Environmental Education in Rural Development

A Case Study in Mecubúri District, Mozambique
FOREWORD AND ACKNOLEDGEMENT

This dissertation has been undertaken as an examination work in the Masters’ Programme in Peace and Development Work at Linnaeus University, Växjö, Sweden. The research was carried out in collaboration with Nampula Province Department for Coordination of Integral Development and the District Government of Mecúburi, Mozambique.

Firstly, we want to express our gratefulness to all the people of Mecubúri, who contributed their time and knowledge in interviews and informal meetings, which comprised a significant part of the content of this thesis.

Secondly, we are grateful for the opportunity of doing this thesis in cooperation with the Provincial Government of Nampula and the District Government of Mecubúri. We wish to express special gratitude to Felicidade Muiocha and to the Mecubúri Administrator Nerinha John Bustan who dedicated much of their time and efforts to support our study.

Lastly, we would like to take the opportunity to express our gratitude to Gunilla Åkesson and Nélia Taimo, for supervising and giving support throughout the process of empirical data collection and writing. It has been an incredible journey, both scientifically and personally. We will never forget the people, the food, the air, the stars and the implausible nature of Mecubúri.

Växjö, Sweden, 05-06-2011

Maria Elfving and Sanna Ristimäki
ABSTRACT


This masters’ thesis is a result of research conducted during three weeks in Mecubúri District, located in northern Mozambique. The study aims to explore environmental challenges and the environmental education in Mecubúri area. It strives to understand how rural farmers are able to use environmental education as a measure to act upon the environmental challenges in the area as well as to strengthen their livelihood assets. The target group of the study is the people living in Mecubúri.

A basic understanding of environmental education and the socio-economic situation in Mecubúri was achieved by a systematic collection of empirical data through the use of a methodological approach called Participatory Rural Appraisal. Ethnographic methods such as participatory observation and semi-structured interviews built the base for the qualitative primary data collection and the secondary data was collected through literature reviews. The holistic and human centred theoretical framework Sustainable Livelihood Approach (SLA) laid the analytical base of the study.

The most prominent environmental concerns identified by the inhabitants were agricultural issues, uncontrolled bushfires, changes in rainfall and the increased prevalence of strong winds and cyclones as well as sanitation and hygiene. Education was transmitted through both formal and informal communication channels, whereby conservation farming, education related to sanitation and hygiene as well as various educational channels were identified as the most important factors for the rural people in Mecubúri.

As a concluding remark, it is argued that the society has a strong social capital which is effectively being used in environmental education. In contrast, an increased effort from the governmental level is advocated whereby a focus on conservation farming is recommended.

Key Words: Environmental Education, Mecubúri District, Sustainable Livelihood Approach.
TABLE OF FIGURES

Figure I. Sustainable Rural Livelihood Framework.......................................................... 14
Figure II. Illustration over the hierarchy of the societal structures in Mecubúri District......33
Figure V. Illustration of how the various Structures are working together with the Consultative Councils.................................................................36

LIST OF TABLES

Table I. SRL Capital Assets .................................................................................................13
Table II. How the framework for livelihood analysis was applied.....................................15
Table III. Human Development Indicators of Mozambique..............................................19
Table IV. Human Development Indicators in comparison to South Africa.......................19
Table V. Environmental Challenges and main forms of Environmental Education....56 and 74
Table VI. Educational Channels and Types of Environmental Education.......................57 and 76
Table VII. Impacts and counter measures suggested in the EIA........................................69
ABBREVIATIONS

AMETRAMO = The Association for Traditional Medicine in Mozambique (Portuguese acronym)
CDM = Clean Development Mechanism
CF = Conservation Farming
CFJJ = Judicial Education Centre, Maputo
DFID = Department for International Development
DUAT = The Right to Use and Benefit from Land (Portuguese acronym)
EE = Environmental Education
EIA = Environmental Impact Assessment
ES = Environmental Services
FAO = Food and Agriculture Organisation of the United Nations
FSC = Forest Stewardship Council
GDP = Gross Domestic Product
LGR = Lúrio Green Resources S.A
LDCs = Least Developed Countries
MICOA = Ministry for the Co-Ordination of Environmental Affairs (Portuguese Acronym)
NAPA = National Adaptation Programme of Action
NGO = Non-Governmental Organisation
NWFP = Non-Wood Forest Products
ORAM = Rural Association for Mutual Support (Portuguese Acronym)
OLIPA = Organisation for Sustainable Development
PARPA = Poverty Reduction Strategy Paper (Portuguese Acronym)
PECOA = Communication and Environmental Divulgation (Portuguese Acronym)
PRA = Participatory Rural Appraisal
SRL = Sustainable Rural Livelihood
SFM = Sustainable Forest Management
SCIP = Strengthening Communities through Integrated Programming
WWF = World Wide Fund for Nature
TABLE OF CONTENTS

PART I, Introduction, Method and Analytical Framework ............................................. 1
1. Introduction .................................................................................................................. 1
1.2 Scientific Debate ........................................................................................................ 2
1.3 Research Aim and Purpose ....................................................................................... 4
1.3 Research Questions .................................................................................................... 5
1.4 Disposition .................................................................................................................. 6
2 Research Procedure and Methodological Design ....................................................... 7
2.1 Research Presentation ............................................................................................... 7
2.2 Participatory Rural Appraisal .................................................................................... 8
2.2.1 Semi-Structured Interviews ................................................................................ 8
2.3 Validity and reliability .............................................................................................. 10
2.3.1 Triangulation ....................................................................................................... 10
2.4 Methodological and Scientific Limitations ............................................................. 10
3 Analytical Framework .................................................................................................. 12
3.1 Applying the analytical framework .......................................................................... 14
3.1.1 Vulnerability Context and the livelihood assets ................................................ 15
3.1.2 Access to Livelihood – Societal Structures and Processes .................................. 16
3.1.3 Environment and education ............................................................................... 16
3.1.4 Outcomes of Environmental Education ............................................................. 16
PART II, Context Description Findings ........................................................................ 18
4 Vulnerability Context .................................................................................................. 18
4.1 Socio-Economic Overview OF Mozambique ............................................................ 18
4.1.1 Brief Historical Overview .................................................................................. 20
4.2 Socio-Economical Situation in Mecuburi District .................................................... 21
5 Transforming Processes and Structures ..................................................................... 31
5.1 Law ........................................................................................................................... 31
5.2 Societal Structures ................................................................................................... 33
5.2.1 Modern Leadership ............................................................................................ 34
5.2.2 Political and Legal Structures ........................................................................... 35
5.2.3 Consultative Councils ......................................................................................... 36
5.2.4 Traditional leaders .............................................................................................. 37
5.2.5 Private Sector ...................................................................................................... 39
5.3 Culture and tradition ............................................................................................... 40
5.3.2 Cultural features and expressions ....................................................................... 40

VI
PART I, INTRODUCTION, METHOD AND ANALYTICAL FRAMEWORK

1. INTRODUCTION

This section will give an outline for the study by providing; the scientific debate, the research problem, the aim and purpose as well as the research question. The chapter ends with presentation of the disposition of the report.

In scientific debate, natural resource scarcity and environmental degradation has often been claimed to be one of the main elements for conflicts and violence. As a result, conservation of the natural environment and biodiversity has become a global concern. Furthermore, sustainable natural resource management has been identified as a socio-cultural matter and thus directly linked to people’s livelihood assets. With the creation of The Belgrade Charter in 1975, the role of environmental education was recognised to be vital in efforts made towards a sustainable development – both globally and nationally.

Due to the fact that environmental concerns such as the global warming have dominated academic discourses during the recent years, the place and relevance of rural dwellers in natural resources and environmental management has become a pivotal field to study. In an area where the majority of the population live directly from the land - and so are directly exposed to any environmental hazard – it can be argued that it is imperative to strengthen the capabilities of these rural people to counter act against environmental challenges. As Munyaradazi (2011:881) argues, the intelligence, knowledge and responsibility of rural people will have to be taken into consideration and respect within environmental education.

“Empowerment of peasant farmers and other rural dwellers should be in the forefront on environment issues that affect their communities – in other words rural people should be made environmental managers of their own communities” (Munyaradazi, 2011:875)

In the study area of this paper, Mecubúri District of Nampula Province, Mozambique, the main environmental challenges are uncontrolled bushfires, desertification, reduction of river
water levels, rainfall deficit and harmful effects on the environment due to extraction of firewood collection and charcoal production (NAPA, 2007:18). In addition, irregular rains and strong winds were perceived to be extremely harmful for local communities in Mecubúri District. Furthermore, the rural dwellers linked sanitation, hygiene and irrational exploitation of natural resources, such as land and timber, to be a part of environmental concerns. In Mozambique as a whole, the most hazardous environmental events include droughts, floods and tropical cyclones. Other environmental challenges faced by the country include various epidemics, plagues, slash-and-burn practices, industrial accidents and erosion. (NAPA, 2007:11)

Given the raised concerns of rural people living in Mecubúri District, the role of environmental education was seen as an important field to study. Since not only the global actors in scientific debate acknowledge the link between livelihood and environmental challenges, but also the rural people themselves were seen to strive for a betterment of their lives through environmental activities.

### 1.2 Scientific Debate

Environmental education can be understood in various ways, and hence a brief overlook will be provided on the main schools of thought in the field. To start with, already in 1969 William B. Stapp et al (Stapp et al 1969:35) defined the main characters of environmental education, whereby it was stated that the fact that an individual is an integral part of an eco-system should be taken holistically into account in education. An eco-system was identified as consisting on humans, culture and biophysical environment. In this context, culture was seen as playing a key role in environmental education, given that culture is the context through which an individual interacts with biophysical environment. Hence, environmental education was not only meant to include formal education in its conventional form, but instead it was also supposed to incorporate customary laws, traditions and constitutions which define the context in which an individual acts. Moreover, it was advocated by William B. et al (Stapp et al 1969:35) that environmental education should strive for distribution of a combination of factual knowledge with a motivation towards emotional concerns which would then result in a tendency to act.

In 1977, a firm definition of environmental education was laid down in the Tbilisi Declaration
in Intergovernmental Conference on Environmental Education. Four main features and principles of environmental education were identified as being the following: environmental education should consider social aspects of environment and take into account its close links with country’s economy; environmental education should consider linkages between environment and development; the curricula should adopt both local and global perspectives; and finally, environmental education should also promote international solidarity. On top of these principles, the treaty also put an emphasis on the importance of a holistic and an interdisciplinary approach with critical thinking and action learning methods. (Sauvé, 1996:8)

The Tbilisi treaty further recommended that environmental education should be delivered to general public at every age, at all levels of formal education, and for specific occupational or social groups through formal and informal channels. (Chee 1998:4)

In 1987, UNESCO and UNEP formulated a definition for environmental education, whereby it was seen as

“a permanent process in which individuals and the community gain awareness of their environment and acquire knowledge, values, skills, experiences, and also the determination which will enable them to act – individually and collectively – to solve present and future environmental problems”. (Chee 1998:2)

Thus, it was stated that environmental education should motivate changes in the behaviour of individuals that have a direct impact on the use of natural resources. It was also stated that environmental education should aim for an increase in public pressure on governments to manage natural resources in a sustainable manner. Thus, as Chee Nina (1998:4) concludes, environmental education was supposed to not only be taught per se – but rather, it should be a process in which people, both individuals and state employees, are made aware of the surroundings they are living in. Hence, environmental messages should be carried out in various forms, for instance through agricultural extension projects and alike. (Chee, 1998: 2-3) As a final remark, it has also been stated that for environmental education to be effective, it should be seen not simply as a separate discipline or specific subject to be added in to the curricula, but instead as an integral element being incorporated in the whole curricula. (Chee, 1998:4)

Finally, a link between environmental awareness and conflicts has been drawn, whereby it has
been claimed that increased information on environment could reduce possible future conflicts. Herein, Carius (2007:61-63) has suggested that an increased access to environmental information and education can play a significant role in strengthening civil society and democratizing and empowering societies. He also notes that most of the research that establishes a link between environmental degradation and violent conflict focuses on two solutions: reducing the pressure on resources on which people are economically dependent; and strengthening the institutional capacities to respond to environmental challenges.

1.3 RESEARCH AIM AND PURPOSE

As the role of rural dwellers in environmental management and education has been emphasised in global debate, it is important to investigate the extent to which rural people can use environmental education as a functioning counter measure against environmental challenges. As seen above, environmental education has been expected to improve the capabilities of rural people to manage their environment in a sustainable manner when environmental education is part of a holistic education and takes into consideration the local knowledge and intelligence. The aim of the study is, herein, to see how much rural people are actually able to use environmental education in their struggle against environment related challenges. If rural people have access to information and know how to manage environment in a sustainable way, can they truly prevent future problems and conflicts rising from environmental matters?

As stated in the Terms of Reference (see ToR in appendix IV), the overall objective of this study was to analyse the socio economic situation in Mecubúri District and to identify how different scales and forms of investments in land may influence the living conditions for different socio-economic groups in the concerned area/district. Within this overall objective given in the ToR, the focal point for this study was narrowed down and the analyses were done by looking at the role of environmental education in the studied livelihood context. Thus, the analyses of how the different scales and forms of investments in land may influence the livelihood conditions were done by keeping environmental challenges and environmental education as a focus. The existing large scale investor in forestry plantation was thus looked upon as a potential actor who might use environmental education in the future.
In order to arrive at the research aim, the study first explored which conditions in Mecubúri were considered by the population to require counter measures through environmental education. Then, it explored the existing means to convey information related to environment, investigating both the formal and informal education. Finally, based on the findings, the study evaluated the effects of environmental education in rural people’s livelihoods in Mecubúri – is environmental education strengthening their capabilities to counter act against environmental challenges? The study also took a close look at the socio-economic situation in Mecubúri District. The main focus of the study was the perception of the rural people living in the region.

1.3 RESEARCH QUESTIONS

Considering the socio-economic situation in Mecubúri district;

- Which are the currently existing environmental challenges and forms of environmental education?
- Which are the actors using environmental education as a counter-measure to the environmental challenges and;
- What can be seen as the outcome of the use of environmental education in regards local people’s livelihood conditions?
1.4 DISPOSITION

Part I of the report presents the introduction, a description of the methodological tools used and a presentation of the analytical framework.

Part II presents context description findings. Chapter 4 gives a historical and socio-economic overview of the region. This chapter keeps environmental vulnerabilities and challenges in the forerun. Chapter 5 gives an outlook of transforming processes and structures which are linked to environmental education. Chapter 6 presents findings directly linked to environment and education. Thus, this chapter includes an empirically based description of the existing environmental challenges and environmental education activities in Mecubúri District.

