-transfer sustainability of state plantations is also vulnerable to failure if the potential beneficiaries i.e. the local communities' views and perceptions are not determined. Social sustainability therefore determines environmental and economic sustainability of the plantations. Likewise Charnley (2005) asserted that similarly to protected areas, environmental sustainability cannot be separated from socio-economic sustainability of local communities.

The main form of SFM evaluation has been conducted through audits by certification bodies such as the Forestry Stewardship Council (FSC) and government forestry departments. Criteria and indicators (C&I) have been developed to facilitate assessment of SFM (Mendoza *et al.*, 2002). However, the actual assessment of the indicators still poses a challenge. According to Mendoza *et al.* (2002) even critical threshold values which can be used quantitatively for ecological indicators can still be ambiguous, require scientific expertise or be impossible to determine. Indicators for socio-economic sustainability are mostly qualitative with no agreeable 'critical threshold' to assess them. This implies that through conventional SFM audits, such indicators are subjectively judged largely through the perception of the auditor. This is because obtaining views from a representative number of people from the local communities is impossible due to constraints such as time and cost. This study therefore acknowledges and subsequently qualifies the local community members themselves as the most competent and credible

judges of the socio-economic sustainability performance of a forest management unit. The performance scores will thus be based on the peoples' perceptions and satisfactions. This aspect was also supported by Karumbidza (2005) when he indicated that some forest companies have seemingly good corporate social responsibility programs which, however, are sometimes not relevant or applicable to the rural communities adjacent to their plantations.

1.3 Objectives and research questions

The main objective of the study was to assess socio-economic sustainability and potential of alternative management regimes for Gaba and Rossbach government plantations in Limpopo province, South Africa. The first specific objective was to analyze community perceptions on socio-economic performance of state plantations using indicators of SFM. The related research questions were as follows;

- Are there multiple products for consumption by the local communities?
- Do plantations make a positive contribution to the local economy and livelihoods?
- Is there prioritization of local people to business and employment opportunities?
- Is participation of local communities facilitated?
- Do the local communities participate in plantation management, protection and utilization?
- Do local communities understand and respect plantation ownership, management and use arrangements and do they perceive them as fair?
- Are conflicts and grievances effectively and properly managed?

The second specific objective was to assess socio-economic sustainability potential of alternative plantation management regimes based on perceptions of local communities.

The main research question under this objective was;

- Which plantation management regime can best satisfy the goal of socio-economic sustainability?

1.4 Layout of Thesis

This thesis consists of six chapters. Chapter one is an introduction to the thesis consisting of the background to the study, objectives, research questions and rationale. Chapter two is a review of literature on socio-economic sustainability of plantations, methods of assessing SFM and a description of alternative management regimes. Chapter three presents description of the study area, sampling design and statistical analysis. Chapter four is a presentation of the results followed by discussion of the results in chapter five. Chapter six then presents conclusions based on interpretation of the findings and recommendations arising therefrom.

CHAPTER 2: LITERATURE REVIEW

This chapter provides the context and significance of socio-economic sustainability by outlining the opportunities presented by plantations in terms of socio-economic benefits as well as the potential negative impacts on local communities. The chapter further provides insight on how the balance between the two determines perceptions of communities and how such attitudes can affect functioning of the plantation itself. The motivations and obligations for plantations to consider the needs of neighboring communities are presented. This chapter also provides an overview of SFM assessment methods and description of alternative management regimes applicable to state plantations. Review of literature on the above-mentioned is presented in the context of South Africa as well as other countries.

2.1 Socio-economic sustainability of plantations

Contextually, socio-economic sustainability is a state whereby plantations maintain good relations with local communities characterized by absence of conflict, appropriate response to their grievances, livelihoods improvement through provision of essential goods services (Charney, 2005; Gordon *et al.*, 2013). This socio-economic sustainability therefore is generally a combination of social acceptance of the plantation functionality, economic beneficiation and general livelihoods improvement with regard to local communities.

2.2 Social sustainability

Social sustainability is sometimes referred to as community engagement, corporate social responsibility or public participation. Modern industry practice has adopted political and social roles and responsibilities as compared to the traditional economic role (Toppinen, 2011). According to Gordon *et al.* (2013) community engagement is now an essential component of every organization, forestry industries included, that has a responsibility to incorporate stakeholder concerns in its functions. Social sustainability or acceptance may be achieved through the derivation of socio-economic benefits

together with elimination, avoidance or remediation of adverse effects. However, it is particularly in the context of large scale commercial forests that adversity of effects on societal values and the environment should and is often prioritized (Charney, 2005; Gordon *et al.*, 2013). Karumbidza (2005) reported that large scale monoculture plantations in Zululand were depriving the locals of their land for agriculture, grassland pastures, water resources, etc. He also reported that these plantations were compromising the safety of locals by creating hidden places for illegal activities, loss of cultural values due to lack of naturalness of the environment and absence of trees or areas of spiritual significance (Karumbidza, 2005). In such case there would then be absence of social acceptance but prevalence of conflicts.

Gordon *et al.* (2013) indicated that social sustainability goes beyond minimum compliance. This is based on the fact that there is need to make the stakeholders' themselves to have a good perception which is a function of their contention. Despite the potential difficulty for an organization to successfully balance conflicting stakeholder views and wants, society still has the right and capacity to define expectations for organizations operating within its boundaries (Toppinen, 2011).

2.3 Livelihoods improvement

Provision of forest products to the local communities is an essential component of socio-economic sustainability. Charnely (2005) indicated that apart from the main benefit of plantations to local communities being provision of employment opportunities, they can also provide them with wood products from harvesting residues. Provision of such socio-economic benefits to the communities is often, the primary responsibility of community woodlots. Although the primary function of commercial plantations is timber production and financial returns, some governments use them as rural economic development tools (Charnley, 2005). South African forest policies and legislation such as Policy on Participatory Forest Management, provisions within the National Forest Act No 84 of 1998 on community forestry and access and use of state forests, are therefore in agreement with this ideology.

According to Charney (2005), converting state land into state plantations can potentially alter customary rights of locals to use resources on such land in order for them to subsist. This is of particular relevance to the South African state plantations which were established on 'former homeland areas'. The implication is that DAFF would be technically obliged to provide the locals with resources obtainable from the plantation. DAFF's forest policies focus strongly on the use of forestry as a driver of local economic development and livelihoods improvements implying the generation of a worthy relationship between the state and local communities (Andrew *et al.*, 2000). Andrew *et al.* (2000) and Ham (2000b) reported that plantations provided fuelwood for lighting, cooking and heating as well as poles for construction of houses, kraals and fencing to local communities. Additionally, headloads of firewood are collected free of charge while poles and bulk firewood are sold at comparatively cheaper and affordable prices. Ham (2000b) further reported that 3700kgs of firewood per household per year were being collected from the Kentani woodlot in the Eastern Cape while 15000 poles were sold for the year 1998-1999. Similarly practices are undertaken in other countries, for instance in Russia, forest companies supply local communities with firewood and building materials (Matilainen, 2013). Tapp (1996) also reported the sale of timber below market prices to enable affordability in the case of Chinese fir plantations in Jiangxi and Fujian provinces.

Madubansi and Shackleton (2006) reported that in South Africa three quarters of the rural households use fuelwood for energy provision to varying extents. Due to use of wood from plantations as opposed to use of other energy sources such as electricity, household expenditure can be significantly reduced. Together with direct income that can be generated from plantations, such tangible financial benefits will contribute to purchase of other products and services. Such improvement in livelihood aspects was also reported in Bangladesh where small scale plantations were reported to have contributed to better housing, education, medical facilities, purchasing ability, family income, safer drinking water and food provision (Muhamed *et al.*, 2009). Despite the importance of these forms of livelihood improvement, these may not be easily quantifiable. Therefore, an alternative measure would be evaluating the perceptions of the people.

Central to achievement of absolute socio-economic sustainability, is effective consultation and two-way communication between the plantation management and the community thus enabling the locals to influence planning and management decisions (Charnley, 2005; Dare *et al.*, 2012). Owing to the interconnectedness of social and economic aspects, plantations can only be truly socio-economically sustainable if the multiple objectives are brought together in implementation, evaluation and monitoring. The SFM framework for assessment provides an opportunity for such convenience.

2.4 Assessment of sustainable forest management

Khadka and Vacik (2012) reported that modern forest management, particularly community forestry, is characterized by multi-stakeholder involvement and the sustainability concept. In order to provide an adequate measure of sustainability, a set of criteria and indicators must be developed to embrace all forest management values particularly economic, social and ecological. Wolfslehner *et al.* (2005) reported that the need to assess forest management regimes and alternatives with regard to their benefits and sustainability has motivated the use of criteria and indicators (C&I). After the development and commitment to implementation of the “noble” concept of SFM, C&I development have been referred to as the most significant initiative towards successful implementation of the concept (Mendoza *et al.*, 2002; Wijewardana, 2008).

Criteria and Indicators (C&I) approaches have thus been widely adopted in the assessment of SFM. C&I approaches have the ability to effectively describe, conceptualize, evaluate and interpret information related to SFM at national, regional and forest management unit levels hence their use in political initiatives such as the Montreal Process as well as certification initiatives endorsed by the FSC (Wolfslehner *et al.*, 2005). The term C&I is often used to reflect the entire set of principles, criteria, indicators and verifiers. A principle is a basic guideline for managing a forest sustainably (Mendoza *et al.*, 1999; Mendoza & Prabhu, 2000). A criterion is a standard by which an object is assessed adding meaning to a principle without itself being a direct measure of performance (Mendoza *et al.*, 1999; Datta & Chatterjee, 2012). An indicator is a variable of a forest management system used to deduce the status of a criterion and a verifier is

the actual data or information on the ground that enables the assessment of an indicator (Mendoza *et al.*, 1999; Datta & Chatterjee, 2012).

Development of C&I is a vital step towards successful implementation and evaluation of SFM. However, this development has to be coupled with scientifically sound methodology in order to effectively utilize the evaluation tool. For South Africa, the White Paper for Sustainable Forest Development of 1996 committed government to facilitate the process of C&I development and the National Forest Act 84 of 1998 provided for determination and enforcement of SFM C&I by the Committee for Sustainable Forest Management (CSFM) (Scotcher & Everard, 2001). As a result, the CSFM developed a national set and a forest management unit set of principles, criteria and indicators which were published as draft regulations in 2008 (DWAF, 2008). However, development of a locally relevant set of C&I for a specific forest management unit is critical in the effective implementation and evaluation of SFM (Mendoza & Prabhu, 2000). In the top-down approach, C&I identification entails use of a generic set and weighting of indicators by experts whereas the bottom-up approach largely involves local stakeholders in development of indicators with or without an initial set as reference (Mendoza *et al.*, 1999).

2.5 Multi-Criteria Analysis (MCA) methods for SFM assessment

MCA methods are among the approaches used to structure and implement the C&I-based evaluations of SFM (Wolfslehner *et al.*, 2005). MCA methods are most appropriate when there are heterogeneous multiple criteria and different management alternatives to be considered and when there is need for rational, transparent and comprehensive analysis of both qualitative and quantitative data (Wolfslehner *et al.*, 2005). Balana *et al.* (2010) reported that MCA offers an analytical framework that accommodates stakeholders' multiple views, objectives and perceptions thereby providing an appropriate tool for assessing SFM. According to Khadka and Vacik (2012) MCA methodology is a particularly valuable tool in community forestry management since it accommodates individual concerns and opinions of various stakeholders, particularly the user communities.

MCA methods commonly used are ranking, rating, pairwise comparisons and scoring (Mendoza *et al.*, 1999). Since ranking, scoring and rating are based on assignment of scores based on perceptions (Balana *et al.*, 2010), they follow likert scaling principles. However, in indicator assessment, they have frequently been used on a much larger scale of one up to nine unlike the conventional five-point scale.

Ranking involves assignment of a rank to an indicator depending on its perceived importance using predetermined points of scale. The relative weight of a decision element is then calculated on the basis of the ranks assigned to each by stakeholders (Balana *et al.*, 2010). Scoring involves examination and judgment of the current condition of each indicator relative to a perceived target or desired condition of the indicators under each criterion for evaluation of the performance of forest management (Balana *et al.*, 2010). Rating is a form of ordinal ranking where indicators are judged by their relative degree of importance indicated by scores instead of cardinal ranks (Mendoza & Prabhu, 2000). Pairwise comparisons are one-to-one comparisons between the indicators of all the criteria to assess its relative importance and it can also be used to assign relative weights directly to criteria using a nine-point numerical scale (Balana *et al.*, 2010).

Due to their compatibility and complementarity, the C&I approach and MCA methodology have been used in modern SFM evaluation research such as in assessment of sustainability of community forest management in northern Ethiopia (Balana *et al.*, 2010), determination of most appropriate forestry extension model in Iran (Samari *et al.*, 2012), development of C&I for evaluation of SFM in Kyrgyzstan (Jalilova *et al.*, 2012), assessment of community forestry management activities and alternatives in Nepal (Khadka & Vacik, 2012) and in India (Datta & Chatterjee, 2012). In South Africa use of these methodologies was loosely implied in a sustainability evaluation of state indigenous forests in the Eastern Cape using audit report data (Quvile, 2011).

2.6 The link between SFM and alternative management types

The concept of SFM essentially requires the need for long term production and functionality. To achieve that, together with the need for continual improvement, there is always a need to assess the potential of different alternative forest management types for possible prescription of an optimal management model. This aspect is of particular relevance to state plantations in South Africa due to their being scheduled for transfer of ownership and management to community-oriented structures. Such alternatives should therefore be considered in the context of community forestry. Joint forest management, community management, community user group and company-community partnerships are relevant to South Africa because they have been used previously in different contexts.

In order to determine the optimal management regime, assessment of potential sustainability of the alternatives has to be conducted. Outcomes of such evaluation will then provide recommendations to forest management policies and regulations based on the potential to improve economic benefits, social acceptance and participation. Such studies have been conducted by Kijazi and Kant (2011) for assessment of social acceptance of alternative forest management options in Tanzania and by Khadka and Vacik (2012) for community forest management in Nepal. Kijazi and Kant (2011) reported that collaborative management was perceived to guarantee stakeholder satisfaction. Khadka and Vacik (2012) reported that MCA techniques were useful in improving decision-making processes by integrating different stakeholders' preferences, identification of promising compromise management strategies and acknowledgement of the importance of tradeoffs among various alternatives.

2.6.1 Joint forest management

Joint forest management is the management of forests through partnerships between communities and governments. This management regime originated in India in the 1970s following the failure of state control and the need for community participation (Tewari & Isemonger, 1998). The terms Participatory Forest Management and joint

forest management are commonly used interchangeably. Although in South Africa, PFM has strongly been applied to management of natural forests and woodlands. The merits of the management regime warrant evaluation of its potential in achievement of SFM of plantations in the post transfers era. Andrew *et al.* (2000) reported that joint forest management may be useful in management of DAFF plantations because communities lack the capacity to manage on their own whereas the government may find it difficult to totally withdraw itself from management. Total withdraw of management by government will lead to retrenchment of workers and other legal implications (Andrew *et al.*, 2000). The absolute strength of joint forest management lies in facilitation of community participation and acceptance of project, sharing of benefits, liabilities and roles and responsibilities most importantly capital investment and training from government and labor provision by the community.

