Towards Understanding the Impact of Community-Based Natural Resource Management on Household Livelihoods: A Case Study of the Combomune Community Project, Mozambique

by

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DECLARATION

I declare that the work contained in this thesis is my own original work resulting from a case study in the Combomune Community Project, Mozambique. All other sources, used or quoted, have been indicated and acknowledged by means of complete references. This thesis has not been submitted for a degree at another university.

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ABSTRACT

Since 1998, the communities of Combomune in Southern Mozambique have participated in a project intended to improve the quality of their lives, while ensuring the natural resources they depend on are well managed and sustainably used. The approach employed is Community-Based Natural Resource Management (CBNRM). CBNRM is the resource conservation and management approach which has emerged as one of the models to involve local communities, previously excluded from conservation and management of natural resources and rural development programs. This model promotes community participation, responsibilities and benefit sharing among stakeholders involved in natural resource management programs. A case study was conducted to assess the impacts of the Combomune CBNRM project on household livelihoods and on the environment. The Combomune CBNRM project is meant to improve the household livelihoods of the Madliwa, Hochane and Chaves communities involved in the management of indigenous forest resources. The involved communities derive direct and indirect benefits from the CBNRM project. These benefits have impacts on household livelihoods and on the environment. The most noted benefits are social and economic changes. These changes have positively affected the living conditions of the involved communities. Further, the study revealed the Combomune CBNRM project charcoal production was the only activity generating monetary income to individual and to community development funds. Monetary income was invested in the improvement of homesteads, the purchase of domestic animals and the development of infrastructure with a high social impact. Water supply, education, health care and household homestead improvements were the major project achievements. The project encouraged environmental friendly practices such as sustainably agricultural activities and a fire management program. Local residents were also encouraged to plant trees on bare soil to protect it from being eroded. The study has not deeply explored the CBNRM project impacts, therefore more case studies are recommended to further explain effective CBNRM project contributions to household livelihoods, so it may be reasonably promulgated as a strategy not only devoted to involve local communities or merely for resource conservation, but as the approach which improves livelihoods of the rural poor.

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ACRONYMS

CBNRM: Community-based natural resource management

DANIDA: Danish International Development Assistance

DED: Deutscher Entwicklungsdienst

GvMz: Government of Mozambique

GTA: Grupo de Trabalho Ambiental

GTZ: Deutsche Gesellschaft für Technische Zusammenarbeit

INIA: Instituto nacional de Investigação Agronómica

JICA: The Japan International Cooperation Agency

MDG: Millennium Development Goal

NGO: Non-governmental organization

NRM: Natural Resource Management

PEDFFB: Política e Estratégia do Desenvolvimento de Florestas e Fauna Bravia

PNA: Política Nacional de Agua

PNE: Política Nacional da Educação

PRA: Participatory Rural Appraisal

PSS: Política do Sector de Saúde

RRM: Rapid Rural Appraisal

TFCA: Transfrontier Conservation Areas

UN: United Nations

SADC: Southern African Development Community

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Chapter 1: Introduction

Since 1998, the communities of Combomune in southern Mozambique have participated in a project intended to improve the quality of their lives, while ensuring the natural resources they depend on are well managed and sustainably used. The project, using the Community-Based Natural Resource Management (CBNRM) approach, was meant to engage the community members as partners in the management of the project. In return the community would receive benefits to improve their livelihoods. After twelve years of operation many questions have arisen about the success of the project and to what extent it has met its objectives. Being one of over 40 CBNRM projects in Mozambique, there is much to learn from the experience of the communities in Combomune in terms of the effectiveness of CBNRM approach in relation to its impact on the livelihoods of the involved communities.

Livelihoods refer to the capabilities and assets (natural, physical, human financial and social capital) that together determine the living gained by an individual or household (World Food Program 2005:2; Solesbury 2003:5; Krantz 2001:1-7; Ellis 2000:10 in Morris *et al*. 2002:7). Household livelihoods of most rural communities in developing countries depend on natural resources that are locally available (Unruh 2008:12-14; Morris *et al*. 2002:5-6; Scoones 1998:11). Natural resources are common or shared assets requiring an effective management approach to enable rural communities to maximize benefits and to combat poverty, while increasing control over negative impacts on the environment. Resource management approaches are effective if, at community level, they ensure local decision-making power, resource ownership, and access to funds, access to technology and access to a range of livelihood resources and markets (World Food Program 2005; Scoones 1998:2; Erskine 1996:4-5). These are factors which may lead to sustainable rural development, environmental sustainability and poverty alleviation objectives. Thus the CBNRM approach has been adopted as a new participatory paradigm to involve communities in rural development programs, and to promote participative environmental management, sustainable outcomes, responsibilities and benefit sharing (Sebele 2009:137; Marshall 2008:1-4).

The CBNRM approach is a broad range of management practices to manage natural resources and ensure sustainable use. It involves management partnerships amongst the government authorities, NGOs and host communities as well as benefit-sharing among the partners (Munthali 2007; Shyamsundar, Araral & Weeraratne 2005). CBNRM projects are being widely adopted by governments in southern Africa as a means to promote sustainable land use, biodiversity conservation, rural development and harmony between conservation agencies and rural communities (Brian 2006; Kumar 2005). Critical studies on the CBNRM projects indicate some positive socio-economic impacts on rural community livelihoods and on the environment. Thus, CBNRM is recognized as a valid rural development approach, based on natural resources management, under a broad spectrum of community participation models (Munthali 2007). The Danish International Development Assistance (DANIDA) (2007), Brian (2006), and Kumar (2005) indicate that the CBNRM approach encompasses various rural development activities collectively planned and implemented to improve the present and future status of natural resources, and the well being of rural communities.

Globally, CBNRM is a relatively new participatory paradigm in rural development. It was tested during the 1980s and 1990s for its capacity to address economic hardships associated with unsuccessful, top-down, centrally-driven rural development approaches (Kumar 2005; Carol & Marmorek 2003). Since the 1992, United Nations (UN) conference on environment and development in Rio de Janeiro, Brazil, CBNRM has been accepted as the approach to address the challenge of environmental conservation and community development in developing countries (Virtanen 2004). The key assumption of CBNRM is that if economic development and community participation are not promoted in combination with environmental conservation, then local populations will not be interested in protecting resources (Brian 2006; Virtanen 2004; Cassidy 2001). Of particular importance are issues related to access to education, health care services, clean water, transport and market infrastructure; these are critical to improve the living conditions of most rural communities and are key motivators to community participation in CBNRM (Shyamsundar *et al*. 2005:23; van der Jagt, Gujadhur & van Bussel 2000: 13-14).

Sub-Saharan Africa continuously faces the challenge of alleviating poverty due to slow economic growth. Thus, most southern Africa countries are adopting, among other programs, CBNRM to

promote the integration of biodiversity conservation and rural development, and to alleviate rural poverty (Munthali 2007; Brian 2006; Salafsky *et al*. 2002). In addition, the primary focus of CBNRM is to establish means by which the multiple stakeholders might share rights and responsibilities regarding natural resource management and household livelihood improvements (DANIDA 2007). Through reinforced local community participation in decision-making, CBNRM projects create economic incentives for local communities to conserve natural resources (DANIDA 2007). CBNRM projects strengthen local community structures in two ways: first, there is a greater focus on household livelihood improvements through sustainable use of natural resources; second, CBNRM seeks to empower local communities with greater decision-making powers (Shyamsundar *et al*. 2005).

1.1. Background of CBNRM in Mozambique

Mozambique is one of the southern African countries that embarked on CBNRM only after independence. During the Portuguese rule, Mozambique's natural resource conservation and management system was exclusively under Government authority. The natural resource management system comprised only state-protected areas such as national parks, game reserves, controlled hunting areas and forest reserves (Virtanen 2004). After 1975, the new Government of Mozambique (GvMz) adopted a people-based, socialist political system. This system was intended to empower and motivate communities to actively participate in the decision-making process for uplifting the economy through converting natural resources (e.g. land, flora and fauna) into a valuable source of socio-economic income. In 1997, the GvMz adopted a Policy and Strategy for Management of Wildlife and Forestry, through Cabinet resolution Number 8/97. This document outlined key principles for involving local communities in the management of natural resources (Salomão & Matose 2007:8). These principles have enabled the establishment of 42 CBNRM projects around the country (Nhantumbo, Norfolk, & Pereira 2003). These CBNRM projects were designed to create the conditions for institutional change, enabling local communities to manage natural resources through full power devolution and resource property rights (Anstey 2001). While power devolution has been partially achieved, the needs of rural communities, particularly of the poor, have remained largely unchanged. Power devolution alone cannot resolve the poverty issue which is complex and can only be addressed through a wide

range of activities (Nhancale 2007). Thus, a legal framework is required to supports community organization in the management of natural resources.

1.1.1. The legal context for CBNRM in Mozambique

CBNRM operates within a legal framework which generally supports community rights over natural resources. In Mozambique, as in many other African countries, the supreme law, the Constitutional Law, vests custodianship and ownership of land in the State, with management being delegated to other stakeholders including agencies of the State, the private sector and local communities under customary arrangements (Salomão & Matose 2007).

In 2004, the Constitutional Law recognized community rights over land and other natural resources on it. Subsidiary laws, such as the Wildlife and Forestry Law of 1999 and the Land Law of 1997, recognize ownership of land by the communities living on it if they have lived on it for a period equal to or greater than ten years. These laws operate within the framework of Constitutional Law, clearly stating that local communities have secured land rights and natural resource use for their benefit (Serra 2007). In addition, subsidiary laws set guidelines highlighting community participation in the management and use of natural resources such as forest and wildlife to improve rural development and generate benefits to local communities. Land and other natural resources on the land are considered to be foundational to CBNRM projects (Salomão & Matose 2007).

The GvMz promotes and supports the implementation of CBNRM projects through adopting legislation and policies to enable access by local communities to natural resources through participatory approaches (Salomão 2002; Anstey 2001). The government framework prioritizes community involvement in natural resource management to improve livelihoods and combat poverty defined by the Strategic Policy for Development of Forest and Wildlife (GvMz[1] 1997) and the National Environmental Strategy (GvMz[2] 1995).

[1] GvMz- Política e Estratégia de Desenvolvimento de Florestas e Fauna Bravia- aprovada pela resolucao 8/97 do Conselho de Ministros do Governo de Moçambique e publicada no suplemento do BR -14: I-série de 1 de Abril

Community participation and decentralization shape the effectiveness of CBNRM projects towards achieving the dual objective of rural development and resource conservation (Salomão 2002). Agrawal and Ribot (1999) recognize that participatory approaches grant to local communities power over natural resource management. However, they argue that effective power and rights to accruing benefits from such management remains complex. Political, legal and institutional issues need to be addressed to enable the effective exercise of management powers and benefit accrual by local communities (Jones 2004c). Gibson (1999) concludes that it has proven difficult to ensure that power devolved to local communities simultaneously contributed to efficient and equitable satisfaction of economic and social needs, and to natural resource conservation. Therefore, laws and procedures supporting the CBNRM approach still need some improvements for this approach to meet intended sustainable development objectives (Salomão 2002).

The CBNRM approach is compatible with the global rural development agenda and policies emerging in the early 1990s (Virtanen 2004; Jones 2004c). This motivated the GvMz to adopt the CBNRM approach in the 1990s in an effort to encourage rural community institutions to participate in decision-making processes with regard to management and sustainable use of natural resources (Nhantumbo *et al.* 2003).

1.1.2. The development context for CBNRM

Natural resource management policies establish clear guarantees to rural communities for claiming natural resource ownership. Natural resources are recognized as assets which local communities use in their development (Heal 2000; Heal 2004). Specifically, the GvMz designed power-devolution strategies and resource ownership to facilitate the participation by local communities in joint ventures with potential investors (Serra 2007). These strategies are intended to attract investments for the development of rural areas with direct benefits for resource users (Salomão & Matose 2007). The Government acknowledges the rights of communities with

[2] GvMz-Politica Nacional do Ambiente – aprovada pela resolucao 5/95 do Conselho de Ministros do Governo de Moçambique e publicada no suplemento do BR -49: I-série de 6 de Dezembro

regard to access, management, control and benefits from land and forest resources (Brower 2008).

In Mozambique, CBNRM is implemented in the context of land-use options available in the delimited community land (Nhantumbo *et al.* 2003). Most CBNRM projects in Mozambique are oriented to the management of agricultural land, irrigation schemes, water bodies, flora and fauna.

The GvMz adopts the CBNRM approach as a resource conservation and rural development strategy (GvMz[3] 1997; Virtanen 2004). Mozambique is considered wealthy in natural forests which are a source of products, such as wood and non-wood products, essential to supply energy and material for shelter and food supplements. The government encourages local communities to engage in CBNRM projects to access natural resources and to use these resources sustainably. However, Nhantumbo *et al.* (2003) argue that in Mozambique it still a myth that the CBNRM model can meet community livelihoods improvement.

1.2. Scope and delimitation of the study

The study focuses primarily on the impact of the CBNRM project on local community livelihoods. It evaluates the social and economic impact of the CBNRM project on households in Madliwa, Hochane and Chaves communities. The study also investigated the impact of the project on the environment.

Selection of the study area was determined by four factors. First, the three communities have had external support to implement a CBNRM project. Second, these communities are involved in the management of natural resources to improve their living standards. Third, earlier investigations reported the livelihoods of local communities and environmental resources had slightly improved due to the project. Fourth, more than ten years after the project was launched, local communities

[3] GvMz- Política e Estratégia de Desenvolvimento de Florestas e Fauna Bravia- aprovada pela resolucao 8/97 do Conselho de Ministros do Governo de Moçambique e publicada no suplemento do BR -14: I-série de 1 de Abril

continue to be limited to charcoal as the only source of income generated from forests. Thus, it was important to understand the impact of the Combomune CBNRM project on community livelihoods and the impact on the available environmental resources.

1.3. Study area

The study focused on the Combomune CBNRM project. Little documentation is available for the study area. Some ecological and rainfall data were based on records from the Limpopo and Banhine National parks as these parks share ecologically similar features with the Combomune community area.

1.3.1. Combomune CBNRM project

The Combomune CBNRM project involves three village communities organized to manage natural resources. Management is meant to maximize benefits while ensuring conservation for future generations (Ackerman & Roberto 2005; GTA reports 2001). Communities form committees responsible for management and utilization of natural resources. The Combomune community received exclusive rights and responsibilities over natural resources from the Mozambican Government, and financial support from NGOs to manage their resources through a CBNRM project (Ackerman & Roberto 2005).

1.3.2. Location

The Combomune CBNRM project area is located about 380 km north of the capital Maputo, in the District of Mabalane in Gaza Province, southern Mozambique (Kasparek 2008). The community area comprises three rural villages – Madliwa, Hochane, and Chaves; all at the Combomune administrative post. At the project launch, all three communities were aggregated at Gerez which is the project headquarters located 75 km from the Mabalane District headquarters (Ackerman & Roberto 2005). The community area is between the Limpopo and Banhine National Parks, Figure 1.1. The boundaries of the Combomune community area are

Chicualacuala District in the north west, Banhine National Park in the north east, Limpopo National Park in the south west and Combomune village in the south.

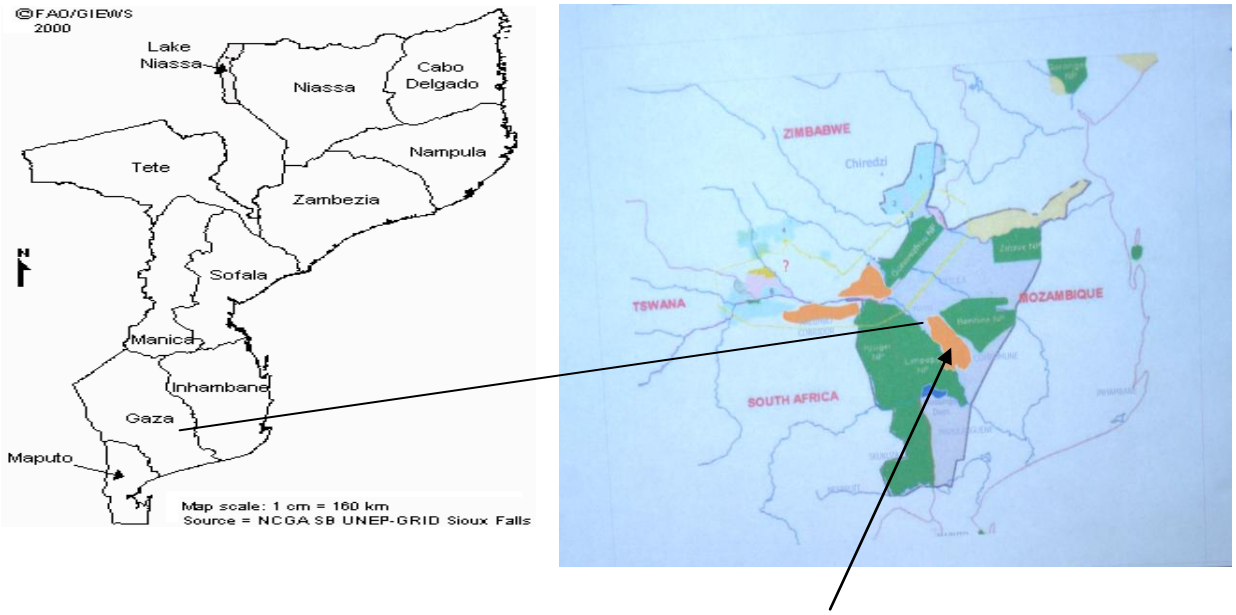

Figure 1.1: Combomune CBNRM project: Source; FAO (2000)

1.3.3. Climate

The Mabalane District has a warm, arid climate with a dry winter and a mean annual temperature exceeding 23˚C. A mean annual rainfall value of 490 mm applies to the community area (Ackerman & Roberto 2005). Instituto Nacional de Investigação Agronómica (INIA) (1999) cited in Ackerman and Roberto (2005) highlights that the dry season in the Combomune area is extended up to 261 days, with rainfall occurring from November to February. The Combomune CBNRM project area is located between the Banhine and Limpopo national parks, which have a warm and arid climate with a dry winter (Stalmans & Wishart 2005). Across the CBNRM project area there is no perennial river, only seasonal rivers flow across the project area, namely the Sungutane, Chigombe, Manjenje and Majemisse Rivers. Climatic conditions affect land productivity and lead community to limited activities as source of incomes such as forest harvest and cattle rearing.

1.3.4. Vegetation

Vegetation is often used as a surrogate or building block for defining habitats (Timberlake *et al*. 1993 cited by Stalmans & Wishart 2005). Physiognomic differences in vegetation types are determined by diversity of climatic conditions (Salomão & Matose 2007). In the Combomune there are three plant communities, *Colophospermum mopane* (mopane), *Androstachys johnsonii* (Lebombo ironwood) and mixed forest (Brower 2008; Tanago & Zunk 2007), while at the bordering Banhine National Park, eleven plant communities are known (Stalmans & Wishart 2005). The Combomune community area is covered by woodlands dominated by *Colophospermum mopane* and *Androstachys johnsonii* (Brower 2008). These species are used for production of charcoal and for housing. Local inhabitants also use woodland as a livestock free-range.

1.3.5. Demographic and socio-economic characterization of the study area

Combomune has a population of about 10 467 inhabitants (Ministério da Administração Estatal 2005). However, the project involves only three communities Madliwa, Hochane and Chaves hosting about 1067 inhabitants, distributed across 263 households (Kasparek 2008).

Generally, local inhabitants practice subsistence agriculture, livestock keeping and forest exploitation (Brower 2008; Kasparek 2008; Ackermann & Roberto 2005; Ministério da Administração Estatal 2005). Most residents are socially and economically tied to South Africa, with household members spending years across the border as migrant workers (Brower 2008).

1.4. Problem statement

Since early 1998, the Combomune community in the Mabalane District, southern Mozambique, has been implementing a CBNRM project as a core element of their participatory, household livelihoods improvement strategy. One thousand sixty-seven (1067) inhabitants live in 263 households in the rural villages of Madliwa, Hochane and Chaves. These inhabitants are directly

dependent on the natural resources in the area and are involved in the CBNRM project. However, despite the project, poverty prevails and most households remain poverty-stricken (Brower 2008). Further, the Combomune CBNRM project itself is still financially and technically dependent on external support. Regarding external dependence of CBNRM projects, Nhantumbo *et al.* (2003) found that CBNRM projects are designed to quickly achieve the intended goal of improving household livelihoods. In most rural communities, if the project does not have its own independent source of income, the goals are achieved only to the extent that there is external funding. When external funding and technical support is withdrawn, CBNRM progress stops.

There is little research data on the Combomune CBNRM project (Brower 2008), thus project evaluation is subjective. Reliable research data about the Combomune CBNRM project would measure the project impacts and benefits. Further, research data from Combomune would expand the understanding of the impact of CBNRM projects on biodiversity conservation, household livelihood improvements, and poverty reduction. Finally, additional research data would further highlight the role played by forest resources and how these resources improve the economic wellbeing of the communities (Salomão & Matose 2007).

1.5. Objective and research sub-objectives

This study explores the impact of the CBNRM project on the communities in the three villages and on the environment. The study was conducted in the context of the project implemented at the Combomune ward as a strategy to improve household livelihoods of the involved communities, while conserving environmental functions. Drawing on lessons learned at the Combomune CBNRM project, this study provides some recommendations to improve stakeholder performances and the development of CBNRM projects. The sub-objectives of the research are to understand:

1. The social impact of CBNRM project on household livelihoods
2. The economic impact of CBNRM project on household livelihoods and
3. The impact of CBNRM project on the environment

1.6. Research method

This study uses a case study approach and Participatory Rural Appraisal (PRA). In addition, a number of specific tools and techniques were also used: fieldwork reconnaissance, report review, direct observation, semi-structured interviews and group discussions. These are discussed in detail in Chapter Three, but presented briefly here.

PRA tools and techniques complemented the case study in the data gathering. Qualitative and quantitative data were collected to enable the analysis of the social and economic impact of CBNRM project on local household livelihoods and the project impacts on the environment. The additional tools and techniques also complemented the case study in the fieldwork preparation process, data collection and preliminary analysis. These tools and techniques were also important in analyzing the study objectives, sub-objectives and weaknesses. Despite PRA tools and techniques gathering information relatively quicker, they require the researcher to be exploratory, interactive, inventive and flexible in adapting them to specific fieldwork conditions (Chambers 2002; Chambers 1994).

At the onset of the research, three community leaders and three local government officials were interviewed as key informants. Three community leaders and three government officials provided the background to the project, information on how the communities were organized, the number of households and a preliminary perspective on the Combomune project. The report review consisted of numerous project documents and reports. This provided background to the Combomune project and a framework for testing field data.

The fieldwork reconnaissance was used at the beginning of the research to get an initial understanding of community relationships with the Combomune project. Through this part of the study, stakeholders were identified. The information thus gathered was used to analyze the data from the semi-structured interviews.

Direct observation was used throughout the field research to verify information as it was gathered and to prompt additional questions and follow-up. Direct observations focused on the daily work of local communities and on traditional culture.

Semi-structured interviews, led by key questions (See appendix B), were used to assess activities developed in the Combomune CBNRM project and their impacts on local communities and environmental resources. Six interviews were used to gather information on the project launch, and community involvement and participation in the decision-making processes. Further, they were also used to assess information related to resource access by local communities in the project area and to the core activities of forest harvesting and livestock keeping. Additional data gathered through the semi-structured interviews were related to livelihood strategies, food security, household habitation, education, health care facilities, marketing, transport systems and water supply systems.