In part III, the outcome of environmental education is analysed and discussed with the help of an analytical framework elaborated from the Sustainable Rural Livelihood Approach. The analysis section will raise three themes identified to be important, namely conservation farming, sanitation and hygiene and educational communication channels.

In part IV conclusions, recommendations, reflection over future research and bibliography are presented.

In appendix I-V the following can be found: a complete interview list, interview guides, a matrix over the possible socio-environmental impacts of one investors’ presence in the region the Terms of Reference for the study.
2 RESEARCH PROCEDURE AND METHODOLOGICAL DESIGN

This section provides an introduction to the research procedure and a description of the approach used in the study. Thus, it gives an overview and presents the methods used in data collection, as well as an account on the considerations for respondent selection and interview techniques. Additionally, it gives an elaboration on validity, reliability, and limitations of the study.

2.1 RESEARCH PRESENTATION

The study was based on a field research conducted in the Mecubúri District of Nampula province, Mozambique, where the research team stayed for three weeks in April of 2011. In total, the field research continued for five weeks and included interviews at provincial level in Nampula and in Maputo, the capital of Mozambique. Interview respondents were individuals and groups from various societal levels and occupations. The methodological toolbox of Participatory Rural Appraisal (PRA) was applied. Primarily PRA methods such as semi-structured interviews and participatory observation constituted the main part used in the field research. Furthermore, in order to increase the level of reliability and validity, a literary review of documents, reports and articles was done both before the field study and during the process of writing. This way data was cross-checked by using multiple sources.
2.2 PARTICIPATORY RURAL APPRAISAL

The Participatory Rural Appraisal (PRA) method can be described as a set of tools and techniques in how to apply a practical approach to data gathering in a participatory manner in rural areas. Core characteristics of PRA, as described by Chambers and Mikkelsen, are: flexibility; participatory observation; learning from and with rural people; triangulation; semi-structural interviews; and review of secondary sources (Chambers, 1991 & Mikkelsen, 2005:63ff). In the following sections it will be explained further how the PRA method has been applied in this study.

2.2.1 SEMI-STRUCTURED INTERVIEWS

Using interviewing is not only a method commonly used in PRA, it was also described by Mikkelsen to be the “par excellence” method in development studies (2005:169). Semi-structured interviews together with qualitative ethnographic methods were chosen since it provides the researcher with tools to produce descriptive information about people from their natural context. (Aspers, 2007) This methodology was chosen because of its bottom-up approach of data gathering.

When the situation allowed, interviews were held in a conversational style, while still controlled and structured. In the formal interviews, an interview guide was used as a question support in order to not lose focus during the interviews (see appendix III). Furthermore, in order to avoid fixed answers in the interviews, open ended questions were used.

The interview procedure was to a large extent performed as following; at the beginning of each interview, information about the study purposes, aims and topics were introduced to the respondents, and, if needed, the terms of reference were given to the respondents. Based on pre-written questions, various topics were covered. The questions and interview-guides were formed according to the characteristics of the actors interviewed; for instance, in interviews
with students, a different guide was made in comparison the one used when teachers were interviewed. The only occasion when a questionnaire based interview was used was in connection with family-unit interviews. The purpose for using detailed questionnaires was to gain comparable information on some issues, collected from each of the sample families, making the appearance of same questions necessary.

Participatory methods for data collection were not only applied in interviews. Also by participation in seminars and through community walks in where, for example, people living in Mecubúri centre guided us around in the surroundings where they lived. By applying these types of interactive methods both in interviews and in daily conversations with local people, an increased understanding of the studied surroundings was achieved. This conversational method has been address by Feuerstein as “plain talk” was used extendedly as a complement to the formal interviews (Mikkelsen, 2005; 173). When using these methods, it is however important to always be clear with the person with whom one is talking, that the conversation is part of a data gathering process. Therefore, people who engaged in conversations with the research team, but were not part of a formal interview, were always informed about the study so that they were aware that the content of the discussion could be used in it.

2.2.2 SELECTION OF INTERVIEWEES

Interviews were conducted with farmers, associations, committees, local authorities, traditional leaders, health workers, schools, one large-scale investor working in the area, religious leaders and other important actors in society. Both men and women participated as well as individuals from different age groups. This was done in order to ensure gender sensitivity and to enable women to participate through women-only interviews. Likewise, homogenous group interviews were carried out when the aim was to gain in-depth knowledge on a specific issue. Furthermore, sometimes interview groups were formed according to age, allowing the research team to run interviews with youth and adults separately to understand the different learning processes, attitudes and perceptions in relation to the environment.

In total, over 60 interviews were conducted with 30 different societal actors\(^1\). No strict age limits were set, however, no children of ages younger than 13 participated in the interviewes.

\(^1\) See appendix I
Some key informants and stakeholders from other areas than Nampula Province were also included in the selection of interviews, for example national level respondents in Maputo, the capital of Mozambique.

As the study concentrated on environmental education, the selection process included consideration of, for example, informal and formal environmental education, environmental management, people using NWFPs and teachers teaching environmental education in the local schools. Already before the initiation of the field study, contacts were made with district authorities, who helped the research team to contact individuals and groups belonging to the target group of the study. Furthermore, the snowballing method was used in order to acquire additional interview participants.

2.3 VALIDITY AND RELIABILITY

2.3.1 TRIANGULATION

By applying triangulation, a core method used in PRA, the research team cross-checked information from various sources and disciplines as well as from a wide range of respondents. This method allows the researcher to consider data from several sources and so gain a wider approach to the research problem (Chambers, 1991:4). This, in turn, ensures increased reliability of the empirical data gathered.

A review of secondary data was conducted as the first part of the triangulation process. Several books, reports and articles were consulted dealing with land use issues and developmental aspects of Mozambique. Secondly, primary data was cross-checked by asking the interviewed people at different societal levels about the same topic. Cross-checking and follow up questions were done in order to better understand possible inconsistencies with the observed environment and replies obtained.

2.4 METHODOLOGICAL AND SCIENTIFIC LIMITATIONS

One methodological limitation constraining the research team was biased information which
sometimes emerged from within either the researchers themselves or from secondary and primary sources. Possible biased attitudes also may have influenced on the data, as the information given may itself be biased, or in contrast be treated with personal biases by the researchers. However, with the help of field-study tutors, who had extensive experience in the reality studied, this issue was repeatedly raised and a critical self-awareness was instilled on the researchers.

Secondly, the voice of women was sometimes difficult to capture during the study. The reason for this was both due to the selection process as well as due to cultural reasons. Hence, one of the main principles in PRA, the right of an individual to represent his or her own views and not have others speak on their behalf, was not always fulfilled. This was true especially in interviews with mixed focus groups since in such situations men commonly dominated the conversations as the local culture dictated the women ought to be more passive then men in public discussions.

Thirdly, considering the fact that most of the interviewed people were indicated to us either directly or indirectly by the local authorities, it could be questioned how representative the selected interviewees were. For instance, when visiting villages we foremost met the traditional leaders and their closest people. Although, upon a request we also met other people, they were however also introduced to us by the local leaders in the village. This is a factor which put limitations on the validity of the result of the study. However, this factor has been considered while conduction the research.

In terms of scientific limitations, there are several factors to point out. Firstly, the empirical part of this study is restricted to one province in northern Mozambique; the findings will therefore not be applicable to other places and regions. Secondly, the given focus will limit us to only consider environmentally related aspects. This can be seen as a limitation since the level of generalisation of the conclusions could be questioned. However, the purpose with qualitative research of this kind is not to produce generalisations, instead it strives to produce a deeper understanding of a certain topic.
3 ANALYTICAL FRAMEWORK

This section will introduce the analytical framework used, and describe how it was applied in the study.

The analytical base taken for this study is a holistic and people-centred approach called Sustainable Rural Livelihood (SRL). It is an analytical tool used to “improve our understanding of livelihoods, particularly the livelihoods of the poor” (DFID, 1999:1). As expressed by Diana Carney, the SRL approach is “about working together to build on people’s strengths” (Carney, 1998:3). The SRL framework was developed by the Sustainable Rural Livelihoods Advisory Committee, on request from the British governments’ Department for International Development (DFID) to promote “sustainable livelihoods” (Carney, 1998:3).

The SRL framework was chosen in this study because it provides guidance on how to understand and promote sustainable livelihoods while at the same time promoting adequate management of natural and physical environment (Carney, 1998:3). In essence, the SRL approach starts with people and does not compromise the environment (Carney, 1998:4). Doing so, it allows the research to put a great emphasis on people and their livelihoods, and not on resources as such. (Carney, 1998:3).

Furthermore, the SRL framework was chosen as an analytical tool because “one of the strengths of the SRL approach is that it ‘mainstreams’ the environment within a holistic framework” and “it is inherently responsive to people’s own interpretations of and priorities for their livelihoods”. (Carney, 1998:4) The general definition of sustainable rural livelihood is:

“A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (Carney, 1998: 4)
The sustainable livelihood concept suggests that livelihood capital assets should not only be determined in monetary terms, since livelihood also comprises assets such as access to land, working tools, knowledge, health and social relationships (Carney, 1998:7). This way of analysing people’s livelihoods is different from many other approaches since it focuses on people’s strengths and not on peoples’ needs (ibid). The five livelihood capitals used in this study are presented in Table I. The five capital assets are interdependent, i.e. an increase or decrease of one capital may have a direct or indirect impact on other capitals

Table I. SRL Capital Assets

<table>
<thead>
<tr>
<th>Capital Assets</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Capital</td>
<td>Natural resources from which resource flows useful for livelihoods are derived. Examples are: land, water, wildlife, biodiversity, environmental resources.</td>
</tr>
<tr>
<td>Social Capital</td>
<td>Is composed by social resources such as networks, membership of groups, relationships of trust and access to wider institutions of society. Upon these social resources people can pursue and accumulate livelihoods.</td>
</tr>
<tr>
<td>Human Capital</td>
<td>Is composed by; the skills, knowledge, ability to labour and good health. These are important to the ability to pursue different livelihood strategies.</td>
</tr>
<tr>
<td>Physical Capital</td>
<td>Stands for basic infrastructure, such as: transport, shelter, water, energy, and communications. It also includes production of equipment and means which enable people to pursue their livelihoods.</td>
</tr>
<tr>
<td>Financial Capital</td>
<td>Means the financial resources which are available to people. Examples are: monetary savings, supplies of credit or regular remittances or pensions.</td>
</tr>
</tbody>
</table>

(Source: Carney, 1998:7)

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2 It is important to emphasize that; an increase of social capital has a direct impact on the other capitals. I.e. mutual help systems can for example lower the cost of labour and lead to increased production which leads to an increase in financial capital which in its turn may increase the other capitals. In the case of a declines access to social capital a negative effect may undermine all other capitals.
Figure one illustrates Diana Carneys SRL Framework from 1998.

**Figure I. Sustainable Rural Livelihood Framework**

(Sustainable Livelihood Guidance Sheet 2.1, Department of International Development- DFID, 1999)

3.1 **APPLYING THE ANALYTICAL FRAMEWORK**

In order to achieve an understanding of the rural people’s livelihood situation, the SRL framework was used as an analytical tool to identify the multitude of elements constituting and influencing households’ livelihood situation. As the framework provided by Carney is composed by three main components, the vulnerability context, the livelihood assets and the transforming structures and processes, the study identified the context in Mecubúri District following these themes. This was done by giving a focus on the main theme of the study – environmental education - and thus, all those themes were evaluated by taking environment and education as a starting point. To illustrate this, a framework has been elaborated into a linear and more descriptive table, where environmental education is investigated with a major focus. The linear table illustrated in Table II gives an overview of how the SRL framework has been applied chapter by chapter.
Table II. How the Framework for Livelihood Analysis was applied

<table>
<thead>
<tr>
<th>Chapter 4</th>
<th>Chapter 5</th>
<th>Chapter 6</th>
<th>Chapter 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livelihood Assets, Capitals and Vulnerability Context</td>
<td>Transforming Processes and Structures</td>
<td>Vulnerability Context and Livelihood Strategies as Counter Measure Actions</td>
<td>Outcomes of Environmental Education</td>
</tr>
<tr>
<td>- Description of the socio-economic situation in Mecubúri District by using Carney’s Livelihood Capitals</td>
<td>- Societal structures</td>
<td>- Identifying environmental challenges</td>
<td>- Anticipated outcomes of environmental education</td>
</tr>
<tr>
<td>- Identifying parts of the Vulnerability Context by looking at seasonalities, trends and shocks in regards to livelihood assets</td>
<td>- Law</td>
<td>- Identifying the nature of environmental education existing in the area.</td>
<td>- Strengths and hinderances of these measures</td>
</tr>
</tbody>
</table>

(Table based on Carneys SRL and adopted from Ellis, 2000:30)

3.1.1 Vulnerability Context and the Livelihood Assets

In this study, vulnerability context and livelihood assets have been investigated simultaneously. When presenting the livelihood assets by using Carney’s capitals, notions on seasonalities, trends and shocks were discussed with a focus on socio-economic trends. This was done in order to see immediately the strengths and weaknesses of each asset in term of livelihood. Notwithstanding, environmental aspects of the vulnerability context were left for later section, to be elaborated together with the environmental education. This was done due to the fact that the study looked upon environmental education as a possible counter measure action to these challenges, and thus it was logical to link the challenges with the possible solutions. Furthermore, in order to provide a deeper understanding of the context, a presentation of a brief overview of the human development situation in Mozambique and a brief historical overview was combined in this section.
3.1.2 Access to Livelihood – Societal Structures and Processes

When identifying the transforming structures and processes in this study, the research specifically intended to pinpoint such structures and processes that either use environmental education as means to transform the situation, or have an influence on environment and education as such. The transformative structures and processes included institutions such as the public and private sector, organisations, legislative bodies, laws, policies and culture. In this study, law related to environmental aspects and education was evaluated. Also, within legislative bodies, both modern and traditional structures having an influence on the main theme were identified. Environmental education was seen as a part of transformative structures as it was thought to provide means and capabilities for certain issues to transform. However, it was not included in the section where other transformative structures are presented, as it was the main focus of the study and hence needed an own chapter.

3.1.3 Environment and Education

In order to see if and how environmental education was used in Mecubúri district and what kind of affects and elements it had, the study evaluated which environmental challenges existed in the area. This was done solely by listening to the inhabitants of the area since the study aimed at identifying the environmental challenges according to the people themselves. Then, environmental education was evaluated in a similar manner by identifying the actors and actions as they were perceived by the inhabitants. Shocks, trends and seasonalities were in a special focus when evaluating the environmental situation of the study area.