2.6.2 Company-community partnerships

Mayers (2000) defined company-community partnerships as formal or informal relationships established between companies and local communities (individual or groups) in forest management on expectation of benefits. Andrew *et al.* (2000) referred to this regime as joint ventures/equity sharing partnerships where both parties have a share in the joint company equivalent to their contribution and both parties share ownership, profits and liabilities of the company. Mayers (2000) described the basic characteristics of this regime as partnership whereby the forest company provides technical support, financial support and market whereas the community provides labor and land. In the Eastern Cape Province, such partnerships were proposed and initiated in the late 1990s. In these partnerships, local communities were to contribute their land, labour and/or Settlement and Land Acquisition Grants whereas forest companies would contribute capital, expertise, physical assets, information, networks, processing and marketing the products (Andrew *et al.*, 2000). However, most of these partnerships were unsuccessful e.g. the North East Cape forest/Ugie partnership, Mondi/Umzimkhulu and Sappi/Lambazi partnerships (Andrew *et al.*, 2000).

Despite the failures in the past, company-community partnerships can still be considered as a potentially viable management regime for post-transfer management of state plantations considering the potential they possess. Andrew *et al.* (2000) reported that company-community partnerships opportunities had been created by DAFF's commitment to restructure ownership and management of their plantations as well as the need for forest companies to promote afforestation and secure access to new sources of timber. According to Mayers (2000), these partnerships are beneficial to the community in the following ways; potential higher net returns from land and labor, reliable cash flow due to assured product market, availability of technical and financial support and clear means of participation with the partner forest company.

2.6.3 Community management

Community management is ideally a scenario whereby the community manages the plantation either through an elected management committee or through the traditional leadership similar to the case of "community woodlots" in South Africa (Evans, 1998). Another variant would be management of the forest through a 'community user group' whereby the forest would be managed and owned by a specific group of people from the community. An example of such management type is management of Masakhona woodlot in Limpopo province (Evans, 1998).

Although ownership and management of forests by the community would potentially provide optimum participation by the locals, it is constrained by the capacity of those communities to manage on their own in terms of technical and financial capital and relevant skills. Ham & Theron (1999) reported that the poor condition of community woodlots was caused by lack of knowledge and uncertainty in the mode of participation attributed to the top-down approach during establishment. This management regime can therefore potentially achieve optimal performance in socio-economic sustainability provided that tenurial rights are formally given and disseminated to the communities as well as provision of technical support, financial support and skills development.

2.7 Chapter summary

Literature regarding the potential of plantations to contribute to livelihoods of neighboring communities and how it may also affect them negatively was reviewed. Results of previous studies in South Africa and other countries were also reviewed to establish the extent to which plantations and communities interact in terms of socio-economic aspects. Conventional methods of assessing sustainable forest management were reviewed particularly the utility of criteria and indicators. Different management options were reviewed to highlight their potential in sustainably managing state plantations with regard to socio-economic sustainability.

CHAPTER 3: METHODOLOGY AND STUDY AREA

This chapter provides a general description of the study area in terms of location, biophysical characteristics of the plantations and socio-economic characteristics of the neighboring communities. It also outlines the methods used for selecting the sample households and questionnaire administration as a household survey method. Adoption and use of indicators and verifiers through likert scaling are also presented. The chapter also describes statistical analyses methods used to test for differences in frequencies, summative scores of indicators and potential of alternative management regimes.

3.1 Description of study area

The study was conducted at Gaba and Rossbach plantations which are in Thulamela and Makhado local municipalities, respectively (Fig 3.1). Both study sites fall within Vhembe district of Limpopo province in South Africa. Limpopo Province shares international borders with Mozambique, Zimbabwe and Botswana as well as provincial borders with Mpumalanga, Gauteng and North West provinces. It covers a total area of 125 754 km² with a total population of about five million people. The province consists of five district municipalities subdivided into 25 local municipalities.

Vhembe district is characterized by a dry savannah with a subtropical climate. Temperatures range from 17 to 27°C in summer and 4 to 20°C in winter. The average rainfall is between 400 mm to 600 mm and the soils range from deep red Hutton to Bushveld shales. The topography ranges between hilly, steep and undulating. The altitude is between 600 m and 900 m above mean sea level (M'marete, 2003). In terms of state plantations, the district consists of seven category C and six category B plantations ranging from 34 ha to 1300 ha in size.



Fig 3.1: Map showing location of study sites

3.2 Description of study sites

This study was based on selection of two cases to represent the two main types of state plantations in Vhembe district, category B and category C. The main differences between the two are that the former are more productive, located in accessible areas whereas the latter are less productive and located in marginal areas. Gaba and Rossbach plantations were thus selected as cases to represent category C and category B plantations, respectively.

Since this study was based on perceptions of local communities, the actual study populations were considered as the sub-villages closest to the plantations. This was meant to represent the most conservative form of a “local community” for the plantations according to the definition given by the FSC. According to the FSC (2012), a local

community is a community of any size that is within or close to the management unit such that it may have a significant impact on the economy or the environmental values of the management unit. The economies, rights or environments of such a community can be significantly affected by the management activities or the biophysical aspects of the management unit (FSC, 2012).

In this study, Tshikudini and Magangeni sub-villages were therefore purposively selected as the local communities for Gaba and Rossbach plantations respectively by virtue of being closest to the plantations'. The use of entire sub-villages as study populations was also motivated by the fact that members share the same resources and are a coherent social group that falls under the same traditional authority, the headman. The concept of "local community" in this study therefore carries a particular definition as informed by sustainable forest management concept as well as the logical characterization of a community.

3.2.1 Biophysical characteristics of Gaba plantation

Gaba plantation is located at 22°46'60" South, 30°43'0" East, about 40km from the nearest town of Thohoyandou. Although the total area is 1300 ha, planting/afforestation was stopped citing availability of considerable quantities of protected species and lack of accessibility to the plantation. Consequently, only 300 ha are planted with *Pinus patula*, *Pinus elliotti* and *Eucalyptus grandis*. It is therefore unique due to the abundance of natural/indigenous forest resources.

3.2.2 Biophysical characteristics of Rossbach plantation

Rossbach plantation is located at 23° 11' 52.9" South 30° 03' 33.3" East about 7 km from the nearest town of Elim and about 18km from the N1 highway. The plantation is about 86.4 ha planted with eucalypts i.e. *Eucalyptus grandis*, *Eucalyptus cloeziana*, and *Eucalyptus hybrids* and about 20ha of natural vegetation. There is no significant quantity of indigenous or natural forest in between the plantation and the local community.

3.2.3 Socio-economic profile of Tshikudini community

Tshikudini subvillage consists of about 177 households out of the 1688 households in the entire Gaba village. There are about 55% females and 45% males, estimated per village. The community is characterized by very high levels of unemployment such that the majority of community members depend on social grants provided by the government. Other livelihood strategies are subsistent production of crops, particularly maize, as well as cattle and goat production. The community members have poor toilet facilities since about 16% of the villagers do not have any toilets, 71% have pit toilets without ventilation and only 4% have flush toilets (SSA, 2014). The majority of the villagers have access to communal piped water whereas only 17% have piped water inside their yards or houses and some do not have any access to piped water. Although the village is electrified (95%), 17% of the villagers still reside in traditional housing such as mud huts. Despite the availability of electricity, about 78% of the community members still use firewood for cooking (SSA, 2014).

3.2.4 Socio-economic characteristics of Magangeni community

Magangeni subvillage forms the larger part of Njhakanjhaka village, consisting of about 400 of the 678 households in the entire village. The village comprises of about 47% males and 53% females. With only 35% of those eligible to work being employed, most villagers depend on social grants for household income. The community also improves their livelihoods by engaging in subsistent crop production and rearing of cattle and goats. Housing is satisfactory considering that only very few individuals (2%) reside in traditional structures. However, toilet facilities and access to clean water is poor. About 44% of the villagers do not have access to piped water and 58% have pit toilets without ventilation (SSA, 2014). Despite the village being electrified (93%), about 38% of the villagers still use firewood for cooking (SSA, 2014).

3.3 Sampling design

Simple random sampling was used to select respondent households for the study. Random sampling is the basic probability sampling design that ensures that every sampling unit of the population has an equal chance of being selected thus eliminating bias and facilitating representativeness (Nachmias & Frankfort-Nachmias, 1992; Babbie & Mouton, 2001; Monnette *et al.*, 2014).

The basis of simple random sampling is identification, acquisition or creation of a sampling frame (Sarantakos, 1998; Monnette *et al.*, 2014), in this case, lists of households in the local communities. A list of households in Tshikudini was readily available and acquired from the headman. However for Magangeni, neither such list nor the number of households was available. Listing and enumeration of households and addresses in-field have been recommended for construction of sampling frames for small scale household surveys because of inaccuracies associated with use of pre-existing lists (Devereux, 1992; Bailey, 1994). Such inaccuracies include duplication and/or omission of units due to illegal inhabitation, emigration among others (Devereux, 1992; Bailey, 1994).

According to Barber *et al.* (1996), numbering of households may be done to facilitate identification and locating of sample units within either a pre-existing sampling frame or one that is constructed for the study. Construction of sampling frame for Magangeni was therefore conducted so as to produce the list of households, the total number of households and the location of each household. Although Magangeni is in a rural setting, there is a well-defined grid of roads. The sampling frame was therefore developed by driving and walking through every road/street indicating the location of households. The location of each household was done by assigning a unique reference number to each household based on the road/street and position they were located in relation to other roads and other households. The unique reference number therefore facilitated ease of identification and locating the selected sample households. A total of 407 households were identified and coded. The lottery method (Sarantakos, 1998) was then used to randomly select the sample households.

At Tshikudini, 50 out of the 177 households were selected whereas 102 out of 407 households were selected at Magangeni, resulting in sampling intensities of 28 % and 25 % respectively. The higher sampling intensity for Tshikudini was meant to increase the sample size so that minimum expected cell frequencies would suffice statistical analyses requirements. According to Sarantakos (1998), sample size and representativeness differs with homogeneity of population, type of research and availability of resources, with most qualitative researchers being content with minimum sample sizes of 30-100. Due to the confinement of the households in small geographical constructs and common use of the plantations in their vicinity, sample sizes of 50 and 102 were deemed representative enough to answer the research questions and objectives.

3.4 Focus group discussion with DAFF officials

A focus group discussion was conducted with three DAFF officials responsible for managing the plantations. The focus group discussion was meant to collect information on functionality of the plantations and brainstorm on relevant socio-economic issues in order to adequately and accurately define indicators (Sarantakos 1998). The issues and information sought were; mechanisms used for consultation with local communities, availing and prioritization of local communities to employment and income generating activities, access and use arrangements and provision of plantation products.

3.5 Household Surveys

Administration of a structured questionnaire by the researcher and a research assistant, who assisted in interpretation of the questions, was used for data collection (Appendix 1). The use of this method was motivated by the recommendation made by Babbie and Mouton (2001) that low literacy levels in South Africa can potentially compromise responses if self-administered questionnaires are used. The questionnaire covered three aspects. Firstly, questions relating to general socio-economic profile of the respondent. Secondly, questions relating to participation of the local communities

through use of products, forest protection and income-generating activities. Thirdly, verifiers for socio-economic sustainability of current management followed by indicators for assessing potential performance of alternative management regimes.

According to Datta and Chatterjee (2012), an indicator is a variable of a forest management system used to deduce the status of sustainability without itself being a measure whereas a verifier is the actual data or information on the ground that enables the assessment of an indicator. Verifiers were therefore used for assessment of the actual performance of current management by DAFF whereas indicators were deemed sufficient and appropriate for judging potential of alternative management regimes. The alternative management regimes whose potential was assessed were community management, community user group, joint forest management and company-community-partnership.

For socio-economic profile and participation, close-ended questions were used whereby respondents were offered a set of answers to choose from. These questions were preferred because of their attributes of absence of the need for the interviewer to take notes as well as their ease to ask, respond and analyze (Nachmias & Frankfort-Nachmias, 1992).

Likert scaling was used through conveniently structured verifiers and indicators to acquire perceptions of the respondents. The Likert scale is one of the most popular approaches to scaling consisting of a series of statements each followed by +/-five response alternatives to measure peoples' attitudes (Nachmias & Frankfort-Nachmias, 1992; Monnette *et al.*, 2014). Sarantakos (1998) recommended the use of likert scales by emphasizing their ability to cover all significant aspects of a concept, high precision, reliability, simplicity and high comparability. In this study, the likert scale items were the verifiers and indicators of socio-economic sustainability. The respondents therefore judged the performance of these verifiers and indicators through responding to a response format structured as follows; 1, strongly disagree; 2, disagree; 3, agree and 4, strongly agree.

As recommended by Monnette *et al.* (2014), one important requirement in development of likert scales is selection of scale items and testing for reliability. SFM assessment principles also emphasize the need for adoption of locally relevant C&Is in this case, verifiers and indicators.

Identification of socio-economic C&I relevant to the study area and context were conducted using the C&I development bottom-up approach guidelines (Mendoza *et al.*, 1999). An initial preliminary set of C&I was developed by the researcher using the DAFF forest management unit draft C&I set (DWAF, 2008), the CIFOR C&I generic template (CIFOR, 1999), FSC principles and criteria (FSC, 2012) and ITTO revised criteria and indicators for sustainable management of tropical forests (ITTO, 2005).

Reliability test was then conducted on the remaining likert scale items, the verifiers for assessment of current management and the indicators for alternative management regimes. The concept of reliability testing is done through bivariate correlations to identify and exclude items which are internally inconsistent (Nachmias & Frankfort-Nachmias, 1992; Sarantakos, 1998; Monnette *et al.*, 2014). Cronbach's Alpha was then used to test for reliability with an alpha value of 0.70 being accepted (Nachmias & Frankfort-Nachmias, 1992). All verifiers and indicators were retained. The final C&I sets for both study areas were composed of six indicators and 32 verifiers (See Section C of Appendix 1).

According to Babbie and Mouton (2001) the multilingual nature of South Africa and the low literacy levels requires that respondents be interviewed in their most comfortable language. Questionnaires were thus translated from English into Xitsonga and Tshivenda which were the vernacular languages for the local communities. In order to achieve lexical equivalence, the double blind method or back translation (Babbie & Mouton, 2001) was used for the translation process. After the initial translation, the questionnaires were translated back into English by different translators from the previous ones and then checked for inconsistencies against the original version. Semantic errors were then identified and corrected. Ambiguous questions were restructured after pre-testing the questionnaires as recommended by Babbie and Mouton (2001). Instructions were also added onto the questionnaire for respondents not

to be asked contingency questions which are not applicable to them due to their responses to the preceding filter questions (Nachmias & Frankfort-Nachmias, 1992; Babbie & Mouton, 2001).