Group discussions were used after the semi-structured interviews to follow-up on specific issues raised in the interviews. These discussions were used to verify, deepen and enrich the data gathered from other methods. These focused on collective, community-wide issues, whereas the semi-structured interviews focused on households.

1.6.1. Data analysis

System theory provided the framework to analyze and interpret the world views from the perspective of the community and other key stakeholders, government and the project implementers with regard to existing internal and external relationships and influences on the Combomune CBNRM project. Data analysis and interpretation consisted of qualitative descriptions of the changes in Combomune as result of the CBNRM project. Qualitative data were analyzed through comparing different answers in the questionnaires. Quantitative data gathered through the semi-structured interviews were interpreted by using simple mathematical calculation; calculating percentage used to support and analyzes qualitative data. This analysis was used to identify and evaluate changes in the household livelihoods, and their relationships

with the CBNRM project; and challenges faced by local communities in the management of the project.

1.7. Structure of the thesis

This thesis consists of five chapters. Chapter One presents the background of the study, the legal context for CBNRM, and the development context for CBNRM. It also introduces the study area and describes its characteristics. The problem statement, scope, limitations, and research methods of the study are also summarized. Chapter Two is a literature review of CBNRM– its concepts, objectives, and background. It also explores the opportunities and challenges of the CBNRM approach. Chapter Three introduces and describes the research methodology. Chapter Four presents the results of the study, data interpretation and discussion of the findings. Chapter Five presents conclusions, recommendations and suggestions for further research.

Chapter 2: Literature review

This chapter discusses key aspects related to community-based natural resource management (CBNRM). It addresses the concept, definition, origins and the historical perspective of CBNRM. It also defines rural development, explores the relationship of CBNRM with social, environmental and economic objectives of the United Nations and discusses the impact of CBNRM on the goals of rural development. It presents a framework for managing CBNRM programs in the context of stakeholder partnerships and benefit sharing. The reality and challenges of implementing CBNRM are briefly described. Finally, the summary suggests a conceptual model, including indicators, for assessing CBNRM programs.

2.1. Community Based Natural Resources (CBNRM), concept and definition

This section discusses the concepts of natural resource management and CBNRM. It then provides a working definition for CBNRM. Finally, it presents a brief overview of origin and history of this approach to natural resource management.

2.1.1. Concept of natural resource management and CBNRM

Natural resource management (NRM) is the protection and wise use of areas of significant indigenous vegetation and significant habitats of indigenous fauna (Forgie, Horsley &Johnston 2001). It involves taking care of natural resources such as land, water, marine and biological systems, with a particular focus on how the management affects the quality of life for both present and future generations. It is about the long-term implications of actions, the thinking about the future and not just the present (Rudquist *et al*. 2004; Ghimire & Pimbert 2000).

Shyamsundar *et al.* (2005: 10-16) and Jones (2004a: 12-14) associate CBNRM with a diversity of terms, such as “participatory”, “community-based”, “collaborative”, “joint and popular natural resource management”. These terms are often used interchangeably, but may also be used to highlight the specific distinctiveness of associated approaches. Thus, the concept of CBNRM

tends to be associated with approaches "where the focal unit for joint natural resource management is the local community" (Shyamsundar *et al*. 2005:26).

The concept of CBRNM is a marriage of NRM with sustainable development practices. CBNRM arose out of the need to achieve the objectives of conservation and of sustainable development in the context of the people who relied on the natural resources for their livelihoods (Maguranyanga & Rihoy 2007; Jones 2004a; Mehta & Heinen 2001). As is argued by Engle and Korf (2005), natural resources are assets of significant importance to the livelihoods of many rural households. CBNRM makes it possible for natural resources to be managed both an environment and a socio-economic issue.

The concept of "community-based" approaches is grounded in participation theory. This theory promotes participation of local communities and other relevant stakeholders in natural resource management (Jones *et al*. 2006; Carol & Marmorek 2003; Cassidy 2001). Community-based approaches use community social organizational structures, such as committees and traditional leadership, to motivate community participation in resource management.

In the context of natural resource management, the concept of "community-based" has a particular context; there was a need to incorporate it into law. Jones *et al.* (2006), Njaya (2005) and Jones (2004c) noted that governments recognized the rights of local communities to use natural resources and therefore passed laws to create a legislative framework that entrenches these rights and delegates management powers over their natural resources. Often they then provide assistance to user communities to enforce these regulations.

2.1.2. Definition of CBNRM

Various researchers and authors have posited definitions of CBNRM. They all address issues of community participation and decentralized decision-making in the context of achieving the objectives of conservation and socio-economic development.

Schmink (1999) defines community-based natural management as a particular form of project design and implementation seeking to achieve social equity through community participation in natural resource management. He considers CBNRM as a strategy seeking to reconcile the dual goals of biodiversity conservation and improved livelihoods for local communities. He further argues that CBNRM should involve resource users because it is an inclusive resource management program (Schmink 1999). CBNRM differs from resource management aimed solely at economic development or environmental preservation, without regard for social equity (Orr 2000; Schmink 1999).

Rice (2001: 6) defines CBNRM as the approach to natural resource management "where rural communities are once more given the right to manage and benefit from the resources with which they live and which they need for their livelihoods." Similarly, Nhantumbo *et al.* (2003:5) define CBNRM as a "decentralization process aimed at giving grass roots institutions the power of decision-making and rights to control their resources."

Shyamsundar *et al.* (2005: 2) define CBNRM as a community-centered approach employed to improve local development and biodiversity conservation, particularly in communal areas. However, Engle and Korf (2005) caution that CBNRM is based on the assumption that effective management is more likely when local resource users have shared or have exclusive rights to make decisions and benefit from resources.

DANIDA (2007) defines CBNRM as co-management of natural resources, a partnership by which two or more relevant social actors collectively negotiate terms and conditions underlining resource management processes with regard to local community development.

There is general agreement on the pillars of CBNRM which are capacity building, income generation, community organization and empowerment Mansur & Cuco (2001) cited by Nhantumbo, *et al*. (2003). However, Roe, Nelson and Sandbrook (2009) consider that CBNRM has three pillars which are community empowerment, economic gains and environmental sustainability.

Based on preceding definitions, CBNRM could be defined as an integrated participatory resource management approach applied to rural development and environmental management programs.

2.1.3. Origins and historical perspective of CBNRM

Globally, in the early 1950s, the top-down approach to development was dominant. Its focus was primarily on economic growth, regardless of either community participation or social development priorities (Orr 2000). From the early 1950s through to the 1970s top-down development approaches continued to be used. These approaches undermined community participation in development activities (Wainwright & Wehrmeyer 1998). Applying this approach essentially meant that a single stakeholder took primary responsibility for natural resource management as well as for rural development, and generally has authority over the governing processes (Forgie *et al*. 2001). However, the top-down approach failed meeting these dual objectives. And this failure is attributed to the use of top-down development approaches (Arances *et al.* 2001).

Simultaneously, the top-down approach has been applied to natural resource conservation and management programs, but only by government agencies (Fabricius, in Palmer *et al*. 2000). The primary objective of this top-down approach was to maximize economic growth through accelerated industrialization, with little emphasis on social development and rural community well-being (Whitman 2000). Thus, in the early 1950s, technology became dominant in the development paradigms based on evolutionary beliefs that economic growth could be the solution to sustainable development (Novelli & Scarth 2007). Despite the recognized usefulness of top-down approaches in the management of industrial development, this centre-driven approach excludes different stakeholders in the process of managing natural resources, even if the community is involved and dependent on those resources (Kumar 2005). It is an approach that focuses on external impositions. Further, it is the approach in which decision-making processes only involve top managers of a given organization or project (Novelli & Scarth 2007).

Globally, the origins and history of community-based natural resource management are imprecisely traced (Kumar 2005). The coalescing of development and conservation gave rise to the CBNRM participatory. CBNRM can be traced to the 1950s and 1960s; this was the earliest shifting away from the technology-dominated paradigm toward a more people-centered approach (Wainwright & Wehrmeyer 1998). This period corresponds with the origin of the community-development movement (Kumar 2005; Chambers 1983). However, Kumar (2005) argues that between the 1950s and 1960s community-development movements had little success beyond creating government awareness of the need to involve community in natural resource management. In the early 1980s, in some developing countries, including southern African countries, there emerged community organizations interested in collaborative natural resource management processes (Jones *et al.* 2006; Kumar 2005; Chambers 1983). The focus on community gained importance in the mid-1980s with the emergence of participatory methods (Chambers 1983). Since then community participation has been recognized as necessary part of development projects in most developing countries – most project are now participatory in design (Kumar 2005).

CBNRM, as a new rural development paradigm, is supported by the more recent international policies on development advocating decentralization and power devolution to local communities; and collaborative management and decision-making. These international policies encourage community participation "to become more involved in decision-making to manage the resources on which their livelihoods are based" (Korf 2005:12). Virtanen (2004:2) concludes, "The success of the CBNRM approach is linked to its compatibility with the new international policy agenda emerging after the collapse of the socialist regime and the ending of the Cold War in the early 1990s".

The application of CBNRM has, however, been constrained by the challenge of defining natural resource management, community participation, and rural development (Nhancale 2007; Brian 2006). An additional challenge is a general delay in the adoption of participatory approaches in rural development. Finally, CBNRM is often resisted because of its primary aim of participation; these approaches would inevitably result in governments having to share power with NGOs, private entities and local communities (Korf 2005).

Further, despite innovative rural development policies globally recognized as adequate to address unsustainable development, most countries still embark on exclusive and centralized decision-making processes. Using non-participatory development approaches affect not only the resources and household livelihoods, but also all humanity through environmental degradation and climatic changes (Wong, Roy & Duraiappah 2005).

2.1.4. CBNRM experience in Africa

Currently in Africa, management of natural resources is changing, with a shift from state to local participation, with a focus on local community participation (Novelli & Scarth 2007). Inclusive processes for natural resource management were only recognized and accepted from the early 1980s to the 1990s (Blaikie 2006). In the mid-1980s in the southern African region, some countries expectantly started CBNRM programs to empower local communities to manage and benefit from natural resources (Sebele 2009; Blaikie 2006; Whitman 2000). Thus, the 1980s is considered the beginning of a new era in natural resource management practices in southern Africa (Brian 2006; Jones 2004b). Southern African governments have adopted the CBNRM approach as a way to promote sustainable land use, biodiversity conservation, and rural development (Sebele 2009). Thus, over the last three decades, a number of southern African countries have implemented community-based natural resource management as a part of their rural development programs (Turner 2004a:5; Turner 2004b: 48).

Most southern Africa conservation programs, particularly the CBNRM projects, are undertaken in areas (e.g. rangelands) with low productive and income potential with the objective establishing alternative and more profitable uses of the land (Brian 2006). Specifically, rangelands are areas with peculiar characteristics such as low and erratic rainfall, frequent droughts, and poor soils (Maxwell & Ashley 2001). These characteristics make them suitable only for wildlife and livestock farming (Jones 2006). Therefore, CBNRM programs generally have been implemented in the rangelands to maximize their partial benefits and to improve local livelihoods (Campbell *et al*. 2001).

The CBNRM approaches adopted in southern African countries differ in focus because of legal frameworks governing the collective management of natural resources in these countries. The respective emphases range from disbursement of economic benefits and the development of local-level resource management mechanisms, to ecological concerns, and social and cultural issues (Mosimane & Aribeb 2005). Notwithstanding country-specific legal adaptations, CBNRM has become widely recognized and accepted as an approach to conservation and development facilitating improved conservation impacts, economic benefits and environmental governance (Wirbelaeur *et al*. 2005). Schmink (1999:1) observes that, "as development workers have become more concerned with environmental sustainability, conservationists have begun to recognize the need to work for the benefit of local peoples' livelihoods". This emerging reciprocal understanding results in an increased consensus on the need to experiment with new ways to work with local communities on efforts to improve the management of natural resources and rural development programs (DANIDA 2007; Maxwell 2004; Maxwell 2003).

2.2. CBNRM and rural development

Rural development is the improvement of local livelihoods conditions through sustainable use of available resources (Schmink 1999). In the context of this study, rural development is evaluated through socio-economic and environmental impacts associated with the global development principles sustaining the United Nations development Goal.

2.2.1. CBNRM in relation to social, environmental and economic objectives of the UN

Community-based natural resource management priorities address simultaneously the triple objectives of the United Nations Millennium Development Goals (UN-MDGs) which are grounded in the overarching goal of sustainable development and seek to achieve social and economic in the context of environmental preservation (Maxwell 2004).

The three CBNRM pillars correlate strongly with the MDGs of the United Nations which were designed to address a broad range of issues related to unequal development, by 2015 (Maxwell 2003). The United Nations MDGs approved by the General Assembly are:

- eradication of extreme poverty and hunger;
- achievement of universal primary education;
- promotion of gender equality and empowerment of women;
- reduction of child mortality;
- improvement of maternal health; the combat of HIV/AIDS, malaria and other diseases;
- environmental sustainability; and
- development of global partnerships for development.

CBNRM aligns well with the UN development objectives which require commitment to good governance and reinforce participation and involvement of all stakeholders in rural development policy and strategy design and implementation (Brian 2006). Bodmer (1994) cited by Schmink (1999) concludes that CBNRM is used to add value to resources and reduce the negative impact of this use through provision of clear incentives for conservation with community participation.

Maxwell (2003) recounts three of the UN-MDGs in the light of NRM. The first is to eradicate extreme poverty, which can be achieved, in part, through equal rights to access natural resources. A second is to ensure environmental sustainability, which can be achieved through the integration of the principles of sustainable development into country policies and programs and reverse the loss of environmental resources due to overexploitation. The third is creating a global partnership for development through further development of open rule and non-discriminatory access to financial systems – this is essential for successful NRM. This global partnership includes a commitment to good governance by governments, rural communities, and developing agencies (Maxwell 2003).

Similar to the UN-MDGs discussed by Maxwell, CBNRM pillars also cover poverty reduction, environmental sustainability, participatory approaches, integrated rural development and good governance. In putting this to effect, local communities, government departments and development agencies are key CBNRM stakeholders. As partners, they address rural

development and environmental sustainability through developing program governed by integrated rural development pillars (DANIDA 2007).

2.2.2. Impact of CBNRM on the goals of rural development

The objective of CBNRM is to maximize benefits from natural resources locally available while limiting environmental impacts. In southern Africa, governments encourage involvement of local communities in CBNRM as a way to improve the development of rural areas (Blaikie 2006). Specifically, financial and technical support has been devoted to the development of collaborative management strategies (Nhantumbo *et al.* 2003). These strategies commit stakeholders to being organized as a way to get benefits from natural resources. However, the impact of CBNRM on the environment and household livelihoods is still insignificant (Salomão 2002).

Natural resource conservation, laws and land use policy have been adopted or adjusted to ensure that the various stakeholders and government increasingly share the benefits with the poor rural majorities (Salomão & Matose 2007). CBNRM involves local communities in development and conservation of natural resources relied on by most rural communities for their livelihoods (Sebele 2009; Turner 2004b). It is the strategy that addresses environmental problems such as pollution and degradation. CBNRM is designed to alleviate rural poverty by empowering communities to manage resources for long-term social, economic and ecological benefits (Phuthego & Chanda 2004). However, in order for CBNRM to effectively address rural poverty and environmental sustainability, then implementation strategies need to address power devolution to local resource-users (Jones 2004a) as the majority of rural communities are still powerless (Nhantumbo *et al*. 2003). Natural resource conservation legislation should set guidelines for power devolution to local communities to manage and sustainably use natural resources (Salomão 2002). This would enable local communities to control natural resources over-exploitation and threats to environmental sustainability (Wong *et al.* 2005).

2.2.3. CBNRM management framework: stakeholders in partnership and benefit sharing

The CBNRM framework links management objectives to ecosystem management, integrated management, collaborative management and adaptive management for environmental sustainability and rural development Figure 2.1.

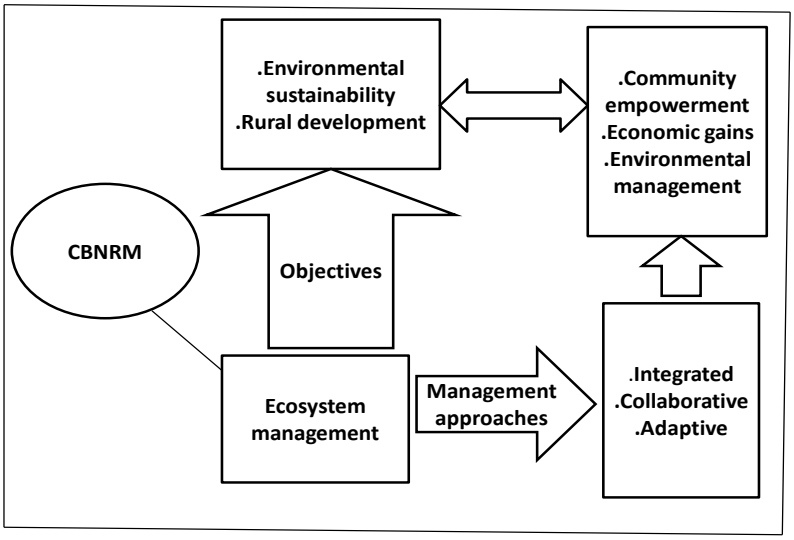

Figure 2.1: CBNRM framework, developed from (Roe, Nelson & Sandbrook 2009)

The CBNRM framework is becoming an integral part of most government policies and programs (Roe, Nelson and Sandbrook 2009; Nhantumbo *et al*. 2003). In many countries, this framework has resulted in changes in resource access and use patterns (Castro & Engel 2007). The framework also offers local communities and stakeholders new possibilities for resource management and benefit sharing. Most southern Africa countries have successfully applied the CBNRM framework to promote community and partner participation in the identification of problems affecting ecosystems; and in designing management and development strategies to address poverty and environmental sustainability (Schmink 1999). CBNRM creates collectivism in natural resource management (Mosimane & Aribeb 2005). Jones *et al.* (2006) conclude that governments, non-governmental organizations (NGOs), and donors promote CBNRM as a means of generating income from various natural resources to address poverty. However, most rural people in Africa remain poverty-stricken (Chambers 1998).

2.2.4. Assessment of CBNRM contribution to rural development

An important way to assess CBNRM is to make a critical evaluation of its contribution to poverty reduction and biodiversity conservation with an emphasis on household livelihood improvements. However, environmentalists acknowledge their lack of knowledge and skills to assess CBNRM costs and outcomes (Brian 2006). Further, little is currently known about the contribution of CBNRM in rural development and environmental sustainability (Sebele 2009; Jones *et al*. 2006; World Bank 2004; Molnar, Scherr & Khare 2004), and the impact of CBNRM on poverty alleviation is probably undervalued (Brian 2006). Most CBNRM data focus at the national or community level, so there is little indication of the impacts at household levels. Brian (2006) concluded that the potential contribution of CBNRM to poverty reduction should be measured through social development and environmental sustainability.

Traditionally, when assessing CBNRM, intangible benefits such as empowerment, security against shocks, capacity building, safety nets, and the building of community institutions are seldom considered (Shyamsundar *et al.* 2005). Jones *et al.* (2006: 5-7) analyzed the southern African CBNRM programs and concluded that, "Currently there are no monitoring frameworks to adequately measure impacts of CBNRM programs on the various dimensions of poverty." CBNRM programs lack data to be used in evaluating aggregate benefits at community level and at household level. Further, Jones *et al.* (2006) observed that indicators should be adopted to assess CBNRM program contributions to rural development and poverty alleviation. Finally, he suggests a few key indicators such as household socio-economic well-being, establishment of community institutions, employment, community empowerment, construction of social infrastructure, improvement of social welfare and environmental awareness. These indicators could guide evaluation of specific CBNRM program components and lead to an understanding of the extent to which CBNRM contributes to community living conditions and to its reality and challenges.

2.3. Reality and challenges of implementing CBNRM

Challenges are unplanned events negatively influencing a course of activities (DANIDA 2007:15). Most CBNRM advocates argue that there are a number of issues constituting challenges to CBRNM programs. Campbell *et al.* (2001) identifies the following challenges: community socio-cultural systems; dependence on external funding and technical assistance; political systems and government structure; and legislation and policies. These challenges impinge on community institutions and development agencies often resulting in the adoption of unsustainable strategies to address household livelihoods and environmental problems, and strategies that vary significantly from the framework. A lack of governmental legitimacy in local organizations creates a perception of government being unable to devolve power and responsibilities to local communities to manage resources (Salomão & Matose 2007). Some governments undermine community organizations which lack accountability and capacity to manage natural resources and contribute to local development (Graham 2008); rather than building capacity, they retain direct control over resource management. The challenges identified by Campbell *et al.* (2001) are separately and briefly discussed below.

2.3.1. Communities socio-cultural systems and resource ownership

The implementation of CBNRM is affected by socio-cultural systems and by resource ownership. Socio-cultural systems encompass local community traditions and beliefs. These socio-cultural systems influence community perceptions of resource management. CBNRM is a resource management paradigm designed to highlight the value of cultural practices of local people; thus it should be an appropriate alternative model to combat rural poverty (Carissa, Marlene & Anantha 2005). Notwithstanding the cultural sensitivity of the CBNRM approach, is it often the case that traditions and beliefs continue to lead local communities to resist collaboration in the implementation of CBNRM programs (Salomão & Matose 2007). Resistance to the acceptance of CBNRM programs postpones a variety of social and economic benefits to communities (van der Jagt, Gujadhur, & van Bussel 2000). A key factor in community resistance to CBNRM programs is the issue of resource ownership. In order to change community perceptions towards CBNRM programs, the community must have a sense of ownership of the resources (Carissa,

Marlene & Anantha 2005). Without this local communities are unwilling to support either management of government property or management principles for natural resources (Novelli & Scarth 2007). Further, as will be discussed in the next section. While the intention of the CBNRM is to work within local socio-cultural patterns, the financial arrangements often override this.

2.3.2. Financial and technical dependence of CBNRM programs

Leadership and management functions of CBNRM programs in most cases remain directly connected with the funding organization (Malo, Odera & Ochuodho 2006). Thus, CBNRM programs remain identified with donor agencies and the expatriate personnel managing the program. Rihoy and Maguranyanga (2007) argue that the philosophy, science, and data underlying CBNRM approaches lack 'indigenous' conceptualization and development because the program remains connected to donor agencies. This connection is a direct result of financial and technical control held by donor agencies. This creates dependence which gives rise to community perceptions that CBNRM is an imported environmental paradigm, with little relevance and legitimacy to local culture and development.

External funding and technical dependence challenge CBNRM implementation and sustainability. After donor support ceases, over-reliance leads CBNRM programs to collapse and community memberships to disintegrate. Selman (2004) concludes that the key challenge in most countries is finding ways of allocating limited government resources to stimulate community initiatives. Limited government resources and lack of accountability, associated with poor financial management at community level determine the external power involvement in CBNRM programs. Rihoy and Maguranyanga (2007) observed that, at community level, there is insufficient capacity to manage and account for CBNRM funds. Most rural communities lack the technical capacity and management skills to manage their resources. Capacity building through responsibility-sharing among communities and external agents has not strengthened sufficiently to build capacity in the involved communities to manage financial resources (Malo *et al.* 2006; Shyamsundar *et al*. 2005). Further, some government structures and political systems are

becoming in most cases challenge to the implementation of CBNRM through community resistance to involve with government structures driven by political objectives.

2.3.3. Government structures, political systems and institutional resistance to CBNRM

Resource management programs designed by government agencies are influenced by specific government structures and political systems. Driven by political objectives, most government systems use a top-down approach to natural resource management (Malo *et al.* 2006) and their involvement is perceived to be (and often is) extractive (Salomão & Matose 2007). For example, Rihoy and Maguranyanga (2007) observed that a CBNRM program in Botswana was affected by its foreign origins; communities and the government were indisposed to support what they perceived as foreign conservation principles.