3.1.4 Outcomes of Environmental Education

An analysis of the findings was made by using the SRL framework. As depicted above, environmental education was to be analysed as a transformative structure. However, when embarking on the analysis, the study team had to re-adjust the analytical framework. The main reason for this was that the respondents used environmental education as a component in their livelihood strategy rather than only a measure entailing transformative power. Thus, the analysis section, Carney’s capitals were used in order to reach a deeper understanding of how
environmental education functions as a component of a livelihood strategy.
PART II, CONTEXT DESCRIPTION FINDINGS

4 VULNERABILITY CONTEXT

This chapter will present a context description of Mecuburi district. It will start by giving a socio-economic account and a brief historical overview of Mozambique. Then the chapter will move on to a presentation of the study area – Mecuburi District - whereby Carney’s capitals from the analytical framework will guide the presentation.

4.1 SOCIO-ECONOMIC OVERVIEW OF MOZAMBIQUE

Mozambique is a country in South East Africa which since the end of devastating 16 years long civil war has made impressive progress in its strive for peace. The country’s transition to democracy initiated in 1994 when a peace agreement was reached and democratic elections were held the year after. The Mozambican economy has gradually increased and the number of people suffering from poverty has been reduced markedly. After the war, comprehensive changes in both the governance system and in the public financial management were made (HDR, 2010:107). The construction of the new governance system has however faced both political and developmental challenges3 (ibid). As a result, human development is still far behind the average of the sub-Saharan region (UNDP, 2010). This can be seen in table IV, which illustrates a human development comparison between Mozambique and its neighbouring state South Africa. In terms of human development, Mozambique is one of the world’s most vulnerable countries. The slow but consistent increase4 in human development ranks Mozambique as 165 out of 169 countries in the Human Development Index (UNDP, 2010).

3 As explained in the 2010 Human Development Report, the situation in Mozambique “Transplanted best practices may look impressive but may not fit agency needs, match management capacities or reflect political and organizational realities.” (HDR, 2010:107)

4 Between 1980 and 2010 Mozambique’s HDI increased annually by 1.3% (from 0.195 to 0.284 today) (UNDP, 2010)
Table III. Human Development Indicators of Mozambique

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Data for Mozambique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 2010</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>48.4 years</td>
</tr>
<tr>
<td>Years of schooling (adults aged 25 and up)</td>
<td>1.2 years</td>
</tr>
<tr>
<td>Expected Years of schooling (children)</td>
<td>8.2 years</td>
</tr>
<tr>
<td>GNI per capita&lt;sup&gt;5&lt;/sup&gt;</td>
<td>854</td>
</tr>
<tr>
<td>Under-five mortality, per 1,000 live births</td>
<td>130 year 2008</td>
</tr>
<tr>
<td>Minimum Salary (2011)&lt;sup&gt;6&lt;/sup&gt;</td>
<td>Agricultural sector 2005 Mt (approx. 74.9 US dollar)&lt;sup&gt;7&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Source: Human Development Indicators from UNDP, Human Development Report 2010

As table III illustrates, the human development rates of Mozambique are low but are improving if one consider the rates from year 1980. The life expectancy and years of schooling amongst adults and children has been raising. Likewise, the Gross National Product per capita has almost doubled. Moreover, a great improvement has occurred in regards to the under-five mortality, where the numbers have decreased from 249 to 130 from 1990 to 2008. The minimum salary has increased during the last years and is today approximately 78.9 US dollar per month for people employed in the agricultural sector. (meusalario, 2011)

Table IV. Human Development Indicators in comparison to South Africa

<table>
<thead>
<tr>
<th>Indicators year 2010</th>
<th>Data for Mozambique:</th>
<th>Compared to data for South Africa:</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inequality-adjusted HDI value&lt;sup&gt;8&lt;/sup&gt; (IHDI)</td>
<td>0.155</td>
<td>0.411</td>
<td>Higher nr indicates less inequality rate</td>
</tr>
<tr>
<td>Multidimensional Poverty index&lt;sup&gt;9&lt;/sup&gt; (MPI)</td>
<td>0.481</td>
<td>0.014</td>
<td>Lower nr indicate less poverty</td>
</tr>
</tbody>
</table>

<sup>5</sup> (constant 2008 PPP US$) - calculated
<sup>6</sup> Source: meusalario.org
<sup>7</sup> 1 USD = 26.7500 MZN
<sup>8</sup> The Inequality-adjusted HDI adjusts the HDI for inequality in distribution of each dimension across the population
<sup>9</sup> The Multidimensional Poverty Index (MPI) identifies multiple deprivations at the individual level in health, education and standard of living
Table IV illustrates the high numbers of inequality and poverty which can be found in Mozambique. These numbers do however not include statistics over the heavy burden which HIV/Aids present for the future of Mozambique. The HIV/AIDS situation does not only include the primary affects on individuals, families, communities and national levels, but also secondary effect pose additional challenges to human development (UNDP, 2007:iiff).

4.1.1 BRIEF HISTORICAL OVERVIEW

After several years under Portuguese rule Mozambique and the other Portuguese colonies in Africa reached independence in 1974-75, when the last colonial war in sub-Saharan Africa had come to an end. (Abrahamsson & Nilsson, 1995:15) At this time, the colonial rule had systematically neglected the Mozambican citizens through social exclusion systems. As a result of that, only 13 percent of school-age children attended a school and as much as 93 percent of the Mozambican population was illiterate. Also the health-care was neglected, something which contributed to the strengthening of the radicalization of the anti-colonial opposition movements. (ibid, 1995:22)

Subsequently, based on the history and the heritage of the colonial time, it is necessary to take various aspects in to consideration while studying the complex situation which constitutes the reality of the people studied. However, two developmental barriers appeared prominent in this study and may be argued to influence contemporary development. These were: the colonial rulers’ administration of the economy as an ”unfavourable economical heritage” and the societal exclusion of the native Mozambicans in the social sector as a ”unfavourable social heritage”. These two aspects can in turn be explained by the fact that Mozambique has for

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The Gender Inequality Index (GII) reflects women’s disadvantage in three dimensions—reproductive health, empowerment and the labour market.

HDI measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living.
many years suffered from a chronic deficit in the current account, starting from the colonial time (Abrahamsson & Nilsson, 1995:19). The chronic deficit shows how badly the Portuguese administered the economy, and still today this heritage leaves marks in the development efforts of the country. Hence, the chronic economic deficit may, for example, explain the neglected infrastructure. Furthermore, it was first in 1960 that goal oriented economic strategies were initiated. However, the market economy mechanism did not break through as it was meant to do and peasants did not manage to increase their productivity. This meant that the domestic market did not expand and the market economy strategy failed. (ibid, 1995:21)

4.2 SOCIO-ECONOMICAL SITUATION IN MECUBÚRI DISTRICT

Mecubúri district is located in the northern part of the Nampula Province in northern Mozambique. With its 7.252km$^2$ and 181.430$^{12}$inhabitants, the population density is approximately 25 inhabitants per km$^2$. $^{13}$In 2005, it was estimated that 47% of the inhabitants were 15 years or younger (District Profile of Mecubúri, 2005:9). The district is divided in four administrative posts: Mecubúri, Milhana, Muite and Namina. These are in turn divided in localities. The administrative post of Mecúburi consists of five localities $^{14}$, the administrative post of Milhana consists of one locality $^{15}$, the administrative post of Muite consists of three localities $^{16}$ and the administrative post of Namina consists of one locality $^{17}$. (District Profile of Mecubúri, 2005:14). Maps can be found in appendix V

4.2.1 HUMAN CAPITAL

In the Mecubúri district, in 2009, 41,803 students were attending the first level grades of primary school (EP1), 5120 students the second level of primary school (EP2), and 2,596 in first level of secondary school (ESG1) and, finally, 719 in upper level of secondary school

$^{12}$ Estimated number made by the Mocambiqan Governemnt in their Economic and Social Plan & District Budget document from 2011.

$^{13}$ 25 inhabitants per km$^2$ is relatively few inhabitants, considering that Nampula is the most populous province in Mozambique. Mozambique has in total 27 inhabitants per km$^2$.

$^{14}$ Locality Mecubúri Sede, Issipe, Momane, Nahipa-Marririmue and Natala-Popue
$^{15}$ Locality Milhana Sede
$^{16}$ Locality Muite Sede and Napai, Ratane
$^{17}$ Locality Namina
According to the district authorities, overall there are currently 102 schools. In 2005, 81% of the population was illiterate, of this number the majority were women (District Profile of Mecubúri, 2005:11). (PESOD, 2010:39) The teacher per pupil ratios have been somewhat high in Mecubúri, given that in EP1 level the ratio was 55 pupils per a teacher, in EP2 60 and 75 in secondary schools in 2009 (PESOD, 2011:37) Notwithstanding, it has been stated by the district authorities that the number as teachers would see an increase in year 2011. (PESOD, 2011:37)

A gender bias can be seen in the teacher training where women are a minority in teacher training programmes, directly seen in the low female teacher numbers. This discrepancy was described to be a challenge for the future by teachers interviewed during the field research. The lack of female teachers was by both the local people and the existing teachers correlated with the high number of drop-out rates among girls. Interestingly, it has been suggested that especially in rural areas the enrolment of girls in basic education has improved when there was a female teacher available (Nampula Gender Profile, 1998:108) As for the district of Mecubúri, in 2009, there were 80 female teachers in EP1 level in comparison to 348 male teachers, whilst in EP2 level the number was 19 against 91 and 3 against 44 in secondary level respectively (PESOD, 2011:37). The high female drop-outs and low female school attendance levels against those of males was a concern of many of the respondents; it was acknowledged by school workers and also by rural dwellers that there a strong discrepancy between the schooling opportunities of females and males.

Other factors contributing to the discrepancies in school enrolment and attendance between the genders are early marriages, premature pregnancies and long distances to school buildings. Premature pregnancies and early marriage were described to be a major challenge for girls’ education. For instance, school workers as well as health workers participating in interviews during the research often mentioned these dimensions to affect negatively on girls’ educational opportunities. Having that said, it is relevant to mention that; in 1998 the average age of marriage for girls in rural areas of Mecubúri was 14 to 15, while for men it was approximately 20 years. Moreover, a study carried out in Nampula province in 1996 stated that 48% of girls reaching the age 16 were pregnant or already had a child. (Nampula Gender Profile, 1998:16)
As was explained by teachers from the secondary school in Mecubúri, and by a primary teacher in the Administrative post of Namina, the overall, major challenges in the educational sector are difficulties to attract new teachers to the schools. As explained by them, the teaching conditions are challenged through large classes, lack of books and teaching resources in addition to poor housing conditions of teachers. These constraints were however described by the same teachers to be acknowledged by the central government and a number of incentives, such as higher salaries and construction of houses for professors are done in order to attract teachers. One example of an unfavourable condition in schools is the poor access to potable water - out of 76 primary schools only 2 has access to wells (PESOD, 2011:35).

In regards to health sector, in Mecubúri district, the most harmful diseases identified by a health coordinator of the central health clinic of Mecubúri Sede were malaria, cholera and HIV/AIDS. In general, malaria was considered to be the most harmful one, as it caused most of the deaths in the area. However, the coordinator stated that there was a declining tendency in the occurrence of malaria; with an increased information flow, mosquito net distribution and improved sanitation, malaria cases have decreased. However, this decline was not thought to be significant yet, and malaria was still considered to be the most deathly disease in the area.

Similar kinds of remarks were highlighted by a water and sanitation committee in Namina, which stated that earlier, prior to the creation of the committee, there were many diseases in the community. These included, for example, malaria, diarrheal and cholera – all of which have been reducing after the improvement of water management and sanitation. Interestingly, the committee pointed out that in the beginning of the process of latrine construction a certain resistance existed against both latrine use and construction in the local communities. One representative from the committee explained that a minor group of residents in one community had created a rumour which accused the latrines to be the source for diseases in the community.

When it comes to the question of hygiene, a number of mobilisation work was initiated by both local committees and NGOs. SCIP was working with this issue by; giving out pamphlets with information about how to keep a good hygiene, training “local woman educators”\textsuperscript{18}, and they worked with awareness building in terms of hygienic household work and latrine use. For instance, they have worked in communities to organise the dish bench so that plates and glasses can be cleaned in an easy way. SCIP furthermore work with sanitation and hygiene in

\textsuperscript{18} Women from the villages who were trained to visit, observe and advice families
direct connection to the local clinics and health centres. One of their activities is to audit how the clinic is working in practice.

As for cholera, a similar kind of tendency has been seen. Mecubúri district has been suffering from cholera epidemics so the health centre has been holding communal speeches and meetings to discuss it. The general perception was that these measures have helped decrease cholera cases, and in 2011 there were no cholera cases in Mecubúri district at all. In comparison, in 2010 there were 9 cholera cases and in 2009, 20 cases in total. Thus, this suggests that the overall tendency is that cholera has been decreasing. According to the respondents, these epidemics usually occurred during the rainy season, starting from November and lasting until March. Similar kinds of remarks were highlighted by a water and sanitation committee in Namina, which stated that earlier, prior to the creation of the committee, there were many diseases in the community. These included, for example, malaria, diarrhoea and cholera – all of which have been reducing after the improvement of water management and sanitation.

Furthermore, the district solely has one doctor for its 181,430 inhabitants and in 2009 there were 13 health units in total. Out of these units, only 6 have access to potable water. (PESOD, 2011:28) In 2009 there were 75 health workers in the district (PESOD, 2011:27) Due to the low number of health personals and the traditional legitimacy of traditional doctors who were often consulted by the local people, the district doctor operating in Mecubúri underlined the importance of an integrated collaboration between the public health sector and the traditional doctors’ association AMETRAMO. In 2009, there were 68 registered traditional medical personals in the district (PESOD, 2010:27). The importance of traditional doctors was well illustrated by the district doctor in Mecubúri;

“One of the first things I saw when I came to work here was how resistant people are to visit the health centre. Instead they choose to go to the traditional doctor. I soon understood that I had to collaborate with the traditional doctors, the AMETRAMO. Sometimes we have even needed to work together with him”

The importance of the traditional doctors was also found to be relevant in women’s health. There were 22 trained traditional midwifes in the district in 2009. In 2009, 236 deliveries were carried out in conventional health clinics (PESOD, 2011:28); the total number of deliveries cannot be identified due to the lack of registration of births at home, however, it
was stressed by the district doctor that the number would be much higher than this one. A woman from a local community, participating in an informal interview explained that the resistance to go to the health centre was often due to the fact that many of the people working in a health centre did not have the same traditional “belonging” or they “came from a different reality”. As illustrated by her;

“People working in the health centres do many times not have the genuine knowledge or respect for the tradition of the women. Because of this, women who come from the countryside do not feel comfortable and willing to give birth in the health centres”

4.2.2 Social Capital

It was explained by both community leaders and representatives from locally active NGO’s that, local communities have received training and help in the last years from NGOs and from the Central Government in order to organise themselves in local associations and committees. This was described by some of the respondents participating in interviews to have been very beneficial for them since it had increased their capability to build social networks and commercialise through the associations. Social networking was furthermore described to be important when it came to land accessibility; good and fertile plots were sometimes said to be located far away from communities, and with a good social network it was easier to find a good place for cultivation. Another essential aspect falling under social capital was the use of mutual benefit systems. For instance, one example of this was given in a family interview in Tocolo, where it was explained how neighbouring families used to help each other with harvesting and seeding. The mutual help system they used made it possible for the families to increase the capacity and thus, ease the burden of the households. All family members from both families were helping. Lastly, many of the local associations were also organised through a mutual help system. For instance, by saving some of the income from the sold surplus, the money was used for common investments such as seeds, school material or to finance funerals for family members of the association.