3.6 Data Analysis

3.6.1 Derivation of indicator performance scores

Likert scale falls under the category of summated rating scales whereby individual likert items are summed up to produce a total score for each subject per respondent (Desselle, 2005; Martinez-Martin, 2010; Monnette *et al.*, 2014). Indicator scores were thus calculated by summing up the responses from all verifiers of each indicator. According to Martinez-Martin (2010), total scores can then be standardized into a percentage or mean value. However, some authors asserted that total scores from likert scales are ordinal in nature and therefore statistical parameters such as mean, standard deviation as well as parametric tests are inappropriate (Jamieson, 2004; Gardner & Martin, 2007; Monnette *et al.*, 2014).

The final indicator score was therefore presented as a percentage on the basis of highest possible performance score (See equation 1).

$$S_i = \frac{\sum_{i=1}^n v_i}{pn_i} \dots\dots\dots (1)$$

Where S_i is the total performance score of indicator i in percent,
 v_i is likert score of verifiers of indicator i ,
 n_i is total number of verifiers for indicator i ,
 p is the highest possible score of the likert response format.

3.6.2 Derivation of total scores of alternative management regimes

Cronbach's Alpha test which was conducted confirmed the internal consistency of the indicators which were used for assessing the potential of alternative management regimes towards achieving socio-economic sustainability. Following the summated rating scales concept (Desselle, 2005; Martinez-Martin, 2010; Monnette *et al.*, 2014), overall socio-economic sustainability would thus be the subject that is assessed through

the relevant indicators. The likert responses for each indicator were therefore summed up to compute total scores for each management regime per respondent.

3.6.3 Statistical analyses

Both descriptive and inferential statistics were used to analyze the data. Descriptive statistics, particularly frequencies and measures of central tendency allows for reduction of data or observations to meaningful forms (Cramer, 1998). Frequencies and modes were used for summarizing the nominal variables.

Inferential statistics allows for developing explanations for observations made (Cramer, 1998). The Chi square goodness of fit test was used to test for differences between observed and expected frequencies (Nachmias & Frankfort-Nachmias, 1992; Bless & Kathuria, 1993; Cramer, 1998) among categories of some of the nominal variables for participation of communities in plantation activities. Pearson's Chi square test of association was used to test for association between participation variables and communities using cross-tabulation (Cramer 1998). Where the expected frequencies were too small, some response categories were combined. Mann Whitney U test was used to test for differences (Bless & Kathuria, 1993; Cramer, 1998) between the two communities regarding total indicator scores as well as total scores of alternative management regimes.

Friedman's test was used to test for differences among the potential performance scores of alternative management regimes (Rohatgi, 1984; Mattson, 1986). It was also used to rank the respondents' scores for the alternative management regimes thereby determining the regime with the highest potential. Such ranking analysis was adopted from Fakayode *et al.* (2012) who used Kruskal-Wallis ANOVA by ranks to assess farmers' perceptions on major sources of risk in fruit and vegetable farming while simultaneously ranking the sources. The Friedman's test equation for estimating the ranks for the scores of the four alternative management regimes is shown in equation 2.

$$F = \frac{12}{bk(k+1)} \sum_{j=1}^k R_j^2 - 3b(k+1) \dots \dots \dots (2)$$

Where b is the number of scores in a group and k is the number of groups (Rohatgi, 1984; Mattson, 1986). Statistical tests were conducted using SPSS version 22 using a significance level of 0.05.

3.7 Chapter summary

The methodology presented in this chapter provided a general description of the study area, biophysical characteristics of the plantations and socio-economic characteristics of the surrounding communities. The chapter also outlined the construction of a sampling frame, random selection of sample households, questionnaire development and administration. Methods for calculation of total indicator scores and statistical analyses of the data were also presented.

CHAPTER 4: RESULTS

This chapter presents results on the general demographic characteristics of the communities' gender, age, ethnic grouping, education level, employment status and household income. Participation in forestry activities comprises of utilization of plantation products, assistance in forest protection and involvement in income generation activities. Results on current socio-economic sustainability are also presented followed by those on potential of alternative management regimes.

4.1 Demographic information of respondents

In Tshikudini community, 22% were male while 78% were female. The sex ratio was almost the same in Magangeni community where 24.5% males and 75.5% females. For both study sites the majority of respondents were those between the ages of 26-50 years, followed by those above the age of 50 years and the least were those between 18-25 years (Fig 4.1).

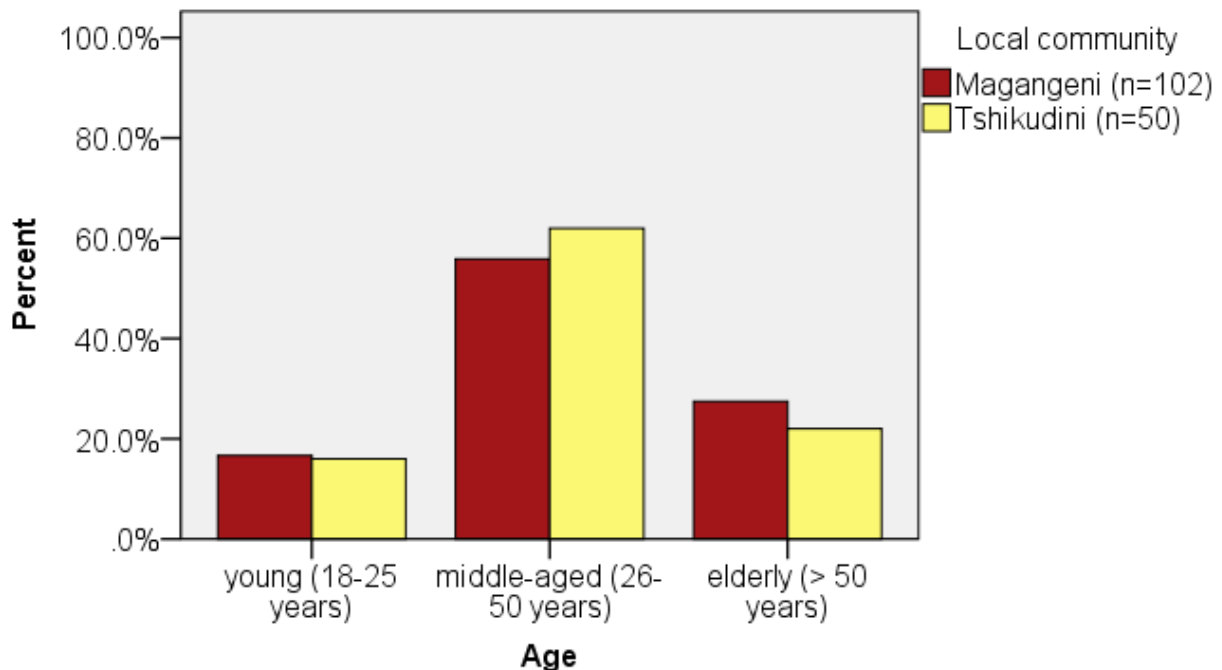


Fig 4.1: Age categories of Tshikudini and Magangeni communities

All the respondents for Tshikudini community were of the Tshivenda tribe whereas Magangeni community consisted of 80.4% Xitsonga and 19.6% Tshivenda. Over 50% of both communities had attended secondary school followed by between 20-30% with primary education. Tertiary education was attended by the least number of respondents accounting for only 6% of both Tshikudini and Magangeni communities (Fig 4.2).

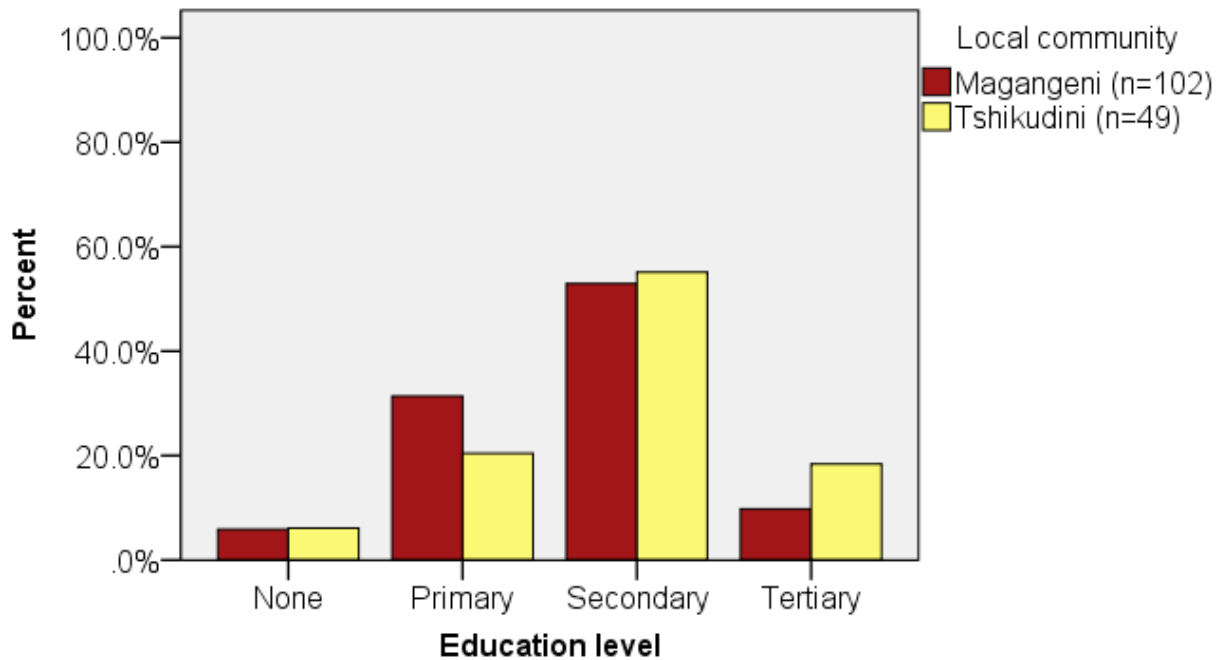


Fig 4.2: Education levels of Tshikudini and Magangeni communities

High unemployment levels were evident for both communities whereby 92% of the respondents in Tshikudini and 82.2% in Magangeni were unemployed. A majority of the respondents in Tshikudini had total household monthly incomes lower than R452 (64.6%) whereas in Magangeni, most respondents (46.9%) had household incomes between R453-R2000 (Fig 4.3).

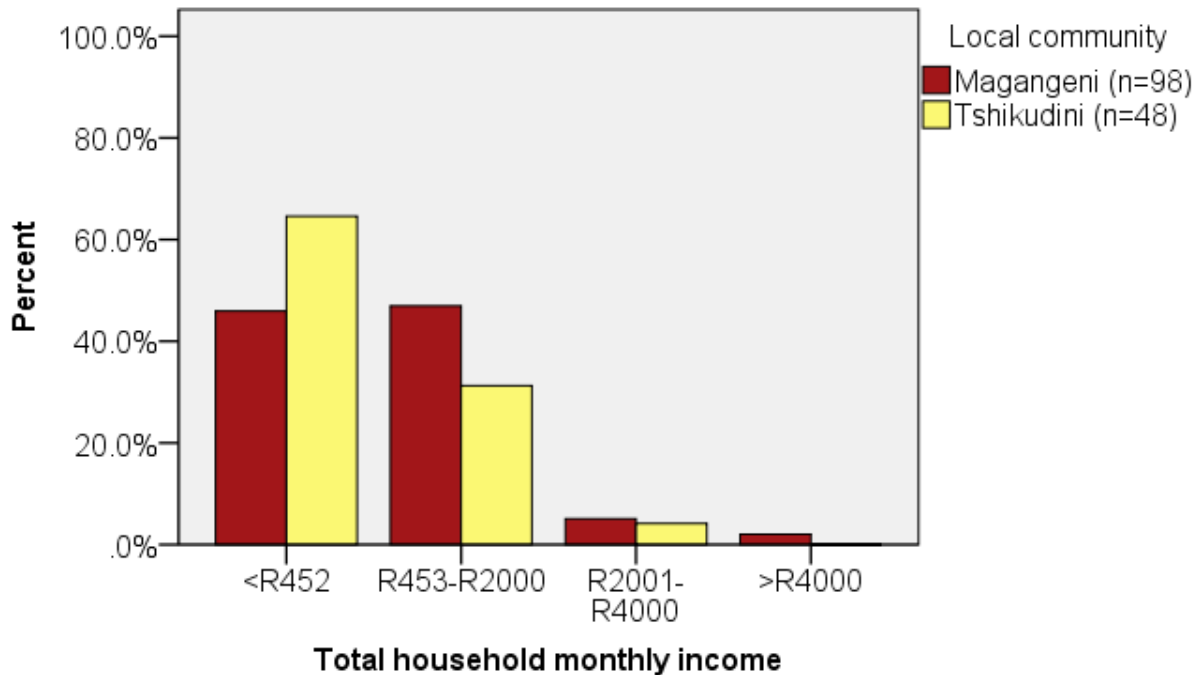


Fig 4.3: Total household monthly income of Tshikudini and Magangeni communities

4.2 Plantation management and other associated activities

According to DAFF officials, category B and C plantations under the management of DAFF are mostly situated in the impoverished rural areas where they thus form a source of wood products and income in line with government's policies. Mechanisms are therefore set in place to facilitate effective community engagement. The plantations provide firewood and poles to local communities through collection of headloads for free and buying larger quantities of firewood, poles, among other products at low prices which are set by the national treasury. Potential source of income is also offered to the locals by providing employment and contract/business opportunities. The methods mostly used for information dissemination are; through meetings at schools, notices in public places, notifying the traditional authorities, among others. The major challenges faced in the plantations are illegal harvesting and fire incidences. However, plantation management receives significant assistance from the local communities. Poor accessibility to the plantations in terms of poor condition of roads and distance from the

villages and towns is the main constraint to utilization of the plantations by the communities.

4.3 Participation of local communities in plantation activities

Questions relating to participation in plantation related activities were only directed to respondents who were aware of functionality of plantations within their respective villages, 96.0% at Tshikudini and 75.5% at Magangeni.

4.3.1 Participation of local communities in protection of the plantations

The majority of respondents in both communities actively participated in protecting the plantation forest, 91.7% for Tshikudini and 84% in Magangeni. A Chi-square test showed that the differences in frequencies of participants compared to non-participants were significant for both Tshikudini ($\chi^2=33.333$, $p=0.000$) and Magangeni communities ($\chi^2=34.680$, $p=0.000$). The most common forest protection activities were fire control for Magangeni (77.8%) and reporting fire incidences for Tshikudini community (72.7%). However, reporting of illegal activities was undertaken by the least number of respondents at Tshikudini whereas at Magangeni, reporting fire incidences was the least practiced activity (Table 4.1).