Further, government agencies tend to be protectionists of their traditional influence and authority. In most cases they are unwilling to share responsibility with other stakeholders to implement conservation action plans not within their domain (Forgie *et al.* 2001). They have demonstrated unwillingness to test the CBNRM approach as a promising approach to improve rural development and alleviate poverty (Malo *et al.* 2006). Government reluctance to adopt CBNRM programs may result from fear of threats to its structure. This has become one of the greatest challenges to CBNRM approaches (Malo *et al*. 2006).

There is also resistance to change or to adopt CBNRM by those traditionally involved in natural resources management. NGOs, National Parks Board and other environmental agencies, normally they invest interests in maintaining the *status quo* (Agrawal & Gupta 2005; Ndunguro & Hahn 2002; Orr 2000; Agrawal & Ribot 1999).

Despite institutional resistance and a general belief that government and its agents are extractive rather than supportive, local communities are, nevertheless, slowly engaging in CBNRM programs (Salomão & Matose 2007). In a few countries, community engagement has triggered amendments and changes to national legislations and policies enabling power devolution and

slowly motivating community participation in resource management and use (Shyamsundar 2005). Also see Section 2.3.4.

However, community-level adoption of CBRNM has not fully addressed the situation. Even with the introduction of micro-enterprises to benefit from natural resource management and communities establishing their own rules and regulations governing natural resource management and sustainable use by such enterprises, there remain enormous weaknesses around community authority to enforce those rules and regulations (Rihoy & Maguranyanga 2007). Further, the economic value of natural resources base for community enterprises are not fully explored or information about economic value of natural resources is unavailable (Pearce 2001).

2.3.4. Natural resources management legislation and policies

In general, legislation and policies governing control and use of natural resources are not facilitating sustainable management at the local level (Campbell *et al.* 2001). Government policies, where available, are unable to effectively address heterogeneity; ensure equitable distribution of benefits at community level; and provide adequate support to enhance sustainable outcomes (Shyamsundar 2005; Shyamsundar *et al*. 2005).

Governments and proponents of CBNRM approaches acknowledge communities would certainly support CBNRM programs generating monetary revenue to be shared equitably among individuals and community participants. However, revenue sharing often lacks comprehensive regulations to harmonize its distribution (van der Jagt, Gujadhur & van Bussel 2000). Financial policies at community level are, in some cases, inadequate to ensure that people in the community benefit equitably. Equitable income distribution, for example, faces the challenge of how to meet aspirations of complex and heterogeneous groups of communities and stakeholders involved in the management process; not all members of the community want the same things.

Despite these limitations, there are a number of CBNRM programs which accrued and shared monetary revenues among participants that have been successful and supported at the grass roots level (Shyamsundar *et al*. 2005; Kumar 2005; Arntzen *et al*. 2003).

2.4. Summary

This section summarizes the development context of CBNRM, and addresses issues of assessing impact of CBNRM programs. Finally it presents a conceptual model with suggested indicators to assess the impact of CBNRM programs.

2.4.1. CBNRM and the development context

CBNRM is an integrated resource management approach applied to rural development and environmental management programs. It aims at the improvement of rural household livelihoods and environment sustainability through the involvement of local communities and other relevant stakeholders in the management of natural resources. However, little is currently known about social and economic CBNRM program impacts on household livelihood and on environmental sustainability.

Despite promoting institutional change, CBNRM approaches need to be adjusted significantly to improve the lives of poor people and the resources on which they are dependent. To be effective, CBNRM approaches require donors, and policymakers to recognize deficiencies and address issues of project design, power devolution and implementation challenges (Salomão & Matose 2007).

Household benefits are an important incentive in motivating communities and stakeholders to participate in integrated resource management initiatives. Benefits derived from CBNRM programs need to be distinguishable from the benefits of other development or support initiatives to motivate participants. In southern Africa most households involved in CBNRM projects derive specific benefits, including cash dividends, employment in lodges and tour agencies, income from selling handicrafts and other tourism-related services, and receiving meat from culling operations (Arntzen *et al*. 2003).

Understanding distinct impacts on household livelihoods and the environment may reinforce the dissemination of CBNRM approaches as viable rural development strategies. Southern African

CBNRM programs have primarily involved conservationists, protected areas and neighboring communities as a way to promote sustainable resource management. Currently, CBNRM programs are part of rural development agendas and involve various stakeholders (Sebele 2009; Jones 2006). Although there are challenges along the way, top-down approaches are being replaced by participatory natural resource management approaches. Governments are encouraging rural communities to formally participate in natural resource use as a way to improve local conditions and ensure sustainability of environmental resources. Participatory management system approaches are being adapted and adjusted to meet the needs of a new rural development era.

Most southern African Governments encourage implementation of CBNRM programs in areas with low productive and income potential e.g. rangelands. Rangelands are areas with low and erratic rainfall, frequent droughts, and poor soils (Maxwell & Ashley 2001). Brian (2006) found that these lands are low productive areas and used with the objective to establish alternative and more profitable uses of the land (Brian 2006). Rangelands have peculiar characteristics making them suitable only for wildlife and livestock farming (Jones 2006). Therefore, CBNRM programs generally have been implemented in the rangelands to maximize their partial benefits and to improve local livelihoods (Campbell *et al*. 2001).

The southern African experience reveals that most countries in the region have adopted CBNRM approaches in combination with the UNMD goals. CBNRM approaches are based on participatory methods and tools, where participatory methods are used as guidelines for resource management towards improved household livelihoods and environmental sustainability. CBNRM approaches have resulted in collaborative decision-making processes with regard to natural resource management and rural development responsibilities. This reinforces community institutional and organizational structure, participatory frameworks and development governance.

The success of CBNRM approaches depends on an adequate combination of different factors such as the ability to involve local communities and ensure active participation, capacity to motivate stakeholder partnerships and their active participation in different management systems. These factors enable communities to individually and/or collectively maximize benefits from

CBNRM opportunities. However, CBNRM should not be implemented in isolation. It should be implemented along with other sustainability-based approaches, such as improved agricultural practices.

CBNRM programs help to diversify activities and generate off-farm incomes (Jones 2006). They facilitate local community and institutional empowerment, and provide safety nets to address a number of social key issues, such as empowerment and resource ownership necessary to combat poverty. CBNRM programs raise multiple opportunities, for example ecotourism, employment, joint ventures and the acquisition of skills – all of which can be channeled to the benefit of local development and livelihood improvement. However, internal and external factors such as political systems, government and institutional resistance, socio-cultural factors and a tendency toward donor dependence together with high poverty rates and low technical and financial capacity have hampered the implementation and impact of CBNRM programs. While multiple factors are recognized to negatively affect the implementation of CBNRM there is a need to assess the impact of CBNRM programs on the overall objectives of improving rural household livelihoods and environmental sustainability.

2.4.2. Assessing the impact CBNRM programs

Assessment of CBNRM programs needs to be based on its impact on natural resources management and on rural development objectives to make a distinction between intended environmental sustainability and socio-economic objectives (Pearce 2001).

2.4.2.1. An overview of assessment issues

Assessment of the impact of CBNRM programs on the communities and environment is critical. This assessment involves the evaluating impact of CBNRM programs on the target community. Pearce (2001) found that thus far when, evaluated in terms of the accomplishment of program objectives and participant satisfaction, CBNRM programs have shown only short term successes. The question arises as to the range of criteria to be used for assessing CBNRM programs.

In southern Africa, this assessment needs to consider specific areas and contexts of rural household status and available resources, such as financial and technical, to support the program (Nhantumbo *et al.* 2003).

CBNRM programs are designed to improve socio-economic conditions through biodiversity conservation (Jones 2006); and while CBNRM programs can contribute to poverty reduction and biodiversity conservation, their design and implementation faces challenges (Jones *et al.* 2006). These challenges include local community organizational systems, inadequate land for proposed activities, high poverty rates, and natural resource vulnerability (Campbell *et al*. 2001; Maxwell & Ashley 2001). These challenges need to be considered in the assessment to determine constraints which might have negatively affected CBNRM programs from contributing positively to socio-economic improvement and environmental sustainability.

Jones (2006) notes that CBNRM programs most often have been evaluated in terms of income generation, household livelihood diversification, buffers against risk and shocks and community empowerment. However, Brian (2006) argues that it is also important to understand the relationship between CBNRM goals, poverty alleviation objectives and linkages with the different stakeholder objectives. CBNRM programs should primarily address local community exclusion in the management and benefits derived from natural resources; and positively contribute to biodiversity conservation and household livelihood improvement (Jones 2004b). In addition, CBNRM are meant to capitalize opportunities and maximize benefits from natural resources to meet community needs (World Bank 2004; Arntzen *et al*. 2003).

Therefore, CBNRM program assessment needs to consider the impact of community participation on resource management and use, and on the environment (Nhancale 2007). These impacts are highlighted in the United Nations Millennium Development Goals emphasizing sustainable use of natural resources to alleviate extreme poverty while considering the needs of future generations (Maxwell 2004; Maxwell 2003). Assessment of CBNRM programs needs to be based on its impact on natural resources management and on rural development objectives to make a distinction between intended environmental sustainability and socio-economic objectives (Brian 2006; Maxwell 2003). These objectives are biodiversity conservation, community

empowerment, poverty reduction, sustainable livelihoods and income generation (Salomão & Matose 2007). These objects should inform the criteria for assessment.

2.4.2.2. Indicators for assessing CNRM

Based on the literature discussed above, a conceptual model Figure 2.2 has been developed to show how the CBNRM influences household livelihoods and environmental sustainability. This conceptual model suggests some indicators to enable the assessment of the impact (both positive and negative) of CBNRM programs, Positive impacts result in sustainable rural development, environmental sustainability and improved socio-economic conditions for most rural households. Negative impacts result in high poverty rates and increased environmental degradation.

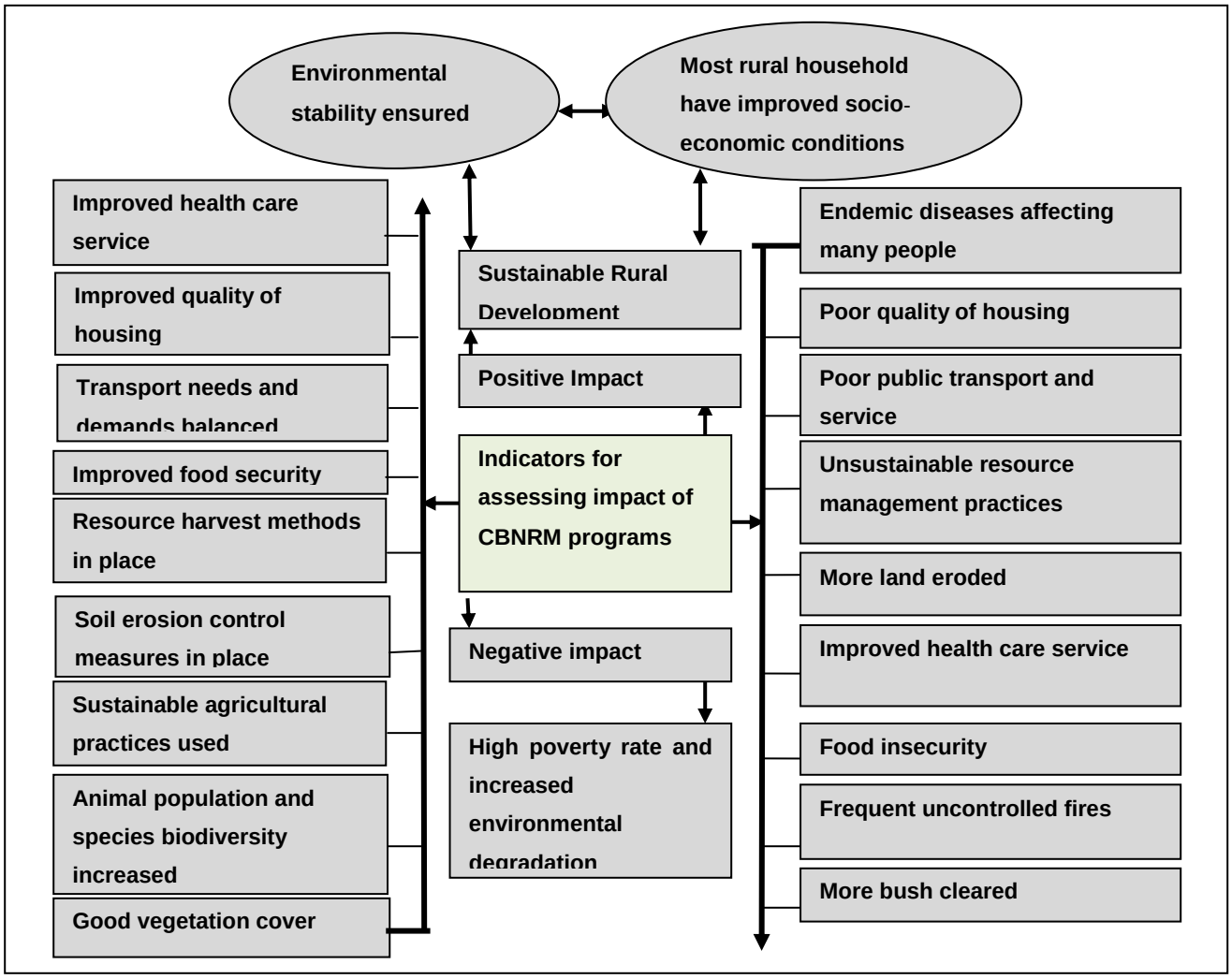

Figure 2.2: Conceptual model for assessing CBNRM programs

The conceptual model Figure 2.2 incorporates the World Bank indicators identified by Jones (2006) which are used to evaluate achievements in poverty alleviation. The World Bank indicators assume that CBNRM programs increase economic opportunities, community empowerment and ensure security against socio-economic shocks. However, these indicators are not comprehensive and they do not capture all factors in which CBNRM programs can contribute to combating poverty and to environmental sustainability. Nevertheless, they do provide an indication of the general impacts that can be easily checked in field (Pearce 2001). To address missing elements, the model in Figure 2.2 provides additional indicators focusing on services and activities resulting from community organizational systems required for community-driven development and sustainable rural development approaches suggested by Campbell *et al*. (2001).

The conceptual model provides a base from which CBNRM proponents and critics of the approach can build arguments regarding its contribution to combating poverty. Currently, it is difficult to trace CBNRM program contributions to socio-economic and environmental improvements due to little impact assessment data against which CBNRM approaches can be evaluated. Further, available evaluation data for CBNRM programs is limited to income generation which is only one aspect of rural poverty (Jones 2006). Therefore, indicators suggested in Figure 2.2 aim to identify additional ways in which CBNRM programs, as a rural development approach, can be evaluated with regard to its contribution to combating poverty while maintaining environmental sustainability. However, the significance of the model in the context of evaluating the socio-economic impact of CBNRM program and the impact on environment depends on confidence drawn after fieldwork trials.

Chapter 3: Methodology

This chapter presents the methodology to the research done at the Combomune CBNRM project. It outlines the main approach used, the additional tools, techniques applied, and other factors of the research design.

The study was conducted using a case study and Participatory Rural Appraisal. In addition, a number of specific tools and techniques were also used: fieldwork reconnaissance, direct observation, report review, questionnaires, and semi-structured interviews. All of these tools and techniques are commonly used within the framework of a case study (Leedy & Ormrod 2001). These additional tools and techniques enabled researchers to investigate the differing standpoints of the beneficiaries and other stakeholders involved in management decision-making. These tools and techniques were used as a complement to the case study method when assessing social and economic improvements and the project contributions to environmental management.

To assess the economic, social, and environmental impacts of the Combomune CBNRM project, this study used a before-after impact model. The model is based on respondent reflections on personal life experiences (Kaaria *et al.* 2008). Respondents were asked to reflect on their situation before the project to compare with the current situation. Although recall data has some disadvantages because it is dependent on respondent memories, it provided a guideline for the project impact assessments with regard to household livelihood improvement and also to ascertain the project impact on environmental sustainability.

This chapter is organized into six sections. Section 3.1., describes the case study approach adopted in the research. Section 3.2., describes participatory rural appraisal. Section 3.3., presents additional tools and techniques used in the research. Sub-sections 3.3.1-3.3.5., describe fieldwork reconnaissance, direct observation, documentary data, quantitative survey, focus group interviews, and semi-structured interviews, respectively. Section 3.4., briefly describes sampling. Section 3.5., describes the surveying process at the study area. Finally, section 3.6., summarizes the methods and process used to analyze data.

3.1. Case Study

A case study is designed to facilitate in-depth understanding of a "particular individual, program, or event" (Leedy & Ormrod 2001:149). The use of a case study is justified when seeking to understand events and their relationships (Kaaria *et al.* 2008).

While this method is usually applied to two or more cases, it is also used to study individual cases and is "especially suitable for learning about a little known or poorly understood situation" (Leedy & Ormrod 2001:149). It is noted that when studying a single case, it may not be possible to generalize the findings to other cases. In this study, the case study approach was applied to a single case with the purpose of revealing the relationships between the Combomune CBNRM project and household livelihood improvement. Stake (1995) and Yin (1984) cited by Kaaria, *et al.* (2008) concluded that case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Case study approach, if systematically implemented can result in reliability and generality of findings, even with a small number of cases (Kaaria *et al.* 2008).

3.2. Participatory Rural Appraisal

Participatory Rural Appraisal (PRA) is a research method to involve local communities in the assessment of problems concerning them; and to develop action plans to address these problems (FAO 1997). Gaventa (1991) cited by Doyle and Krasny (2003) defined PRA as a tool to simultaneously create knowledge, education, empowerment and action. PRA is an approach for shared learning (Doyle & Krasny 2003). PRA evolved from rapid rural appraisal (RRA), a set of informal techniques used by development agents in rural areas to collect and analyze data (World Bank 2004). This approach empowers local communities to investigate problems. It comprises a group of tools and techniques to encourage communities to actively participate in analyzing their life conditions to create a correct action plan for improved life conditions. PRA tools and techniques are well suited to address case study questions. Further, PRA tools and techniques are low cost and quick to implement (Mudhara & Shoko 2004). Therefore, PRA tools and techniques relevant to a case study were used for data collection at the Combomune CBNRM project.

3.3. Additional tools and techniques

Additional methods relevant to a case study and to PRA were used for data collection in this study. These methods were: fieldwork reconnaissance, direct observation, report review, questionnaires, group discussion and interviews. Report review and fieldwork reconnaissance were carried out as a research preparation process leading to the three-month field research.

3.3.1. Fieldwork reconnaissance

Fieldwork reconnaissance is a trip to a research area with the purpose of collecting sample data for a preliminary assessment (Carr, Nipper & Plumlee 2000). Fieldwork reconnaissance is a preliminary survey to determine study area conditions (JICA[4] 2009). It aims to collect basic information for actual fieldwork planning. A preliminary survey was undertaken to initiate contact with the community leadership, project management committees and local government officials at the Combomune ward. Research equipment material and assistance, such as transport camping material and field guides were planned from the preliminary survey results.

3.3.2. Direct observation

Direct observation is a fieldwork technique mostly used by anthropologists and sociologists to collect qualitative and quantitative data leading to an in-depth understanding of community practices, motivations and attitudes. Direct observation involves investigation and understanding of the project background and the general characteristics of the beneficiary communities (World Bank 2004). This method was adopted in the Combomune CBNRM project, throughout the villages and households. The observation focused on three aspects: daily work of women and men in the household; women's participation in community meetings; and decision-making. The information thus gathered was to complement data collected from other methods.

[4] JICA- The Japan International Cooperation Agency: Samoa Tsunami:- A preliminary survey report on bulky wastes and sewages conditions

3.3.3. Documentary data

Report reviews are a form primary data collection that involves collection and analysis of existing data and information relevant to a topic (Zeeuw & Wilbers 2004). It is used to establish background information about the target group, such as socio-economic and institutional arrangements. Further, report reviews help to determine gaps and possible contradictions in the available data. Data collected through report reviews are crosschecked and gaps filled in through the field study (Zeeuw & Wilbers 2004).

Progress reports, project evaluation reports, annual management and development plans are the official documents of the project. These documents contain information on project objectives, achievements and challenges. These documents also hold information on failed initiatives, such as the introduction of cabbage, tomato and ostrich farming programs, in this case.

3.3.4. Quantitative survey

Questionnaires are often considered PRA tools mostly used in structured interviews to collect quantitative data for a survey (Mudhara & Shoko 2004). The use of questionnaires in this study focused on gathering information regarding social characteristics of the community and organization systems for the CBNRM project. The survey also addressed the project launch, community participation in decision-making processes, access to resources and management systems. Additionally, questionnaires were designed to seek an understanding of economic and social benefits communities derive from natural resources to improve their livelihoods. Furthermore, each respondent was asked to rank livelihood strategies for poverty and hunger alleviation (See Appendix B).

Finally, the challenges faced by households and by the community involved in the project management were also assessed through questionnaires. The survey questionnaires were designed to ask questions not requiring long-term detailed memory and to ensure that the respondents were able to answer all questions. These questionnaires were administrated by the researcher with an assistance of a locally-appointed community guide.

3.3.5. Focus group interviews

Group discussion is a PRA tool used for small groups of individuals, having similar backgrounds (World Bank 2004). These discussions provide collaborative opportunities, through shared experiences. Discussion groups are an important tool to explore management problems, causes and possible solutions. It is a tool enabling group members to participate after introducing of the topic under discussion (Mudhara & Shoko 2004). Although in a discussion group, views may vary with participant background, main issues affecting community livelihood are likely to be raised, such as lack of alternative resources, high unemployment rates, extreme poverty and unclear community roles in the management processes. The group interviews are an important data gathering tool where the moderator steers the discussion in order to cover the pre-determined issues but makes space for the participants to add new and related issues (Dawson, Manderson & Tallo 1993).

3.3.6. Semi-structured interviews

Semi-structured interviews are informal and conversational discussions using a list of key issues prepared in advance (Zeeuw & Wilbers 2004). These interviews are commonly applied in qualitative studies to acquire relevant information on the topic, in particular opportunities, problems and community perceptions. Semi-structured interviews are partially structured by a flexible interview guide, with a limited number of lead or key questions prepared in advance of the interview (World Bank 2004). The lead questions ensure that the researcher remains focused on the issue at hand, while allowing enough scope for the conversation. In addition, semi-structured interviews allow participants to introduce and discuss relevant topics (World Bank 2004). Semi-structured interviews were conducted in three community groups from three villages and moderated by the researcher with an assistance of a community leader in each village. Table 3.1, shows the participation in the semi-structured interviews in each community.

Table 3.1: Focus group interview in the three villages

Village	Number of groups interviewed	Number of participants in each group
Madliwa	1	15
Chaves	1	12
Hochane	1	11
Total	3	38

In the fieldwork survey at the Combomune CBNRM project, face-to-face semi-structured interviews were conducted. These interviews were held to assess socio-economic realities of the local communities involved with the natural resource management project.

3.4. Sampling

The Combomune community-based natural resource management project involves three rural villages. These villages host 1067 people living in 263 households. Sample size defined for the study was 107 (40.68%) of the 263 households. Of these households surveyed fifty-six (52%) were in Madliwa, thirty (28%) were in Chaves and twenty one (20%) were in Hochane, (See Table 3.2)

Two sampling exercises were conducted for this study. The first was for a preliminary survey to get data about project objectives, size of the project area, communities involved, number of households, population size and relationships among communities. Interviews involved 12 respondents, 4 Government officials, 1 NGO (GTA) and 7 from three villages (See Table 3.4: Appendix C); these members were not counted in as part of the total survey. The snowball sampling method was used for the preliminary survey.