Even though Portuguese is the official language in Mozambique, the mother-tongue of the majority of the inhabitants in the district is Emakuwa, also addressed as Makhua. From the 24.5% of the population speaking Portuguese, only 6.1% are women. This is directly linked
to the fact that men are often the ones having the best opportunities when it comes to social life inclusion, schooling and entrance to the labour market (District Profile of Mecubúri, 2005:10, 29).

4.2.3 Natural Capital

As most of the population base their livelihood in agricultural practises, land is the most important element of their natural capital. Land is used for agricultural purposes and forestry sector. Other natural resources used by the population are the non wood forest products (NWFP). The most frequently used NWFP are: mushrooms, forest fruits, long grass, bamboo, ropes, stones used for manual grinding, fish, hunted animals, sticks, trees for charcoal production and firewood. NWFP are used by the community members for house construction, household consumption and for commercial purposes. Houses in the district are predominantly constructed of clay, wood, and grass therefore construction materials are locally collected. In the forest extraction business of the district, the precious tree species19 Ebony and Pau Rosa were the most important timber resources (Mecuburi District Profile, 2005:6).

Even though Mozambique in the past has suffered from heavy deforestation during the colonial time and the civil war, the country holds large protected forest areas (FAO, 2011:4). Mecubúri district holds a large nature reserve of 195 400 ha which has wild animals and intact forest. That Mozambique hold large areas of forest was pointed out in the Global Forest Assessment in where it was stated that out of all protective forests20 in Africa (19.6 million ha), Mozambique holds the largest amount (8.7 million ha) (FAO, 2010:111-112). The same report points out the importance of the protective functions of forests as related to soil and water resources. Using SRL approach when look at this, the protective function of forests can be seen as one way in how to increase the forests value in natural capital since “forests conserve water by increasing infiltration, reducing runoff velocity and surface erosion, and decreasing sedimentation” (FAO, 2010:110).

19 The tree species are classified into various groups depending on their value and the use of the tree. Three classifications commonly used in Mozambique are: precious timber, first class timber and secondary class timber.
20 The protective role of forest is by FAO described to include “protection of soils from wind and water erosion, coastal protection, avalanche control, and as air pollution filters” (Global Forest Resource Assessment, 2010:109)
Any actor other than local community, using the land for their own consumption, needs a license in order to conduct forest and wildlife exploitation. The Law on Forest and Wildlife (Art 35) set out that; the fees in order to obtain a license to exploit forests and wildlife was set up periodically by the Council of Ministers. Moreover, the fee for the license, a special diploma establishes the percentages of amounts derived from forest and wildlife exploitation that are to be used for the benefit of local communities (Art 35, Law on Forestry and Wildlife). The amount of the fee is also determined by the type of forest exploited. As was explained by a province level forestry technician in Nampula, precious timber\(^1\) was charged 2 300 Mt per cubic meter while the first class timber\(^2\) was charged 575 Mt per cubic meter and the second class timber 375 Mt per cubic meter. From the total fee gained through the operators’ presence, a sum of 20% is given to local communities residing in the respective exploitation zones. The communities can thereafter collectively use the money as they wish. Additionally, 15% of the fee money is to be allocated to re-plantation of deforested areas.

The district holds few cattle or draught-animals; however, the Ministry of Agriculture has initiated development programs where draught-animals have been distributed in the districts. So far, the implementation of this developmental strategy has not been very successful since only 4 of the 16 distributed oxen are currently alive. District authorities at the agriculture department explained a number of reasons caused this, such as a coordination failure and a lack of knowledge in how to take care of the animals due to weak educational training and preparation. However, smaller animals such as goats, stock and poultry, are very important for local farmers’ livelihood.

4.2.4 Financial Capital

The economy of the district was, in the time of this field study, based on subsistence farming. Thus, households relied upon their agricultural production for food supply and for monetary capital. The most important food crops in the region were cassava, maize, beans, sorghum, rice and peanut. The most common cash crops were cotton, sesame, tobacco and cashew nut.

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\(^{21}\) Pau preto, Pau rosa

\(^{22}\) Some examples of first class timber are: Jambire, Chanfuta, Umbila, Pau fera (Pau fera is also used as poison while fishing – very poisonous and bad for the water).
A majority of the population was partly or completely dependent on agricultural for their income. For instance, in 2005, only 2% of the population received a salary and, more drastically, only 10% among these 2% were women. (District Profile of Mecubúri, 2005:32) In 2009, there were 84,142 ha under food crop cultivation and 104,661 for cash crops (PESOD, 2010:11). According to the 2005 district profile of Mecubúri, the agricultural land was divided in 81,000 plots in where 73% of the plots were smaller than half a hectare. The district profile furthermore stated that 45% of the plots were cultivated by women, and 35% were cultivated by children under 10 years old. (District Profile of Mecubúri, 2005:23) In the field study it was recognised that efforts have been taken on district level and state level to improve income generation through introduction of conservation farming methods and other more specialised farming methods such as improved cashew nut production, fish farming and by introducing new types of animal breeds and animal traction. There are currently three agricultural extensionists working in the district, and in 2009, 1117 farmers were reached by them (PESOD, 2010:11)

Lack of local purchasing power and the poor transportation conditions were often cited as the main hindrances for commercialisation. Further reasons for limited commercialisation in Nampula province, was explained by many local farmers to be: poor condition of storage capacities, lack of appropriate transportation and communication infrastructure, ineffective banking systems and a lack of credits. Furthermore, the lack of competition, i.e. the lack of buyers, hinders the possibilities of farmers in Mecubúri to bargain with prices and thus often the prices paid remain relatively low.
In general, the local farmers interviewed stated that the demand for agricultural products was higher during rainy seasons. Local farmers in Mecubúri Sede said that the dry season usually started from June and lasted until December, whilst the rainy season began from December and lasted until March. Farmers growing horticultural products were able to sell their tomatoes at a higher price during this time. Furthermore, during March it was, according to farmers interviewed in Mutapa, profitable to sell maize products as there was a lack of maize at that time – a factor causing the prices to be set higher. Consequently, small-scale entrepreneurs interviewed in Namina stated that after the rainy period, communities had the best purchasing power, as income generation through agricultural products sold during the rainy season was high. Thus, the most serious lack of food among the majority of the rural people in Mecubúri district was in a period between January and March, just before harvesting their fields.

As for transportation, in more remote areas of the district, it was expressed by farmers of local communities that getting their products to markets was difficult. For example, a group of farmers in Mumane said that there are hardly any buyers for their products, as there are no traders coming to pick them up. Farmers in Natuko further gave a vivid illustration of this lack of transportation:

“We hire people to carry our products to Namina on their heads. They start walking around 3 a clock in the morning and return to Natuko at 5 pm the following day. They don’t eat during this trip and when they return back they get their salary – homemade beer.”

4.2.5 Physical Capital

Roads in Mecubúri are generally unpaved and built up with gravel and sand. The majority of them are in poor condition and can barely be used in the rainy season. (PEDD, 2009:9,10) One major problem is road erosion. The poor conditions of smaller roads in the rural areas were described by respondents as a major hindrance for development. Hence, bad roads put constraints on both access to transportation, and access to information. They also hinder traders from coming to the village to buy or sell products.

The district had public transportation until the year 2004, when it ceased to exist due to bad
accessibility (PEDD II, 2005:19f). At present, semi-collective transportation system is run by private actors who transport passengers and goods on trucks and pickup-vans. This transportation service was frequently used by the inhabitants. However, the security standard was described by people using the transportation be low and the vehicles often had no protection against the sun. There were approximately 10 such transportation vehicles functioning in the district (PEDD, 2005-2009:20). Additionally, there is a railway operating from Malawi to Nakala which passed Namina locality.

During the recent years, internet and telecommunication connections have been improved in the main rural cities in the district. However, due to the lack of electricity and slow connection, the use of the internet is still very restricted. Electricity provision is not covered by the public electricity net; it merely exists in the administrative post of Namina. In the rest of the district, electricity generators are run by gasoline (District Profile of Mecubúri, 2005). However, generator usage is costly and it is difficult to get hold of petrol since there is no petrol filling station in Mecubúri. Nevertheless, currently there is a new petrol station under construction in Mecubúri.

At present, the district does not have functioning mail distribution. Until the year 2003, there was a mail service in the district, however it stopped working after the service was centralised to Nampula City (PEDD II, 2005:20). There is furthermore no agency distributing journals and newspapers in the district, as the closest service can be found in Nampula City (PEDD II, 2005:25).

The district had 174 mechanical wells and 20 manual wells in 2009 (PESOD, 2010:28). The difficulties in reaching clean water was described as one of the major challenges encountered by both local communities and local authorities. Hence, wells are being constructed and whilst there was only 3% water access in 2000, in 2005 35% of the total population had access to water.
5 TRANSFORMING PROCESSES AND STRUCTURES

Keeping environmental education as the focal point, this chapter will discuss the political and societal structures that are related to transforming processes. Land law, environmental law and societal structures having capabilities to influence environmental education will be introduced. This will facilitate the analysis process in relation to the vulnerability context; hence, these processes and structures will entail the possibility to influence to strengthening livelihood assets of people living in Mecubúri district.

5.1 LAW

“In order to ensure the correct management of the environment and the necessary community participation, the government, in coordination with social communication entities, shall establish mechanisms and programmes for formal and informal environmental education.” (Article 20 Environment Law of Mozambique, n. o 20/97)

As illustrated in the law text above the use of environmental education is a recognised tool to ensure a “correct management of the environment”. The legal context for environmental protection in Mozambique consists of a large number of laws and policy document. These include primarily the Constitution of the Republic, the land law and the law on forestry and wildlife, the national adaptation programme of action (NAPA), The Program for Education, Communication and Environmental Divulgation (PECOA) and the Poverty Reduction Strategy Paper (Portuguese Acronym - PARPA II (2006-2009).

The right to live in a balanced environment is recognised in Art 90 (1) of the 2004 Constitution. The same article furthermore brings forth a duty – the duty to defend the environment. The very same article also advocates the collaboration of both modern and traditional structures in the protection of the environment (Art 90 (2)).

One important occasion in the legislative history of Mozambique was when the country became independent in 1975 and all land became nationalised. However, it was first with the

23 A national Program which provides a process for Least Developed Countries (LDCs) “to identify priority activities that respond to their urgent and immediate needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.” (www.preventionweb.net)
creation of the Land Law in 1997, that regulations on land policies were further institutionalised. (Theting and Brekke, 2010:8) The main objectives of the land law were to protect existing land rights; to promote a transparent land allocation system; to create a favourable environment for investments in rural areas and, to stimulate community development with mutual benefits for all stakeholders.

Art 3 of the Land Law states that, “the land is the property of the state and cannot be sold or otherwise alienated, mortgaged or encumbered”. Although the state owns the land, article 10 states the right to “use and benefit” from the land is the right of all Mozambican citizens. The “Right to Use and Benefit from Land” (DUAT in Portuguese) sets out three societal groups which may receive a license to use and benefit from the land. These are: individual persons or local communities in accordance to customary norms and practices, b) individual Mozambicans using the land ‘in good faith’ for at least ten years and c) in response to an application. (Land Law Art. 12:a, b and c). Public consultation is a prerequisite for obtaining a license to use the land. For concessionists, the right to use land is valid for a period of 50 years and can thereafter be renewed. The concessions are subjected to an annual fee, which depends on what type of tree and how many trees that are extracted. (DUAT Legal Framework, 2007:62) The entity of the state responsible for authorising DUAT to actors operating in rural areas depends on the size of the land required. The provincial government may give out DUAT for areas less than 1,000 hectares, the Minister of Agriculture can authorise the DUAT for areas between 1,000 and 10,000 hectares; and the Council of Ministers authorises DUAT for areas greater than 10,000 hectare. The Council of Ministers may give out DUAT for areas larger than 10,000 hectare (DUAT Legal Framework, 2007:12 & land law article 22). Since the land authorised from the DUAT may be as large as 10,000 hectare or even bigger and additionally is valid for a period of 50 years, it makes a great impact on the situation of the local communities. It is a long-term change in land use that may impact them either directly or indirectly. Article 18 in the Law on Forestry and Wildlife strengthens the third party rights (in this case, the local communities) by stating that “forest and wildlife exploitation for commercial, industrial or fuel producing purposes shall safeguard all third party rights in the exploitation area, as well as free access to the local communities.

24 A forestry concession is "a delimited area in the public domain awarded to a particular operator under a concession contract for the purpose of forest exploitation in order to supply industry, with a previously approved management plan" Art. 1 (7) Mozambican Law on Forestry and Wildlife
within the area, including the rights to use the natural resources that they need for their subsistence.” However, due to the recent creation of the before mentioned laws, the implementation process is still undergoing improvements. The weak implementation of the currently existing laws was in interviews with state authorities brought up as a major problem. The implementation failure is also highlighted in a study made by CFJ/J/FAO (2004). As a result of the weak implementation of these laws, the national debate on forestry and natural resource management has accelerated the last years.

5.2 **SOCIETAL STRUCTURES**

Societal structures are important due to their direct relation to functioning societal processes. Laws, executed through legislative bodies are however depending on implementation entities, such as court systems, as well as several societal processes such as culture. As illustrated in Figure no II, structures are composed by the public sector and the private sector. Processes are composed by policies, legislation, institutions, culture and power relations. In the study context, these structures and processes interact in both modern and traditional forms. As described by Baleira et al (2004:6), the judiciary landscape in Mozambique is pluralistic, and the traditional instances serve as an important basis for the ‘societal structures and processes’. Below, a brief account will be given of such societal structures in Mecubúri.