Table 4.1: Participation in plantation forest protection by Tshikudini and Magangeni communities

Activity	Frequency (% respondents)	
	Magangeni (n=75)	Tshikudini (n=47)
Fire control	77.8	36.4
Reporting fire incidences	9.5	72.7
Reporting illegal harvesting	12.7	4.5
Fire control and reporting fire incidences	0.0	11.4
Reporting fire incidences and illegal harvesting	0.0	2.3

4.3.2 Use of firewood and poles

More than 97% of the respondents in both Tshikudini and Magangeni communities used firewood for their cooking. A Chi-square test showed that the differences in frequencies of users compared to non-users were significant for both Tshikudini ($\chi^2=44.083$, $p=0.000$) and Magangeni communities ($\chi^2=73.052$, $p=0.000$). Most respondents for both communities (59-65%) indicated that using firewood was meant to reduce household expenditure. Other reasons given were preference of wood and unavailability of electricity (Fig 4.4). The difference in the reasons cited were significant for both the Tshikudini community ($\chi^2=21.043$, $p=0.000$) and Magangeni community ($\chi^2=28.880$, $p=0.000$).

All the respondents at Tshikudini used poles for either fencing (47.9%) or construction of kraals and houses (52.1%). Similarly, the majority (92.1%) of the respondents in Magangeni community used poles for fencing (63.2%) and construction of houses and kraals (29.0%). A Chi-square test showed that differences in frequencies of uses of poles were significant for Magangeni community only ($\chi^2=35.474$, $p=0.000$).

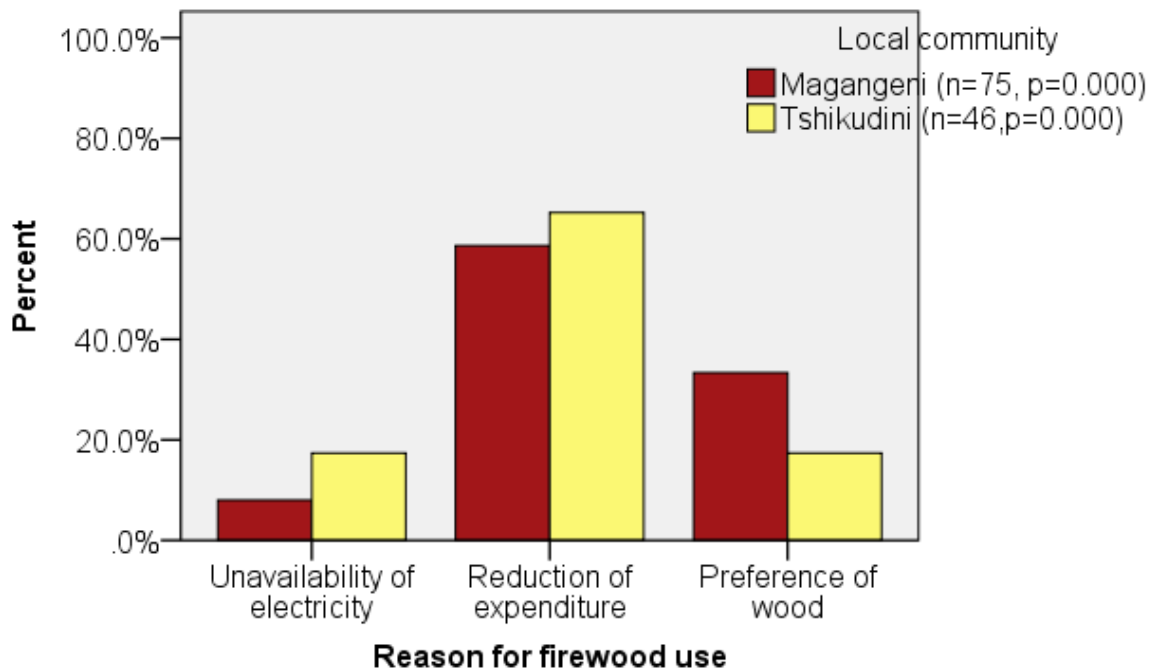


Fig 4.4: Reasons for use of firewood for Tshikudini and Magangeni communities

4.3.3 Collection of firewood from plantations

The majority of the Tshikudini community collected their firewood from the natural forest whereas only 13.0% collected their firewood from the plantation (Fig 4.5). At Magangeni, 56.0% collected their firewood from the plantation compared to 41.0% who collected from the natural forest and 2.7% from formal shops and informal traders. There were highly significant differences among the three different sources of firewood used by both Tshikudini community ($\chi^2=55.609$, $p=0.000$) and Magangeni community ($\chi^2=34.160$, $p=0.000$). There was a significant association between local community and source of firewood used ($\chi^2=21.984$, $p=0.000$).

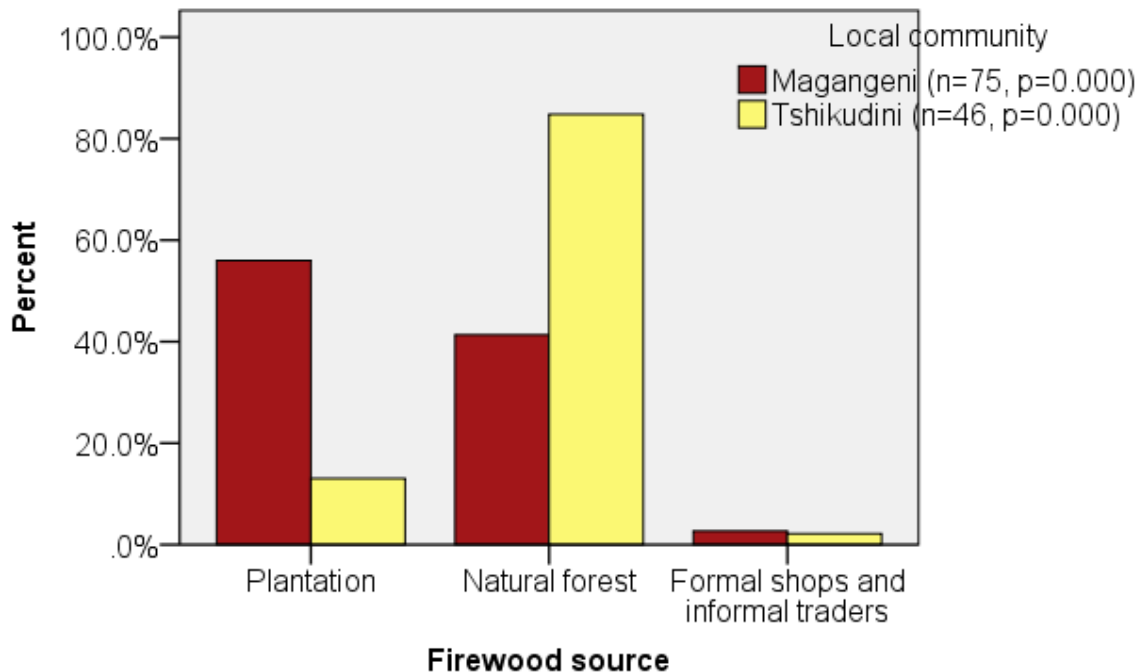


Fig 4.5: Sources of firewood for Tshikudini and Magangeni communities

Refusal of permission was cited as the main reason for not collecting firewood from the plantations by the majority of respondents from both Tshikudini (77.3%) and Magangeni communities (51.5%). The other reasons cited were poor service delivery, preference of indigenous species, lack of preference for gum trees and availability of enough wood in the natural forest (Table 4.2). The difference in the reasons cited were significant for both the Tshikudini community ($\chi^2=91.227$, $p=0.000$) and Magangeni community ($\chi^2=23.121$, $p=0.000$).

Table 4.2: Reasons for not collecting firewood from the plantation for Tshikudini and Magangeni communities

Reason	Frequency (% response)	
	Magangeni (n=33, p=0.000)	Tshikudini (n=44, p=0.000)
Poor service delivery in plantation	6.1	2.3
Preference of indigenous species in natural forest	39.4	11.4
Lack of preference for gum trees	3.0	4.5
Refusal of permission	51.5	77.3
Availability of enough wood in natural forest	0.0	4.3

4.3.4 Collection of poles from plantations

The majority of respondents in Tshikudini community (46.8%) collected poles for household use from the natural forest whereas only 31.9% bought from the plantation (Fig 4.6).

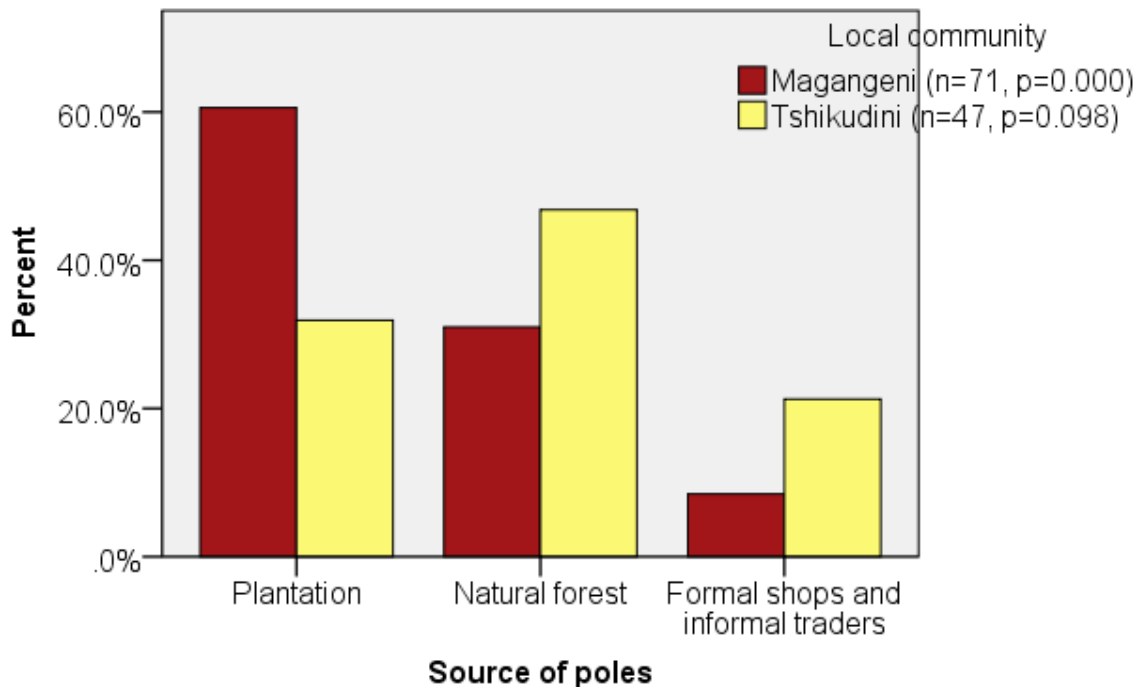


Fig 4.6: Sources of poles for Tshikudini and Magangeni communities

However, the majority of respondents in Magangeni community (60.6%) bought their poles from the plantation whereas only 31.0% collected from the natural forest. Differences in source of poles were thus only significant for the Magangeni community ($\chi^2 = 29.099$, $p=0.000$). There was a significant association between the local community and source of poles used ($\chi^2 = 10.052$, $p=0.000$).

Lack of alternatives was cited as the main reason for buying poles from the plantations by the majority of respondents from both Tshikudini (73.7%) and Magangeni communities (66.0%). The lack of alternatives was in terms of shortage of funds to purchase the poles from other sources, scarcity of wood in the natural forest, distance of natural forest or formal shops and informal traders from the communities (Fig 4.7). Preference for gum trees in the plantations and prevention of deforestation of indigenous forests were the other reasons cited. A Chi-square test showed that the variability in reasons cited was significant for both Tshikudini community ($\chi^2=28.828$, $p=0.000$) and Magangeni community ($\chi^2=31.057$, $p=0.000$).

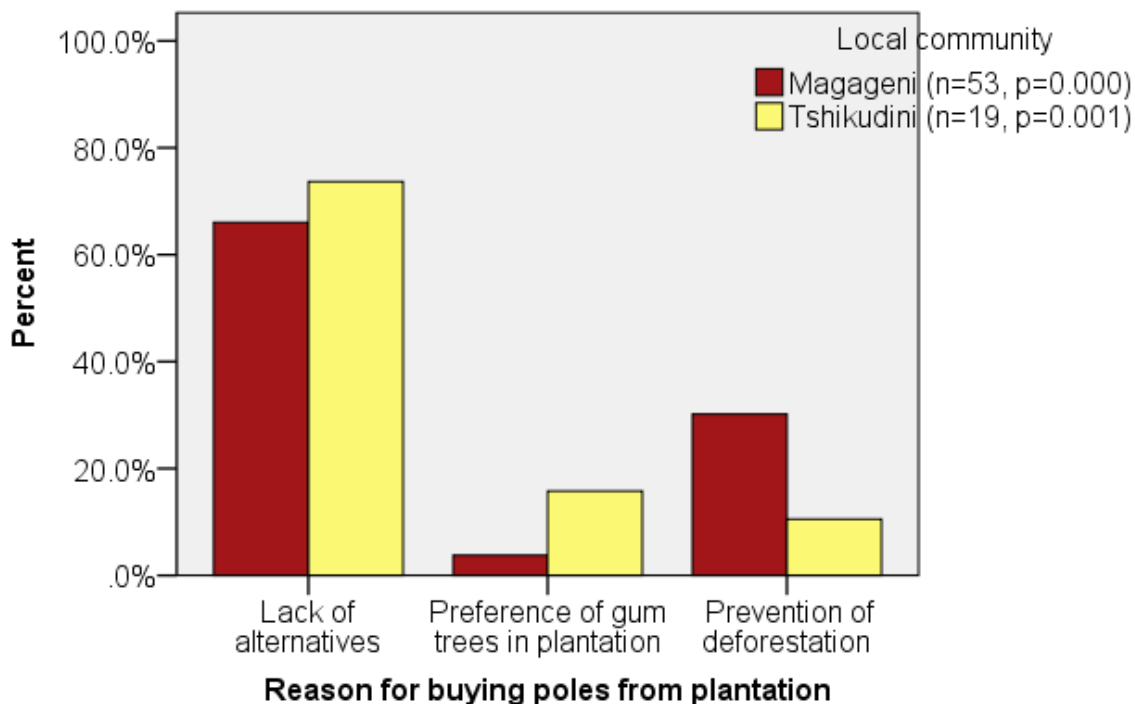


Fig 4.7: Reasons for buying poles from plantations for Tshikudini and Magangeni communities

Refusal of permission was indicated as the main reason for not purchasing poles from the plantation by the majority of the respondents in Tshikudini community (48.3%) whereas lack of affordability was cited by 84% of the respondents at Magangeni. The other reasons indicated were poor service delivery in the plantation, distance from plantation to the communities, preference for indigenous species and preference for treated poles (Table 4.3). A Chi-square test showed that the variability in reasons cited was significant for both Tshikudini community ($\chi^2=14.000$, $p=0.001$) and Magangeni community ($\chi^2=29.120$, $p=0.000$).