Snowball sampling is a chain referral sampling method. This method has been widely used in qualitative social research (Biernacki & Waldorf 1981). Van Meter (1990:31) concludes that snowball sampling is a more advanced form of classification analysis, and is a coherent and rigorous methodology for studying populations.

Applying this sampling method was useful for identifying knowledgeable households from each of the three villages. It had been predetermined to interview twelve stakeholders, seven from local community, one from GTA, technical support agent, and four from the government, giving a total of twelve stakeholders (See Table 3.4, Appendix C). The supervisor of the project selected the first household in each village. The first house then suggested the second house, and second house suggested the third house.

For the purpose of the main study, stratified sampling was used. The sample size limitations for the respondent were defined by setting an age range. Respondents should not be under 18 years old or above 79 years old. In most rural households, residents younger than 18 are unaware of most household responsibilities, they are limited to herding livestock and looking after young siblings. Individuals aged 79 years and over stay in the homestead; their ability normally restricts them to daily housekeeping, so they were not involved with countryside development programs. In keeping with Leedy & Ormrod (2001), establishing limits on sample sizes respondent sample sizes for this study were limited for both female and male respondents to within the age ranges of 18 years and 79 years.

In determining the sample size, two factors were considered. The first factor was the total number of households and their distribution across the three villages. Second were the total population and its distribution across the three villages. As can be seen in Table 3.2, when the demographics of the communities were studied, the ratio of households to population was inconsistent. The average number of people in each house was four. However, in Chaves the average was 6.4. In an effort to compensate for disproportionate populations, it was decided to increase by seven the number of households interviewed in Chaves.

Table 3.2: Study area population and household size, percentage of the households surveyed

Villages	Households (total)	% of sample	People (total)	% of sample	People per Household	Households surveyed (n)	%
Madliwa	165	63	561	53	3.4	56	52
Chaves	46	17	296	28	6.4	30	28
Hochane	52	20	210	20	4.0	21	20
Total	263	100	1 067	100	4.1	107	100%

Within the stated parameters of purposive sampling described above, the household respondents for the study were stratified and selected from three community villages, namely Madliwa, Chaves and Hochane. An important criterion for selection was that residents from these villages were involved in the project and that respondents were directly or indirectly participating in resource management. These community villages received financial support from the German Service for Development "Deutscher Entwicklungsdienst (DED) and technical assistance from the Group de Trabalho Ambiental (GTA). Population sample size was based on the village population and household size, 20% to 52% of the households were surveyed, Table 3.2. Sampling process for interviews is briefly described in section 3.5.

3.5. Survey process at the Combomune CBNRM project

A three-month, that is, 90 day research project was conducted at the Combomune CBNRM from 1 July 2009 to 30 October 2009. The process, described below was designed to explore the impact of CBNRM projects with a particular focus on local communities; and to gain an in-depth understanding of their experience of this type of project management.

The research was conducted in 75 days stretching over a period of 90 days during July – October 2009. The 75 days were divided among the three villages: 28 days in Madliwa; 26 days in Chaves; and 21 days in Chaves. The number of days in each village resulted from the actual work done and differed for each village, based on the total number of respondents to be interviewed and the distance between homesteads. The Madliwa population was concentrated in one area, while the Hochane and Chaves populations were more dispersed, thus requiring more time relative to the number of households interviewed. Days spent in the field included camping, meeting with the community leaders, participation in community meetings, visits to charcoal mining sites and conducting a survey, using the questionnaire, the semi-structured interviews and group interviews were applied.

Prior to conducting the household interviews, households were grouped for random selection for the practical survey. Household grouping was done as follows:

1. The number of households to be interviewed was explained in Section 4.1 and presented in Table 3.2.

2. Knowing the number of households to be visited in each village, this number was then divided by five to identify the pool of households (groups of five households) from which the number of households to be visited would be selected. Five represented a manageable target group from the total households in each community village from which only one household was to be randomly selected.

3. Two households out every group of five households were to be interviewed until the total number of households per village to be interviewed was reached. The selection of actual households was done in the field.

4. The community members were informed that the survey would be conducted, but, to reduce the possibility of bias among households, they were not informed of the specific day or time the interviews would be held. To further guard against the interview at one household being influenced by the interview at a previous household, the households interviewed had to be out of the line of sight of each other. This prevented a household still to be interviewed from preparing itself for the interview. Table 3.3 shows the results of this process. The grouping of interviews was 33 in Madliwa, 10 in Hochane and 9 in Chaves.

Table 3.3: Groups of five households per village

Village	Total No. of Households	Groups of five
Madliwa	165	33
Chaves	46	10
Hochane	52	9

The household survey was conducted from Monday to Friday from 10 am until 6pm. These days and times were the most suitable for the local residents and they could be found at their homesteads. The inhabitants were in their fields early in the morning. This process was followed until the required number of households had been interviewed

The village leader in each village appointed a guide to work with the researcher. The guide's task was to introduce the researcher at each selected household and to explain the main objective of the visit. This approach facilitated the interactions between the researcher and households.

Household interviews were designed to be completed in less than an hour per household. In most cases the interview took one hour; at most the interview took one an half hours. No interviews were less than one hour long. It was observed that the respondents spent little time answering questions from the first section, but required more time for the other sections. All households answered all the questions in the questionnaire.

3.6. Data analysis

Data collected were analyzed using the interpretive technique and data coding. Interpretive technique is based on observation and examination of data which is then interpreted through forming an impression (Kumar 2005:10). Data coding is an interpretive technique that both organizes the data and provides a means to introduce the interpretations of it into certain quantitative methods (Van Meter 1990: 24). Tables were designed and used to gather quantitative data and Microsoft Excel was used to calculate data coded in numbers and percentages to support qualitative data descriptions.

3.6.1. Analyses of survey data

Triangulation was used to verify survey data and to help shed more light on the issues raised in the study (Olsen 2004). Triangulation can be applied using PRA methods and works with qualitative data to ensure that information is valid and reliable. Mixing methods is encouraged (Olsen 2004) and it is further recommended to have a minimum of three sources to investigate the same subject (World Bank 2004). In this case study, triangulation was used to compare the following three sets of data with each other:

1. Data from non-managerial community members and focus group interviews;
2. Data from formal presentations members of the Management Board and community members who are not part of formal management but are actively involved; and
3. Data from official records and documents including government documents, management plans and evaluation reports.

Data consisted of qualitative descriptions, explaining the present situation of local community livelihoods and impact of the Combomune Project on the environment. Tables were used to support the qualitative data descriptions. As noted above, data using numbers and percentages explained livelihood conditions and their relationship with the Combomune CBNRM Project.

Chapter 4 presents and discusses results from the three-month research project at the Combomune CBNRM project.

Chapter 4: Results and discussion

The Combomune CBNRM project is a pilot project implemented in the Mabalane District of the Gaza Province, Mozambique to improve the living standards of the communities in Madliwa, Hochane, and Chaves, through involvement in the sustainable use and management of their natural resources (Ackermann & Roberto 2005). The project objective is the management and conservation of indigenous forests through community-based approaches (Brower 2008). The Combomune project comprises about 1067 people living in 263 households in three communities covering an area of 1700 km^2 (Village communities' leader personal communication 16 June 2009 & the Combomune Post Administrative Office personal communication 15 June 2009).

The pilot project started in 1998. It was implemented by GTA "Group de Trabalho Ambiental" [Environmental Working Group], a national NGO. Since 2004, the project has benefited from German technical advisors paid by the German Development Service (DED) "Deutscher Entwicklungsdiens". Between 2004 and 2006, DED supported the development of the management plan in collaboration with the resident communities. Since 2007, DED has concentrated on the development of alternative income opportunities (Brower 2008).

The study investigates the social and economic impact of the project on the communities and the perception of project impacts on the environment. As noted in Table 3.2 in Chapter 3, a total of 107 people participated in the survey; 56 in Madliwa, 30 in Chaves, and 21 in Hochane. The Combomune community project was meant to have improved the socio-economic conditions of all 1067 people living in the 263 households dispersed throughout the three villages, Madliwa, Chaves and Hochane, each representing their household. The findings that follow give an indication of the extent to which this goal was achieved.

4.1. Demographics of the respondents

The residents participating in this study of the Combomune community project are fairly typical of southern Mozambican populations. They are mostly Shangane people and live largely according to cultural traditions of tribe and extended families. They are pastoral, keeping sizeable

herds of cattle; however they are generally poor and depend on subsistence agriculture and the exploitation of natural resources for their livelihoods. The overall demography of the households participating in the survey is presented in Table 4.1.

4.1.1. Age and gender distribution

This section presents the profile of the respondents. The population structure is defined by gender (female and male), and by age (ranges 0-17; 18-59; 60-79) termed young, adult and old, respectively.

Table 4.1: Demography of the households surveyed and distribution per category

Population		Households	Distribution per category		%
			Category	Total	
	778	107	Young	395	51
			Adult	370	47
			Old	13	2
Total	**778**	**107**		**778**	**100**

Seven-hundred and seventy-eight (778) is the population of the 107 households surveyed. Population distribution per category is young 51%, adult 47% and old 2%, Table 4.1. Of the 778 people 60% were female and 40% were male Table 4.2. The female population is 469 distributed in three categories: young (209), adult (256) and old (4).

The male sample population is 309 distributed according to three categories: young (186), adult (114) and old (9). These data show that in households surveyed, females dominate in two categories (young and adult), while males only dominate in one category (old) Table 4.2.

If a high female population represented female dominance in project decision-making processes, management could possibly prioritize problems affecting most females in the villages, such as water supply. High illiteracy rates in the female population of the study area (63%) might have resulted from challenges faced by females in rearing the young of the household and their required contribution to their households.

Table 4.2: Distribution of total population per gender and age

Population size	Gender	%	Age	Total	%
778	Female	60	Young	209	45
			Adult	256	54.6
			Old	2	0.4
			Total	469	100
	Male	40	Young	186	60
			Adult	114	37
			Old	9	3
		100	Total	309	100

Gender distribution was evaluated based on households rather than only on the gender of the respondents. The 107 respondents came from 107 different households comprising a total of 778 people. As indicated in Table 4.1 and Table 4.2 of the 778 people, 469 (60%) were female and 309 (40%) were male. The average age of the respondents was 41 years. The oldest respondent was 79 years old, while the youngest was18 years old. The Table 4.3 shows households gender distribution and literacy among residents of the surveyed area.

Table 4.3: Households gender distribution and literacy

Gender	**Category**	**Age range**	**Total**	**%**	**Literacy**			
					Literate	**% of total***	**Illiterate**	**% of total***
Female	Young	0-17	209	45	159	76	50	24
	Adult	18-59	256	54.6	16	6	240	94
	Old	60-79	4	0.4	0	0	4	100
	Total		**469**	**100**	**175**	**37**	**294**	**63**
Male	Young	0-17	186	60	174	94	12	6
	Adult	18-59	114	37	38	33	76	67
	Old	60-79	9	3	0	0	9	100
	Total		**309**	**100**	**212**	**69**	**97**	**31**
Total	Young	0-17	395	51	333	84	62	16
	Adult	18-59	370	47	54	15	316	85
	Old	60-79	13	2	0	0	13	2
	Total		**778**	**100**	**387**	**50**	**391**	**50**

* The percentages shown are per age group except the totals which are per gender and then per total population.

4.1.2. Household occupation

The Combomune CBNRM project is implemented in a rangeland with a distinct shortage of government and private sector representation and employment opportunities. Unemployment affects household livelihoods and leads households to peasantry dependence Table 4.4.

The area is characterized by a high peasantry rate, 103 respondents are peasants depending on subsistence agriculture for their livelihoods. In the three villages peasantry is the dominant activity. Madliwa registered 53 peasants involved in subsistence agriculture associated with domestic animal raising, Hochane 20 peasants and Chaves 30 peasants, all relying on subsistence agriculture and raising domestic animals.

Table 4.4: Households' occupation in the CBNRM project

Household associated activities	Madliwa	Hochane	Chaves	Total
Peasantry	53	20	30	103
Small scale business	0	1	0	1
Traditional medicine " traditional doctor"	1	0	0	1
Student	2	0	0	2
Total	56	21	30	107

4.1.3. Household leadership in the Combomune CBNRM project

In the project area, males are dominant in the household leadership. Household male dominance is a social characteristic of poor rural areas in Mozambique. This is exacerbated by the dominance of traditional culture characterized by gender differentiation and voiceless women. Females are responsible for a household only if a husband is dead or if it is a single-female headed household.

Local culture sustains the extended family, a common characteristic of poor rural areas. Thus, in this area, families are commonly comprised of three generations such as parents, a son, a daughter and a grandchild to whom the household leader can delegate responsibility. As shown in Table 4.5, men headed the majority of households in the study area (76%).

However, twenty-six (26) households are headed by single women as result of the death of their husbands. Of the 81 male-headed households, some 27 (30%) respondents were not the male head of the household. Of these 27 respondents from male-headed households, 19 (18%) were wives, 7 (14%) were responsible sons and one (1) 3% a grandson.

In the case of this study, not all of the respondents were the actual head of household Table 4.5 provides a breakdown of the respondents by gender, and respondents by status, in the family in each of the communities.

Table 4.5: Household head by gender and respondents by status in the family

Respondents	Madliwa	Chaves	Hochane	Total	%
Male-Headed household	37	26	18	81	76
Female-Headed Household	19	4	3	26	24
Total	**56**	**30**	**21**	**107**	**100**
Responding for male-head of household					
Male head of household	23	21	10	54	50
Wife of head of household	9	4	6	19	18
Responsible son of head of household	4	0	3	7	7
Responsible daughter of head of household	0	0	0	0	0
Responsible grandson of head of household	1	0	0	1	1
Responding for female head of household					
Female head of household	14	2	3	19	18
Responsible son of head of household	0	0	0	0	0
Responsible daughter of head of household	5	2	0	7	7
Responsible grandson of head of household	0	0	0	0	0
Total	**56**	**30**	**21**	**107**	**100**

4.1.4. Educational and literacy factors

Table 4.6 shows the levels of literacy in the general population of the three communities included in this study. For the purposes of this study, illiteracy is the inability to read and write at a basic functional level in any language (Thompkins 2006). In the study area, the illiteracy rate is high.

Generally, in the project area illiteracy is more predominant in adult men and women than it is among younger respondents. As shown in Table 4.3, 33% adult men were literate and 67% illiterate. Amongst adult women, 6% were literate and 94% illiterate. Among 209 young women, 76% were literate and 24% illiterate. Among 186 young men, 94% were literate and 6% illiterate. These high levels of illiteracy are because before 1975, the area had no school, thus local communities were denied opportunities for formal education or training.

Sixty-three (59%) respondents were functionally illiterate. Of the 63 respondents, 30 are in Madliwa, 14 in Hochane and 19 are in Chaves. Significant numbers of adolescents 39% both males and females have attained primary level of formal education; in Madliwa 24, Hochane 7 and Chaves 11. Only two respondents (2%) attained secondary level education Table 4.6.

Table 4.6: Educational background of the respondents

Level of Literacy	Madliwa	Hochane	Chaves	Total	%
Functionally illiterate	30	14	19	63	59
Primary level	24	7	11	42	39
Secondary level	2	0	0	2	2
Total	56	21	30	107	100

4.2. Findings from the research methods

As explained in Section 3.6.1., this study relied a great deal on triangulation as a means to verify and to enrich the understanding of the responses of the respondents. This section provides a brief description of the range of data collected and issues addressed for each of the research tools discussed in Chapter 3. However, to provide a detailed analysis of the result from each method would not contribute significantly to the findings of the study. Rather it is in the triangulated analysis of the data that the responses find meaning. These are set out in sections 4.3. – 4.7. These are followed by a discussion set out in Section 4.8.

4.2.1. Fieldwork reconnaissance

Fieldwork reconnaissance was undertaken in June 2009, before the actual research. This preliminary survey enabled collection of data used to plan the three-month survey. Data collected included an understanding of the project management system, as shown in Figure 4.1, and of the existing villages, community organization and the number of households per village (See Table 3.2). Other relevant information gathered was about practical things the researcher would need to conduct the study such as transport, camping equipment and food. Fieldwork reconnaissance was important to visualize the real situation of the area and to critically re-examine research topic and objective.

4.2.2. Direct observation

Direct observation started with a preliminary survey and was continued throughout the field research. It helped to confirm data gathered from interviews including the type of houses, the charcoal production process, household involvement in daily work and their participation in community meetings. Direct observation was specifically used to verify the preference (and the rationale behind it) of the local communities to farm land cleared from forests dominated by *Colophospermum mopane*. (See section 4.5.3.) Other data gathered through direct observation centered on agricultural and land use practices such as field preparation methods (e.g. bush clearing) and the use of bush cleared to fence fields to protect crops from damage by animals.

4.2.3. Documentary data

Documentary data review is searching for information in different documents related to the topic of a study. Documents reviewed include reports, management plans, and government documents such as policies and rural development strategies. Data gathered included the size of the community area, basic demographic information about inhabitants in the study area, objectives related to rural development in general and to the Madliwa, Hochane and Chaves communities in particular. It was also used to gather data about the establishment of the Combomune community

project, the involved stakeholders (See section 1.2.1.), efforts applied as to address project management, and the success and failures of local development (See section 4.8.1.).

The documents studied confirmed that the Combomune project is managed by the three local communities (Madliwa, Hochane and Chaves) with the technical assistance of an NGO (GTA). They also confirmed that the purpose of the project was to improve the condition of the communities through sustainable use of natural resources. The documents did not clearly articulate the criteria neither for measuring 'improvement' in the communities nor for the evaluation of the project post-implementation.

The documents reviewed also highlighted key challenges in implementing community-based projects. The most notable of these challenges were:

- Of the money provided by to the project, the majority went to administration and running costs, and did not reach the community in any tangible way; and
- The implementing agency did not initially include the government in designing, implementing and managing the project.

4.2.4. Quantitative survey

Quantitative survey is the collection of data which are numerically expressed. In the Combomune study it included all the tabulated data presented and discussed in Chapter 4. Quantitative data improved an understanding of the real-world situation of and the challenges faced by the Combomune CBNRM project. Quantitative data related to the development of social infrastructure in the community area were also collected. These data include a health post, three primary schools with seven classrooms and two water supply systems. Detailed discussion is provided in section 4.4.

From the quantitative survey it was learned that there is a strong relationship between the human and domesticated animal populations. Those who had more livestock were less vulnerable to changes in the factors that affect their livelihoods– they were more resilient. They survey showed that the number of people who had a basic education increased as a direct result of the

establishment of additional classrooms and two new schools in the area. The survey also revealed that the water system (despite improvements made) is insufficient to meet the real needs of the growing population.

4.2.5. Focus group interviews

Focus group interviews moderated by the researcher focused on the implementation, management, outcomes and challenges of the Combomune CBNRM project. Data collected were similar to those collected in semi-structured interviews and were thereby part of the triangulation process. The focus group interviews revealed that there was a clear understanding of local community involvement with the project management and of community expectations from the project. In the interviews were also identified problems such as lack of adequate market and transport systems and their influence on the prices of goods - pushing them higher (See section 4.4.5.).

4.2.6. Semi-structured interviews

Semi-structured interviews were more informal conversation conducted throughout the research fieldwork. They were also part of the triangulation process. The interviews focused on how local communities perceived the project and how this perception has influenced project management and benefits. Much of the data is similar to data gathered through the focus group interviews (See section 4.2.5.).

The interviews revealed that the local community had welcomed the project as a way to improve their livelihoods. They were excited about the potential benefits they would gain following the project. The interviews also revealed the increased confidence on the part of the community in managing their project especially as a result of visits to other projects in and out of the country. Further, the interviews found that the introduction of new crops had not succeeded in that they could not adapt to local conditions. Finally, the interviews showed that the community was aware of the challenges of implementing community-based projects. Key challenges among others are:

- Insufficient skill on the part of the community to manage the project;
- As skills were developed, there was insufficient support to maintain the project and fund spinoff project; and
- Lack of direct access to markets (e.g. having transport) made them more vulnerable to others who controlled access to the markets.

4.3. General responses to the project

In addition to measuring the socio-economic and environmental impacts of the project, the study also investigated more general responses to the establishment, presence and overall impact of the project on the communities in the project area.

4.3.1. CBNRM project launch and community interactions with the management

The Combomune community project was launched in 1998 with the involvement of the Mabalane District Government and local communities in the reconnaissance of the project area. The field survey indicated that 70% of the respondents knew when project was launched. Of the 75 familiar with the project launching, 59% are Madliwa residents, 21% are Hochane residents and 20 % are Chaves residents and all were involved in the project implementation.

Of the 32 (30%) unfamiliar with the project launch: in Madliwa 10 % respondents were new settlers, thus not aware of the project launch date; one 1% was not informed despite having been resident in Madliwa before the project implementation. Similarly, in Hochane, 4% were new residents and were unaware of the project launch; one 1% despite being resident for long period was unaware of the project launch. In Chaves, 14% were new settlers, attracted by opportunities arising from CBNRM project implementation, but they were unaware of its launch date.

Respondents indicated they were aware of the project management through their interactions with members of different management committees. Combomune CBNRM has five committees: a natural resource committee, an agriculture committee, a finance committee, a water

management committee and a patrol committee. Each committee has an elected manager reporting to the president of the management board. The management board meets monthly to discuss project performance. Also, as the need arises, a community assembly is called for general discussion and management board reports. The community assembly generally takes place every two months.

The local community in the project area is of diversified origins. The study reveals the population is from more than 16 places, within and outside the country. Foreign origins are primarily Zimbabwe and South Africa. Residents originating from outside the area have been resident for varying times. The time average for incoming residents was, 25 years in Madliwa; 22 years in Hochane; and 14 years in Chaves.

Despite the registered influence of new residents, those residents with more than forty years in the area have more influence. Chaves has more new residents seeking for opportunities arising from the project. New incoming residents in Chaves are mainly from the neighboring district of Chigubo, Gaza province. Other reasons for land occupation in the CBNRM project are return to homeland, security, marriage, and employment and business opportunities in the three villages. Natural resource availability, such as land; *Colophospermum mopane,* the forest used for charcoal mining; *Androstachys johnsonii,* the forest used for pole exploitation; cattle farming opportunities; and business and self-employment also justify this land occupation.

4.3.2. Community perceptions and social organization structure

About 34% (36) people welcomed the project; 19 at Madliwa, 11 at Hochane, and 6 at Chaves. About 79% (84) people believe that CBNRM projects help to improve livelihood through skills applied to sustainable resource-use; 46 at Madliwa, 18 at Hochane, and 20 at Chaves, respectively.

4.3.3. Participative project management system

All (100%) of the households surveyed were aware of the project management system and that it operates based on committees, with specific management responsibilities. Respondents revealed that these management committees coordinate the CBNRM project activities, such as agriculture and water management, natural resources and financial management. Also, the respondents were aware of the technical assistance from the GTA and of financial support and technical advice from DED.

Figure 4.1, shows the basics of the project management structure as explained by the respondents. They explained that the project management structure was established to facilitate a participative decision-making process. The decision-making process involves the project management board, traditional community leaders, local government leaders and the community through consultation with selected individuals and groups and/or through assemblies and broader community meetings. At some of these consultations and meetings, the GTA and DED are invited to participate as facilitators. The Combomune CBNRM project is an interactive resource management system. Figure 4.1, below shows stakeholder coordination system in the Combomune project.