**Figure II**, Illustration over the hierarchy of the societal structures in Mecubúri District

<table>
<thead>
<tr>
<th>Modern Structures</th>
<th>Traditional Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>District Government</strong></td>
<td>District</td>
</tr>
<tr>
<td>(Composed by the District Administrator, the District Permanent Secretary and the Directors of the district services.)</td>
<td></td>
</tr>
<tr>
<td><strong>Directors of the district services</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chief of the Administrative Post</strong></td>
<td>Administrative Post</td>
</tr>
</tbody>
</table>
Chief of Locality | Localy
---|---
Traditional Chief\(^{25}\) (Composed by the Régulo/King or the Rainha/Queen and their advisers)
Advisory Council of Elders and other key persons in the community or "chefes de grupo e de povoação - neighbourhood chiefs."\(^{26}\)

The Secretary of the Villages | Neighbourhood and Villages | Cabos or Village Leaders

Community | Community Leadership or Local Chieftaincy

Source: Åkesson & Nilsson and data gathered in interviews in Mecubúri

5.2.1 Modern Leadership

Mecubúri district has various societal structures which have either direct or indirect role in relation to natural resource management and environmental education. The most prominent character of these formations was the way in which modern and traditional societal structures have merged together. They can be divided according to the type of power they entail—while some of the structures had more political power, others had social power. Likewise, a distinction between legitimate and legal power can be made (Åkersson et al. 2006:5). For instance, district authorities working for the Government in Mecubúri district can be described as having political and legal power, whereas religious leaders can be said to have legitimacy and social power.

\(^{25}\) As explained by Åkesson and Nilsson (2006:43), the traditional authorities of today "are marked by both the traditional and the colonial systems and in the present process of recognition of the traditional authorities, it is not always easy to find out who is the true Traditional Chief (Åkesson & Nilsson, 2006:43)"

\(^{26}\) The Régulo is surrounded by various "co-workers". The Cabo, the secretary and the chefe da povoação was however the most commonly referred to in interviews.
5.2.2 Political and Legal Structures

Mecubúri district was governed by district governmental authorities, who in turn were under the governmental authorities of Nampula province. In general, the highest authority in a district belonged to an administrator; districts were then divided in localities with a chief of the administrative post being the highest authority. In Mecubúri district, the localities were Momane, Popué, Naipa, Mecubúri Sede and Namina Sede.

Cadastral authorities worked with land and natural resource management. In total, cadastral authorities of the province of Nampula had eight technicians working in the 21 districts of Nampula. This was recognised to be a rather low number, and it was expressed during a seminar attended by the research team in Nampula, that the authorities would like to see at least one technician in each district. During the same seminar, a further obstacle for the work of cadastral authorities was identified – the lack of means of transportation, since it affects their capacities to follow land law related questions.

On the other hand in Mecubúri, the agriculture and forestry department was responsible for natural resource management. In total, there were three technicians working currently in the area. Some of their tasks included: management of forestry reserves and identification of degraded areas when allocating land for investors and operators. Furthermore, the department supported communities in creating committees who handle the 20% fee returning to communities from investors. Accordingly, this support was focused in areas where there were no NGOs working. Furthermore, the department conducted strategic evaluations of the use of land and natural resources. However, in a land use seminar held in Nampula, it was stated that district authorities, including the agriculture and forestry department of Mecubúri, did not always have enough capacities to implement, or knowledge about, the land law. This hindered the possibilities to avoid violations of the law. It also hampered the possibilities to protect the rights of the people, and it furthermore made them unable to help them defend their rights.

27 When an investor cuts intact trees, 20% of the annual fees they must pay for the government is given to the community.
The department for strategic district development planning of Mecubúri had an important role in local development, and a significant role in questions related to environmental issues. For instance, the director of the department, Antonio Pedro, described that his task was to design a social and economical plan for the district. This plan was to be done after first listening to consultative councils, who were expected to identify local concerns. Furthermore, the director followed up the consultative councils and thus worked as a link between local communities and authorities. Department technicians then helped communities make requests at the district level as it needed.

5.2.3 Consultative Councils

Consultative councils were a legitimate body designed to work as the voice of the local people. Consultative councils were created in three levels; at the local level, administrative post level and, finally, in district level. (Åkersson, 2006:41) The members of these councils were elected by the local communities, following the way traditional leaders are selected. Members were from various societal occupations, such as religious leaders and teachers. (Åkersson, 2006:42) The role of community councils was well illustrated by members of one council participating an interview:

“We listen to the people and their worries, and then bring forward communities’ hopes and needs to governmental authorities.”
5.2.4 TRADITIONAL LEADERS

Since the independence, traditional leaders have been a legitimate part of power, however they are not considered to be part of the governmental authorities. (Åkersson 2006:44) A traditional leader, régulo or rainha, was the traditional leader, who had legitimate authority over the population in his “regulado” and were thus entailed to deal with political, religious and administrative issues. (EIS, 2010:104) Community leaders thus worked with many tasks, and in relation to environmental education they namely took care of the mobilisation of communities in several issues such as sanitation, prevention of forest fires, and local level conflict resolution. An example of this is the way how community leaders were said to

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28 Régulo is used when referred to male leader, rainha when referred to a female leader.
mobilise people to work at their plots in Momane and mitigate possible community conflicts. Furthermore, traditional leaders were within the process when an investor or an operator wished to obtain a licence, as well as when distributing land to community members (EIS, 2010:104). The study thus suggested that traditional leaders played an important role with regards to the several committees and associations working in Mecubúri. An example of this was a forestry committee interviewed in Mecubúri Sede, whereby it was explained that the régulo of the community was the advisor of the committee. Furthermore, Cabos were also found to play a role in non-conventional environmental education, as describe by a respondent:

“Cabos are really trying to battle against bushfires and irresponsible behaviour.”

In this context, the important role of traditional leaders in regards to environmental issues became evident in many occasions during the field research. For instance, a water and sanitation committee told that especially at the beginning of their work, farmers were often suspicious with the aims of the committee. These misunderstandings and doubts were then solved by the régulo who explained the community about the importance of the work of the committee.

However, a Rainha, a female traditional leader interviewed in Namina, explained that even though traditional leaders do have legitimate social power over communities, this power is somewhat weaker now than it was in the past. The Rainha explained, for instance, that today it is much harder for a traditional leader to mobilise people against bushfires. The reasoning behind this was the fact that populations are getting larger and so it is not easy to get in contact with everyone. Another aspect of this concern was also raised by the Rainha, who concluded that:

“People understand democracy in a wrong way. They understand it to mean that everyone can do whatever they want. So people don’t respect traditional leaders so much these days – they don’t always even come to community meetings.”
5.2.5 Private Sector

In regards to the increasing change in land use occurring in the Mecubúri district, the main commercial enterprises were forestry investors and forest exploitation operators. In interviews conducted with people living in the region, it became evident that the presence of these actors may have a deliberate impact on the livelihood situation of many of the local people. Their direct or indirect impact depends on the accompanying process established in connection to their entrance in the region. The following section will provide a presentation of the Forestry Plantation Project of Lúrio Green Resources S.A.

In short, the objective of the international forestry company Lúrio Green Resources S.A (LGR) is to establish a forestry plantation of three tree species with a high commercial value, in an area of 126,000 ha in the Province of Nampula, northern Mozambique. The three non-native tree species that will be used in the plantation are: Acacia, Eucalyptus and Gmelina. With the forestry plantation, the company both intends to produce timber and sell carbon credits to the international carbon credit market. The LGR project furthermore strives to become Forest Stewardship Council (FSC) certified and sell carbon credits through the Clean Development Mechanism (CDM). This implies that the company would undertake a strong socio-economic responsibility. Hence, the FSC and the CDM demands a number of, both socio-economic and environmental criteria’s to be followed. (EIA, 2010:iff) The possible outcomes from the presence of the company in the area were generally anticipated to be rather positive by the local population; the company was expected to increase employment opportunities, invest in infrastructure and support commercialisation through income generation and by purchasing locally produced products. However, also possible negative impacts were expresses, namely that of, for the local people, restricted access to good and fertile land as a result of land use change and soil degradation.

In private sector, the various NGOs working in the area were also found to be an important part in transforming societal structures and processes. Both international and national NGOs working with the areas were active in dealing with issues closely related to environmental education. The major organisations identified by the research team were the following; Care International, which worked with water, sanitation and hygiene; SCIP, which worked with
conservation farming, hygiene and sanitation; Forum Terra, working with land demarcation; Olipa, which dealt with delimitation issues and, ORAM, working with land issues, community consultations and land delimitation mainly through awareness raising and legal support and, finally, Salama, which took care of health related issues.

5.3 CULTURE AND TRADITION

The studied region is composed by the ethno-linguistic belonging of Emakuwa, also addressed as Makhua, being the main language spoken in the region. The population however belongs to a number of societal groupings, or clans. These societal groupings have a leader, the King/Regūlo or the Queen/Rainha which is holding a legitimate traditional power over the villages that belongs to his/her “kingdom”. (EIA, 2010:104)

5.3.2 CULTURAL FEATURES AND EXPRESSIONS

One important cultural and traditional feature which was used as a form of expression for happiness, suffering, ligation to ancestors, moments of pain, greeting to the ancestors and as “fertility campaigns” was dance. Other important characters of the culture in Mecubúri district were the sacred “residence” of the spirits, which were said to “live in” trees, closed forests, lakes, caves, mountains, rivers etc. This made the region and its nature hold a fundamental symbolic “sacred geographical importance” for the local communities. (EIA, 2010:105) These sacred places and their well-being are part of the eco-system they live in and was, consequently, found out to be highly important for members of local communities being interviewed.

During observations in the field, culture and tradition was seen as an important part of the vulnerability context, as it was understood to be interlinked with the dominating religions – Islam and Christianity. This could be seen to create a very context specific vulnerability context. Closeness to nature and widespread beliefs in spirits were thus combined with the other religious beliefs. For instance, church meetings were many times held in connection to the traditional sacred places. Moreover, if some sacred places were harmed or destroyed by, for example, a forest fire or other disastrous events, it was said that the traditional leaders
needed to go there to ask the spirits for forgiveness. The spirits were also seen as important in traditional medicine, i.e. the traditional doctors used their sacred places to make a ceremony asking the spirits for help in the healing of the sick person. As was expressed by a leader of the traditional doctors’ association in an interview carried out in Mecubúri Sede:

“When asking the spirits to heal and cure through a ceremonial act, I go to the sacred mountain and ‘spread the sorghum flour’ with the wind, so that the spirits will come and eat it. Sometimes the sorghum flour is taken by the wind, and sometimes, the spirits come in the shape of a monkey, or some other animal, and eat the sorghum flour”.

5.3.3 WOMEN AND TRADITION

The Gender Profile of Nampula (1998:13) describes the societal hierarchy in Mecubvíri to be matrilineal; women give the social name to children, and when entering into marriage, the husband is expected to live and work together with his wife’s family. This has meant that the man is traditionally dependent on his wife’s family in regards to land resources for cultivation purposes. This societal hierarchy was in the field study confirmed to still be valid by women living in Mecubuíri. In interviews with both public servants and local farmers it was explained that livelihood strategies have been traditionally based on extended families with mutual support safety nets. However, due to a number of factors, such as the war and an occurrence of structural adjustment programmes in Mozambique, changes in the traditional structures have occurred. These changes were also seen in Mecubuíri. Faced with challenging living conditions, families had to create new livelihood strategies and thus new social networks emerged outside the traditional family based safety nets. These include, for instance, saving groups, credit banks, committees and associations.

Despite the matrilineal system, women are generally in a disadvantaged position in comparison to men due to the unequal share of power. This unbalanced social status is linked to the traditional division of tasks in both private and public spheres, which was often described by the interviewees. Accordingly, men living in Mecubuíri many times hold societal domination over women. Throughout the interviews conducted during the field research, it became evident that several tasks in daily life are divided according to gender; women take
care of children, fetch water, collect firewood and are responsible of food production in plots, while men are responsible of work outside of the household domain. This division of labour and societal tasks was repeatedly pointed out by women and men in the rural areas.

The Nampula gender Profile (1998:14) points out that, after the 1960s, when Mozambique was introduced to the monetary system, men started to exclusively deal with money. According to the respondents in the rural areas, this was still the case in Mecubúri, where the male domination over money was brought up by several women.

Subsequently, men tend to be the ones selling agricultural products among rural families as well as the ones taking care of cash crop production – a prominent trend in Mecubúri district that was clearly described by the respondents. This tendency has also been reflected in the labour market and education; since women are considered to be responsible for household tasks, there have been less training and employment opportunities for them. The unequal gender status has, however, lessened to some extent recently. For instance, already in 1998 it was seen that; in public and state owned spheres an increase of women employees has taken place (Nampula Gender Profile, 1998:22). This was also seen in Mecubúri district, as the research team met strong women with high positions in the district government. For instance, both the district administrator and the head of the administrative post of Namina were women. The legal status of Mozambican women has likewise improved during the years, particularly since they are granted equal status in the national law. However, the coexistence of customary law and formal law is still hindering women from obtaining equal status, and it was often seen during the interviews, as seen in the discussion above.
6. ENVIRONMENT AND EDUCATION

The following chapter provides a detailed account on the existing environmental challenges and environmental education activities in Mecubúri district. Means of formal education and informal education will be explored as well an account on the contribution by civil society and the private sector.

6.1 ENVIRONMENTAL CHALLENGES IN THE DISTRICT

The field research identified the main environmental challenges faced by the people living Mecubúri District. Through the interviews, it became known that rural dwellers perceived uncontrolled bush fires, changes in rains and winds, unfertile land and diseases spreading due to the lack of appropriate sanitation as the main challenges when it came to environment.

Uncontrolled bush fires were especially cited by the rural people when asked about the challenges –they were often described to be one of the most frequently occurring environmental challenge in the area and thus the importance of avoiding bushfires was often stressed. This was further explained with the fact that these fires destroy fields, kill animals and reduce the fertility of soil, as expressed in the following quote by a member of a committee for natural resources:

“Bushfires destroy our lives. It is a serious problem. We have lost many animals and harvests. Also the land becomes very poor after fires.”

In addition, it was often stated that smoke from bushfires was hindering rainfall.

The link between sanitation, hygiene and environmental education was explained by citing the correlation between diseases and poor water management. Cholera and malaria were both described to be spreading through water and sewage. It was thus widely know that many diseases such as malaria and cholera are a direct consequence of faulty drainage, sanitation, solid waste management and water supply systems. Hence, sanitation and hygiene were often perceived as an environmental challenge by rural population in Mecubúri.
In regards to land access, some trends were identified by the respondents. In general, in the district and provincial level it became clear that that there is plenty of cultivable land in the area, and thus all the farmers should have easy access to land. This view was, however contested by some of the farmers attending the interviews. Fertile soil was often described to be rather hard to find by farmers living in Namina, Momane, Mutapa and Nihelia. According to these small-scale farmers, fertile land was mostly located far away from the dwelling places of the interviewees, being namely in central areas of the localities. For instance, a group of farmers in Momane stated that when they wanted to look for new plots, they had to go very far away. Similar experiences were put forward in Mutapa, where respondents concluded that:

“It is quite difficult to get access to land close to our houses and village as the soil close is very tired.”