Table 4.3: Reasons for not buying poles from the plantations for Tshikudini and Magangeni communities

Reason	Frequency (% response)	
	Magangeni (n=25, p=0.000)	Tshikudini (n=29, p=0.000)
Plantation is too far in relation to natural forest	4.0	6.9
Poor service delivery in plantation	0.0	6.9
Preference of indigenous species or treated poles	12.0	6.9
Refusal of permission	0.0	48.3
Lack of affordability	84.0	31.0

4.3.5 Collection of thatch grass and medicinal plants from plantations

The majority of respondents in Tshikudini community (89.9%) collected thatch grass from the plantation whereas only 28.0% collected at Magangeni. A Chi-square test showed that the differences in proportions of respondents who collected thatch grass from plantations compared to those that did not, were significant for both Tshikudini ($\chi^2=17.894$, $p=0.000$) and Magangeni communities ($\chi^2=14.520$, $p=0.000$). There was a significant association between a particular local community and collection of thatch grass from the plantation ($\chi^2=32.317$, $p=0.000$).

Half of the respondents in Tshikudini community collected medicinal plants from the plantation. Similarly, 56.2% of respondents in Magangeni community also collected

medicinal plants from the plantation. A Chi-square test showed that the difference in proportions of respondents who collected medicinal plants from the plantation compared to those that did not, was significant for only Tshikudini community ($\chi^2=1.000$, $p=0.000$).

4.3.6 Cash savings as a result of utilization of plantation products

At Tshikudini the majority of the respondents (82.9%) saved monthly income of less than R100 by utilization of plantation poles, firewood, thatch grass or medicinal plants whereas at Magangeni, 48.6% saved between R100-R200 per month (Fig 4.8). The highest category of cash savings was R201-R300 at Tshikudini (2.4%) whereas 2.9% of Magangeni community saved amounts greater than R300. A Chi-square test showed that there were significant differences in categories of amount of cash saved in both Tshikudini ($\chi^2=46.600$, $p=0.000$) and Magangeni communities ($\chi^2=40.743$, $p=0.000$). There was a significant association between a particular local community and the amount of cash saved by respondents ($\chi^2=20.549$, $p=0.000$).

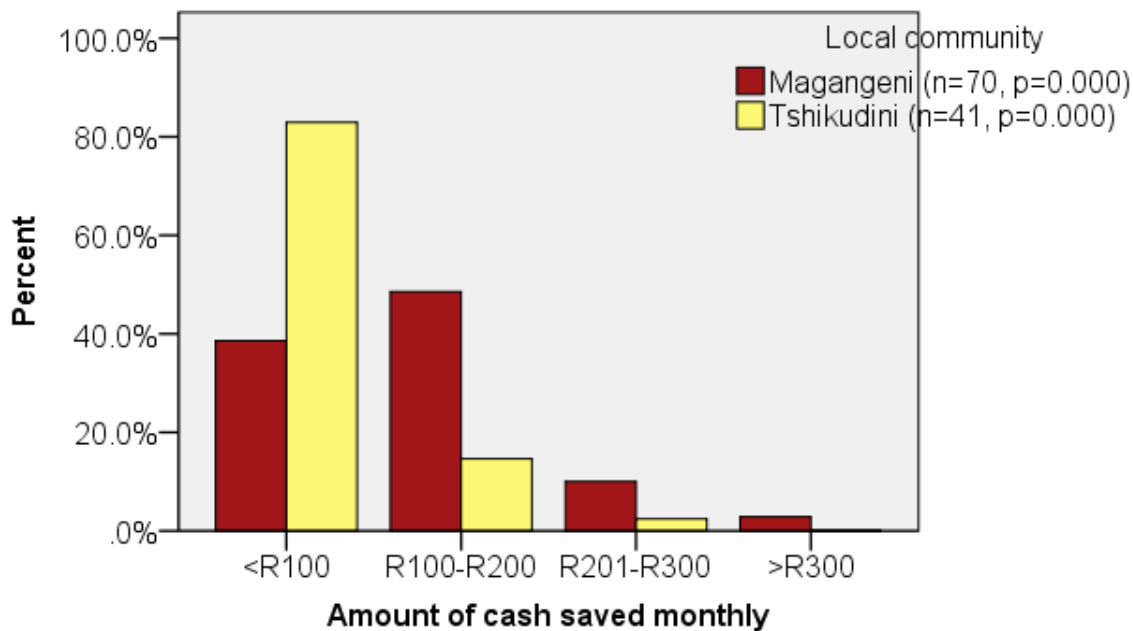


Fig 4.8: Amount of cash saved monthly through utilisation of plantation products for Tshikudini and Magangeni communities

4.3.7 Participation in income-generating activities

Participation in income-generating activities was very low (<10%) in both communities. A Chi-square test revealed that the differences in frequencies of participants compared to non-participants were significant for both Tshikudini ($\chi^2=43.085$, $p=0.000$) and Magangeni communities ($\chi^2=51.946$, $p=0.000$). The majority of respondents in both communities actively participated in protecting the plantation forest, 91.7% for Tshikudini and 84% in Magangeni. At Tshikudini, 2.1% of the participants were plantation employees whereas at Magangeni, 2.7% were plantation employees and 5.6% were firewood/pole retailers, honey producers, thatch grass and medicinal plant retailers (Table 4.4).

Table 4.4: Participation in plantation-related income generating activities for Tshikudini and Magangeni communities

Activity	Frequency (% respondents)	
	Magangeni (n=74)	Tshikudini (n=47)
DAFF plantation employee	2.7	2.1
Firewood/pole retail	1.4	0.0
Honey production	1.4	0.0
Thatch grass retail	1.4	0.0
Medicinal plant retail	1.4	0.0

4.4 Current socio-economic sustainability and potential of alternative management regimes

4.4.1 Indicator 1: Provision of multiple resources and improvement of local livelihoods

The majority (75.4%) of respondents in the Magangeni community felt that a diverse range of products were being obtained from Rossbach plantation. In contrast, 93.5% of the respondents in Tshikudini community did not perceive Gaba plantation to be offering them multiple products (Table 4.5). The majority of respondents in Tshikudini community indicated that products from the plantation were insufficient to meet their household needs (78.3%) or provide raw materials for income-generating activities (80.5%). In addition, the respondents felt that products from the plantation did not make

significant contribution to their household incomes (82.6%) and resultant livelihoods improvement (56.5%). In contrast, the respondents in Magangeni community confirmed the sufficiency of plantation products for household use (91.8%) and income generating activities (85.2%) thus contributing to their household income (57.4%) and livelihoods improvement (85.2%).

Using equation 1, the perceptions of respondents in Tshikudini and Magangeni communities on indicator 1.1 resulted in an overall performance score of 36.9% for Gaba plantation and 62.0% for Rossbach plantation, respectively. Mann Whitney U test showed that the difference in the performance of indicator 1.1 was significant ($U = 226.000, p=0.000$).

Table 4.5: Multiple resource use and contribution of plantations to livelihoods of Tshikudini and Magangeni communities

Verifier	LC	Response (%)				Mode*
		SD	D	A	SA	
Multiple products are obtained from the plantation.	Magangeni	13.1	11.5	36.1	39.3	4
	Tshikudini	56.5	37.0	6.5	0.0	1
Plantation products suffice household needs.	Magangeni	1.6	6.6	70.5	21.3	3
	Tshikudini	28.3	50.0	21.7	0.0	2
Plantation products suffice needs for income-generation.	Magangeni	1.6	13.1	63.9	21.3	3
	Tshikudini	45.7	34.8	19.6	0.0	1
The plantation and its products contribute to household income.	Magangeni	13.1	29.5	21.3	36.1	4
	Tshikudini	43.5	39.1	17.4	0.0	1
The plantation and its products improve livelihoods.	Magangeni	0.0	14.8	18.0	67.2	4
	Tshikudini	17.4	39.1	39.1	4.3	2

LC=local community, SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

The majority of respondents in both Tshikudini and Magangeni communities (>80%) agreed with the view that joint forest management has the highest potential in ensuring that they can obtain a diverse range of products from the plantation (Table 4.6). For Tshikudini, community management was perceived as having the least potential by the majority (70.7%) whereas for Magangeni, managing the plantation through a community user group had the least potential (72.5%). However, the majority of Tshikudini

residents perceived community user group management (68.3%) and company community partnership (51.2%) as having considerable potential in provision of multiple products and improvement of their livelihoods.

Table 4.6: Potential of alternative management regimes to provide multiple resources and improve livelihoods of Tshikudini and Magangeni communities

Alternative management regime	Local community	Response (%)				Mode*
		SD	D	A	SA	
Community management	Magangeni	5.9	41.2	35.3	17.7	2
	Tshikudini	7.3	63.4	29.3	0.0	2
Community user group	Magangeni	11.8	60.8	17.7	9.8	2
	Tshikudini	0.0	31.7	68.3	0.0	3
Joint forest management	Magangeni	0.0	1.7	31.4	66.7	4
	Tshikudini	0.0	14.6	56.1	26.8	3
Company-community partnership	Magangeni	4.0	47.1	33.3	15.7	2
	Tshikudini	7.3	36.6	51.2	4.9	3

SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

4.4.2 Indicator 2: Prioritization of communities to business and employment opportunities

The majority of respondents in both Tshikudini and Magangeni communities confirmed that they are indeed informed of employment opportunities (80-92%) and plantation related business ventures (70-90%). They also felt that their communities were given priority for employment opportunities (60-90%) and 70-85% for plantation related business ventures (Table 4.7).

Using equation 1, the perceptions of respondents in Tshikudini and Magangeni communities on indicator 1.2 resulted in an overall performance score of 59.0% for Gaba plantation and 57.5% for Rossbach, respectively.

Table 4.7: Prioritization of business and employment opportunities to Tshikudini and Magangeni communities

Verifier	LC	Response (%)				
		SD	D	A	SA	Mode*
Local people are informed of contracts and other income-generating opportunities in the plantation.	Magangeni	19.7	9.8	34.4	36.1	4
	Tshikudini	0.0	13.0	76.1	10.9	3
Local community members are given preference for plantation-related business opportunities.	Magangeni	14.8	14.8	41.0	29.5	3
	Tshikudini	0.0	15.2	82.6	2.2	3
Local people are informed of employment opportunities.	Magangeni	11.5	8.2	49.2	31.1	3
	Tshikudini	0.0	8.7	82.6	8.7	3
Local people are given preference to employment opportunities.	Magangeni	19.7	16.4	31.1	32.8	4
	Tshikudini	0.0	10.9	82.6	6.5	3

LC= local community, SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

The majority (80-96%) of respondents from both communities (80-96%) expected joint forest management regime to best facilitate the prioritization of locals to business and employment opportunities (Table 4.8). Community management was reported to have the least potential by the majority of Tshikudini residents (68.3%) whereas at Magangeni, most respondents (78.4%) did not perceive any for community user group.

Table 4.8: Potential of alternative management regimes in prioritization of local people to business and employment opportunities for Tshikudini and Magangeni communities

Alternative management regime	Local community	Response (%)				Mode*
		SD	D	A	SA	
Community management	Magangeni	21.6	41.2	25.5	11.8	2
	Tshikudini	9.8	58.5	31.7	0.0	2
Community user group	Magangeni	29.4	49.0	13.7	7.8	2
	Tshikudini	0.0	34.2	65.9	0.0	3
Joint forest management	Magangeni	2.0	2.0	43.1	52.9	4
	Tshikudini	0.0	17.1	63.4	19.5	3
Company-community partnership	Magangeni	13.7	37.3	33.3	15.7	2
	Tshikudini	7.3	39.0	51.2	2.4	3

SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

4.4.3 Indicator 3: Facilitation of local communities' participation

The majority of respondents in both Tshikudini and Magangeni communities agreed with all statements verifying the facilitation of their participation in plantation related issues through effective consultation (Table 4.9). The respondents in Magangeni community mostly (81.9%) acknowledged the existence of effective communication and information dissemination between their community and plantation management. All the respondents at Tshikudini felt that they were effectively consulted regarding assistance in protecting the plantation. In contrast, 27.8% of the respondents at Magangeni disagreed.

Using equation 1, the perceptions of respondents in Tshikudini and Magangeni communities on indicator 2.1 resulted in an overall performance score of 59.5% for Gaba plantation and 57.9% for Rossbach, respectively.

Table: 4.9: Facilitation of local communities' participation for Tshikudini and Magangeni communities

Verifier	LC	Response (%)				Mode*
		SD	D	A	SA	
Local communities are consulted regarding decisions on plantation management issues.	Magangeni	6.6	21.3	49.2	23.0	3
	Tshikudini	0.0	13.0	78.3	8.7	3
Local communities are consulted regarding access and use of plantation products.	Magangeni	6.6	27.9	44.3	21.3	3
	Tshikudini	0.0	15.2	78.3	6.5	3
Local communities are consulted regarding protection of the plantation.	Magangeni	9.8	18.0	47.5	24.6	3
	Tshikudini	0.0	0.0	89.1	10.9	3
Local communities are consulted regarding employment and entrepreneurial opportunities in the plantation.	Magangeni	8.2	11.5	55.7	24.6	3
	Tshikudini	0.0	4.3	87.0	8.7	3
There is an effective communication and information dissemination mechanism between plantation management and local communities.	Magangeni	13.1	4.9	55.7	26.2	3
	Tshikudini	4.3	15.2	71.7	8.7	3

LC= local community, SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

Both communities confided in joint forest management in facilitation of their participation in plantation management (Table 4.10). At Tshikudini, 56.1% thought that community user group would also be able to facilitate participation, which was in sharp contrast with the Magangeni community (77%) who perceived community user group as having the least potential.

Table 4.10: Potential of alternative management regimes in facilitation of local communities' participation for Tshikudini and Magangeni communities

Alternative management regime	Local community	Response (%)				Mode*
		SD	D	A	SA	
Community management	Magangeni	17.7	41.2	29.4	11.8	2
	Tshikudini	12.2	53.7	34.2	0.0	2
Community user group	Magangeni	25.5	51.0	15.7	7.8	2
	Tshikudini	2.4	41.5	56.1	0.0	3
Joint forest management	Magangeni	2.0	5.9	43.1	49	4
	Tshikudini	0.0	22.0	63.4	14.6	3
Company-community partnership	Magangeni	15.7	41.2	25.5	17.7	2
	Tshikudini	9.8	51.2	39.0	0.0	2

SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

4.4.4 Indicator 4: Participation in plantation management, protection and utilization

Respondents for both Tshikudini and Magangeni communities confirmed that they influenced plantation management decisions made by DAFF (80-85%) and assisted in protecting the plantation (90-95%). Most of the respondents (80-85%) also acknowledged their awareness of employment and entrepreneurial opportunities provided by the plantation (Table 4.11). All the respondents at Magangeni agreed that more wood was collected from the plantation as opposed to the natural forest. In contrast, 69.6% of the Tshikudini community disagreed. Despite the negative perception of the Tshikudini community regarding utilization of wood from the plantation, both communities still assisted in protecting the plantations (90-95%).

Using equation 1, the perceptions of respondents in Tshikudini and Magangeni communities on indicator 2.2 resulted in an overall performance score of 53.7% for Gaba plantation and 65.2% for Rossbach, respectively. Mann Whitney U test showed that the difference in the performance of indicator 2.2 was significant ($U = 226.000$, $p=0.000$).