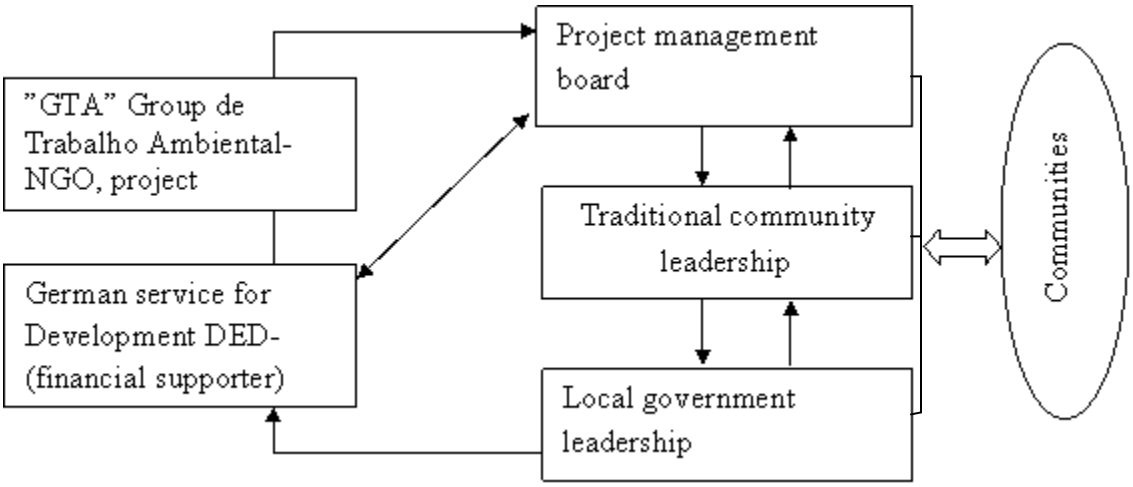

Figure 4.1: Combomune CBNRM project participative management system

The survey showed that not all respondents responded to the query into the management system. Those responding 105 (98%) all indicated they were satisfied with the project management system Table 4.7. They cited that through this system they have a better understanding about the opportunities they have, to improve their lives. They also noted that they now have more control over their natural resources. This has reduced the possibility of outsiders coming into the area and exploiting community resources without the knowledge or permission of the community. The project staff and supervisors confirmed that there has been less unauthorized use of natural resources, for example, poaching. This was also confirmed by the Department of Forests and Wildlife who issue permits for harvesting forest products and who monitor movements in and out of the area (Zimba 2008[5], personal communication).

It was noted that of those not responding, 2 (2%) were mostly those who are less involved or who through personal circumstance have less access to the natural resources. For example, older women who do not have the physical strength to use natural resources no longer use them; these women did not give any input about the project management system.

Table 4.7: Community participation in the management system

Responses	Madliwa	Hochane	Chaves	Total	%
Yes	56	21	28	105	98
No			2	2	2

4.3.4. Community participation in the CBNRM project activities and accrued benefits

In the Combomune CBNRM community, participation creates opportunities to share benefits such as community funds for development, to enforce and reinforce rules and common goals on resource exploitation for benefit sharing. Eighty-three (78%) respondent residents have acknowledged that communities are involved in forest resource exploitation and are using resources according to resource management plans. Of the 83 respondents, 51.9% are in Madliwa, 27.7% are in Chaves and 20.4% are in Hochane. Local communities recognize that

[5] Alexandre Zimba, is the head of provincial department of Forest and Wildlife in Gaza Province

participation is critical to decision-making, activities monitoring and patrols to maintain the community project resources.

One source of benefits is charcoal production. All respondents indicated that were producing charcoal through employing direct or hired labor in the production. Benefits accrued from this activity included direct financial benefits and the ability to buy cattle, goats, chickens, sheep, donkey, pigs and ducks, and to purchase building materials, such as iron sheets and cement for housing. In some cases, the money individuals accrued is used to buy trailers for transportation of household goods and food. The project benefits also include acquired resource management and utilization skills, such as charcoal production skills, and the creation of a community fund used for social amenities including two water systems in Madliwa and Hochane, a health post at Madliwa and seven classrooms, three in Madliwa and two Hochane and Chaves villages.

CBNRM project development and community satisfaction, 105 (98%) respondents revealed to be satisfied with project implementation and management. According to interviewees, benefits correspond to individual effort and to work collectively performed. These benefits reinforce community participation and community understanding around the need for resource conservation, through quota setting for individual residents.

Ninety-eight percent of respondents from the three villages confirmed that resources rights are granted to all residents in all 3 villages and this guarantee helps to maintain resources for future generation, enforce resource utilization regulation, sustain livelihood, and facilitate resource-use.

4.3.5. Project Management Board

The establishment of the Combomune CBNRM was preceded by setting up a project management structure and the democratic election of the Project Management Board. The Project Management Board governs four management committees addressing agriculture, water, finance and natural resources .The Board is comprised of six members. The president and deputy president are elected from local communities and by those communities. They are considered

permanent members of the Board in that they remain on the Board for the duration of the management plan (i.e. 15 years). They call and chair management committee meetings.

The other four members of the Board are the chairmen of each of the four management committees. They are proposed to the community by the president and deputy president and approved by a general assembly of the communities. Their membership on the Board depends on their performance which is reviewed by the Board and the community.

Other stakeholders are invited to participate in meetings of the Management Board. These include representatives from agencies such as GTA, GTZ and the Government. They serve as advisors to the Board.

The responsibilities of the Management Board include planning activities and designing development strategies and rules governing implementation of the project and its related activities.

The Project Management Board created the Devolvement Fund as a way to promote equitable distribution of project outcomes. This Fund is maintained through levies paid on the harvest, production and sale of forest products such as charcoal and poles. The use and priority for the Development Fund is discussed and determined by general meeting which is held in the interval of six months.

Interviews during survey confirmed the project organizational system and structure. A number of respondents see their connection to and association with the project system and structure (See Table 4.8). They recognize that their involvement in the project activities and use of local resources is done according to Board's resource management plan. This was acknowledged by 43 people in Madliwa, 17 people in Hochane, and 23 people in Chaves. Local community recognizes that participation in the decision-making process, monitoring and patrol is critical to maintain resources in the community project Table 4.8.

Table 4.8: Project management and respondents involvement

Activities	Madliwa	Hochane	Chaves	Total
Decision-making	12	12	10	34
Planning	4	5	2	11
Monitoring activities	26	9	4	39
Respect a plan for resources use	43	17	23	53
Patrol	51	16	21	88
Management committees	45	20	13	78
Establishment of rules	37	17	14	68

4.3.6. Summary of the general responses

Evidence from the survey shows that establishment of the project met community expectations. All of the local residents were aware of the project and the management plan. Community interactions with members of different management committees reinforced relationships, awareness and participation in project management. The communities acknowledged DED's funding and GTA's technical support.

It was found that the CBNRM project management system encourages community participation in project management. The management system recognizes communities as part of the decision-making process. This raised general belief that the CBNRM project would help improve livelihoods through developing skills around sustainable resource-use.

A significant factor in community motivation was the Development Fund which helps the communities address communal problems such as education, water and other basic infrastructure. The benefits of the project, though minimal in terms of the long-term hopes of the communities, have had a significant socio-economic impact on household livelihoods. The challenge is how these benefits can be extended and sustained. While the overall response has been positive, the communities still expect more development to come from the project.

4.4. Economic Impact on household livelihoods

All 107 respondents (100%) indicated that their household livelihood income had significantly improved as a result of the project. The Combomune communities have limited opportunities to diversify livelihoods. Livelihood strategies in the Combomune community project are mainly focused on natural resources, that is, land and forests.

Prior to the project, the communities had effectively only two main livelihood strategies: subsistence agriculture and livestock keeping. They also had an intermittent income from selling their labor. Local residents continue to use land for subsistence agriculture. However, this activity is often ineffective due to the harsh climatic conditions exacerbated by poor rains. Communities also continue to rear domestic animals as an alternative source of household incomes in the case of poor harvests from agriculture. The project introduced a third livelihood strategy, charcoal mining which has now been established as another viable alternative to generate income to alleviate hunger and poverty.

4.4.1. Livelihood strategies

The household survey confirmed that prior to the establishment of the project; the primary livelihood was subsistence farming. Occasionally people came from outside the area to hire some of the community members as labor to cut trees for poles to be sold outside the area. The project changed this to some extent.

All 107 respondents (100%) confirmed that their livelihoods rely on natural resources found locally. Of the 107 respondents 84% ranked subsistence agriculture as the most important means of making a living, while 16% ranked charcoal mining as the second most important livelihood strategy in the three rural villages. Charcoal mining was identified as an alternative to subsistence agriculture. Charcoal mining has become one of the ways the communities cope with high unemployment. Livestock and charcoal production will be discussed in more detail in the following sections. Finally, 61% of the respondents' ranked government and NGO support, for

example, food for work programs, as the least important livelihood strategy. Respondents stated that government and NGO support to local communities had ceased a long time ago.

4.4.2. Livestock

As noted above, raising livestock was the second livelihood strategy for the Combomune community. As a part of its program, the Combomune community project encouraged the community to purchase animals as an alternative source of food and income. While detailed numbers of domestic animals in the area are unknown, the project plan for Combomune indicates, and the respondents confirm, that the number of domesticated animals in the area before the project was quite low. This had been partly due to drought, but was also due to the dispersion of the population because of the civil war. The number of domesticated animals has significantly increased since the introduction of the project. Domestic animals in the three community villages comprise cattle, goats, sheep, chickens, guinea fowl[6] , baboons[7], ducks, pigs, donkeys Table 4.9. The 107 households have a combined total of 962 chickens, 583 goats 554 cattle, 145 dogs, 66 donkeys, 65 sheep and 59 ducks.

Table 4.9: Domestic animals in the households surveyed

Species	Madliwa	Chaves	Hochane	Total of animals
Chickens	452	393	144	989
Goats	317	126	140	583
Cattle	331	154	69	554
Dogs	56	46	43	145
Donkey	39	11	16	66
Sheep	42	6	17	65
Ducks	44	12	3	59
Cats	4	7	6	17
Guinea fowl	17			17
Pigs	2	10		12
Baboon		1		1

[6] Guinea fowl [6] Baboons[3] are domesticated

Appendix A provides a detailed allocation of these domesticated animals across the three villages. What is of significance is that in most cases the majority of the animals are found in Madliwa. This would appear consistent with the fact that Madliwa was the first of the three villages to be settled; it has the largest population and is the headquarters of the project.

Most of the domestic animals are used to improve household livelihoods through selling meat and other products and by-products. Dogs and cats are also common in the communities; dogs are often sold as hunting dogs. While cats are mostly household pets, in some cases they are used for meat. Donkeys are used to tow trailers and for plowing lands. The one baboon was a pet.

4.4.3. Charcoal production

Charcoal can be made relatively easily by cutting trees, piling them together, covering them with soil and burning them. The process can take about 15 days after which the soil is removed and the charcoal collected. This is locally referred to as charcoal "mining", Figure 4.2. Prior to the project, the mining was done by outsiders using local Combomune residents as labor. The project changed this significantly.

Figure 4.2: Charcoal production

The Combomune community project supported almost all community members through reorganizing charcoal production and marketing. The reorganization brought by the project was such that the residents became the producers (miners) selling the charcoal to the buyers from outside. Instead of merely being laborers, they took control of the natural resource and they now hire their own labor to mine the charcoal. Among the 107 Combomune CBNRM project respondents, 102 (95%) indicated that they have engaged in charcoal production at some point as a means of subsistence Table 4.10.

Table 4.10: Objectives for using natural resources in the Combomune CBNRM project

Resource use objectives	Madliwa	%	Hochane	%	Chaves	%	Total
For subsistence	52	50.9	20	19.6	30	29.4	102
Economic gains	10	9.8	1	1.0	4	3.9	15
Housing and other infrastructure	11	10.8	1	1.0	3	2.9	15

Of the 107 respondents, 14.7% affirmed that natural resources are used for economic gain and for animal protein from wild animals. The most common and recurrent natural resource based activity among the households surveyed is charcoal production. At the household level, charcoal production contributes to the improvement of livelihoods. When the rains are good, most abandon charcoal production to farm; when rains are poor, they return to charcoal production. It is very rare that a household will pursue farming and charcoal production at the same time, due to limited household labor.

This is confirmed by Kasparek (2008) who noted that in the Combomune CBNRM project area, charcoal production improved the average household income to more than double the official minimum wage and to a level 30% higher than the average household income of Gaza Province. This might also explain the positive image people have of the economic impact of the Combomune project.

The benefits accrued from charcoal production included direct financial benefits resulting in the capacity to buy domestic animals, for example, cattle, goats and chickens; and to purchase building material to improve their houses. In some cases, the money individuals accrued was used to buy trailers for transportation of household goods and food.

4.4.4. Summary of economic impact on livelihoods

The majority of the respondents indicated that the Combomune CBNRM project had a positive economic impact on their livelihoods. While most of the families still rely on subsistence agriculture, the project made it possible for them to expand and stabilize their livestock activities and gave them power over the charcoal production. The Combomune CBNRM project has strengthened the capacity of the local communities to explore effectively limited resources and opportunities for economic gain. Most households in the community area have limited strategies and alternatives to generate economic income. Charcoal and livestock had become the only alternatives for addressing multiple socio-economic problems. Rural poverty is still a major social problem for the Combomune communities.

4.5. Social impact of CBNRM on household livelihoods

When the respondents were asked about how the Combomune CBNRM project affected the social condition of their lives, they responded mostly in terms of changes in social infrastructure. The major improvements cited were education, water supply and health; all of which increased due to the project. In addition, however, improvements to homesteads and markets and transport were also cited.

One of social benefits acknowledged by some respondents is a health care post. This social infrastructure minimizes distances local communities had to travel to Combomune for first aid treatment.

4.5.1. Household habitation improvements

Prior to the project almost all of the houses were traditional huts made from mud, poles and thatch grass. As a result of financial gains from the project, traditional huts have been improved through replacing thatch grass with iron sheets and covering mud floors with cement. Some of the walls are now also covered with cement.

Among the 107 households surveyed in the three villages, 342 houses were identified. Of these 174 (51.87%) were traditional houses (huts) made of poles and thatched roofs. Another 167 (48.83%) were huts improved with a combination of local and conventional building materials. Only one (1) house (0.3%) had been built using cement bricks and iron sheets – using no traditional materials. Most of the 107 households had both traditional and improved huts. Of the 342 houses identified, 199 (58%) were single-room structures, 115 (34%) were two-roomed structures where both rooms were used as bedrooms, and 27 (7.8%) were two-roomed structures where one room was a bedroom and the other room was a lounge. One (1) house (0.2%) was a four-roomed structure where all the rooms were bedrooms.

4.5.2. Education

Two of the three rural villages had no school before the project. As noted earlier, this probably contributed to the high illiteracy rate among the adult population. Development of education infrastructure is one of the project priorities. Community funds were invested in building new schools and improving teacher accommodation and facilities. Children from all three villages now have equal education opportunities.

In the villages surveyed, there were 332 students, with one (1) primary school per village. There are a total of 7 classrooms and 9 teachers Table 4.11. The additional classrooms were built in 2000. This means that all of the children between 7 and 16 years of age had the opportunity to attend school. It also means no one over 16 years had attended school. Lack of schools affected the adult and aged. All the villages have classrooms which have positively affected the children, who now have the opportunity the older community members did not, have to attend school.

This might explain the disparity between the literacy rate of the adult and old aged groups and that of the children; 84% of the children aged 0-16 years are literate and all 13 older residents interviewed were illiterate.

Table 4.11: Students, teachers and classrooms in the study area

Village	Number of Students	Number of Teachers	Number of Classrooms
Madliwa	193	6	3
Chaves	89	2	2
Hochane	50	1	2
Total	332	9	7

Of the 332 students, 58% were at the Madliwa primary school, 27% were at Chaves primary school and 15% were at Hochane primary school. Six (6) of the 9 primary school teachers were at Madliwa, two were at Chaves and one was at Hochane. Teachers are contracted and paid salaries by the government budget.

Of the seven classrooms, three were built at the Madliwa primary school, two (2) each were built at Chaves and Hochane. Hochane and Chaves originally had no primary schools; Madliwa had a two-room school built by the government. Community funds from the Combomune project were mobilized to develop infrastructure for education. As a result, the schools at Hochane and Chaves were built, each with two classrooms. In addition, from 2007 to 2009 a fifth classroom was built at Madliwa and six teacher huts were improved; three in Madliwa, two in Chaves and one in Hochane.

4.5.3. Water supply

Prior to the project, there was no formal water supply system. The communities relied entirely on natural water ponds. The project established two water systems, one at Madliwa and another at Hochane; both were managed by a single water management committee with representatives from each of the villages. The Madliwa and Hochane water supply systems directly benefit 217 households, comprising 771 residents. If water systems are working properly, households,

especially the females in those households, instead of spending time fetching water can spend this time on other household activities leading to livelihood improvement.

However, in spite of the developments brought by the project, the communities remain vulnerable to water shortages. Severe drought and a resulting water shortage is the main constraint for project management. Communities are forced to walk long distances of about 15 km to fetch water from one of two natural ponds in the area. Water supply systems were constructed by the project at Madliwa and Hochane. However, these systems were experiencing technical problems and high salt content. Both systems were based on boreholes with water pumps using solar power. The Madliwa water system was frequently broken and the Hochane system supplies water with a high salt content unsuitable for human consumption. Chaves had no water system; its 46 households were relying only on the natural water ponds, in turn, these depend on unreliable rains. If the dry season is prolonged, water ponds dry up and the residents of all three villages are forced to buy water from a private water system at 3,00Mt[8] for 20 liters of water.

During the dry season, which occurs annually between March and November, the long distances from water and/or having to pay for water as a last resort become common challenges to the villagers. Further, the private water system is owned by a cattle farmer in the Chaves rural area about 15 to 24 km away from Madliwa and Hochane villages, respectively. All 1067 inhabitants of the Combomune CBNRM project face a water shortage dilemma for upwards of nine months of each year. All of the respondents in the survey confirmed this. This dilemma also affects cattle farming and crop production leading to low productivity of land and livestock. Respondents noted that most wildlife species, which are water dependent, have emigrated and thus access to wildlife to supplement household incomes has also been affected.

[8] 1USD= 27,00Mt

4.5.4. Health care

Prior to the CBNRM project, there was no primary health care service provider in any of the three communities. A unique first-aid post, the first one in the district, was built by the project. Currently, there is only one first-aid post for primary health care serving all three communities. It is located at Gerez, the main settlement of Madliwa and the CBNRM project headquarters. The health post offers only an auxiliary health care assistant whose support is limited to common minor ailments such as coughs, headaches, stomach pains and small injuries. If cases become complicated, a referral is made to the Combomune health centre 25 km away, or to clinics in Mabalane or Mapai, 60 and 70 km away, respectively, or to the rural hospital with nurses and doctors, in Chokwe 170 km away. Hochane and Chaves have neither health care facilities nor reliable transport services. Hochane residents must walk about 25 km to Combomune and Chaves residents about 10 km, for treatment at Combomune. There is a brief waiting period for treatment at the Gerez health post; and long waiting periods at the Combomune centre and the Chokwe rural hospital, mostly due to the large number of patients and limited number of health care professionals.

4.5.5. Markets and transport

In the CBNRM project there are neither improved markets nor shops. Rural villagers rely on the barracas, rustic wholesale shops constructed from local materials, for their daily needs. These barracas have developed as a result of the CBNRM project income and are individually owned. The supply of goods by barracas depends on unreliable public and private transport; therefore, a limited quantity of goods is available at the barracas. This limited supply contributes to the high prices, for example, at Chokwe; a 300ml soft-drink is purchased for 10,00Mt, about USD $0.37[9],

The main shopping village is located about 170 km from Madliwa, Hochane and Chaves rural villages; goods bought there by 10,00Mt, example soft drinks are re-sold in the barracas for 15,00 Mt, about USD$ 0.56. Basic-need goods such as staple foods and soaps are not only re-

[9] 1USD= 27,00Mt

sold at high costs, they are also in short supply. Residents are forced to travel to Mapai, a one-day trip, or even to Chokwe, a three-day trip, to purchase locally unavailable goods, or those in short supply.

The area lacks efficient, reliable public or private transport. The only public transport is the train travelling from Maputo to Chicualacuala, which passes through the Combomune area only twice a week. Local communities occasionally use private transport to Chokwe or Mapai at a variable and high cost per trip ranging from 200.00Mt to 150.00Mt to Chokwe and Mapai. By comparison, travel by train costs 35.00 Mt to Chokwe and 15.00 Mt to Mapai.

4.5.6. Summary of the social impact

The field survey at the Combomune CBNRM project revealed significant social improvement in the households**.** This is consistent with the findings of the SADC report on the Combomune Community Project, which also cited significant improvements to livelihoods at household level (Brower 2008). The major improvements included better housing construction, improved water supply, more schools and classrooms, and a primary health care facility.
However, despite these improvements, there are still many social infrastructure problems. Water shortages are still a serious challenge for the communities; all of the respondents noted that water shortages persist affecting not only the communities but also the livestock and wild animals. While the project invested community funds in water supply systems, the systems constantly experience technical problems.

Further, the area still lacks markets and reliable public transport. Rural villagers rely on the rustic shops constructed using local material acting as wholesalers (barracas) for their daily needs. Goods supplied by barracas depend on public and private transport, which are unreliable, therefore, there is a limited supply of goods, and the demands for goods are not met.

It was observed that while the project installed and/or upgraded various types of infrastructure, the skills required to sustain these improvements had not been developed within the community. In particular, technical and financial support needs to be improved to ensure sustainable results.

The establishment of Community Development Funds[10], for example, means that individual households get access to improved water supply without directly paying for it, allowing them to spend extra money on school uniforms, school fees or hospital costs.

Community funds invested in social infrastructure development for education and health not only benefit local households through education and treatments, but also have social and economic multiplier effects for local residents, and countrywide through employment opportunities. Teachers and health professionals were contracted. Interviews revealed that from 2007to 2009, schools built at Hochane and Chaves are directly benefiting 139 children who never had education opportunities in their villages. All 51 households from Chaves and Hochane affirmed that schools previously were only found in the Gerez and Combomune villages. Households using these schools required additional funds to pay for accommodation or transport. Schools built in each village resulted in household savings, as there are no longer any accommodation and transport costs.

Ninety-nine (99) (93%) respondents indicated that the decision-making process in resource management in the project area was under the Management Board, but that as and when needed general community meetings were called, particularly if issues of particular impact, for example, setting the quota for tree harvesting are at stake. Participative decision-making has resulted in social relationships being strengthened among households in the three community villages.

4.6. Impact of CBNRM on the environment

The environment is the source of all life, providing resources and material needed for human welfare (Wong *et al.* 2005). The environment regulates natural systems, providing health and cultural benefits. The Combomune CBNRM project is meant to promote sustainable resource use, preserve environmental functions and generate benefits. Project management plans reinforce the control of human activities which have a negative impact on the environment. All 107

[10] The Devolvement Fund was created by the Project Management Board as a way to promote equitable distribution of project outcomes. This Fund is maintained through levies paid on the harvest, production and sale of forest products such as charcoal and poles

respondents (100%) claimed they were collaboratively controlling activities, such as fire and forest overexploitation, which could destroy the forests. This collaboration ensures the maintenance of environmental functions. Forest resource exploitation is dictated to by forest management plans. These plans prescribe management principles, including zoning and a maximum allowable tree to be cut. For example, forest exploitation for charcoal mining is limited by a quota of 60 trees per household per annum; this is equivalent to 30 trees per household per semester. According to the Department of Forests and Wildlife (2008) limited forest harvesting through a harvesting quota has resulted in minimum habitat destruction. A successful fire management program in the Combomune CBNRM project may have contributed to improved ecosystem functions, necessary to ensure sustainable socio-economic development and benefits to local communities. Control of agricultural practices also has positive impact on the environment.