Thus, the lack of fertile land was perceived by some farmers as being a major environmental challenge in their livelihoods.

Deforestation was also cited to be a challenge by the rural people living in Mecubùri district. The reserve in the district suffers from changes in land use and deforestation, particularly in the northern parts of the reserve (WWF, 2005:24). Exploitation of natural resources in the general was also a concern of some of the respondents. In Momane, for instance, this was illustrated in a following way by a local farmer;

“We used to have big trees in our forests but now we only have bushes. We don’t replant trees.”

This decrease in intact forests was described as having been started already in colonial times; members of the community forest reserve committee stated that the reduction of woods in forests started due to excessive exploitation and is still continuing. Furthermore, animals were said to be fewer today, which was likewise identified to be caused by hunters operating in the areas during colonial time as well as in current times. Similarly, in Namina, it was said that there are less trees now due to exploitation, both before and after independence. Nevertheless, provincial employees of the forestry sector in Nampula highlighted that the number of illegal forestry operators, often thought to hold the main responsibility of forest degradation, was
currently decreasing. A small-scale farmer in Mumane concluded that:

“It could be that in the future we will have problems with access to land – now operators are leaving the soil dry while the population is growing at the same time.”

As for the changes in rains and winds, some rural dwellers perceived that the area has seen changes in its rainfall and winds. In most cases, the changes were described to be the prevalence of more irregular rains and stronger winds in comparison to previous generations, often referred to as “our mothers’ and fathers’ time”. For instance, Namina saw an extremely heavy thunder storm in 2010, which was mentioned frequently in the interviews carried out with small-scale farmers, school employees and entrepreneurs. A small scale entrepreneur explained that he had lost a hostel of six rooms during the storm in November 2010. Likewise, a school in building in Namina was damaged as classrooms and a roof were destroyed. A district employee working in the department of Planning and Local Development in Mecubúri district stated that, during the rainy season, roads were often ruined. This has also been confirmed in the District Plan for Strategic Development whereby rains were described to be destroying the district road network on a regular basis. (PEDD, 2009:9) However, heavy rains are not the only reason for destroyed roads, as also the poor construction of them affect in poor infrastructure condition.

Farmers from various localities in the district highlighted that there had occurred changes in the rainfall levels. For instance, a group of small-scale farmers living in Momane locality (approximately 20 km away from Mecubúri city) explained that the rainy period was said to be starting later, which resulted in later sowing period;

“Rainy periods are changing, in some years it rains early and others later; last years it only rained in December and February and nothing in January. In our time it has been like this, but in our mothers’ time the rain periods were more predictable.”

The changes in rainfall were also highlighted by another group of farmers interviewed in Mutapua, who said that currently they start the seeding period in December, whereas in the past this was done in October. Rainy periods were thus described as problematic by farmers
interviewed in various localities. Albeit the evident importance of water as such, infrastructure was been destroyed and certain horticultural products such as tomatoes suffered from heavy rains. On the other hand, dry seasons were also depicted as a burden; for instance, during dry season in some locations such as in Muite, women had to walk 10km to fetch water.

6.2 ENVIRONMENTAL EDUCATION ACTIVITIES IN MECUBÚRI DISTRICT

In the study area of Mecubúri, environmental education was defined to cover various issues related directly to environment, such as forest management, as well as indirect issues such as sanitation and agriculture. When discussing the existing environmental education in the area, the most frequent responses thus included avoidance of uncontrolled bushfires, re-plantation of forests, improved sanitation, nutrition, health and hygiene as well as conservation farming. A clear link between the inhabitant’s livelihood assets and the above mentioned concerns was evident, and thus the research found that environmental education was a part of rural people’s livelihood strategies in Mecubúri District.

This has also been expressed by the Central Government; according to the Central Government, an increase in public knowledge of local environmental topics would result in better support and involvement in the search for solutions in betterment of daily lives of people. (PARPA 2006:91).

6.2.1 FORMAL EDUCATION

Environmental issues have been recently implemented in the national curricula of Mozambique. Consequently, the major environmental priorities in Mozambique are with local and institutional aspects, such as environmental education, compliance with the law, and development of institutional capabilities. Accordingly, environmental education is not only the responsibility of the Central Government; the private sector also is expected to bear responsibility for environmental matters. Moreover, all actors should, including the Central Government, properly play their role in preserving the environment, both urban and rural, in which environmental education is of vital importance. (PARPA 2006:63)
Environmental education was described as responding to the geographical location of the area and it is included in local curriculums. In general, 20% of teaching hours should be allocated to local curriculum dealing with local aspects (Felicidade, 2011). A director of a secondary school in Mecubúri explained that the local curriculum there includes environmental issues whereby students are taught to value forests by explaining the importance of forests. However, within the field research, it became evident that the implementation of local curriculum was not always possible, as the example of Nakakali village shows. A consultative council explained that the implementation of the local curriculum in Nakakali School failed, as the school did not manage to obtain teachers with appropriate knowledge.

The most prominent means to teach environmental issues were identified to be lessons related to natural science, mainly biology and geography in which students learn about rivers, mountains and wild life. However, environmental education was also said to be incorporated in almost all topics taught at schools. Furthermore, as mentioned by the director of a secondary school in Mecubúri centre, there was an annual environment day at the school. There were no specific textbooks about environmental education as such, however, it was being taught through natural science textbook starting from the fifth grade. Additionally, there were national programmes dealing with important environmental issues. The most prominent programme was called “one tree per one student”, whereby every student was planting a tree nearby a school. The aim of this programme was to teach pupils about the importance of re-planting trees. As explained by a teacher:

“We teach the children that to cut a tree is like killing a person”

By 2010, 33,532 trees had been planted in total in Mecubúri (Governo Da Província de Nampula, 2010:21). Subsequently, all the respondents attending a school says they had done this, however, some challenges with the programme were identified. For instance, it was often stated that albeit the actual plantation period of the trees was successfully completed, there was no means to follow up the growing of these trees. This was due to the fact that often schools lacked irrigation possibilities and many of the trees did not manage to grow and died eventually. Additionally, some of the trees were planted in the dry season, while they should be planted during the rainy season for them to grow. Currently, as the first phase of this
programme has been finished, schools are moving on to the next phase of the programme, whereby students are encouraged to plant a fruit tree.

As for the students who participated in the interviews, secondary school students stated that they learn about sustainability, the importance to avoid bushfires, to avoid irrational use of natural resources, sanitation and waste management. They further described to be learning about the interdependence between environment and humans. It was described that environment as such is extremely important to humans as they would not be able to live without it. It was also stressed that sanitation and general waste management was being taught at school due to its strong role in preventing diseases such as cholera and malaria. Students participating in an interview mentioned, for instance, the following topics they learned;

“We learn not to pollute water, not to cultivate in a same field for more than two years, not to pee on plants and not to hunt animals during the reproductive period”

Additionally, agriculture was mentioned by students and teachers alike to be part of environmental education, whereby some students in Mecubúri Centre secondary school learned cultivation methods by working in plots belonging to the school. The students learned conservation farming in these plots where they produced maize and beans. The importance of this kind of teaching was described by a teacher to be prominent, as through this, students would be able to sustain themselves, even if they do not find employment after graduation. Most importantly, conservation farming was often cited as one of the possible means to control and avoid bushfires, as it evades clearing land by burning - a method practised commonly by the farmers in Mecubúri.

However, there are general challenges faced by the educational sphere, which directly affect on the capacities to teach and to learn environmental issues. These include, most prominently, the lack of teachers and the lack of school buildings. Hence, it was sometimes described by the respondents that it was difficult to attract teachers to remote areas, making the workload of the present teachers extremely heavy. This meant, accordingly, that teachers were often responsible for several subjects, classrooms and other tasks – a challenge that clearly influenced their abilities to teach about specific environmental topics. The lack of teachers
also results in large numbers of pupils in classes, often cited to reach above 50 per class. Not only was it said to be difficult to attract teachers to remote areas, but also teacher training was said to be lacking specific environmental training. As an employee of Centro Terra Viva explained, currently most of the teachers have not received any environmental training at all. This means, according to him, that the standard of teaching depends solely on the personal commitment of a teacher, as he or she often only relies on the natural science book being used at schools. Another hindrance faced by the students in Mecubúri was identified by the respondents to be the long distances – it was explained that it is common for children to have to go ten kilometres to the nearest school. Other challenges in formal education were the lack of teaching materials as well as the lack of school libraries.

6.2.2 INFORMAL EDUCATION

Throughout the study, informal education by community members proved to be extremely important in relation to environmental education. These methods and channels of disseminating information were found to be directed at the whole community as such, rather than merely at young students. For instance, a programme resembling the “one tree per one student” was the “one leader, one forest” programme. This governmental programme aimed to promote sustainable continuity and preservation of forests and it was also said to be encouraging rural people to create a habit of replanting trees. The research team visited one of these community forests in Namina and discovered that it was indeed a prominent form of informal environmental education in Mecubúri district. Quoting the words of the local leader who was responsible of this community forest;

"Our children can see our native trees here. We teach them about the purpose of forests and tell them that the forests will belong to them when we adults die, and so they will be responsible of them."

Furthermore, during the same occasion the leader also said that adults involved in the community forest activities were teaching children about the importance of avoiding uncontrolled bushfires. Accordingly, they told children that fires decrease the fertility of soil and kill small insects.

Another example of environmental education being transmitted informally to whole
communities was the work of the community forest volunteers in the Mecubúri Nature Reserve\textsuperscript{29}. They were a group of community members who had formed an association and worked voluntarily in the forest reserve of Mecubúri and thus dealt with multiple issues related to environmental education. The importance of their work can be captured in the following quotation from an interview conducted with the fiscais:

\"Without the reserve children will not know about the native trees.\"

The task of the volunteers was to protect the nature reserve from illegal hunters and other forms of illegal exploitation such as the usage of poison while fishing and deforestation. Furthermore, the forest fiscais were, accordingly, teaching locals to avoid burning grass during dry seasons. It was also mentioned during the interviews that in May 2011, the volunteers would undertake a community mobilisation whereby they would teach communities on how to prevent and control fires. Another important aspect of the work of the forest fiscais was their involvement in local schools where they held general meetings with parents of children attending a school. In these meetings they were speaking about the importance to preserve forest resources such as wild animals, trees and NWFP’s. This form of environmental education exemplifies how community actors work in an organised way to avoid children to engage in illegal hunting and other unsustainable activities in the future. The volunteers were trained in 2006 through a governmental project where they learned, for example, about animals through practical lessons. This training lasted for 30 days. Furthermore, the members were trained with the support of FAO in 2008 to conserve natural resources such as forests. All in all 56 forest fiscais were trained in that community, however majority of them has stopped working actively\textsuperscript{30}. The reason for this was the fact that volunteering, accordingly, was a highly time consuming task as the fiscais also had to work in their own farms.

Another prominent way to learn about environmental management often identified by the respondents was traditional knowledge learned through parents, relatives and local leaders. Such issues were, for instance, rules concerning firewood collection; some species may not be used for firewood. These unwritten rules were common knowledge, as they are learned from earlier generations. For instance, precious and primary tree species such as Umbila, Nabiri, 

\textsuperscript{29} The word \textit{fiscal} (fiscais in plural) in Portuguese does not have a direct translation to English. A \textit{fiscal} is a person who controls, supervises, monitors or, (in terms of financial fiscal activity) collects taxes.

\textsuperscript{30} All the work conducted by the forest volunteer was done on voluntary basis.
Moco and Chambiri were prohibited to be cut for firewood or charcoal purposes. It was further explained by local entrepreneurs in Namina, that local structures consisting of traditional leaders and chiefs protected these trees by giving punishments in case someone cuts these species for wrong purposes. Moreover, environmental information related to medical plants and herbs were found to be transmitted through parents, relatives and friends.

An additional means to learn about environmental issues informally was stated to be radio. As an example, a group of farmers in Mutapa village of Namina said that they have learned to avoid bushfires through radio programmes. It was explained that the farmers normally take their radios to the field and listen to the programmes whilst working. Accordingly, there were many programmes in local languages such as Makwa teaching about agriculture and uncontrolled bushfires; one prominent channel was identified to be Radio Mozambique.

Interestingly, informal means to learn about environmental education included also the spreading of knowledge from young people to their parents. It was sometimes described by the respondents how children were teaching their parents about environmental issues. This was found to be a highly important channel for disseminating information, as often parents were said to be lacking educational opportunities or being unable to reach agricultural technicians. Accordingly, most of the local farmers were illiterate and many of them were not able to speak Portuguese – a language often used by the technician. Thus, parents’ accessibility to formally transmitted information was lacking, and they had to rely on their children’s information. This style of transmitting knowledge was explained to work so that first students learned about environment agriculture at school or through an NGO, and then, in turn, they would explain the issues at home to their parents.

Finally, religious leaders interviewed by the research team were conducting informal environmental education, and this included various churches were often teaching people about the importance of avoiding bushfires and about the importance of replanting trees. Furthermore, an idea of expanding the national programme of one forest per one community was being developed by a church which wanted to have a “one church, one forest” programme.

Another important informal channel for environmental education is the traditional initiation rite undertaken by boys aged 6 to 10. During these rites, boys are being taught issues related to adulthood in a secluded area and environmental issues are likewise included. Thus, during
the initiation rites, boys learn about preservation of the environment through activities that respect the ecological balance: not hunting and fishing during prohibited periods, and rotating crops to let the soil rest, learning how to allow the regeneration of species, methods of avoiding unnecessary bushfires, hygiene and conservation of watercourse and rivers as common property, crop rotation to avoid soil exhaustion. (Nampula Gender Profile, 1998:102) Also girls undertake environmental education in their initiation rites, however, the secluded learning period for girls is somewhat shorter than the one dedicated for boys (Nampula Gender Profile, 1998:103) The means to teach these issues during initiation rites is often through songs and dramatic representations. (Nampula Gender Profile, 1998:103)

6.2.3 CIVIL SOCIETY

Civil society organisations were also found to be an important factor in relation to environmental education. Also the central government advocates partnership with the civil society in order to encourage the adoption of sustainable management of natural resources. This, accordingly, means a promotion of inclusion of poor communities in design, implementation, and monitoring of environmental programs. (PARPA 2006:75) Furthermore, the central government has pledged to promote a service that would provide information on existing natural resources by assisting the establishment of local and private initiatives related to sustainable use of natural resources. (PARPA 2006:133)

Consequently, communities in Mecubúri received environmental and health related training through various civil society organisations. For instance, communities learned about sanitation, latrine building and hygiene through organisations such as SCIP, OLIPA and Care International whereby Care International was teaching issues related to water, sanitation and wells. SCIP on its part had specific programmes directed at youth, and in an interview conducted with these youths working with SCIP it was told that they often forwarded the information to their parents. A group of “SCIP youths” participated in an interview whereby it was explained that they learn the same topics as SCIP teaches in public schools as well, however, the difference was that;

“At school we learn these things in theory; with SCIP we learn the practise.”