Table 4.11: Participation in plantation management, protection and utilization for Tshikudini and Magangeni communities

Verifier	LC	Response (%)				Mode*
		SD	D	A	SA	
Local communities influence decisions on plantation management.	Magangeni	6.6	9.8	47.5	36.1	3
	Tshikudini	4.3	10.9	73.9	10.9	3
Local communities assist in protection of the plantation against fire damage and illegal harvesting.	Magangeni	1.6	4.9	54.1	39.3	3
	Tshikudini	2.2	8.7	84.8	4.3	3
Local communities are aware of employment and entrepreneurial opportunities in the forest.	Magangeni	1.6	16.4	49.2	32.8	3
	Tshikudini	2.2	15.2	78.3	4.3	3
Utilization of wood from plantation as opposed to natural forest.	Magangeni	0.0	0.0	44.3	55.7	4
	Tshikudini	37.0	32.6	30.4	0.0	1
The outcomes of local communities' consultations are implemented.	Magangeni	4.9	13.1	42.6	39.3	3
	Tshikudini	2.2	19.6	73.9	4.3	3

LC= local community, SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

Joint forest management was deemed to have the highest potential in ascertaining active participation of both local communities (85-90%) in plantation management, protection and utilization (Table 4.12). At Tshikudini, community management was perceived to have the least potential (31.7%) whereas at Magangeni, managing the plantation through a community user group had the least potential (27.5%).

Table 4.12: Potential of alternative management regimes in increasing participation of Tshikudini and Magangeni communities

Alternative management regime	Local community	Response (%)				Mode*
		SD	D	A	SA	
Community management	Magangeni	17.7	39.2	29.4	13.7	2
	Tshikudini	12.2	56.1	31.7	0.0	2
Community user group	Magangeni	21.6	51.0	15.7	11.8	2
	Tshikudini	4.9	51.2	43.9	0.0	2
Joint forest management	Magangeni	0.0	13.7	45.1	41.2	3
	Tshikudini	0.0	14.6	70.7	14.6	3
Company-community partnership	Magangeni	25.5	29.4	27.5	17.7	2
	Tshikudini	7.3	51.2	41.5	0.0	2

SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

4.4.5 Indicator 5: Knowledge and fairness of plantation ownership, management and use arrangements

The majority of respondents in Tshikudini and Magangeni communities agreed with the notions that plantation ownership (60-80%) and use arrangements were known, understood and respected (60-85%). Both communities also felt that ownership (75-85%) and use arrangements (80-85%) were fair (Table 4.13). Transparency and fairness in availing of employment (75-90%) and business opportunities (75-85%) in the plantations were acknowledged by both communities.

Using equation 1, the perceptions of respondents in Tshikudini and Magangeni communities on indicator 2.3 resulted in an overall performance score of 55.5% for Gaba plantation and 59.9% for Rossbach, respectively.

Table 4.13: Knowledge and fairness of plantation ownership, management and use arrangements for Tshikudini and Magangeni communities

Verifier	LC	Response (%)				Mode*
		SD	D	A	SA	
Ownership of plantation is known and understood.	Magangeni	13.1	8.2	32.8	45.9	4
	Tshikudini	6.5	30.4	54.3	8.7	3
Access and use regulations for the plantation are known, understood and respected.	Magangeni	13.1	9.8	29.5	47.5	4
	Tshikudini	0.0	39.1	60.9	0.0	3
Standard of general plantation management and service provision is satisfactory.	Magangeni	3.3	19.7	49.2	27.9	4
	Tshikudini	0.0	15.2	76.1	8.7	3
Ownership arrangements for the plantation are fair.	Magangeni	3.3	19.7	52.5	24.6	4
	Tshikudini	0.0	15.2	80.4	4.3	3
Access and use arrangements for plantation products are fair.	Magangeni	0.0	14.8	55.7	29.5	4
	Tshikudini	0.0	19.6	71.7	8.7	3
There is fairness and transparency in plantation related business opportunities.	Magangeni	6.6	14.8	55.7	23.0	4
	Tshikudini	4.3	10.9	80.4	4.3	3
Plantation employment opportunities are fairly availed	Magangeni	9.8	16.4	49.2	24.6	4
	Tshikudini	4.3	8.7	76.1	10.9	3
There are no conflicts between local communities and DAFF regarding ownership of the plantation.	Magangeni	11.5	21.3	31.1	36.1	4
	Tshikudini	0.0	19.6	80.4	0.0	3
There are no conflicts between local communities and DAFF regarding access and use rights.	Magangeni	13.1	23.0	32.8	31.1	3
	Tshikudini	0.0	34.8	65.2	0.0	3

LC= local community, SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

Both communities perceived joint forest management to have the highest potential in ensuring that plantation management and use arrangements are satisfactory, fair, understood and respected (Table 4.14). The majority of respondents at Tshikudini community members (56.1%) had the opinion that community user group (65.9%) and company-community partnerships (58.5%) can also achieve such objective. In contrast, the Magangeni community felt that community user group had the least potential (70.6%).

Table 4.14: Potential of alternative management regimes to facilitate fairness in plantation ownership, management and use for Tshikudini and Magangeni communities

Alternative management regime	Local community	Response (%)				Mode*
		SD	D	A	SA	
Community management	Magangeni	11.8	39.2	33.3	15.7	2
	Tshikudini	9.8	51.2	39.0	0.0	2
Community user group	Magangeni	13.7	56.9	19.6	9.8	2
	Tshikudini	0.0	34.2	65.9	0.0	3
Joint forest management	Magangeni	0.0	2.0	43.1	54.9	4
	Tshikudini	0.0	7.3	61.0	31.7	3
Company-community partnership	Magangeni	5.9	41.2	37.3	15.7	2
	Tshikudini	7.3	34.2	53.7	4.9	3

SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

4.4.6 Indicator 6: Effective management and resolution of conflicts and grievances

More than 70% of the respondents at both Tshikudini and Magangeni agreed with the notion that effective mechanisms for expression of grievances exist and such grievances are resolved timeously. More than 80% of the respondents also confirmed that conflict resolution mechanisms existed and conflicts were resolved peacefully (Table 4.15).

Using equation 1, the perceptions of respondents at Tshikudini and Magangeni communities on indicator 3.1 resulted in an overall performance score of 59.5% for Gaba plantation and 60.3% for Rossbach, respectively.

Table 4.15: Effective management and resolution of conflicts and grievances for Tshikudini and Magangeni communities

Verifier	LC	Response (%)				Mode*
		SD	D	A	SA	
Effective mechanisms for expression of grievances exist.	Magangeni	13.1	6.6	45.9	34.4	3
	Tshikudini	0.0	2.2	97.8	0.0	3
Grievances from local users are timeously attended to and resolved.	Magangeni	13.1	14.8	42.6	29.5	3
	Tshikudini	0.0	2.2	97.8	0.0	3
There are conflict resolution mechanisms between local communities and plantation management.	Magangeni	4.9	16.4	49.2	29.5	3
	Tshikudini	0.0	4.3	95.7	0.0	3
Conflicts are respectfully handled and peacefully resolved.	Magangeni	8.2	8.2	45.9	37.7	3
	Tshikudini	0.0	2.2	97.8	0.0	3

LC= local community, SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

The majority of respondents in both Tshikudini and Magangeni communities (85-95%) had the highest confidence in joint forest management with regard to effective management of conflicts and grievances (Table 4.16). In Tshikudini, most of the community members (53.7%) perceived community user group management regime to also have some potential. However, 74.5% of Magangeni community members expected the community user group to poorly manage and resolve conflicts and grievances.

Table 4.16: Potential of alternative management regimes in management and resolution of conflicts and grievances for Tshikudini and Magangeni communities

Alternative management regime	Local community	Response (%)				Mode*
		SD	D	A	SA	
Community management	Magangeni	9.8	41.2	29.4	19.6	2
	Tshikudini	12.2	46.3	41.5	0.0	2
Community user group	Magangeni	15.7	58.8	7.8	17.6	2
	Tshikudini	0.0	46.3	53.7	0.0	3
Joint forest management	Magangeni	0.0	7.8	27.5	67.7	4
	Tshikudini	0.0	12.2	70.7	17.1	3
Company-community partnership	Magangeni	9.8	43.1	29.4	17.7	2
	Tshikudini	4.9	58.5	36.6	0.0	2

SD= strongly disagree, D= disagree, A= agree, SA=strongly agree

*Most frequent response, 1=SD, 2=D, 3=A, 4=SA

4.4.7 Overall potential socio-economic sustainability of alternative management regimes

The Friedman's test revealed that there were highly significant differences among the potential performance scores of the four alternative management regimes for both Tshikudini ($\chi^2=32.079$, $p=0.000$) and Magangeni communities ($\chi^2=53.789$, $p=0.000$). Ranking analysis showed that in both communities, joint forest management was perceived to have the highest potential to achieve socio-economic sustainability of the two plantations (Table 4.17). Community management and community user group regimes were perceived to have the least potential by the two communities.

Table 4.17: Ranking analysis for alternative management regimes using Friedman's test

Alternative management regime	Tshikudini (n=41)		Magangeni (n=51)	
	Mean rank	Rank*	Mean rank	Rank*
Community management	1.87	4	2.1	3
Community user group	2.63	2	1.95	4 ^a
Joint forest management	3.3	1	3.56	1 ^a
Company-community partnership	2.2	3	2.34	2
Chi-square	32.079		53.789	
Degrees of freedom	3		3	
Asymp. Sig	0.000		0.000	

^a Statistically significant differences between Tshikudini and Magangeni communities

* 1-4= lowest to highest rank

Mann Whitney U test revealed that community user group was allocated higher scores (U =609.000.000, p=0.000) by the Tshikudini community compared to the Magangeni community who allocated higher scores to joint forest management (U =564.000, p=0.000).

4.5 Chapter Summary

The results presented in this chapter showed that the Magangeni community members perceived Rossbach plantation to be providing them with multiple resources thereby improving their livelihoods. Respondents were also content with the level of facilitation of participation in plantation activities, access and use arrangements as well as management of conflicts and grievances. Respondents in Tshikudini community also perceived management of Gaba plantation in a similar way as the Magangeni community. However, Tshikudini respondents felt that the plantation was neither providing them with a diverse range of products nor contributing to their livelihoods. Although the collection of firewood and poles from the plantations was relatively low for Tshikudini residents, they still collected thatch grass, medicinal plants and assisted

significantly in protecting the plantation. Joint forest management was perceived to have the highest potential in achieving socio-economic sustainability.

CHAPTER 5: DISCUSSION

This chapter presents discussion of findings of this study in relation to literature regarding perceptions of the local communities towards the indicators of socio-economic sustainability as well as potential of alternative plantation management regimes

5.1 Contribution of plantations to local livelihoods

Forest resources have been widely recognized to significantly contribute to the improvement of local livelihoods and alleviate poverty (DWAF, 2005a; Shackleton *et al.*, 2007b, Chirwa *et al.*, 2008). Firstly, forests can play a safety net function whereby they provide economic benefits in times of critical need (Wunder *et al.*, 2014). Secondly, they can provide basic goods and services to facilitate welfare. Provision of these goods and services result in household cash savings which can then be used to finance other livelihood requirements (Shackleton & Shackleton, 2004; Ham & Chirwa, 2008). Thirdly, they can create or increase household income through employment and participation in other income generating activities.

Respondents in the two communities obtained firewood, poles, thatch grass and medicinal plants from the plantations. Therefore the plantations contributed to the local communities through supply of basic goods important for maintaining or improving their welfare. According to Shackleton *et al.* (2004), over 90% of rural households in South Africa use firewood as a source of energy. Similarly, in the Tshikudini and Magangeni communities, almost all respondents used firewood for cooking in order to minimize household expenditure. Therefore, provision of fuelwood as an energy source is of paramount importance to rural livelihoods. Such importance was emphasized by Shackleton *et al.* (2007a) by asserting that securing an affordable energy source such as firewood is critical to poverty alleviation in rural areas. According to San *et al.* (2012), firewood is the primary source of energy for cooking and heating in the less developed continents of Africa and Asia. In Cambodia, very high firewood use (96%) by

communities has been recorded (San *et al.*, 2012). Provision of firewood is therefore a critical aspect of livelihood improvement that merits attention.

Utilization of products from the two plantations resulted in cash savings greater than R300 per month (See Fig 4.8). This is a significant amount considering the unemployment levels and low income nature of these communities. The respondents in Magangeni therefore felt that Rossbach plantation was contributing to improvement of their welfare. In contrast, respondents at Tshikudini did not share the same sentiment despite collection of thatch grass and medicinal plants. This reflects the significance of firewood and the value it is allocated by the rural communities, implying that, if these plantations are to contribute significantly to the people's livelihoods, wood provision should be prioritized.

There were only a few respondents who participated in income generating activities and they were reluctant in divulging their incomes. Similarly, Mikolo *et al.* (2008) also reported that woodcarving entrepreneurs in Cape Town were not willing to divulge the details of their financial returns. It might also be because the returns were not easily quantifiable and/or they did not keep records. These informal business ventures might therefore only be playing the 'safety net' function for the participants. However, they indicated that those incomes contributed to increasing their purchasing ability for household commodities, better housing, education and access to clean water.

5.2 Participation of local communities in plantation activities

5.2.1 Utilization of plantation products

Gaba and Rossbach plantations provided both timber and non-timber products to Tshikudini and Magangeni communities, respectively. While the majority of respondents from both communities collected thatch grass and medicinal plants from the plantations, the level of consumption for wood products was different. Almost all the respondents in Magangeni community obtained their firewood and poles from the plantation hence they perceived Rossbach plantation to be providing them with sufficient multiple products. This finding is supported by Ham (2000b) and Cocks *et al.* (2000) who reported similar

findings for state plantations in the Eastern Cape where considerable amounts of firewood and poles were being obtained by locals for their subsistence.

However, the Tshikudini community expressed contrary responses on provision of wood products from Gaba plantation. The majority of the respondents who did not collect firewood and buy poles from the plantation indicated that they were not allowed (See table 4.5). This is in contrast with the Eastern Cape where the main reasons cited were; preference for indigenous species for firewood and poles (Evans, 1998; Cocks *et al.*, 2000), distance from the plantation, proximity of the more preferred natural forest/woodland and poor access due to bad condition of road (Ham, 2000b). With regard to firewood collection, the community members are allowed to collect headloads of harvesting residues from the planted trees free of charge and payment of a low amount of money for bigger quantities. According to the state of the forests report for 2007-2009, category C plantations such as Gaba are recognized as less productive, located in marginal areas, less accessible and more valuable as community woodlots than utilization for commercial purposes (DWAF, 2004; DAFF, 2011). Gaba plantation typifies those characteristics with the bad condition of the road worsening the situation and resulting in failure to attract potential timber buyers. Low harvesting levels imply that coppicing of the eucalypts would be limited. This is supported by similar findings by Ham (2000b) where the low utilization of Manubi woodlot in the Eastern Cape and subsequent closure of its pole treatment plant was attributed to the inconvenient location of the woodlot and the bad condition of the road.

The respondents indicated that they were aware of access and use rights and were content with the level of information dissemination by plantation management (See table 4.9). Therefore, the reported refusal of permission to obtain firewood can only be attributed to the limited availability of the harvesting residues implying prevalence of the common problem of scarcity and undesirable cost in searching time for the firewood. Considering the long distance between the village and the plantation and the steepness and bad condition of the road, respondents expressed or presented their most pertinent issue; not being allowed to cut trees for firewood to compensate for the limited availability of harvesting residues.