4.6.1. Biodiversity at the Combomune CBNRM project

The project is implemented in semi-arid landscape characterized by poor rains and poor soil. Semi-arid landscapes generally are unsuitable for cultivation. However, these landscapes are suitable for wildlife and are thus able to sustain a high level of biodiversity. They are also suitable for the development of game and livestock farms.

Of the 107 households surveyed, 90 (84%) affirmed that long ago, the area currently under community management had a high wildlife population and a high biodiversity. Additionally, the 90 respondents noted that, in the early 1970s, the wild animals most frequently seen, or known to occur in the area included antelope, buffaloes, elephants, giraffes lions, leopards, ostriches, zebras and several species of reptiles, game birds, rodents and small carnivores. There were many antelope species, including eland and kudu.

Seventy-five (70%) of the 107 respondents perceived that the wild animal population in the CBNRM project was increasing. They attributed this to reduced hunting and increased community patrols. Further, they added that wild animals were important source of food supplement as they provide animal protein. However, 17% of the overall respondents perceived

that animal populations are decreasing due to poaching and severe droughts, affecting not only the habitats, but also animal populations and biodiversity. Approximately 13% of the respondents had no opinion about the wild animal population.

During the research, a number of species of wild animal were frequently observed. These species included game birds, such as ostrich and guinea fowl, antelopes, such as kudu, nyala, impala, duiker, oribi, steenbok and common reedbuck, primates, such as baboon and monkeys, reptiles, such as monitor lizards, tortoises and snakes and rodents, such as mice.

4.6.2. Natural resource management using the CBNRM project

In early 1998, before the Combomune community project was launched, local resources were under both government and community traditional authority. Forty three (40%) of respondents revealed that before the CBNRM project, natural resource management had been under traditional authority; 33 (31%) affirmed natural resources had been under government authority; 30 (28%) respondents had no information on how local resources in the three rural villages were managed before the CBNRM project; and one (1) 1% said that natural resource management has been under the Council of Elders, Table 4.12.

Table 4.12: Resource control and management before the CBNRM project

Authority responsible	Madliwa	Hochane	Chaves	Total	%
Traditional authority	27	6	10	43	40.1
Government	16	8	9	33	31
Council of elders	0	1	0	1	0.9
Not known	13	15	2	30	28
Totals	56	30	21	107	100

The Combomune CBNRM project changed resource control and management based on traditional and government authorities. CBNRM established resource management committees. About 85.05% respondents are aware of resource management based on new organizational structures; 11.21% respondents insist that resource control and management is under the government; 10.28% reaffirm resource management is still under traditional authority; 7.48%

respondents affirmed resource control and management is under community assembly and 3.74% have no information on resource management Table 4.13.

Table 4.13: Current resource control and management system

Resource management authority	Madliwa	Hochane	Chaves	Total
Traditional authority	3	4	2	9
Government	6	2	4	12
Management committee	40	12	22	74
Community assembly	6	2	0	8
Not specified	1	1	2	4
Total	56	21	30	107

One hundred and two (95%) of the respondents affirmed the CBNRM project priority is to ensure household subsistence, 14% of the respondents indicated that use of natural resources is for economic gain, while other 14% of the respondents indicated that natural resources should be used for building houses and other infrastructures like class rooms, teacher houses, barracas and a health post. The Madliwa, Hochane and Chaves residents generally believe the CBNRM project creates conditions for building communal or individual infrastructures in community areas Table 4.14.

Table 4.14: Natural resource use priorities

Response	Madliwa	Hochane	Chaves	Total
For subsistence	52	20	30	102
Economic gains	10	1	4	15
Houses and other infrastructure	11	1	3	15

4.6.2.1. CBNRM project management zones

The Combomune CBNRM project comprises three management zones set by community in the fifteen-year management plan in which was finalized in and implement from 2005. The zones comprise a forest resource exploitation zone, an agriculture zone and a resource conservation

zone (Brower 2008; Kasparek 2008). Wildlife is meant to be found and managed in the resource conservation zone; however, little effort was made to improve wildlife management in the resource conservation zone. For example, fencing of resource conservation zones for reintroduction of wildlife species was abandoned. As a result wildlife occurs in all the zones, but is not well managed.

Despite failure of initiatives to improve resource conservation zones, 81% of the 107 respondents affirmed wildlife species are important for ecotourism development and income generation for local communities and were in favor of wildlife conservation. However, 13 (12%) were not in favor of supporting the conservation of animals such as elephants, lions, buffaloes, baboons, monkeys and snakes because they are considered dangerous to humans. A further 7 (7%) respondents were undecided regarding the importance of resource management or wildlife conservation.

4.6.3. Agriculture and land use practices

Of the 107 respondents, 104 (97%) believed that, despite the implementation of the CBNRM project, traditional land use and agricultural practices were unchanged. Traditionally land preparation has been characterized by bush clearing and burning. The clearing includes slashing the shrubs and removing roots from the soil through digging. The larger branches from the slashed shrubs are used for fencing fields to protect crops from being damaged or eaten by wild animals and livestock. The remaining tall grass and smaller branches are burnt. The burning is strategically controlled by moving all the material to the center of the field before burning.

However, 3 (3%) mentioned that the implementation of the project had changed agriculture practices. The changes included the introduction of crops, not previously grown in the area, such as vegetables and drought resistant varieties of common crops, such as maize, sorghum, millet and groundnuts. The project had also introduced orchards of fruit trees, such as cashew nut and mangoes. Households were also encouraged to plant forests using eucalyptus, an exotic species and Chanfuta (*Afzelia quanzensis*), an indigenous species.

Other changes not associated with the CBNRM project were the use of cattle and donkeys for plowing the land and fire breaks to limit fire from burning unplanned areas. These changes resulted from life experience. However, implementation of these changes by households was encouraged and reinforced by the CBNRM project, through an awareness program on the advantages of such practices.

It was observed that both sets of respondents were correct. The traditional approach to land clearing was still in practice; this has remained unchanged. However, the crops and forestry noted by the minority of respondents were found to be present. Further investigation revealed the project did deliver new varieties of crops to the communities and most of the farmers had tried them at least once. Those who had favorable results continued with these new crops, while those who had poorer results abandoned these new crops. This explains the different perceptions among the respondents.

A field is used to grow different crops for an average period of 12.21 years[11]. The period of land use for the respondents ranged from 2 to 38 years. Those who had used land for less than 25 years reported to have changed fields several times, even though they had been farming for many years. The land used for 25 to 38 years were located on fields dominated by mopane trees (*Colophospermum mopane),* which had been cleared. Areas used for less than 25 years were fields in areas dominated by Simbire trees (*Androstachys johnsonii*), which had been cleared. Mopane vegetation is associated with good soils rich in nutrients able to sustain agricultural activities over a long time period. Conversely, Simbire vegetation is associated with poor soils for agriculture, hence, the need to change lands more frequently.

The dominant crops are grain, such as sorghum and maize, vegetables and groundnuts. Cassava, (*Manihot esculenta)* sweet potato and various species of trees producing fruit were also planted

[11] 12.21 years calculated by deriving a simple average of the number of years the 86 respondents who stated the length of time they used their fields. Fallow periods were not considered. Starting years were for the original field even if this has increased over the years.

in the project area. Agriculture in whole area of the CBNRM project is rain fed, thus seasonal crops dominated production systems and harvests occur only annually.

The production season lasts for a variable period, ranging from three to five months. Production is affected by unreliable rains. If rains were poor and resulted in a prolonged drought, hunger was likely to occur, particularly from September to March. If rains were good for crops, satisfactory harvests kept households fed for a period of six to nine months. In such cases, hunger would normally occur only between October and January.

It was in response to this production risk that the Combomune CBNRM project introduced charcoal mining as an alternative to generate monetary income. The income would be used to buy food and domestic animals to be reared, as alternative incomes, through the sale of meat, milk, eggs and animal by-products. Charcoal mining was an effective alternative to relying only on unreliable subsistence agriculture, wild fruit and roots.

4.6.4. Fire management program

Fire management is a program using controlled fires as a management tool in managing natural forests. Unplanned fires are destructive to forest and living organisms. Uncontrolled fires contribute to unsustainable resource conservation. Such a farm management program has been implemented in Combomune. All (100%) of the respondents agreed that fire management has been a successful program in the Combomune CBNRM project. The Combomune community project achieved fire control, a unique achievement compared to the neighboring Limpopo and Banhine national parks, in which uncontrolled fires are still management challenges (Zimba 2008[12], personal communication)

[12] Alexandre Zimba, is the head of provincial department of Forest and Wildlife in Gaza Province

4.7. Summary

The Combomune CBNRM project comprises three rural villages with 263 households and 1067 people. The study sample size was 107 households selected from three villages. The study reveals that in the 107 households there were 778 people. The residents were predominantly Shangane, but they were some inhabitants from other tribes.

Just over 60% of the population is female and 40% male .The rate of illiteracy was high in both female and male adults. The three communities share similar traditions and cultures. Socially they are collaborative creating an enabling environment for common resource management.

Land, forest and wild animals are natural resources available in the communities. These resources are managed by the CBNRM, Project Management Board. The Project Management Board uses a management plan developed by the community with financial and technical support from DED.

This plan recommends management zones and shared management responsibilities. Project management activities have been coordinated by specific committees with community household participation. This participation ensures shared social and economic responsibilities and benefits.

The efforts of the CBNRM project management were oriented towards improvement of the social and economic conditions of local households. Harsh climatic conditions challenge crop and livestock production and force some wild animals to emigrate. The communities indicated that Government and NGO support has deteriorated leading to a shortage of development opportunities, in turn contributing to continuing high poverty rates. The project, however, did create the community development fund and allocated funds for the development of infrastructures with high social impacts, such as education, health and water supplies.

The Project Management Board comprises four management committees, agriculture, water, finance and natural resources. This management system reinforces social and cultural community relationships. The committees coordinate activities with community participation and use fifteen

year and annual management plans as guidelines for their work. In addition to the management plan, resource management principles were developed from local traditions, beliefs and costume with regard to resource use. These principles and ensuing rules and consequent fines for unauthorized resource use are managed by the Project Management Board, jointly with traditional authorities.

4.8. Discussion

This section discusses the research results summarized in the sections above. The discussion concentrates on three main objectives: (i) the economic impact of CBNRM on household livelihood; (ii) the social impact of CBNRM on household livelihood; and (iii) the impact of CBNRM on the environment.

These objectives enable the assessment of the improvement of livelihoods and poverty alleviation in the target villages through sustainable use of natural resources. The research findings are discussed in the light of the intended goals of the Combomune CBNRM project as well as in the light of literature reviewed in Chapter 2.

4.8.1. Overview of the Combomune CBNRM project and local community perceptions

The Combomune CBNRM project was established in 1998 in an effort to involve local communities in the sustainable use and management of indigenous forest resources (Ackerman & Roberto 2005). The Combomune CBNRM has made some impressive accomplishments during its 10 years and there is a foundation for continuing to develop and strengthen the program (Brower 2008). Among households, there is general support to the Combomune CBNRM project. Households also acknowledge that since project inception, the resources have been managed by local communities. This has enabled the creation of a community development fund, used to mitigate social and economic problems.

Further, households in the project area acknowledge and appreciate project performance with regard to water supplies, schools and health. Households also acknowledged the skills acquired for charcoal mining and for responsible use of environmental resources. These benefits have encouraged communities to prevent the forest from being over-exploited, to enhance sustainability of these environmental resources.

However, there are still some challenges to the project which could negatively affect the environment, so motivating community participation in project management. Households noted that despite some positive results achieved by CBNRM project, poverty is still a challenge to local communities. In addition to continuing poverty, the inequitable distribution of social amenities among villages was noted. Social amenities result from the community development fund to which all villages contribute; however, social amenities such as the health care post and water supply systems were only found in Madliwa and Hochane. Chaves has neither a heath care post nor a water system and community members there are conscious of this fact and are unhappy about it. They argue that they contribute to the community development fund, but do not benefit from it as much as Madliwa and Hochane.

4.8.1.1. Population demographics, resource use and livelihood sustainability

Details of the demographics of the respondents in this study are present in Section 4.1. For the ease of reference a brief summary is presented here. The survey results revealed that 778 people resided in the 107 households surveyed. Of these 778 residents 51% (395) were under 18years. This indicates resource sustainability might be challenged because eventually many of these young residents will establish new households with additional children, all of whom will need to be supported by the same resource base. This is a potential threat to sustainable resource-use if local communities continue to be dependent on natural resource for their livelihoods.

Increasing populations, thus increased households in the community area may result in resource high demands, for households to make a living. This demand could affect resources by increasing harvesting quotas to accommodate new households and their need to share benefits from the same resources. Increased populations and households are also influenced by the communities of

the neighboring districts of Chigubo and Chicualacuala in the Gaza province, and the Funhalouro and Mabote districts in Inhambane province. They too are seeking livelihood alternatives and are resettling in the Combomune CBNRM project area. The economic and social impact of the Combomune CBNRM project on local households might be a factor drawing inhabitants from neighboring communities.

4.8.2. Economic impact of the Combomune CBNRM project on household livelihoods

Tam (2008) describes economic impact as the outcome mostly expressed in monetary or household wealth. He further describes a livelihood as a combination of resources and capabilities a person has in connection with decisions, and activities performed to earn a living, and fulfill objectives and desires.

The three rural communities of the Combomune ward have been involved in decision-making with regard to the CBNRM project, which focuses on sustainable management of indigenous forest as a way to gain benefits. Among households, charcoal production is an important economic activity; it involves cutting trees, producing charcoal and selling the charcoal to buyers, Figure 4.3. This activity generates monetary income to most households in the community area. Charcoal traders from Chokwe and Xai-Xai towns and Maputo city are potential buyers of charcoal to supply the residents of Chokwe and Xai-Xai towns and Maputo city. Charcoal production has extended economic multiplier effects.

Figure 4.3: Charcoal (deposit) ready for sale

The Combomune CBNRM project promotes the conservation of indigenous forest and allows sustainable natural resource use for the benefit of local residents. This can be considered an example of the community-centered approach. Theoretically, CBNRM is a community-centered approach employed to improve local development and biodiversity conservation (Shyamsundar *et al.* 2005). The Combomune CBNRM project is meant to involve local communities in the sustainable management of indigenous forests and to improve household livelihoods of the involved communities. The most acknowledged economic benefits of the CBNRM project are monetary returns (Arntzen *et al.* 2003). Monetary incomes collectively accrued are invested in the development of social amenities in the community areas (Hanjra & Gichuki 2008).

In the Combomune CBNRM project, charcoal mining was the only activity generating monetary income at individual and collective levels. Individual monetary income is most often invested in the improvement of homesteads and in the purchase of domestic animals. Kasparek (2008) noted that most households in the Combomune CBNRM project were involved in charcoal mining to get money to improve their homestead and to buy livestock. Livestock Figure 4.4, are considered an indicator of household wealth. As indicated in Table 4.9, the area has a significant number of livestock. Some of these animals were purchased by income from charcoal production.

Figure 4.4: Cattle in the Chaves community

On the collective level however, it has, been difficult in this study to get figures to illustrate how much cash flow each household should gain from charcoal production, or how much cash was deposited in the community account from charcoal production. Community funds, unlike

individual income, were invested in the development of infrastructure of common interest, such as schools and health posts.

4.8.3. Social impact of the CBNRM project on household livelihoods

Social impact of the CBNRM projects can be measured through the quantity and quality of social infrastructure and services offered to households. For a CBNRM project, the social impact is derived from natural resource use. Foundational to this concept is that CBNRM should directly connect local livelihood improvement with natural resource management systems (Schmink 1999). Further, these natural resources are assets used by local communities to achieve rural development (Wong *et al.* 2005).

Most CBNRM literature acknowledges that rural communities consider social benefits to be the solution to the most pressing problems. These problems are different from one community to another. However, the most common social problems addressed by CBNRM projects in Africa are education, health, transport, water supply, irrigation schemes, conservation and marketing of agricultural products, and improved household homesteads (Kasparek 2008; Hanjra & Gichuki 2008).

Some of these components, such as education, health and water supplies were also considered priorities and addressed by the Combomune CBNRM project. These key components of social benefits are also important to achieving the United Nations Millennium Development Goals. Similarly, the Government of Mozambique adopted the UN-MDGs and defined education, health and water supplies as government priorities; this was indicated in the política national da educação "national education strategy" (GvMz[13] 1995) política do sector de saúde "the public

[13] GvMz- Política Nacional da Educação aprovada pelo Conselho de Ministros do Governo de Moçambique, resolução 8/95 e publicada no supplement do BR 41- I série de 22 de Agosto

health strategy" (GvMz[14] 1995); and Política Nacional de Águas "water national strategy" (GvMz[15] 1995).

Despite the existence of government policies, it is the Combomune community themselves that have taken the lead and assumed government responsibilities by investing community money in the development and improvement of education, health service, and water supplies. The government has done little to assist these communities. Inadequate government support negatively affects the sustainability of community initiatives, especially water supply systems. Government could support communities by providing technical assistance and advice about managing water systems to reduce equipment breakdowns.

Universal primary education is one of the UN-MDGs (Maxwell 2003). Further, the Mozambican national education strategy (1995) emphasizes that education is a right of all Mozambicans. Schools are social amenities generating long-term benefits directly to households, and indirectly to natural resource management. Households with higher education generally earn better incomes. Education also creates a foundation for acquiring knowledge and skills to promote sustainable natural resource use. Strategically, the Combomune communities have used community development funds to invest in the development of education. In the long-term, this should help to prepare future generations with technical skills and knowledge to address social welfare and natural resource sustainability.

Similarly, the UN-MDGs highlight health care as critical to community welfare. Significant health care services to communities have strengthened them to work towards improved socio-economic conditions (GvMz 1995). Through the project, the Combomune communities have had an opportunity to reduce child mortality; improve maternal health; prevent HIV/AIDS malaria and other diseases. Improved health care services ensure social development and environmental sustainability (Maxwell 2003; GvMz 1995).

[14] GvMz-Política do Sector de Saúde aprovada pelo Conselho de Ministros do Governo de Moçambique, resolução 4/95 e publicada no supplement do BR 27- I série de 11 de Julho

[15] GvMz- Política Nacional de Águas aprovada pelo Conselho de Ministros do Governo de Moçambique, resolução 7/95 e publicada no supplement do BR 34- I série de 17 de Agosto

Community empowerment, resulting from involvement with the project has had a major social impact in the Combomune communities. These communities are now responsible for local development through sustainable use of natural resources. Salomão (2002) noted that setting priorities to solve the most pressing common problems results in the increased credibility of the community-based, natural resource management model. However, this model needs to be complemented by an equitable sharing of benefits to ensure the empowerment of the poor and most disadvantaged groups in the communities. This justifies the investment by the Combomune CBNRM project of community funds into the development of social infrastructures with high social impact.

Water shortage is the most pressing issue for the three communities involved in the CBNRM project. A decision to invest in water supply systems Figure 4.5, in Madliwa and Hochane was welcomed. However, the systems are unable to satisfy the demands. Moreover, these systems experience technical and mechanical problems. Water is a key element to attain the project objective of improving the living standards of communities involved in the sustainable use and management of natural resources. Lack of a sustainable solution to address water shortage is a problem that might negatively affect project objective and might lead households to mistrust project management systems.

Figure 4.5: Madliwa water supplies system

4.8.4. Impact of CBNRM project on the environment

Environmental management involves addressing human activities having negative impacts on the environmental system (Heal 2000). CBNRM addressed this by simultaneously promoting the integration of biodiversity conservation, rural development and maintenance of environment. Most CBNRM projects are designed to assist in the protection of fragile habitats, endangered wildlife and forest species (Munthali 2007; Brian 2006).

The Combomune CBNRM project is successfully implementing a fire management program. The project management board appreciates the program and encourages local residents to use this environmentally friendly agricultural practice. The project management board also contributes to the preservation of the environment through motivating communities to plant exotic trees, Figure 4.6.

Although most of the respondents indicated that wildlife is important to people, the study found some practical divergence of views. Some had indicated the wildlife population had increased, while others indicated it had decreased. Further, there were three distinct groupings of opinions: one group in favor of conservation for common benefit through ecotourism, a second group in favor of individual gains through hunting "poaching" for food, and a third group that considered wildlife dangerous to humans. These differing views suggest that households assigned different values to wildlife resources.

The group that said the animal numbers were decreasing attributed this to drought and poaching, that is, illegal resource off-take. These factors are also stated in the government Strategic Policy for Development of Forest and Wildlife (GvMz[16] 1997) which estimates that within the country about 80% of rural people hunt wild animals for meat. This statement could indicate a decrease in wildlife in the Combomune CBNRM project, as it is also in a rural area.

Further, Stalmans (2007) and Stalmans (2004) wildlife aerial survey reports indicate that from 2004 to 2007 in the Banhine National Park, the animal population had decreased. As this park

[16] GvMz- Política e Estratégia de Desenvolvimento de Florestas e Fauna Bravia- aprovada pela resolucao 8/97 do Conselho de Ministros do Governo de Moçambique e publicada no suplemento do BR -14: I-série de 1 de Abril

shares boundaries with the Combomune CBNRM project area, this would indicate that the wild animal population in Combomune has in fact decreased. The disparity in responses in this study may be attributed to the probability that the respondents are hunting wildlife and do not want to expose themselves.

This study, however, has not explicitly explored household motivations, which led to these different views about wildlife. Further study is suggested to gather more information about community perceptions with regard to the importance of wildlife and population trends in the Combomune CBNRM project, particularly in the light of the CBNRM project being a resource management project, in which hunting should not be taking place.

The CBNRM project contribution to the environment helps to ensure that human activities are controlled and that minimal negative impact results. The environment provides households with more resources than are required for material welfare (Wong *et al.* 2005). Environmental degradation could generally affect the development objectives of the Combomune CBNRM project, as well as the Millennium Development Goals of the United Nations, which recommend countries to strengthen their efforts to ensure sustainable environment as a way to combat desertification and attain human wellbeing.

The objective of the Combomune CBNRM project highlights the management of indigenous forest to achieve household livelihood improvement. The overall goal for natural resource management is the improved livelihoods. The Combomune communities depend on natural resources to meet their well-being goals; however, this should not compromise the needs of future generations. Resource management is required. The fire management program and controlled agricultural practices are implemented to ensure livelihood improvement and environmental resource safety.

However, despite some encouraging project results around the environment and human well-being, they are still far from meeting the community satisfaction. Further, limited livelihood alternatives for households leads to greater reliance on forest harvesting and subsistence agriculture, both of which activities have a negative impact on the environment.

Figure 4.6: Eucalyptus planted by the community at Madliwa

The project should address human activities affecting terrestrial ecosystems. The national environmental strategy of the Mozambican Government (GvMz[17] 1995) recognizes a need to establish rural development based on sustainable natural resource use to safeguard the environment and promote socio-economic development of most rural communities. Heal (2000) concluded that environmental management is the control of human activities having negative impacts on the environment. Forgie *et al.* (2001) added that natural resource management requires strategies to accomplish human needs while maintaining ecological sustainability. The Combomune communities have become mindful of environmental degradation and of the needs of future generations. In response to this, once they have cleared and farmed an area, they plant both indigenous and exotic trees to protect the now exposed soil. For even greater sustainability, the youth need to be encouraged to plant trees and be aware of environmental sustainability issues.

[17] GvMz-Politica Nacional do Ambiente – aprovada pela resolucao 5/95 do Conselho de Ministros do Governo de Moçambique e publicada no suplemento do BR-49: I-série de 6 de Dezembro

Chapter 5: Conclusions and recommendations

The objective of the study is to explore socio-economic impacts on the Combomune CBNRM project on household livelihoods, and its impacts on forest and wildlife conservation. This chapter presents the study findings in terms of these objectives and as discussed in Chapter 4. It provides some conclusions and recommendations for further consideration.