Moreover, an organisation called Forum Terra taught local communities how to plant trees
and about the importance of avoiding bushfires. Moreover, the organisation was working with capacity building, teaching the communities forestry management and issues related to fishing, whereby it distributed information on the dangers emanating from fishing with poisonous chemicals. Forum Terra also assisted communities to establish associations and committees in order for them to provide mutual support groups in, for instance, farming and commercial activities. Moreover, the health centre of Mecubúri distributes information on hygiene as well as waste and water management in order to avoid diseases such as cholera and malaria.

Another example of the work done by the civil society is the various committees who contribute to the environmental education. For instance, a water and sanitation committee interviewed in Nihelia village of Namina aimed at mobilising local population for hygienic and sanitation issues. With the help of Care International, the committee has built several latrines in the village and has taught community members on hygiene by discussing about the importance of showers, washing dishes and waste management. The water and sanitation committee was trained by Care in 2007. The following interview quotation illustrates the work of the committee:

“We show people how to take showers and wash dishes. We make visits from house to house and if there is something wrong, we speak with the owner and show how to keep the house clean. These visits are done twice a week. If our advices are rejected, then we invite the family into our own houses – when they see how practical and nice a clean home is, they understand us.”

Care International will also train a similar type of committee in the same village for managing environmental problems. This committee for natural resource management has already been formed; however, the members are still waiting to be trained by Care International. When trained, they will mobilise local communities to avoid setting fires, control and take care of natural resources such as water and forests. One additional task described by the committee members will be the task of having local guards supervising forests and taking action in case there are people fishing illegally by using poison.
6.2.4 Private sector

In Mecubúri region there were a large number of established small-scale operators which have operated for many years. Many operators worked in the forestry sector by conducting logging and forest exploitation activities. Forestry investors on the other hand worked with forestry plantations and their presence in the area was long-term since they work in the same region for up to 50 years, in accordance with their license. The impact on the local communities of the small-scale operators and the large scale investors differed since the large-scale investors came to the region and used large land areas for the purpose of planting, to sell the wood and then re-plant again. Since they were long-term actors, they came with investments and hold a societal function as a source of employment, improvements in infrastructure, boost the local markets by increasing consumption of locally produced products. This made the large-scale investor Lúrio Green Resources (LGR) to be a relevant actor to study in this study. As was understood in the interviews with the local people and from people working in the public sector, the large-scale investor could be a possible channel to contribute to society in terms of EE. For instance, it was expressed by a teacher in a school in Namina that she saw the entrance of LGR to be positive for the local schools since it could possible contribute with knowledge transmittance. As an example, the students could visit the plantation and learn more about plantation methods. Examples of this are: how to protect the seedling from drought and erosion, learn about when and how to plant and what species could be good for different purposes.

On the other hand, a number of consequences were pointed out by local farmers in regard to investors’ establishment/use of land. Particularly when the land close to their habitats were concerned. One major concern described by local people was the potential loss of natural resources. Examples of this are: reduction of availability of NWFPs, difficulties in accessing cultivation plots, reduction of rain and increased risks for forest fires (see also the EIA matrix in appendix II). Since the impact of the activities of the investor may have negative implications on people’s livelihoods, the counter measures could be taken through EE from

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31 The law, providing The Right to Use and Benefit from Land (DUAT in Portuguese) gives an investor the right to use the land for 50 years.
32 This was said in a seminar held by the district government. The participants in the seminar were: traditional leaders and community secretaries, public servants, representatives from civil society and the research team.
the investor. Having said that, it is also important to mention that the land which was used by the large-scale investors was not always used by local farmers for farming activities, but it has been used for activities such as hunting and collection of NWFPs.

In many interviews with local farmers and public servants it became clear that land related conflicts and uncontrolled use of natural resources was a shared concern. It was furthermore expressed that local people’s dependence on natural resources makes it necessary to not only considers the short-time effects, but also the long-term effects of the presence of the investors. However, it was furthermore expressed that despite the long-term negative impacts, investors also bring with them a number of long-term positive effects to all levels in society. One of the advantages was the possibility to increase the level of education, or at least school material. Local people expressed how they saw the entrance of the investor to be a possible lift in general schooling investments. Even though LGR was still was in a starting-up phase and had not yet had the time to make much investments, a high level of expectations could be detected among the local population.

The high expectations on investments and societal improvements were raised as well as the concerns in regard to: the question of land use change, degradation of the soil and forests from long-term use of pesticides and ground water scarcity. (Land use Seminar, Mecubúri district, 22-04-2011) In interviews with local farmers in Mecubúri district and district administration employees it was understood that if the potential negative impacts of the investors presence are not reduced, their presence in the region may cause conflicts in the future. An overview of both positive and negative impacts of LGR’s presence in the region was given in the Environmental Impact Assessment (EIA). For this study, a summarising matrix has been made in order to illustrate the findings in the EIA of LGR’s Forestry Plantation Project33.

By the time the study was conducted, LGR had still not initiated any EE activities, however, based on the expressed expectations of some of the local people and from the EIA the investor was seen to possible be a source to EE in regard to: avoidance of bush fires, teachings of how to conduct conservation farming, transmittance of knowledge in regard to sanitation and hygiene, and finally, the importance to replant trees.

33 The EIA is done by Impacto, a Mozambiqan consultancy company in the environmental field.
6.3 **CONCLUDING REMARKS**

To conclude with, agricultural issues were cited to be part of environmental education at the local level in Mecubúri. Conservation farming methods represented one important strategy in how to improve the fertility of the soil, increase productivity as well as to avoid uncontrolled bushfires. This method was thus taught to the rural farmers by both NGO’s, agricultural technicians and by schools. As the cadastral authorities of the Mecubúri district stated, local farmers were being taught conservation farming through demonstration fields which, accordingly, involved more than 50% of the farmers. However, in Mecubúri district there were only three technicians covering the whole district and according to district planning documents, in 2009 only 1117 individual received assistance from an agricultural technicians (PESOD 2010:11) Additionally, the research team was not able to visit any of the demonstration fields. The low number of governmental employees working with conservation farming was further emphasised by local farmers interviewed in Namina, who said that there were no agricultural technicians working with conservation farming in their living area, and the respondents thus had not had an opportunity to learn about the methods.

Table V illustrates the main environmental challenges and the three main forms of Environmental Education.

**Table V. Environmental Challenges and main forms of Environmental Education**

<table>
<thead>
<tr>
<th>Main Environmental Challenges</th>
<th>Conservation Farming Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Uncontrolled bush fires</td>
<td>Improved Sanitation and Hygiene</td>
</tr>
<tr>
<td>- Unsustainable use of natural resources,</td>
<td></td>
</tr>
<tr>
<td>- Poor sanitation and hygiene,</td>
<td></td>
</tr>
<tr>
<td>- Uncontrolled deforestation,</td>
<td></td>
</tr>
<tr>
<td>- Unproductive soil due to unfertile soil</td>
<td></td>
</tr>
<tr>
<td>- Strong winds, heavy rains and droughts</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Three main forms of Environmental Education</th>
<th>Educational Communication Channels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This Table has been extended and developed further in table VI. which illustrated the existing educational channels and gives an overview over the various forms of Environmental
Education that corresponds to the given environmental challenges.

Table VI. Educational Channels and types of Environmental Education

<table>
<thead>
<tr>
<th>Educational Channels</th>
<th>Types of Environmental Education</th>
<th>Total numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avoidance of bush fires</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sustainable use of natural resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conservation Farming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sanitation and hygiene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Importance to re-plant trees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How to use and find NWFPs</td>
<td></td>
</tr>
<tr>
<td>In schools</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>Youth to parents</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Parent to children</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>Religious leaders</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Associations</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Committees</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Agricultural technicians (from government)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Agricultural technicians (from NGOs)</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Traditional Leaders</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>The Consultative Council</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>NGO’s</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>District authorities</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Province authorities</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Public Sector Health</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>AMETRAMO</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>State Government Programmes</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Radio</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Traditional initiation Rites</td>
<td>X</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total numbers</strong></td>
<td><strong>12</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>5</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>14</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>7</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

(Source: Findings from this study)

As it can be seen in the table, avoidance of bushfires and issues surrounding sanitation and hygiene were taught by the majority of the actors. This coincides with the high priority given
to these two themes by the respondents; the general opinion was that these spheres were indeed important aspects of environmental education. Furthermore, the effect of a prominent presence of hygiene and sanitation education was seen in the area, as diseases for instance were seen to be in decline after introducing hygiene education. In contrast, one can see that education related to conservation provided by actors was rather low. A discrepancy between the available education and the wishes of the respondents thus came evident, as conservation farming was often raised as a vitally important aspect of environmental education. The low number of actors teaching about NWFP can be explained by the fact that it was not seen as a part of environmental education by the respondents. Rather, it was treated as an everyday action belonging to the family sphere, similar to cooking for instance.
PART III, ANALYSIS AND DISCUSSION

7. OUTCOMES OF ENVIRONMENTAL EDUCATION

Following the findings, it became evident that environmental education was not seen merely as a transforming structure by the respondents. Hence, this section will analyse how environmental education is used, and possibly could be further utilised as a component of a Livelihood Strategy. The three themes - conservation farming, sanitation and hygiene and educational channels - were selected for further emphasis due to the importance given to them by the respondents in the study. The analytical tool of SRL Framework will be used in this section to provide a deeper analysis, and the three themes will be examined through Carney’s capitals.

When embarking on the analysis of the findings presented earlier, the research team felt that the chosen analytical tool was not completely sufficient for evaluating environmental education in a wished way. One of the aims of this study was to see if and how environmental education works towards the betterment of rural people’s livelihoods in Mecubúri district. As such, the study treated environmental education as part of the transforming strategies and structures influencing livelihood assets. However, when using the SRL framework, the study team realised that it would provide more insight to the role of environmental if it was treated as a direct component of the livelihood strategy. The reason for this came from the findings, as the research showed that rural people in Mecubúri district did indeed see environmental education as a tool to enhance their livelihoods. Hence, the analytical tool was further adjusted when initiating the analysis section. Three main themes were chosen according to the importance given to them by the respondents, and then the themes were evaluated by using the SRL framework – the main adjustment to be kept in mind, was the fact that environmental education became to be seen as a component of livelihood strategy as opposed to merely a transforming structure.

7.1 CONSERVATION FARMING

Based on the findings, conservation farming was chosen as one of the emphasised outcomes
of environmental education strengthening livelihood assets. The reason for this was the fact that a majority of the respondent raised the issues of conservation farming during interviews. It was often clearly expressed that conservation farming was seen as an important part of environmental education, and would be used extensively as a livelihood strategy if the responds had appropriate measure to this. Conservation farming can briefly be described as being a means to ensure the sustainability of agricultural production within the constraints of the physical and economic environments. In essence, its practise is advocated to be essential in order to manage the land in accordance with its capability, taking into account the natural resource base agriculture is practised, as well as other ecosystems which are influenced by agricultural activity (Shulman, et. al, 2000:32). In Mecubùri district, conservation farming was implemented in order to increase productivity, to keep humidity in the soil and to diversify nutrition. More importantly, it was seen as an instrument to avoid uncontrolled bushfires and to increase the fertility of soil. The described outcomes of CF may be factors which could possibly prevent conflicts and challenges related to restrictions in land access, merging from changes in land use. Consequently, one of the outcomes of CF could, arguably, lead to a decreased need of new land for cultivation purposes due to better soil fertilisation. This is because the CF methods make the soil recapture it nutrition. However, it became clear that even though farmers in Mecubúri knew about the existence of CF, they often faced obstacles in obtaining the appropriate means to implement these methods. The main challenge identified by the farmer was the lack of technicians who taught CF methods.

Consequently, it is argued that a linkage between natural capital accumulation is closely interlinked with promotion of human, physical, financial and social capitals. Thus, the analysis below strives to reflect upon the different possibilities to enhance the information flow in relation to the process of implementation of CF.

7.1.1 HUMAN CAPITAL AND PHYSICAL CAPITAL

Knowledge as such holds an extremely important role in farmers’ capabilities to practise improved farming methods. One way of increasing the practise of CF is directly linked to a combination of physical capital and human capital. Thus, in order to increase the existence of CF, increased information flow and education is needed. For this, the already existing mechanisms could be emphasised and strengthened. For instance, radio programmes were said to be an important source for agricultural information; the existing national programmes
dealing with conservation farming in local languages were listened to by farmers. To increase the efficiency of this means, there could also be organised listening groups, whereby farmers would listen to these programmes together and then discuss them. In addition, if there was a technician attending this type of group discussion, he or she could then answer any possible questions arising from the content of a programme.

Another important aspect related to CF and human capital was the role of formal education; children living in Mecubúri district learned about CF methods at school. This knowledge was then sometimes transmitted to parents. The research team found this to be an extremely noteworthy opportunity to increase the presence of CF, as often parents lacked educational opportunities in addition to the lack of agricultural technicians. Hence, in order to strengthen this type of knowledge transmission, students could be encouraged by teachers to transmit the learned farming methods to their families. Furthermore, there could, for instance, be additional “parents’ days” whereby parents would visit the school plots cultivated by the students.

7.1.2 Social Capital

As noted in the findings, access to information is not enough to guarantee the actual implementation of CF knowledge. Hence, in order to benefit from the accumulated human capital, as discussed above, local communities could make use of the strong social capital that they already posses. For instance, the existence of various committees and associations in the area of Mecubúri suggests it could be used as an instrument when transmitting knowledge related to conservation farming. Due to the fact that there are only three agricultural technicians provided by the district authorities, few farmers have access to demonstration fields and other means of learning. Hence, it could be useful to create committees dedicated to conservation farming, whereby committees could work in a similar manner as the water and sanitation committee in Namina. It could, with the help of a governmental actor, an NGO or other external actor, prove to be a vital channel for realising CF activities. In addition, this type of committee could, for instance, use similar principles as the already existing associations and committees, whereby an NGO or other organisation would train “local agricultural technicians” who then, in turn, would circulate the knowledge to other farmers living in the community. Consequently, this would not only be an effective means to transmit awareness, but also to enable the implementation of CF and decrease dependency on external
actors. Committees could in this manner be used as platforms for farmers when undertaking new farming methods or when improving the already existing methods. The work of SCIP could be used as an example, whereas similar kind of methods would be applied locally. However, as was seen in the district, SCIP only had one technician, and this was not sufficient. In practise, a more realistic option for capital accumulation could be to use a local committee, trained to work with CF, teaching the improved methods for communities where they live in. Committees could for instance have demonstration fields or use their own plots as teaching venues. As the water and sanitation committee, these CF committees could then teach voluntarily families and individual farmers and thus enable the implementation of the knowledge.