According to plantation management, poles from Gaba plantation are transported to Phiphidi pole treatment plant for treatment resulting in communities not being allowed to purchase untreated poles directly from the plantation. The few respondents who reportedly obtained poles from the plantation therefore either collected them from the indigenous forest component of the plantation or the leftovers from harvested compartments. This is particularly so because of the availability of a larger area of indigenous/natural forest as compared to Rossbach plantation.

5.2.2 Employment opportunities

Apart from provision of goods and services, another very important measure of sustainable forest management is the active participation of local communities in plantation-related activities that generate income. Remuneration for employment is potentially a significant form of income generation for local communities surrounding plantation forests (Charnely, 2005; Mayers, 2006). This aspect is of particular importance because of the high levels of unemployment observed in the Tshikudini and Magangeni communities.

However, forestry employment opportunities have been widely reported to benefit more outsiders in comparison to local communities in regions such as Australia and Southeast Asia (Hall, 2003; Schirmer & Tonts, 2003). Similarly, in South Africa outsourcing of labor through contractors has been reported to have resulted in employment of outsiders as well as decrease in wages (Mayers, 2006). Despite this shortfall, some countries have been recognized for empowering local communities through forestry employment. Plantations in rural New Zealand have been commended for their significant provision of jobs to the local communities (Charnley, 2005).

Ensuring participation of local communities goes beyond mere creation of jobs in the plantations. Prioritization of local people to employment opportunities is critical in ensuring actual beneficiation. Both Tshikudini and Magangeni communities confirmed their knowledge of employment opportunities in the plantations as well as being given preference for such opportunities (See table 4.7). Despite the fact that only three

respondents were employed in the two plantations, the communities still felt that they were indeed prioritized for the employment opportunities. The low employment levels were particularly due to the minimal sizes of the plantations. Charnley (2005) reported that eucalypts, unlike other species such as pines, offer less employment opportunities because of lesser tending operations such as pruning. In addition, their ability to regenerate implies that these government plantations do not need labor for replanting at the end of their rotation.

The positive sentiments expressed by the two local communities are further supported by Ham (2000a) when he reported that state plantations in the Eastern Cape were actually overstaffed in comparison to private forest companies. This could be in line with government's commitment to job creation and poverty alleviation even at the expense of economic viability. According to Charnley (2005), plantation forests on their own are bound to create only limited employment opportunities unless they are in combination with timber processing activities. Findings by Ham and Theron (2001) also indicated that respondents for some Eastern Cape plantations felt that planting pines would result in secondary sawn timber industries that would then create more jobs for them as locals.

5.2.3 Participation in income-generating activities

In terms of other income-generating activities, a few respondents were involved in honey production and retailing of firewood and poles, thatch grass, medicinal plants and honey production (See table 4.4). Respondents acknowledged the existence of such business opportunities in the plantations and being given preference for participation. The low number of actual participants in these activities can be explained by the lack of viability of these business ventures due to poor access to markets beyond the community level. The community members can also obtain the same products for free and/or at cheaper prices from the plantations resulting in a total lack of market. According to Rogerson (2001), viability and success of any enterprise is largely determined by proximity to growing and sufficient markets. Furthermore, forest-based

ventures generally produce low returns on capital (DWAF, 2005a) implying that the greater the proximity to the market, the more cost-effective and lucrative the venture becomes. The small scale retailing businesses are therefore more relevant for outsiders who can access markets within their areas, relatively further from the plantations. Cocks *et al.* (2000) reported that at Manubi woodlot in the Eastern Cape, locals did not benefit from participating in pole retail because of lack of capital despite the low prices set for the poles. Furthermore, they reported that outsiders dominated the businesses and brought their own laborers thereby denying casual employment opportunities to locals (Cocks *et al.*, 2000). Therefore, despite prioritization of the Tshikudini and Magangeni communities, they may still fail to take up the opportunities due to lack of start-up capital.

According to DWAF (2005a), lack of capital is a major constraint for rural communities to participate in the trading of forest products. To secure business loans or credits, requirements such as collateral or evidence of capacity to repay are beyond the reach and means of the impoverished rural communities. Furthermore, optimization of economic return and viability can only be facilitated by supplying commercial markets. According to Ham and Chirwa (2008), the limited viability of rural forest-based enterprises is also as a result of poor infrastructure in addition to financial support.

5.2.4 Forest protection

Forest protection against fire damage and illegal harvesting is a critical component of overall sustainable forest management. Local communities play a vital role in protecting forests because they are the potential agents of the threats and are also in a convenient locality to be able to assist in preventing the illegal activities. Both communities perceived themselves to be playing a significant role in protecting the plantations (84% for Magangeni and 91.7% for Tshikudini) by controlling fires, reporting fire incidences and reporting illegal harvesting of timber.

Respondents indicated that they were consulted regarding these forest protection issues. Forest protection has been widely recognized to be facilitated by engagement

and involvement of local communities in forest management activities (Bromley *et al.*, 2008; Thoms, 2008; Bhattacharya, 2010). The acknowledgement of this link between communities and resources forms the basis for community-based forest management regimes such as joint forest management. Success of these management strategies is therefore based on the stewardship role played by the communities where by the benefits accrued motivates them to protect the forest in order to ensure future supply.

5.3 Social sustainability of plantations

According to Gordon *et al.* (2013) social sustainability which is brought about through community engagement, is now an essential component of every organization, forestry industries included, with the responsibility to incorporate stakeholder concerns in its functions. Effective community engagement ensures that forest management in-cooperates the needs and aspirations of local communities thereby increasing the positive impacts while avoiding, reducing and/or remediating the negatives. However, state plantations being under ownership and management of the government, implies that the local communities can only influence the decisions that are made by plantation managers. This can be achieved through effective communication, information dissemination and consultations. The two communities confirmed that they were indeed consulted on matters regarding plantation management such as access and use rights (See table 4.9). They also felt that they were provided with the relevant information and that their opinions and concerns were duly considered. As such, they perceived ownership, access and use arrangements as fair and satisfactory.

The majority of respondents from both communities indicated that there were no conflicts between themselves and plantation management (See table 4.13). They also perceived the management of conflicts and grievances as effective (See table 4.15). Dare *et al.* (2012) asserted that community engagement provides an opportunity to acquire, process and address concerns of local communities thereby avoiding conflicts while ensuring overall long-term sustainability of plantation management.

5.4 Potential of alternative plantation management regimes

5.4.1 Community plantation management

Respondents at both Tshikudini and Magangeni communities felt that management of the plantation by the entire community through an elected committee does not have any potential in achieving or ensuring socio-economic sustainability. Lack of support and confidence in community management of South African indigenous forests has also been reported in Thathe, Gxalingenwa forest and coastal forests in the Eastern Cape (Sikhitha, 1999; Obiri & Lawes, 2002; Robertson & Lawes, 2005). The dominant explanation from these studies was centered on the decline of the impact and significance of traditional authority in modern South Africa. Community members therefore recognize and acknowledge that traditional communal resource protection rules as well as any other forest regulatory rules developed by the traditional authorities would not be obliged with leading to resource degradation and conflicts. In cognizance of this reality, the community management regime for this study was based on management by the community through an elected committee rather than traditional authorities. However, lack of confidence in this regime was still clearly exhibited. In another study on state plantations in the Eastern Cape, Andrew *et al.* (2000) found that local communities did not feel confident to manage the plantations themselves because of lack of experience and community organization and possibility of uncontrolled harvesting. According to Thoms (2008), the success or failure of forest management by communities primarily depends on social stratification and prior collective action experience within the communities. Behera (2009) further presented the demanding nature of community management based on its need for heterogeneity of the community, small size of the community, resource scarcity, among others.

In the context of this study, community management of the plantations would be similar to the common property resources vulnerable to the widely recognized retrogressive 'tragedy of the commons' ideology whereby every member avoids contribution but overexploits the resource (Kahn, 2014). The Tshikudini and Magangeni communities' negative perceptions on the potential of this regime are therefore in agreement with literature and experiences elsewhere. According to Oses-Eraso and Viladrich-Grau

(2007), collective management of any resource without over-exploitation, has not yet been efficiently justified by any economic theory.

5.4.2 Community user group management

Community user group management regime is somewhat, a more organized variant of community management whereby only a specific group of individuals would own and manage the plantation. This would therefore facilitate homogeneity and accountability as opposed to communal management. As such, the Tshikudini community perceived this regime to have potential in achieving socio-economic sustainability.

However, at Magangeni, respondents still did not confide in such management arrangement. The statistical significance of the difference in scores between the two communities emphasizes that the Tshikudini community might possess the core requirements for successful implementation of a community-user group management regime. For instance, community cohesiveness facilitated by the common problem of lack of provision of firewood from the plantation. Other factors or determinants could be; prior experience in collective action in other community projects, homogeneity, and/or trust (Behera, 2009). The positive perceptions may also be motivated by the realization that more dividend economic benefits and products would accrue due to the 'small' group of individuals. In Nepal, community-based forest management has been successful whereby the 'group' is referred to as a community forest user group (CFUG) (Pokharel, 2012). The Nepal situation relates well with the state plantations in South Africa because their community forests are also a result of devolution of ownership and management of the state forests. Despite the success realized in terms of forest protection and improvement of livelihoods of participants, there are still reports that some CFUGs worsen the plight of the poor through the terms of restrictions on products (Pokharel, 2012) as well as the inherent lack of consultation and capacity of the poor to express their opinions and/or participate (Thoms, 2008). Therefore, the negative perceptions of the Magangeni community on the community user group are supported by both theories and practical experiences.

Previous experience with community group-managed Masakhona woodlot, in Vhembe district under a similar management type, further justifies the perceptions of the Magangeni community. Evans (1998) reported that Masakhona was a site of emerging conflicts among the community members and the traditional leadership. For instance, while the 'group' expected revenue to accrue to the group members, the traditional authority was selling the trees to the villagers and retaining the proceeds (Evans, 1998). Community-user-group management also offers a challenge in developing socially acceptable criteria for appointing beneficiaries as well as a justification for exclusion of the others. This management regime is therefore vulnerable to conflicts and generation of undesirable disruption of community cohesion.

5.4.3 Company-community partnerships

Both Tshikudini and Magangeni communities perceived that company-community partnerships have the potential to prioritize them in availing employment and business opportunities and to facilitate fair and acceptable plantation ownership, management and use arrangements. However, both communities felt that this regime would neither facilitate their participation nor enable effective management and resolution of conflicts and grievances (See tables 4.10, 4.12 and 4.16). Respondents at Tshikudini felt that partnering with the companies would facilitate better provision of products and improvement of their livelihoods whereas at Magangeni, the respondents disagreed. Therefore, both communities were not fully confident about the potential of such partnerships.

Partnerships between private companies and individual growers have been reported as successful in South Africa with Sappi and Mondi outgrower schemes earning growers about US\$ 130 per year (Mayers, 2006). With regard to companies partnering with communities, Andrew *et al.* (2000) reported that the few partnerships in the Eastern Cape had been unsuccessful (i.e. North East Cape forest/Ugie partnership, Mondi/Umzimkhulu and Sappi/Lambazi partnerships). However, a deviant form of company-community arrangements in land claim areas have been reported as successfully contributing to local livelihoods and sustaining plantation functionality.

Under such models, a forestry company leases the plantation from the claimant communities who would have been compensated by the government for their land (Tshidzumba *et al.*, 2014 unpublished). The communities then primarily benefit from the rentals paid by the companies as well as other benefits such as income generation through contracting in plantation operations. However, these arrangements seem to fall short to qualify as ‘partnerships’ because there is no equity between the two parties and once the lease is operational, the communities can not actively participate in making operational or management decisions. However, they indeed reflect the significance of variation in the terms and conditions of partnerships in realization of the desired output, which is ultimately, overall SFM.

5.4.4 Joint forest management

Joint forest management was perceived as the plantation management with the highest potential across all indicators of socio-economic sustainability and in both communities (See table 3.17). A study conducted by Robertson and Lawes (2005) revealed similar preferences by communities for management of Gxalingenwa indigenous forest. Andrew *et al.* (2000) also reported that respondents for a study they conducted for state woodlots in the Eastern Cape also confided in joint forest management.

The ultimate strength of this management regime is vested in its ability to empower communities through government’s technical financial and regulatory support. This is supported by evidence of success of the Mabandla, Ngevu and Zintwala ‘community’ projects in the Eastern Cape where government provided technical and financial support to communities for establishment of plantations (Howard *et al.*, 2005). The Mabandla community project has been applauded for its success in sustainability of operations and improvement of livelihoods of participants, with a 15 000% return on an initial investment of R9 million and creation of about 65 jobs per day (SA Forestry magazine, 2008). It is noteworthy that although these projects seem to be inclined to community management, they are characterized by principles of joint forest management due to the critical input provided by government. The Tshikudini and

Magangeni communities are therefore in agreement with reality on the ground through their outstanding confidence in partnering with government in managing the plantations.

Variable models of joint forest management have been implemented and succeeded in forest protection and improvement of local livelihoods mostly in India, Bangladesh and Indonesia (Tewari & Isemonger, 1998; Muhamed *et al.*, 2009; Bhattacharya, 2010; Djamhuri, 2012). In Dhaka, Bangladesh, average returns per year for participant for woodlots, agroforestry and strip plantings were reported as ranging from US\$137 to US\$257 (Muhamed *et al.*, 2009).

The main challenges and weaknesses of joint forest management that have been reported include lack of delivery of responsibilities by government e.g. in South Africa, Bolivia, Guatemala and Philippines (Crockleton *et al.*, 2012; Blore *et al.*, 2013;) and prevalence of conflicts due to unfair terms of ownership and management (Meer & Schnurr, 2013).

5.5 Chapter Summary

The chapter discussed the perceptions of the local communities towards the indicators of socio-economic sustainability as well as potential of alternative plantation management regimes. Magangeni community members were content with the level of participation in plantation activities, relations with plantation management and improvement of their livelihoods. While the Tshikudini community was content with other socio-economic aspects, prohibition of access to wood products resulted in discontent on overall provision of products and improvement of livelihoods. Joint forest management was perceived to have the highest potential for achieving socio-economic sustainability, in agreement with known attributes of this management type.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

This chapter presents conclusions on the socio-economic sustainability of the two plantations as well as the potential of alternative plantation management regimes. Based on the conclusions, recommendations on ways to facilitate achievement of optimal socio-economic sustainability and prioritization of alternative management regimes with potential are also presented.

6.1 Conclusions

Gaba and Rossbach plantations are characterized by different levels of socio-economic sustainability based on the positive perceptions expressed by the neighboring communities. At Rossbach plantation, the local community expressed positive perceptions regarding the entire socio-economic performance aspects of the plantation. At Gaba plantation, while the local community expressed positive sentiments on most of the socio-economic aspects, there was some discontent over provision of wood products.