A literature review provided the theoretical framework for the study. The review of literature significantly helped determine and refine the research methods and enhanced the fieldwork preparation process. A case study was the primary approach to the research. It was complemented with participatory rural appraisal (PRA) tools and techniques, including fieldwork reconnaissance, direct observation, a report review, questionnaires, semi-structured interviews, direct observation and group discussions. Qualitative and quantitative data were gathered to enable an analysis of social and economic impacts of the CBNRM project on local household livelihoods and the project impact on the environment.

The case study method and additional PRA tools and techniques were fundamental for the survey framework. The framework provided comprehensive structure to describe the Combomune CBNRM project as well as to understand potential project challenges.

5.1. Applying CBNRM as an approach to development

CBNRM is the integrated approach applied mostly to rural development programs and programs aimed at sustainable use of environmental resources. This approach highlights the improvement of living conditions of most rural communities through their involvement in sustainable natural resource use. Community involvement and active participation are the basic assumptions of the CBNRM approach. It is a way to improve household livelihoods and environment sustainability.

Lyons (2000) concludes that CBNRM has emerged as one of the dominant models to involve local communities in rural development and the conservation of natural resources. It promotes shared stakeholder responsibility for natural resource management programs. CBNRM is the sharing of costs and benefits, through natural resource management, by local communities and

governments. Schmink (1999) concluded that the foundation of CBNRM is based on the relationship between natural resource management and livelihood improvement and Wong *et al.* (2005) observed that natural resources are assets used by local communities to address rural development.

5.2. Key findings

The Combomune CBNRM project is ten years old. It involves three communities working collaboratively in the management of natural resources to attain a common goal. The project provided an enabling environment to examine its contribution to rural development and the resulting social and economic impacts on the local communities and on the environment. The study showed that the project is an example of the community-centered approach; it promotes conservation of indigenous forest and allows sustainable use of natural resources for the benefit of local residents.

The study demonstrated that the Combomune CBNRM project created social and economic opportunities for household livelihood improvements. Economic impact was limited; the major impact was social. In terms of the environment, the main impact was increased local management of the environment. Although the impacts are reviewed separately, in reality they are a closely interwoven and integrated system. Key findings are presented and discussed in the following sections: Section 5.2.1., discusses economic impact of the Combomune CBNRM project while section 5.2.2., discusses social impact in the living conditions of the communities involved in the project, section 5.2.3., discusses environmental impact. Section 5.2.4., is the conclusions it has two sub-sections 5.2.4.1., and 5.2.4.1., presenting a framework for understanding impact and the false assumption of homogeneity in dealing with different groups or communities. Section 5.3., describes weaknesses and study limitations. Section 5.4., present recommendations to improve project management and finally is a sub-section 5.4.1., which presents recommendations for further study.

5.2.1. Economic impact

The Combomune CBNRM project was found to generate monetary income at the household level through charcoal mining. Money earned thus is most commonly invested in the improvement of homesteads and in the purchase of domestic animals such as cattle, goats, donkeys, and chickens. The livestock are reared and sold for income and used for household food consumption.

The study clearly shows that the economic impact of the project in terms of income generation has been very limited. The community had expected the project to generate more job opportunities than has been done to date. The project management, however, indicated that it was not unhappy with the economic impact as their main concern was with social improvements.

The State was found unable to give any realistic assessment of the economic impact of the project as it was uninvolved in the initiation of the project, came to the project late and found that it was difficult to influence the course of the project. In essence, the State was disconnected from the project and thus not wholly in touch with its outcomes (Zimba[18] 2009, personal communication).

The donor agency GTZ and other key stakeholders such as the local government, external to the project felt that the project failed to meet the intended goal for economic impact. They indicated that the strategy to use the local natural resources was not sufficiently studied to determine the potential for impact, taking into account local conditions which would impact on economic potential (Combomune Post Administrative Office 15 June 2009). They argued about aspects not adequately investigated before project implementation, such as roads, telecommunications, transport systems and access to markets, thus there was no sound basis for substantial economic impact.

[18] Alexandre Zimba, is the head of provincial department of Forest and Wildlife in Gaza Province

The donor and other stakeholders also indicated the project limited economic opportunities to those potentially derived from the forests; other opportunities were not investigated or pursued. They also argued that the project area has a high vegetation cover with dominant woodland forest, so it proved difficult to explain to the local population the threats to the forest ecosystem and the need to switch from charcoal production to other forms of income generation. As forest resources are still abundant in the area and that alternative forms of income generation are affected by climate and market conditions, the argument for forest conservation was unconvincing. Further, they cited a number of non-forest-based project initiatives attempted in the Combomune project area that were not sustained (Combomune Post Administrative Office 15 June 2009). The researcher observed that these unsustainable non-forest projects were blue-print projects imported by the donors from similar projects they had implemented in other parts of the world. It is more likely that the failure of these added projects was not related to issues of the Combomune project, but more likely that they were not grown from grassroots, but were imposed (Kasparek 2008).

The expectations of the community were not wholly unwarranted. According to van der Jagt *et al*. (2000) the utilization of natural resources through CBNRM projects often leads to several interrelated benefits helping to address different needs within a community. They cite the creation of employment as one of the most important strategies to alleviate poverty and bring social security in the lives of the people in remote areas. Financial and service benefits are also cited as important in motivating communities to support CBNRM projects. Further, the findings on the economic impact of the CBNRM project in the Combomune case study are substantially similar to the findings in other projects in the country and in Malawi, Namibia, Botswana and South Africa.

Brower (2008) assessed the Combomune CBNRM project and found the project supported almost all members of the community in reorganizing charcoal production and marketing. This enabled communities to increase incomes from charcoal production. Before the project, charcoal had been a more limited income source. Kafakoma (2008) assessed the Malawi CBNRM project and found the project generated revenue insufficient to cover expenditure from non-timber forest products, but when added to Guinea fowl rearing, bee-keeping and fruit juices, household

incomes were increased. This indicates that limited economic impact on household livelihoods at the Combomune CBNRM project could be due to limited sources of revenue generation. Revenue was only generated from charcoal mining.

Further Mouton (2008) assessed a forest based CBNRM project in Namibia, and found that income generated through the household from Guinea fowl rearing was complemented by income from other activities such as mushroom collection, thatch grass and firewood. This reinforces the idea that the economic outcome at Combomune is limited because it relies on a single source of income generation, and it could not achieve the expected outcomes from forest resources alone.

Norfolk and Tanner (2007) assessed the economic impact of the Canhane CBNRM southern Mozambican project. Their findings show more positive economic outcomes compared to the Combomune and Malawian projects. The Canhane CBNRM project generated revenue from an array of tourism activities including traditional dance and food, handcraft, bicycling, boating, walking safaris, tourist guiding and camping. The economic impact was also diversified by new employment opportunities, diversification of activities in a region very prone to drought and crop failure, and improvement of social infrastructure.

In Botswana, Arntzen *et al*. (2003) found that economic gains filtered through to community members by the CBNRM projects had diversified sources and origins. These included joint venture agreements, employment within the trusts and at the private companies working with communities and donor support.

Nhantumbo *et al.* (2003) state, the major impact of CBNRM projects are the improvement of livelihoods of rural people. However, CBNRM economic benefits depend on resources available as the base of the community project. Shyamsundar *et al.* (2005:7) argue more critically that community benefits are only “a trademark of natural resource management programs”; most community benefits are from direct external assistance and only an insignificant part from program earnings.

A critical analysis of the Combomune findings in the light of other case studies indicates some differences and similarities regarding economic impacts. For example, Nhantumbo *et al.* (2003) assessed the Dere CBNRM project in central Mozambique and noted livestock was one of the main indicators of wealth for local people. This was similar to the Combomune study where it was found that communities reared livestock and considered cattle as an indicator of wealth.

The main difference between Combomune and the other case studies is that at Combomune the economic impact is significantly less. This is largely attributed to the focus on a single income source, charcoal from the forests, whereas other CBNRM projects had more diversified income sources. Beyond this however, in addition to the limited resource base for the project, the differences might be explained by community organization and perceptions, poverty levels in the community, economic status, community power over resources, and external support, government or NGO. These are factors which influence the course of project and affect its outcome and impact on local communities. Given the forgoing, the question then is: how can CBNRM projects in areas such as Combomune, with its limited resources generate positive economic impacts on communities? This would contribute to an understanding of how to increase the contribution of the Combomune CBNRM project within its limited resources and external support. It is agreed that economic outcomes for CBNRM projects depend on the diversification of sources of revenue generation. In cases like Combomune, that diversification would have to be created from within the single resource base and this will require creative and imaginative thinking.

5.2.2. Social impact

At the individual household level, some improvements in the living conditions of the communities involved in the project were observed. Most household dwellings have been improved with better quality and more durable building materials.

The greatest social impact was collective. The social impact of the Combomune CBNRM project is measured in quantity and quality of social infrastructure and services offered to local households. The Combomune communities themselves have taken the lead and assumed government responsibilities by investing community money in the development and

improvement of social infrastructure and services. The government has done little to assist these communities. Inadequate government support negatively affects the sustainability of community initiatives, especially the water supply systems.

The project collaboratively created a community development fund controlled by the three communities. The money in the fund is generated through a levy system attached to charcoal production. The community funds are invested in the development of social infrastructure with high social impact as a way to share project benefits with all community members. Thus, money from this fund has been invested in the development of social infrastructure of common interest, such as schools, health posts, and water supplies. These have had a significant impact on household livelihoods. These social problems were considered by local communities as the most pressing issues. This is in keeping with Kasparek's (2008) and Hanjra and Gichuki's (2008) observations that in Africa the most common social problems addressed by CBNRM projects are education, health, transport, water supply, irrigation schemes, conservation, marketing of agricultural products and improved household homesteads.

A shortage of water emerged as the most pressing issue for the three communities involved in the management of natural resources at the Combomune ward. The study highlighted that community water supply is a key element to attain the project objective of improving the living standards of communities involved in the sustainable use and management of natural resources.
In response to the water issue, investments focused on water supply systems. The systems at least partially addressed the water shortage in Madliwa and Hochane, but did not adequately address the water shortage in Chaves. In the two villages, the systems are unable to adequately satisfy the demands for water. Moreover, these systems experience technical and mechanical problems. Lack of a sustainable solution to address the water shortage is a problem that might affect the project objective and might lead households to mistrust project management system.

Strategically, the Combomune communities have also used community development funds to invest in the development of education. In the long-term, this should help to prepare future generations with technical skills and knowledge to address social welfare and natural resource sustainability.

Through the project, the Combomune communities have invested development funds in programs to reduce child mortality, improve maternal health, and prevent HIV/AIDS, malaria and other diseases (Combomune Post Administrative Office 15 June 2009). Although it is not done consciously, these community efforts correspond closely to the United Nations Millennium Development Goals (MDGs). The UN-MDGs described by Maxwell (2003) and by the Government of Mozambique (1995), highlight improvement of health care services as a way to achieve and ensure social development and environmental sustainability.

Finally, involvement in the project has resulted in the empowerment of the local communities and has made a major social impact in the Combomune communities. Madliwa, Hochane and Chaves are rural villages with communities dependent on natural resources, thus, they are directly involved in the conservation of indigenous forest to improve their livelihoods. These communities are now responsible for, and empowered, to prioritize and more generally command local development and sustainable use of natural resources. This has raised expectations in the key stakeholders as indicated below.

Local communities involved in the Combomune CBNRM project expected the project to address the water shortage, transport and communication systems. They argued that transport and telephones are important to assist communities in case of emergencies. They cited, for example, that transport, especially ambulances could assist communities in referral of patients from the local health care post to the Chokwe or Mapai hospitals. Communities also expected to have health care services and water for each village to reduce long distances from where these facilities are found.

The project management expected an effective management of power-sharing with the general community, government and NGO. The management also expected to create and implement an awareness program in the local and outside communities for sustainable use of natural resources. As revealed by the Combomune project stakeholders interviewed by the researcher in the preliminary survey (See Table 3.4, Appendix C), additional expectations were to obtain resource ownership from the government with the authority of natural resources devolved to local communities.

The State expected more than the donors and local communities from the program. The State pointed out a significant number of challenges which it expected to be addressed by the project; these challenges included water supply, education, transport, health care service and communication system. The State expected each village to have efficient water supply infrastructure enabling communities' access to clean water (Combomune Post Administrative Office 15 June 2009).

For education, the State expected additional educational infrastructure, such as schools in the rural villages with acceptable standards, to enable resident's access to formal education. The State argues that education is a base for sustainable development. Education improves not only community participation in the management and conservation of environmental resources but, also social conditions such as health care services and food security. Further, the State expected the project to create adult learning centre or schools in the rural villages as a way to improve numbers of people able to read and write (Combomune Post Administrative Office 15 June 2009).

The State recognizes the importance of transport and argues that transport is critical for the movement of people and goods from production areas to market, thus the State expected that the project would improve local development to motivate the private sector to explore transport services in the community areas. Further, the State argues that socio-economic development demands communication systems enabling a variety of people from different areas to interact. Thus, the State expected local development to justify investment in telephone communication systems to cover the villages (Combomune Post Administrative Office 15 June 2009).

Regarding heath care services, the State expected an increment of health care infrastructure and service to rural villages and emphasizes that health care services are required to assist vulnerable groups within the communities, For example, pregnant woman, the elderly and children.

Donor expectations were that community institutions with strengthened capacity would be created to manage resources. Donors also expected communities to take responsibility for their

own development through sustainable use of available natural resources. Further, donors expected to identify strategies and activities to generate more socio-economic benefits for example, interest groups for the production of vegetables uncommon in the communities, such as cabbage, tomato and onion, and to create strategies for the development of local markets (Kasparek 2008).

Additionally, donors expected to establish efficient and functional project management structure; and establish, with the government, health care services to assist the three communities. They also expected poverty to be reduced in the three villages, Madliwa, Hochane and Chaves.

King (2007) assessed the CBNRM project attached to the Shongwe Game Reserve, South Africa and observed that the local community generated monetary income. The income was used for a number of objectives, including the fencing of the school and the purchase of chairs for the community. This indicates that the Shongwe community defined activities and prioritized these for social impacts, investing community funds for common benefits. This is similar to the Combomune communities' strategy, as they have also decided investing part of the community funds into the development of education, schools and building teacher accommodation.

Norfolk and Tanner (2007) assessed the Canhane CBNRM project and noted that the project had managed to establish community ownership of the lodge, with a community-elected committee running the lodge. It also improved local capacity to assess needs and take planning decisions. It improved market links through road network improvements. Commitment was renewed to support education as the key to community children accessing new job opportunities locally and in the new national park-driven economy. In Malawi, Kafakoma (2008) found that most of the households invested money from the project in education for their children, and in the construction of houses, using burnt brick, roofed with corrugated iron sheet and with cemented floors.

Balint and Mashinya (2008) assessed the Zimbabwean Communal Areas Management Program for Indigenous Resources (CAMPFIRE) and these findings are similar to those in Malawi and Mozambique. Their main finding was that community empowerment had high socio-economic impacts on local households. Thus, they concluded that CBNRM projects should incorporate

devolving authority to local communities as an essential complement to restructured incentives established to engage community participation. This is also similar to findings at the Combomune CBNRM project, where three communities, empowered by the government authority, work jointly to improve their conditions through sustainable use of indigenous forest resources.

In northern Mozambique, Norfolk and Tanner (2007) assessed the Chipanje Chetu CBNRM project and found that the major social impact was a stronger community organization achieved through community education enabling them to be more aware of their rights. Further, they noted that local communities were working together and hopefully could one day conclude with a formalization process that is rooted in legal provisions. Shyamsundar *et al.* (2005) observed that power devolution of natural resources is a social benefit that creates space for communities to have a "voice" in how forests, water, and wildlife are managed. They conclude that that voice depends on agreement between the State and communities. As highlighted in the projects successfully implemented, different communities and relevant stakeholders exercise power sharing as a social benefit.

Arntzen *et al*. (2003) note that experience in Botswana and Namibian CBNRM projects shows that social benefits, such as power-sharing have a high social impact. Social impacts include: the high status of CBNRM members and villages; the establishment of representative village institutions; the strengthening of the village identity and culture; the development of pride and self confidence; reduced dependency on government support; and technology and product development. Further, Arntzen *et al*. (2003) indicate that CBNRM is a source of new economic opportunities for projects in tourism; exposure to private sector; development of skills and better working relationships with government, conservation institutions and support organizations; and the circumstances to retain educated and productive youth in rural areas.

Most findings from Arntzen *et al*. (2003) were not observed at the Combomune project, firstly, due to limited sources of revenue; and secondly, to a possible disproportional distribution of budget. Of the total budget, 95% was spent on wages and transport for administrative personnel and only 5% on the project activities (Brower 2008). This has affected project performance,

therefore this could explain the difference between results observed in Botswana and Namibia and noted by Arntzen *et al*. (2003) with the Combomune case study results.

In addition, Shyamsundar *et al.* (2005) noted that in Botswana, the CBRNM projects based on forestry had significant social impacts. These projects contributed to a reduction in the high unemployment rate through forest-related enterprises. The findings highlighted joint ventures between communities and the private sector as a factor contributing to improved social benefits. This means the project in Botswana raised business opportunities to attract private sector investment in community areas, as the private sector would only engage with community projects if available resources and management strategies lead to sustainable business.

At the Combomune project, low social impacts can be attributed to multiple factors. One is that the project implementer, GTA and management failed to raise activities to generate socio-economic opportunities. Another could be that the project implementer and management failed to implant secondary projects, such as ostrich farming and vegetable production in the area, (Kasparek 2008). Similarly, an NGO working with the Nyaminyami communities at the CAMPIFIRE in Zimbabwe, after engaging with local communities for ten years, failed to develop adaptive and self-sustaining local institutions that were legally recognized and derived their legitimacy through consensus (Balint & Mashinya 2008).

Arntzen *et al.* (2003) further found that in Botswana most CBNRM project results contributing to socio-economic improvements were highly linked to donor support. This suggests that donors were instrumental in developing infrastructure and technology for the CBNRM projects by providing much needed ‘on-the-ground’ technical assistance. If this assistance improves the social impact of CBNRM projects, then, donors have proven to be extremely valuable for project outcomes. However, their contribution is only really of value if the benefits they bring can be sustained by the project after the donors have ceased their support.

5.2.3. Environmental impact

Sustainable rural development and environmental management has become a key concern of developing countries. Environmental management is less about the environment itself, than about the management of the impact human activities have on the environmental system, with particular concern around negative impacts (Heal 2000).

The study demonstrated a positive contribution by the local communities to the maintenance of environmental systems through controlled activities. However, the results are still limited. The most significant impact was the development and implementation of a program to control fire which can threaten the habitats. The project has not seen an uncontrolled fire in over years.

Another impact is the program of tree planting on land previously used for crops. This is part of a longer-term strategy to reinvigorate the ecosystem. Environmental management is key factor to the maintenance of community livelihoods. Communities expected the project to bring technical innovation for charcoal mining to improve productivity and reduce negative impacts on the indigenous forest resource. Management expected to regulate resource use and set exclusivity of resource exploitation to the residents of the three villages. They argue that this was to maximize benefits accrued by local residents as the outsiders would become potential buyers of the forest product from the locals. This was also to ensure effective control of resource exploitation. They have also added that if outsiders are allowed to explore forest resources they may use advanced technology such as chain-saws and this could result in competition and a quick depletion of resources within the community area.

The State expected collaboration with communities to combat illegal harvesting of forest resources and uncontrolled fires. The State argues that the major cause of resource depletion results from careless use of environmental resources by humans. It is necessary to control human activities to maintain a sustainable environment. The State also expected community strengthened organization and full participation in environmental management to ensure quality of life derived from productive capacity for rural communities. In addition, the State expected the project to promote community participation in decision-making processes and to ensure

protection and conservation of essential ecosystems, while the State assists with the integration of environmental education in the formal education system, (Zimba[19] 2009, personal communication).

Donors expected to assist communities to design a management plan for sustainable natural resource management. The donors argued that funds are only available to support community development programs that are environmentally sustainable. The donors also expected project management committee members to share experiences with other members from their visits to similar projects in Botswana, Malawi and Namibia. The projects in those countries are financially and technically supported by DED. The visits aimed to motivate the managers to enhance their experiences, skills and performance (Ngonyamo[20] 2009, personal communication).

Mouton (2008) assessed the Namibian CBNRM project and noted that it was largely successful and sustainable in conserving natural resources, but challenged in terms of direct income to improve most household living standards. Sustainable conservation of forest resources achieved in Namibia was a result of a prohibition to cut live trees for firewood, to set uncontrolled fires and to pull off branches from wild fruit trees. Additional measures included a restriction on new settlements, extension of fields, fencing of unfenced areas, and exploitation of timber, unless approved by the Forest Management Committee or directly managed by the committee itself.

The similarity of findings at the Namibia case study with the Combomune project is only related to the control of fires. This implies that the Namibian CBNRM project adopted a more proactive approach. This could have resulted from enhanced internal technical capacity for the management committee to handle multiple activities. It also suggests that local communities had sufficient authority to adopt any measure on their land including limiting and controlling activities such as settlement and fencing, which was unobserved in the case of the Combomune community project.

[19] Alexandre Zimba, is the head of provincial department of Forest and Wildlife in Gaza Province

[20] Abel Ngonyamo, is the GTA technical field assistant and represent GTZ at the Combomune community project

Shyamsundar *et al.* (2005) observed that where programs are managed by the community, they are meeting their conservation goals. The indicators are an increase in the number of animals and a decrease in poaching activities resulting from improved monitoring and law enforcement by local communities. This approach leads to sustainable resource use and conservation, the main aim of CBNRM projects. Sustainable use and conservation of natural resource should ensure that environmental benefits are sustained for future generations, while generating income and other benefits for the present generation (van der Jagt *et al.* 2000).

Arntzen *et al.* (2003) assessed community projects in Botswana and the findings led them to conclude that there was a growing appreciation of the value of natural resources by communities. This led to an apparent reduction in poaching, better relationships with conservation officials, preservation of savannah landscape and biodiversity, and a reduced need for agricultural production in marginal areas, thereby preventing the associated agro-environmental problems. It is difficult to find a parallel between the Botswana and the Combomune project findings. The Combomune local communities focused more on forest resources and had different perceptions about wild animals as a component of the environment. They were not as clear or consistent about issues of wild animal populations and poaching.

5.2.4. Conclusions

The Combomune community sustains the CBNRM model as a way to ensure equitable sharing of benefits derived from common resources, to empower the poor and the most disadvantaged groups in the community, such as female-headed families, that is, widows and single mothers. Further, the Combomune CBNRM project promotes simultaneously, the integration of biodiversity conservation, rural development and maintenance of the environment through programs set to regulate and control human activities, such as the use of fire, agriculture and forest harvesting.

The fire management program is an example of successful implementation of the regulation and control aspect of the Combomune CBNRM project. The study has shown that, through the fire management program, environmental resources were controlled. Additional to the fire

management program, local residents use environmentally friendly agricultural practices and forest-harvesting quotas to avoid land degradation and resource depletion.

The Project Management Board enhances conservation of the environment through supporting a tree planting program and motivating communities to plant trees. As result, communities have become mindful of environmental degradation and of the needs of future generations. Once they have cleared and farmed an area, they protect the now exposed soil by planting trees.

Despite positive results showing improvement in human well-being and protection of the environment in the Combomune CBNRM project, these results are still far from meeting community expectations. Limited livelihood alternatives for household leads to greater reliance on forest harvesting and subsistence agriculture, both of which activities have a negative impact on the environment.

5.2.4.1. A new framework for understanding impact

While the study was designed to examine the economic, social and environmental impact of the CBNRM project, it was found that the impacts of CBNRM projects could be better classified into three different categories: impact on poverty, impact on community empowerment and impact on natural resources. It was often difficult to separate social impacts from economic impacts because they were so closely linked, particularly among the poor. Thus it is more useful to measure the extent to which a CBNRM project reduces poverty, or increases wealth than it is to simply measure the social and economic impacts separately. It is the effect of these social and economic impacts on poverty that seems to matter the most. Chambers (2006) stated that poverty is the first and most important challenge in the Millennium Development Goals. Poverty reduction, alleviation or elimination is seen as prime goal and measure of development. For example, the Mozambican strategy for poverty reduction cited in the Ministry of Tourism Strategic Plan for the Development of Tourism in Mozambique (2004-2013) (MITUR[21] 2004) highlights six priorities for poverty alleviation: socio-economic development, education, health,

[21] MITUR: Ministry of Tourism -Strategic Plan for the Development of Tourism in Mozambique (2004-2013), the Government document, English version 1/2004.

agriculture and rural development, basic infrastructure, good governance and macro-economic and financial management. These priorities are directly linked to sustainable development (MITUR 2004). Thus, income measures are mostly used to gauge overall development trends (Fukuda-Parr 2006). The more traditional approaches to sustainable development have looked at the social, economic and environmental factors. This study has suggested that the three key aspects of sustainable development are poverty reduction/wealth creation, democratic ownership and governance, and environmental sustainability, Figure 5.1. This variation highlights outcomes indicating the level of sustainability and the areas of action or intervention required to attain it.

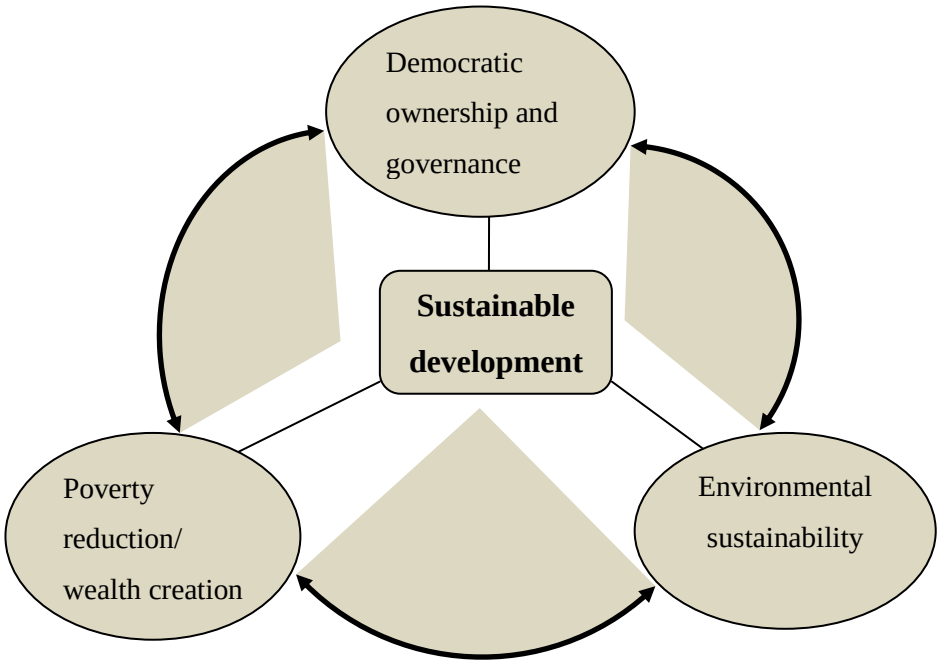

Figure 5.1: Suggested approach to sustainable development

Poverty is capacity deprivation characterized by powerlessness, insecurity, poor social relations, physical weakness and lack of resource materials (Chambers 2006). People are poor if they are deprived of income and other resources required sustaining livelihoods (Townsend 2006). So, CBNRM emerges as the model to address these constraints by socially and economically empowering poor people, providing access to public goods through development of local infrastructure, increasing opportunities to legally use natural resources, increasing private income opportunities through jobs, access to different services and self employment possibilities,

fostering education, home improvement and a greater command over factors influencing lifestyle and standards of living.

Conservation of the natural resource base is one of the main objectives and benefits of the CBNRM approach. When communities recognize the financial and non-financial value of natural resources, they become interested in conserving them, resulting in benefits for current and future generations. It is clear that the success of CBNRM model is based on five pillars: decision-making powers; resource ownership; and access to funds, technology and markets (Sebele 2009). It is also evident that issues related to access to education, health care services, clean water, transport and market infrastructure were fundamental to improve the Combomune living conditions. However, the main challenge and major lesson from this case study is that while a rural development approach, that is, CBNRM is being applied to achieve sustainable development; the process itself must be continuously reviewed and improved to deliver continuing improvements to the household economies and livelihoods, in this case, Combomune.

5.2.4.2. The false assumption of homogeneity

Despite sharing the management of resources, households living in the same village have different perceptions of the problems they face, how development interventions should address them and how interventions will impact on households in the community. This suggests that household socio-economic status and cultural background drive different worldviews in relation to the CBNRM project, which affects how the project evolves, what participants expect from it, and how they measure the success of the project. The three communities involved in the Combomune CBNRM project shaped different views about project management and benefit distribution. Despite positive collaboration of these communities in the project management, their perception and interpretation of desired objectives differed from one community to another. This shows that principles of community homogeneity are a false assumption when dealing with different groups or communities. Those charged with designing and governing the implementation of such projects need to be conscious of the diversity of thought, while striving to create unity of purpose and action and not assume that everyone wants the same thing or wants to achieve it in the same way.

5.3. Weaknesses and limitations of the study

While not intended, the study has been limited by a number of factors. Significant efforts had to be made to overcome suspicions of community members participating in the study. These suspicions were stimulated by three factors. First, that the researcher is not from the study area initially posed an obstacle to gaining the trust of the local communities. The researcher not being known to them, initially made community members defensive when asked questions about their livelihoods. Second, the study was unintentionally undertaken during an electoral campaign. This initially tended to augment household suspicions about the researcher, fearing that he might really be there to ask questions about political affiliations. Third, the researcher was a student and government employee. Initially participants were uncertain about the intention of the study.

The depth of learning was constrained by time factors. The study had to be completed in three months. This limited the number of households that could be interviewed. The study was also limited by long distances and the travelling time required. The villages in the study area were dispersed and households scattered; 20 to 40 minutes were spent getting from one village to the next, and 15 to 25 minutes getting from one household to the next in the same village. This means that much time which could have been spent working with more households was spent traveling. Similarly, the limited budget also affected the study in terms of covering more households. This possibly limited the extent to which generalizations could be made.

Communication and language was another potential limitation. The people in the study areas are purely Shangane, while researcher speaks Xitswa, which is slightly different from Shangane. Great care was always taken in discussions and note-taking. Nevertheless, there is a possibility that some information might have been missed in the process.

In addition to the limitations mentioned above, there was also a lack of previous research data with regard to the contribution of the project to socio-economic and environmental improvements. There was no empirical base-line data available; no previous studies had been conducted. The only source of data was the views of the study participants. Given that there has been little knowledge about evolutionary contributions of the project to the improvement of local

conditions, it was not possible to verify respondent input. The study is based purely on participant perceptions and physical observations of the current state of development.

Being aware of all these limitations, the researcher did all he could to minimize their negative impact on the study. The specific results of this study are valid only for the Combomune CBNRM project and cannot be generalized to other CBNRM projects, even to those with similar socio-cultural and ecological characteristics. However, the study can be used to guide the planning, designing, implementation and evaluation of CBNRM projects as it does broadly address and provide insight into issues of governance, ownership, participation, poverty reduction and wealth creation, and environmental sustainability as they relate to the CBNRM approach.

5.4. Recommendations

Implementing CBNRM projects to deliver improvement to household livelihoods is a process which should be seen as continuous. As a development process, CBNRM has its limitations and is affected by internal and external factors such as community cohesion and donor funding, respectively. The assumption of the homogeneity of communities appearing to be entrenched in the CBNRM philosophy is a clear weakness needing to be resolved, as discussed in section 5.2.4.2.

At Combomune specifically, CBNRM was implemented narrowly in that economic outcomes were derived solely from the immediate natural resources being managed. This limited the ability of the Combomune project to fully deliver positive impacts.

As has been the case in a number of other CBNRM projects, economic improvement is based on a variety of revenue generating options applicable to local conditions. Therefore to improve economic conditions of the Combomune communities, other options compatible with environmental sustainability conditions should be identified. The Combomune project should be expanded to include income generation from other activities, such as cultural activities and value-adding enterprises, that is, making products from forest resources, both of which can be

linked to tourism. For example, the Management Board should create a committee responsible for exploring *Androstachys* poles as complementary to charcoal mining, collect dead wood and sell as firewood or as carved artifacts. Game farming and ecotourism is a potential that can be planned with the two neighboring national parks. The Management Board should also create a market to engage trading among residents, non-residents and tourists. Fees for the account of the community could be charged to sellers.

The Combomune community area is regularly affected by drought, a natural phenomenon. Definitions of activities and priorities should be based on critical observations and analysis of local conditions. In addition, there is a need to consider population distribution and density, volume of natural resources in the area as well as external factors affecting communities and resources. Equitable distribution of social amenities in the three villages is also important to motivate and build positive relationships among communities.

For the Combomune CBNRM project to meet rural development goals emphasized in the Mozambican government policy, the Management Board should continuously monitor human resettlement in the project area; and control forest harvesting activities that might affect project performance and environmental systems.

The full involvement of, and support by, the local government is crucial for the success of the project. For any new projects growing out of the Combomune project, it is important to get the necessary support from the early planning stage and to involve key decision-makers in the planning process. While project implementation can be done under the responsibility of non-governmental organizations, the local government should not have the feeling that something is going on beyond its own influence.

Feasibility studies are required before designing income-generating projects. It is critical to understand the socio-economic characteristics and existing traditional management structures because this determines what activities and benefits can be pursued. In addition, project objectives and activities should be developed from local experience with the involvement of the intended target group and other relevant stakeholders, to facilitate integration of valuable local skills and knowledge to address socio-economic and environmental problems.

The project management needs to extend and secure the continuity of project management and projects, such as the tree planting program, through building awareness and involving youth in these programs. The project management also needs to integrate the community awareness program as part of management activities, to ensure project and environmental sustainability.

The government needs to improve support for the implementation of the project management plan to ensure that project management outcomes continuously meet household desires and environmental sustainability.

5.4.1. Further study

This study has not explicitly explored household motivations, leading to different views about importance of wildlife. Therefore, further study should be considered to gather more information about community perceptions with regard to the importance of wildlife and population trends at the Combomune CBNRM project, particularly in the light of the CBNRM project.

It is suggested that a study be conducted to assess the impact of new resettlements in the project area and to determine 'pull' factors to motivate outsiders to resettle, primarily in Chaves village.

Another study is suggested to ascertain the causes leading to the failure of the ostrich farming and vegetable production projects. This might help in changing strategies, as new alternatives of income are still needed in the Combomune project.

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Appendices

Appendix A: Distribution of domestic animal in the three villages

Domestic animals in the three community villages comprise cattle, goats, sheep, chickens, guinea fowl[22] , baboons[23], ducks, pigs, donkeys (Table 11). The 107 households have a combined total of 962 chickens, 583 goats 554 cattle, 145 dogs, 66 donkeys, 65 sheep and 59 ducks.

Table 4.15: Domestic animals in the households surveyed

Species	Madliwa	Hochane	Chaves	Total of animals
Chickens	452	144	393	962
Goats	317	140	126	583
Cattle	331	69	154	554
Dogs	56	43	46	145
Donkey	39	16	11	66
Sheep	42	17	6	65
Ducks	44	3	12	59
Cats	4	6	7	17
Guinea fowl	17			17
Pigs	2		10	12
Baboon			1	1

Of the 962 chickens, 452 (46.98%) were in Madliwa, 393 (40.85%) were in Chaves and 144 (14.96%) were in Hochane. Of the 554 cattle, 331 (59.75%) were in Madliwa; 69 (12.45%), were in Hochane and 154 (27.80%) were in Chaves. Only 16 households were found to rear 59 ducks. Of the 59 ducks 44 (74.58%) were in Madliwa; 12 (20.34%) were in Chaves and 3(5.08) were in Hochane. Of the 583 goats 317 (54.37%) were in Madliwa; 140 (24.01%) in Hochane and 126 (21.62%) in Chaves.

Of the 145 dogs 56 (38.62%) were in Madliwa; 46 (31.72%) were in Chaves and 43 (29.66%) were in Hochane. Some 37 households (61.68%) rear 66 donkeys for purpose of transport and

[22] Guinea fowl [22] Baboons[3] are domesticated

plowing. Of the 66 donkeys, 39 (59.09%) were in Madliwa, 16 (24.24%) were in Hochane and 11 (16.67%) were in Chaves.

Of the 65 sheep, 42 (64.62%) were in Madliwa; 17 (26.15%) were in Hochane and 6 (9.23%) were in Chaves. Of the 17 Cats 7 (41.18%) were in Chaves, 6 (35.29%) were in Hochane and 4(23.53%) were in Madliwa.

Pigs are 12 only reared in two villages; in Chaves there were 10 (83.33%) animals and in Madliwa 2 (16.67%). Guinea fowl were found in only one village, Madliwa, which rears 17 domesticated guinea fowl. Only one household, in Chaves, was found keeping a baboon.

Most of the domestic animals are used to improve household livelihoods through selling meat and other products and by-products. Dogs and cats are also common in the communities; dogs are often sold as hunting dogs. While cats are mostly household pets, in some cases they are used for meat. Donkeys are used to tow trailers and for plowing lands. The one baboon was a pet.

Appendix B: Household semi-structured questionnaire

(Original questionnaire was in Portuguese and has been translated for ease of reference)

This questionnaire is designed for household respondents from the Combomune CBNRM project. The respondents may answer as and when they wish. They may withdraw their participation at any time should they so wish.

Towards understanding the impact of CBNRM on household livelihoods: the case of Combomune community project

Data____/____/_____ interview № _____ District Mabalane

Village**:** Madliwa (in Gerez) [ ] Hochane (in Gerez) [ ] Hochane [ ] Chaves [ ]

1. Personal particulars

1.1 Position in the household

[1] Household head [2] wife [3] responsible son/daughter [4] other (specify)

1.2 Educational background

[1] No education [2] primary [3] secondary [4] high school

1.3 Occupation

[1] Peasant [2] employee [3] business man/woman [4] other (specify)

Age	Number of Males	Number of Females	Total

2. Origins

2.1 Where were you born?

2.2 If you were not born in here, how long are you living here?

2.3 If you were not born in here, why did you come to live here?

2.4 When have you heard first about Combomune community project?

2.5 If you have heard about the project, are you involved?

[1] Yes [2] no [3]

2.5.1 If no, why not?

2.6 Do you benefit from the project?

[1] Yes [2] no

2.6.1 If yes, in what are you benefiting? ___

2.6.2 If no, why?

[1] I have never got any benefit[2] I do not know[3] I cannot distinguish the project benefits from other support [4] other (specify)

2.7 Does community participate in the project management?

[1] Yes [2] no

2.7.1 If yes in what way?

[1] Decision-making [2] planning [3] monitoring activities [4] respect to resources use plan [5] patrol [6] management committee [7] other (specify)

2.7.2 If no, do you think community should participate and how?

[1] Yes [2] no [3]

2.7.3-a) if yes, why do you think community should participate.

2.7.3-b) if no, why not?

2.7.4 Which way community should participate?

[1] Patrol [2] management committees [3] in the resource responsible utilization [4] I do not know

2.7.5 If community is involved through management committees, how does it participate in these committees?

[1] As individual [3] through community leader [3] community representative [4] others (specify)

2.7.6 How are community representative selected?

[1] Elected [2] appointed by chief [3] hand-picked by the government [4] volunteering [5] hand-picked by an NGO [6] others (specify)

2.8 Do the community representatives (management committee) report back to the community?

[1] Yes [2] no

2.8.1 If yes how do they report?

2.8.2 If no, how would you like them to report back?

2.8.3 What is your opinion regarding to the project?

[1] It's welcome [2] it helps to get better off in our life [3] it opens opportunities to self employment [4] it helps to make sustainable, the use of our resources[5] it brings social amenities [6] it is good for resource conservation [7] it makes no difference

3.1 Resources access

3.1.1 How do communities access common resources?

3.1.2 For what purpose do you use the resources?

[1] For subsistence [2] for economic gains [3] building houses and other infrastructure [4] exchange [5] others (specify)

3.1.3 Some years back who made decisions about the control, access and use of natural resources in the community area?

[1] Traditional authority [2] government [3] council of elders [4] I do not know

3.1.4 Who currently controls and decides on the access and use of natural resources?

[1] Traditional authority [2] government [3] council of elders [4] management committee [5] community assembly [6] I do not know

3.1.5 Are you happy with the current management and control over access to the resources?

[1] Yes [2] no

3.1.6 If yes, why? _

3.1.7 If no, why not?

3.1.8 How would you like the management and resources access to be? ___

3.1.9 How has illegal resources off-take been controlled in the community area?

3.2 Fire burning

3.2.1 There is any fire management program?

[1] Yes [2] no

3.2.2 If yes, how often uncontrolled fire occur in the community area?

3.2.3 If no, why not?

4. Livestock and wildlife species

4.1 Do you keep any livestock?

[1] Yes [2] no

4.1.1 If yes, which species are you keeping?

[1] Cattle___[2] goats___[3] sheep___[4] chickens___ [5]ducks___[6] pigs____ [7]other___(specify)

4.2 **Wildlife species**

4.2.1 What wildlife species occur in the area?

[1] Big five [2] antelopes [3] small mammals and birds [4] reptiles [5] rodents

4.2.2 What wild animal do you frequently see?

[1] Big mammals [2] game birds (avifauna) [3] small antelopes [4] reptiles [5] rodents

4.2.3 In the past what wildlife species occurred in the area?

[1] Mammals [2] game birds (avifauna) [3] reptiles [4] mammals, avifauna and reptiles [5] rodents [6] None

4.2.4 Is wildlife population and species increasing?

[1] Yes [2] no

4.2.5 If yes, why?

4.2.6 If no, why not?

4.2.7 Do you think wildlife have any importance to human?

[1] Yes [2] no

4.2.8 If yes, why?

4.2.9 If no, why not?

5 Livelihood strategies and food security

5.1 What are your means of making a living? Rank them from the most important to the least important [1] most important [2] very important [3] important [4] least important

	Livelihood strategies	[1]	[2]	[3]	[4]
[1]	Agriculture				
[2]	Livestock				
[3]	Charcoal				
[4]	Business (specify)				
[5]	Crafts				
[6]	Incomes from relatives working elsewhere				
[7]	Self employment or private employee				
[8]	Government or NGO employee				
[9]	Others (specify)				

5.2 Where do you obtain the resources for your livelihood strategies?

[1] In the project [2] community forest [3] others (specify)

5.3 Is there any change in agriculture land practice?

[1] Yes [2] no

5.3.1 If yes, how were you preparing your agricultural land?

5.3.2 How do you prepare your agricultural land?

5.3.3 For how long do you plow in the same field?

5.4 Food security

5.4.1 Which crops do you produce?

[1] Grains [2] vegetables [3] fruits [4] grains and vegetables [5] Cassava and potato

5.4.2 How many harvests per year?

5.4.3 How long do you take with your seasonal producer?

5.3.3 Which period does hunger occur most?

5.4.4 What do you do to overcome hunger?

6. Market and transport system

6.1 There is any market or shop in the village?

[1] Yes [2] no

6.2 How many and which category

[1] Market____ [2] shop____ [3] tuck shop/ stall/ barracas ____

6.2.1 Who own these markets, shops tuck shop stall and barracas

[1] Local community [2] singular community member [3] outsider [4] NGO [5] government

6.2.2 How long does it take to the nearest shop/market truck shop/stall?

6.2.3 What is sold in the market shop/market truck shop/stall?

№	Goods sold	yes	usually
1	Maize meal, rice		
2	Soup		
3	Sugar		
4	Cooking oil		
5	Paraffin, candles		
6	Matches		
7	Bicycle spares		
8	Lantern		
9	Mineral water		
10	Soft drinks		
11	Luxury (beer, wine, whisky)		
12	Clothes		

6.4 Transport system

6.4.1 How far is your nearest town or village?

[1] ½ hour [2] 1hour [3] two hours [4] four hours [5] more than five hours

6.4.2 How often do you go to town or village?

[1] Daily [2] once a week [3] once a month [4] occasionally [5] never

6.4.3 What transport do you use?

[1] Bicycle [2] motorbike [3] car [4] public bus [5] private bus [6] train [7] Donkeys [8] walking

6.4.4 How much does it cost?

7. **Health care facilities**

7.1 Is there any health care centre in the village?

[1] Yes [2] no

7.2 If yes, how long do you take to reach the health care centre?

[1] less than ½ hour [2] from ½ to 1 hour [3] more than 1 hour [4] more than 2 hours

7.3 [1] How many doctors_____ [2] Nurses _____ [3] Auxiliary_____

7.4 What kinds of treatment do you go there for?

7.5 How long do you have to wait?

7.6 Where would you go for something more serious? Why?

8. Household habitation

8.1 What building material do you use to build your house?

[1] Local materials, poles, and grass [2] conventional material cement breaks and iron sheet [3] mixture of local and conventional building material

8.1.1 How many houses do you have?

8.1.2 How big is your house?

[1] Single room [2] two bedrooms [3] three bedrooms [4] four bedrooms [5] more than five rooms

9. Education

9.1 There is any school in the village?

[1] Yes [2] no

9.2 If yes, how many schools?

[1] One [2] two [3] three [4] more than three

9.3 How many students, teachers, and classrooms

[1] Students _____ [2] Teachers _____ [3] classrooms _____

10. Water supply system

10.1 Is there any water supplying system in the village?

[1] Yes [2] no

10.2 If yes, how long does it take to the water point?

10.3 If no, where do you get water from?

11. Do you have any comment or suggestions in relation to the community project and its management?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thanks to the interviewee

Appendix C: List of respondents to the preliminary fieldwork survey

Table 3.4: Combomune project stakeholder interviews

Name	Organizations/place of interview	Category	Interview date
Alexandre Paulo Zimba	Provincial department of forest and wildlife- Gaza- Xai-Xai	Head of Department	06-05-09
Alberto Augusto Siquela	Provincial department of forest and wildlife- Gaza- Xai-Xai	Head of Wildlife section	06-05-09
Abel Ngonyamo	GTA/GTZ-CBRNM-Combomune	GTA technical field assistant	11-05-09
Cassamo Bay	Banhine National Park- Xai-Xai	Park warden	16-05-09
Abel Francisco Notico Nhalidede	Limpopo National Park-Massingir	Community liaison officer	23-05-09
Samuel Chauque	Combomune community-Hochane	Local community leader	11-05-09
Amosse Chirindza	Management committee member- Hochane	President of the management committee	11-05-09
Rodrigues Chauque	Management committee member- Madliwa	Deputy president of the management committee	12-05-09
Jaime Sumbane	Management committee member Madliwa	Responsible of the finance committee	12-05-09
Lopes Sumbane	Management committee member Chaves	Responsible of the monitoring committee	12-05-09
Ernesto Macamo	Management committee member Hochane	Responsible of the water mgt committee	13-05-09
Simion Mundlovo	Management committee member Madliwa	Responsible of the financial management committee (controller)	13-05-09