The study showed that those involved in management of the plantations effectively consulted and engaged with the local community regarding access and use arrangements, forest protection, employment and income-generating opportunities. In addition, the communities were aware of the employment and business opportunities provided by the plantations. Hence, it can be concluded that community members understand the plantation ownership, opportunities, and access and use arrangements and perceive them to be fair.

The management of plantations facilitated effective mechanisms for expression of grievances and peaceful resolution of conflicts. In addition, the study showed that local communities actively participated in protecting the plantations against illegal harvesting and fire damage. While Rossbach plantation provided multiple products to the local community, provision of wood products from Gaba plantation was low. Furthermore, Rossbach plantation significantly contributed to livelihoods of the local people whereas Gaba plantation was not perceived in the same way.

The study further showed that joint forest management was highly perceived to be the optimal management regime that could offer the best socio-economic sustainability for both plantations by the local communities as it would enable their participation in plantation activities, improve their livelihoods while maintaining good relations with government officials. Both communities do not realize any potential in managing the plantations communally. Notwithstanding, the local communities felt there was some limited potential of company-community partnerships and community user group in management of plantations.

As a general conclusion, communities acknowledge their lack of capacity to manage the plantations on their own while appreciating the potential and strength of joint management with the government. They also express some level of satisfaction on the current management by the government but formal partnership would enable them to actively participate in making decisions that significantly impact their livelihoods. Finally, the confidence and preference of communities on joint forest management demonstrates their rationality and commitment to sustainable management of the plantations. Sustainable management of the plantations can thus be achieved through joint decision-making and formalized sharing of responsibilities and benefits between the surrounding communities and government.

6.2 Recommendations

Despite the good overall performance of the two plantations, the frequencies of responses in disagreement in some cases show that there is still need to improve the socio-economic sustainability through increased resource use, community engagement, minimization of conflict and increased contribution to the local economy and livelihoods. The following recommendations are therefore made:

- i. A wide range of community engagement methods should be utilized to optimize participation of local communities and resolution of grievances. For instance, DAFF personnel may use general community meetings to reach out to the public

particularly those who are unaware of the functionality of the plantations and the opportunities they offer.

- ii. Innovative ways of maximizing the contribution of plantations to local livelihoods should be considered and researched on. These can be; incorporation or adoption of agroforestry practices and increased capacitation of income generating enterprises such as honey production.
- iii. In situations where there is limited provision of firewood from the plantations (such as Gaba), a formal harvesting regulation through an 'allowable cut' should be introduced whereby firewood and poles can be transported and shared among the community members for household use. According to Meer and Schnurr (2013), non-compliance to regulations becomes inevitable if communities perceive limited opportunities for lucrative participation.
- iv. Socio-economic sustainability assessments should be conducted for all plantations on a case by case basis since there can be significant variation in the extent to which a particular plantation interacts with their respective local communities as exemplified by the differences between Gaba and Rossbach.
- v. In the case of transfer of ownership and management of Gaba and Rossbach plantations, joint forest management between the government and the communities should be prioritized for implementation.
- vi. For Gaba plantation which is recognized as less productive as a plantation but more valuable as a 'community woodlot' (DAFF, 2011), a management regime based on community user group model could be considered due to the evident preference by the local community.
- vii. Further studies should be conducted whereby the potential and feasibility of different detailed models of joint forest management of state plantations are explicitly assessed.

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APPENDIX 1

Questionnaire for assessment of current socio-economic sustainability and potential of alternative management regimes

Reference number:

Section A: General household information

1. Sex:

Male	1
Female	2

2. Age:

Young(18-25 years)	1
Middle-aged(26-50 years)	2
Elderly(>50years)	3

3. Tribe/ethnicity

Venda	1
Shangani	2
Pedi	3
Other, specify.....	4

4. Education level:

None	1
Primary	2
Secondary	3
Tertiary	4

5. Employment

Employed	1
Unemployed	2

6. Total household income in rands per month

<452	1
453-2000	2
2001-4000	3
>4000	4

7. Are you aware of the functionality of..... plantation?

Yes	1
No	2

NB: IF THE ANSWER TO QUESTION 7 IS NO (2), PLEASE END HERE.

SECTION B: PARTICIPATION IN PLANTATION ACTIVITIES

8. What is the main purpose for which you use firewood for in your household?

Cooking	1
Heating	2
None	3

NB: IF YOUR ANSWER TO 8 ABOVE IS NONE (3), PLEASE SKIP QUESTION 9, 10, 11, AND PROCEED TO QUESTION 12.

9. Why do you use firewood instead of other energy sources?

Not applicable	
Unavailability of electricity	1
To reduce expenditure/save money/firewood is free	2
General preference of wood	3
Other, specify.....	4

10. What is your main source of firewood?

Not applicable	
Plantation	1
Natural forest	2
Formal shops	3
Informal traders	4

NB: IF YOUR ANSWER TO QUESTION 10 ABOVE IS 1, PLEASE SKIP QUESTION 11 PROCEED TO QUESTION 12.

11. What is your reason for not collecting firewood from the plantation?

Not applicable	
Plantation is too far in relation to natural forest	1
Poor service delivery in plantation. Specify.....	2
Preference for indigenous species in natural forest	3
Lack of preference for gum, specify reason...	4
Not allowed	5
Bad road to the plantation	6
Availability of enough wood from natural forest	7
Other, specify	8

12. What is the main purpose for which you use poles for in your household?

Fencing	1
Kraal construction	2
Fowl run construction	3
House construction	4
Other, specify.....	5
None	6

NB: IF YOUR ANSWER TO QUESTION 12 ABOVE IS NONE (6), PLEASE SKIP QUESTION 13 AND 14 AND PROCEED TO QUESTION 15.

13. What is your main source of poles?

Not applicable	
Plantation	1
Natural forest	2
Formal shops	3
Informal traders	4

14. Why do you obtain your poles from the woodlot?

Not applicable	
Scarcity of wood in natural forest	1
Natural forest is too far	2
Preference of gum trees in plantation	3
Formal shops/informal traders are too far	4
Limited funds for buying from shops or traders	5
To prevent deforestation of natural forest	6
Other, specify	7

15. What is your reason for not buying poles from the plantation?

Not applicable	
Plantation is too far in relation to natural forest	1
Poor service delivery in plantation, specify.....	2
Preference of indigenous species in natural forest	3
Lack of preference for gum poles, specify.....	4
Not allowed	5
Bad road to plantation	6
Other, specify.....	7

16. What other products do you collect from the plantation

None	1
Thatch grass	2
Medicinal plants	3
Other, specify.....	4
.....	5

17. If you collect/purchase firewood, poles, thatch grass and/or medicinal plants from the plantation for household use, please indicate the amount of cash (rands) you save per month.

Not Applicable	
<100	1
100-200	2
201-300	3
>300	4

18. How have you assisted in protection of the plantation?

Controlling a fire	1
Reporting a fire incidence	2
Reporting illegal harvesting of trees	3
Other, specify.....	4
None	5

19. Do you or any family member participate in any of the following plantation-related activities?

Activity		Number
None	1	
DAFF employee	2	
Contractor/employee	3	
Firewood/Pole retail	4	
Honey production	5	
Charcoal production	6	
Thatch grass retail	7	
Medicinal tree/plant retail	8	
Other, specify.....	9	

20. How much money do you make per month through participating in the following plantation-related activities?

Activity		R/Month
None	1	
DAFF employee	2	
Contractor/employee	3	
Firewood/Pole retail	4	
Honey production	5	
Charcoal production	6	
Thatch grass retail	7	
Medicinal tree/plant retail	8	
Other, specify.....	9	

21. What is the income from plantation employment and/or income-generating activities used for in your household?

Not Applicable	
Better housing	1
Better education (private schools)	2
Better health care (private doctor's consultation fees/ medical aid)	3
Purchasing ability for food, clothing etc	4
Better access to clean water (household tap water/water tank)	5
Better toilet	6
Other, specify.....	7

SECTION C: ASSESSMENT OF CURRENT MANAGEMENT

22. Please indicate whether you agree with the following statements (verifiers) for performance of current management of plantation using a scale of 1 to 4; from 1; strongly disagree, 2; disagree, 3; agree to 4; strongly agree, using an x.

Strongly disagree

Disagree

Agree

Strongly agree

Indicator 1: Provision of multiple resources and improvement of local livelihoods				
V 1.1: Multiple products are obtained from the plantation.	1	2	3	4
V 1.2: Plantation products suffice household needs.	1	2	3	4
V 1.3: Plantation products suffice needs for income-generation.	1	2	3	4
V 1.4: Plantation and their products contribute to household income.	1	2	3	4
V 1.5: Plantation and their products improve livelihoods.	1	2	3	4
Indicator 2: Prioritization of communities to business and employment opportunities				
V 2.1: Local people are informed of contracts and other income-generating opportunities in the plantation.	1	2	3	4
V 2.2: Local community members are given preference for plantation-related business opportunities.	1	2	3	4
V 2.3: Local people are informed of employment opportunities.	1	2	3	4
V 2.4: Local people are given preference to employment opportunities	1	2	3	4
Indicator 3: Facilitation of local communities' participation				
V 3.1: Local communities are consulted regarding decisions on plantation management issues.	1	2	3	4
V 3.2: Local communities are consulted regarding access and use of plantation products.	1	2	3	4
V 3.3: Local communities are consulted regarding protection of the plantation.	1	2	3	4
V 3.4: Local communities are consulted regarding employment and entrepreneurial opportunities in the plantation.	1	2	3	4
V 3.5: There is an effective communication and information dissemination mechanism between plantation management and local communities.	1	2	3	4
Indicator 4: Participation in plantation management, protection and utilization				
V 4.1: Local communities influence decisions on plantation	1	2	3	4

management.				
V 4.2: Local communities assist in protection of the plantation against fire damage and illegal harvesting.	1	2	3	4
V 4.3: Local communities are aware of employment and entrepreneurial opportunities in the forest.	1	2	3	4
V 4.4: Utilization of wood from plantation as opposed to natural forest.	1	2	3	4
V 4.5: The outcomes of local communities' consultations are implemented.	1	2	3	4
Indicator 5: Knowledge and fairness of plantation ownership, management and use arrangements				
V 5.1: Ownership of plantation is known and understood.	1	2	3	4
V 5.2: Access and use regulations for the plantation are known, understood and respected.	1	2	3	4
V 5.3: Standard of general plantation management and service provision is satisfactory.	1	2	3	4
V 5.4: Ownership arrangements for the plantation are fair.	1	2	3	4
V 5.5: Access and use arrangements for plantation products are fair.	1	2	3	4
V 5.6: There is fairness and transparency in plantation related business opportunities.	1	2	3	4
V 5.7: Plantation employment opportunities are fairly availed	1	2	3	4
V 5.8: There are no conflicts between local communities and DAFF regarding ownership of the plantation.	1	2	3	4
V 5.9: There are no conflicts between local communities and DAFF regarding access and use of the plantation.	1	2	3	4
Indicator 6: Effective management and resolution of conflicts and grievances				
V 6.1: Effective mechanisms for expression of grievances exist.	1	2	3	4
V 6.2: Grievances from local users are timeously attended to and resolved.	1	2	3	4

V 6.3: There are conflict resolution mechanisms between local communities and plantation management.	1	2	3	4
V 6.4: Conflicts are respectfully handled and peacefully resolved.	1	2	3	4

SECTION D: ASSESSMENT OF POTENTIAL OF ALTERNATIVE MANAGEMENT REGIMES

23A. Assuming that the plantation is to be managed by the community, indicate whether you agree with the following statements using a scale of 1 to 4; from 1; strongly disagree, 2; disagree, 3; agree to 4; strongly agree, using an x.

	Strongly disagree	Disagree	Agree	Strongly agree
Plantation is owned and managed by the local community. All revenue accrues to the local community and such revenue may be allocated as household dividends, plantation management fund and community development fund.				
I1: There will be multiple resource use and increased contribution to local livelihoods.	1	2	3	4
I2: There will be prioritization of local people to business, contract and employment opportunities.	1	2	3	4
I3: There will be facilitation of local communities' participation.	1	2	3	4
I4: Participation of local people in plantation management, protection and utilisation.	1	2	3	4
I5: Plantation ownership, management and use arrangements will be satisfactory, fair, understood and respected.	1	2	3	4
I6: There will be effective management and resolution of conflicts and grievances.	1	2	3	4

23B. Assuming that the plantation is to be managed by a community user group, indicate whether you agree with the following statements using a scale of 1 to 4; from 1; strongly disagree, 2; disagree, 3; agree to 4; strongly agree, using an x.

	Strongly disagree	Disagree	Agree	Strongly agree
Plantation is owned managed and controlled by specific group of individuals within a community. All revenue accrues to the community group members and such revenue may be allocated as household dividends, plantation management fund and community development fund.				
I1: There will be multiple resource use and increased contribution to local livelihoods.	1	2	3	4
I2: There will be prioritization of local people to business, contract and employment opportunities.	1	2	3	4
I3: There will be facilitation of local communities' participation.	1	2	3	4
I4: Participation of local people in plantation management, protection and utilisation.	1	2	3	4
I5: Plantation ownership, management and use arrangements will be satisfactory, fair, understood and respected.	1	2	3	4
I6: There will be effective management and resolution of conflicts and grievances.	1	2	3	4

23C. Assuming that the plantation is to be managed by joint forest management, indicate whether you agree with the following statements using a scale of 1 to 4; from 1; strongly disagree, 2; disagree, 3; agree to 4; strongly agree, using an x.

	Strongly disagree	Disagree	Agree	Strongly agree
The community enters into a legally binding agreement with the state in terms of management of the plantation and sharing of products, revenue and costs. Share of revenue for the community is in the form of household dividends.				
I1: There will be multiple resource use and increased contribution to local livelihoods.	1	2	3	4
I2: There will be prioritization of local people to business, contract and employment opportunities.	1	2	3	4
I3: There will be facilitation of local communities' participation.	1	2	3	4
I4: Participation of local people in plantation management, protection and utilization.	1	2	3	4
I5: Plantation ownership, management and use arrangements will be satisfactory, fair, understood and respected.	1	2	3	4
I6: There will be effective management and resolution of conflicts and grievances.	1	2	3	4

23D. Assuming that the plantation is to be managed by community-company partnerships, indicate whether you agree with the following statements using a scale of 1 to 4; from 1; strongly disagree, 2; disagree, 3; agree to 4; strongly agree, using an x.

	Strongly disagree	Disagree	Agree	Strongly agree
The community enters into a legally binding agreement with a private forest company in terms of management of the plantation and sharing of products, revenue and costs. Share of revenue for the community is in the form of household dividends.				
I1: There will be multiple resource use and increased contribution to local livelihoods.	1	2	3	4
I2: There will be prioritization of local people to business, contract and employment opportunities.	1	2	3	4
I3: There will be facilitation of local communities' participation.	1	2	3	4
I4: Participation of local people in plantation management, protection and utilization.	1	2	3	4
I5: Plantation ownership, management and use arrangements will be, satisfactory fair, understood and respected.	1	2	3	4
I6: There will be effective management and resolution of conflicts and grievances.	1	2	3	4