7.1.3 Financial Capital

To some extent, an increased access to financial capital could help increase the possibilities to practise CF among locals in Mecubúri. However, due to the fact that land itself is “free” and because the methods used in CF can possibly be based on already existing human resources, tools and equipments, this capital is not, accordingly, as fundamental as social and human capitals. Therefore, the research team claims that when trying to find out means to an increased presence of CF in Mecubúri, a focus should be laid on social and human capital.

7.2 Sanitation and Hygiene

The second focus taken by the research team is sanitation and hygiene. Due to the high emphasis given to this sphere by the respondents, and its direct link to livelihoods, it was seen as an important part when looking at environmental education as a livelihood strategy. There are many ways in how to define the concept of environmental sanitation; however, it can be understood as “activities aimed at improving or maintaining the standard of basic environmental conditions affecting the well-being of people” (Saunders, 2007). Furthermore, the basic environmental conditions may be seen to include: “clean and safe water supply, clean and safe ambient air, efficient and safe animal, human, and waste disposal, protection of food from biological and chemical contaminants, and adequate housing in clean and safe surroundings”. Hence, the concept overlaps and is interlinked to the concept of environmental
hygiene, which content wise is closely related.

It was repeatedly pointed out by interviewees from Mecubúri that, even if the rural people possessed the adequate knowledge for improving their sanitation and hygiene situation, they had limited access to important livelihood resources, such as potable water, limited transportation access, limited access to markets or they had limited resources in terms of money to buy, for example, a lid for their latrines.

The linkage between health, sanitation and hygiene was one of the most frequently described environmental problems in the district. As such, this is, in terms of development studies, not a new finding. Additionally, the process of improving sanitation infrastructure and capacity building in terms of awareness in matters related to sanitation and hygiene were dealt with by almost all active NGOs in the region. By identifying some of the major challenges in regard to sanitation and hygiene, this section will describe, how the sanitation situation is linked to EE and the livelihood capitals given by Carney. Hence, each capital is either directly or indirectly linked to the process of implementation of improved conditions for sanitation and hygiene. The question of culture will also be lifted as it has shown to play an integral role in regard to the outcome of the use of environmental education.

### 7.2.1 Local Structures and Capacity Building

One important source to social capital accumulation in the area of sanitation and hygiene was understood to be the local structures. Local structures, such as the traditional leaders, committees and associations were seen to strengthen the social capital accumulation and thus increase the possibilities for modern and traditional structures to reach sustainable development. Furthermore, the sanitation and hygiene situation, being directly linked to health situation is in its turn strongly linked to tradition and culture. As was pointed out earlier, the culture and tradition may either hamper or support human capital accumulation (DFID, 1999a). The resistance to visit the health clinics and to take use of sanitation improvements introduced, as was discussed in the findings section, when local communitarians started to spread rumours about latrines may be seen as an example of a cultural and traditionally derived event, which is hampering the human capital accumulation. On the other hand the traditional structures and the role of the traditional doctors in the local
areas were seen as actors supporting the implementation work and the work for increased awareness, thus, leading to increased human capital accumulation.

Overall, the role of environmental education in relation to sanitation and hygiene improvement work made by both the traditional and modern structures was to a large extent seen as a means for disease prevention. This work had already been going on for a number of years, and many of the local structures and processes was already working with it through education, capacity building, increased hygiene awareness and construction of latrines. For instance, several associations and committees are working in Mecubúri district, which are thus a prominent feature of the social capital in the study area. This includes local groups such as the consultative councils, water and sanitation committee, associations, NGO’s, and public employees working in the health sector. However, the high legitimacy of the traditional leaders indicated that an encouragement of the already existing ”channels” for information transmission could be of high importance in the continuous work. This means that the traditional leaders were seen and understood as highly competent individuals, and it is therefore argued that it should be used instead of introducing ”new” entry points in the work to reach human and social capital accumulation. Accordingly, disease prevention, not only in its conventional form, but also in terms of environmental education should continue to be done on the basis of the local structures, in collaboration with the local authorities.

7.2.2 Latrine Usage and Hygiene

It was seen in the field that many of the households had a latrine, as well as most of the schools, the major challenge was, as expressed by the representative from SCIP, to increase awareness about ”correct use” of the latrine and access to potable water. In the picture below an example of a locally built latrine can be seen.
The use of lids in the latrines are needed in order to keep away the flies that otherwise would enter and leave the latrine, and in this way spread bacteria. However, one major obstacle which the people interviewed highlighted was the cost to produce lids for their latrines. The latrine lid was said cost 1000Mt (made from iron and stone) and this was expressed to be the main challenge in the district, in regards to latrines\textsuperscript{34}. The importance of the use of lids thus seems to be a crucial element in the struggle to achieve human capital accumulation. However, access to and usage of lids did not seem to be adequate, The correct use of the lid and the importance of hygiene in daily cleaning routines were also brought up repeatedly as important for human capital accumulation.

As was observed in the local areas, there is not a lack of entrepreneurship among the people in Mecubúri; on the contrary, they have a strong creativity and possess impressive knowledge in how to build and construct. Therefore, it was unexpected that the cost to produce the lid would be the major obstacle.

\textbf{7.2.3 \textit{Financial and Physical Capital}}

With all work done by several actors in order to increase the social and human capital, one major obstacle in regard to the possibility for the locals to keep good sanitation and hygiene standards is however access to clean water and access to healthcare. These two obstacles are closely linked to the transformative structures and processes in the society, where the question

\textsuperscript{34} 1000mt=37.3832 USD
of culture and tradition can be seen as one side of the coin, while complex aspects such as access to markets and water sources could be seen as examples of the other side of the coin.

An increase in financial capital could of course mean improved sanitation and hygiene, since it possibly would increase the standard of living and increase access to resources which otherwise could not be used. Despite the lid costs, the major problem described by the interviewees did not seem to be directly related to lack of monetary resources, rather the question of access seemed to be the problem. The question of lack in access can be seen as directly linked to the question of physical capital. As such, sanitation and hygiene improvements are directly linked to the dependency on access to transportation, good roads and markets. This means that physical capitals are needed also in the promotion and spread of environmental education and not least, to the outcome of all environmental education efforts made by the locally active actors.

Lastly, as financial resources are needed to implement programs and to hire people to work with the questions of sanitation and hygiene, the lack of human resources working in the field will be lifted here. Hence, as was mentioned earlier, a lot of work done in the rural areas were done by SCIP, however, due to lack of funding they only have one technician working in 12 localities. This means that; one technician is supposed to train people in a very large region all alone. The lack of human resources in the NGO sector was said to be complemented by the work of, for instance, voluntary woman groups and with the public health sector, however, the challenges are many and more technicians would definitely be needed.

### 7.3 Educational Communication Channels

Following the findings, it became evident that certain means of communication pose a significant role in transmitting knowledge linked to environment. These channels were identified to be the formal education; informal education, NGOs, governmental actors, private sector actors and, finally, committees other civil society actors.

Below, a brief analytical account will be given whereby a reflection is made in relation to Carney’s livelihood capitals and these communication channels. Even though the elaborations do include somewhat all-embracing suggestions, the intention is not to propose that all of the
ideas would be implemented as such. Rather, it is a mere elaboration done in accordance with the analytical framework used in this study.

7.3.1 FORMAL EDUCATION

Formal education was seen as a highly significant channel for environmental education; students learned about environment in an extensive manner. The national programme whereby students were encouraged to plant a tree was especially found to be interesting; instead of merely learning in theory, students were able to widen their understanding through practical lessons. Notwithstanding, financial capital accumulation could provide students with more learning material to enrich the learning period. Human capital was also found to be an important factor to consider; namely, teacher training could be elaborated to enable an increased outcome of schooling. Moreover, an accumulation of physical capital would be needed in order to overcome the challenges faced by long distances from students’ homes to schools as well as with large pupil rates in classes. Additionally, social capital was found to be an important factor in relation to female education – a general attitude promoting girls’ school attendance was associated to be linked in social networks and the civil society. Thus, the civil society bears a significant role in awareness raising in this regard.

7.3.2 INFORMAL EDUCATION

Non-conventional means to transmit knowledge were also found to be a significant channel in environmental education. This became evident due to the fact that through these channels, environmental awareness was reached out to a wide scope of society instead of only being limited to students. As seen in the findings, extensive work is being done by various NGOs, traditional leaders, local committees and association as well as through rural people themselves. Generational transmittance was especially important in this regard – parents taught children and vice versa. Therefore, a broad use of this strong social capital should be continued and it could even be enhanced through capital accumulation; human capital could provide increased capacities of societal actors to pursue their work. For instance, training members of communities, committees and associations to further continue their mobilisation
of communities could prove to be vital. Financial means could provide better means to the
civil society to act upon their concerns. Accumulation of physical capital was likewise found
to be an important factor in regards to information transmission through informal educational
channels; roads and electricity were especially significant. Given the poor conditions of the
roads in Mecubúri, information flow was seen to be negatively affected. Thus, with improved
roads and electricity, rural dweller would both reach information to a larger extent as well as
they would have an increased opportunity to provide information about concerns. Lastly, the
use of natural capital in environmental education was seen to be functioning in a positive
manner. The research team especially appreciated the community forests and saw this as a
great opportunity for environmental education purposes – it does not only affect positively on
natural capital accumulation through re-planting practises, but it also strengthens teaching and
learning through social capital channels.

7.3.3 GOVERNMENTAL ACTORS

Governmental employees were also found to have an important role in environmental
education. However, it was seen that these actors could have an even stronger role in this
regards. The most important aspect of district government employees seen by the research
team was related to conservation farming. There is a need to increase the number of district
level agricultural technician working with CF. Hence, financial capital accumulation by the
State was found to be an important factor, as first and foremost the hiring of agricultural
technicians depends on capacities to pay salaries. Human capital is of course also linked to
governmental employees, as it is necessary to guarantee a professional approach of these
people working with rural farmers. This was also found to be an important factor in relation to
employees who did not directly work with environmental issues; district and governmental
level employees as such were sometimes found to be in need of a wider understanding of
environmental and nature related issues. This is due to the fact that even if a governmental
actor as such does not work in the field, he or she may still need some grass-root knowledge
in order to work with, for instance, policies directly linked to the environment. Finally, the
functioning of agricultural technician could be improved through natural capital, whereby an
extensive use of community demonstration fields would ensure a wider scope of society
member to reach agricultural extensionist practises.
7.3.4 **PRIVATE SECTOR ACTORS**

Given the assumed future implications in land use changes emanating from the presence of the large scale investor Lúrio Green, the study also looked at the link between environmental education and the company’s activities. In order to analyse how and in what way environmental education could possibly prevent future conflicts between investors and local communities, the following paragraphs will identify how environmental education could be applied as a preventive measure for decreasing the potential negative impacts emerging from large scale investor Lúrio Green Resources (LGR).

Overall, the EIA put forth both positive and negative potential impacts in regard to the establishment of LGR’s plantations. The counter-measures to the potential negative impact were given in the management plan of the EIA. Since the given counter-measures are of interests for this study, they will be discussed briefly in coming sections.

**Table VII. Impacts and counter-measures suggested in the EIA**

<table>
<thead>
<tr>
<th>Potential impacts of Investors’ Presence</th>
<th>Measures given as recommendations to handle the impacts in the Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. “Fragmentation and loss of habitats, leading to a consequent loss of biodiversity” (potential impact nr 26, Plano de Gestão Ambiental, 2010:21).</td>
<td>LGR shall ensure that the soil remains devoid of vegetation as little time as possible in order to prevent secondary impacts such as erosion and forest fires, and; creation of “conservation zones” in where the natural vegetation is to be conserved.</td>
</tr>
<tr>
<td>2. “Outbreaks and spread of disease and other gastrointestinal diseases arising from poor sanitation conditions” (potential impact nr 18, Plano de Gestão Ambiental, 2010:17-18)</td>
<td>To install fully equipped sanitation units (understood as latrines) for the workers, public and private hygiene training directed to the workers, implementation of a malaria prevention programme, realization of “hygiene awareness campaigns” and “hygiene awareness training” to the local communities in collaboration with the local health centre.</td>
</tr>
<tr>
<td>3. “Increased risk of forest fires” (Potential impact nr 34: EIA, 2010:170)</td>
<td>Use of practical methods in how to avoid and diminish the risks of forest fires, however, participatory campaigns with the local communities is underlined as one important measure. Furthermore, the EIA measure has identified that the establishment of a plan of sustainable use of forestry waste products(^\text{35}). This would involve local communities, hence, they would be offered to come and pick up the leftover from the trees and have the chance to use it for compostation and later on as soil fertiliser.</td>
</tr>
</tbody>
</table>

\(^{35}\) Forestry waste products include: branches, leaves and rests from the trunk.
4. “General improvement of the living conditions of the locals”
(Potential impact nr 47: Plano de Gestão Ambiental, 2010:)

As an integrated strategy in the Social Corporate Responsibility component of the forestry plantation project, Lúrio Green Resources intend to implement a development programme directed to the communities (EIA, 2010:183). The amount of money given for this was calculated to be approximately 30 million dollars in a period of 15 years. The focus areas for this development programme would accordingly be; income generation, construction and equipping of social infrastructure such as; schools, health centres and sources to potable water etc.

Environmental Impact Assessment for Lúrio Green Resources Forestry investments in Nampula, 2010

Essentially, the creation of conservation zones could be beneficial for an increase in livelihood capital accumulation. Hence, it could provide the local people with increased access to NWFP and recreational areas in where they could continue to practice their traditional ceremonies and other activities connected to social capital. Additionally, the protection of the conservation zones could be done in a joint venture with local communities, leading to an increased trust towards and legitimacy of the company. Local structures such as the Consultative Council and local associations could for instance be consulted and engaged in this work and the company could, as an example, consider establishing a fund for Environmental Services (ES), as part of their Social Corporate Responsibility. The conservation zones could herein be one way in how to increase local people’s access to natural capital in the same time as it could lead to increased collaboration, and thus, trust and legitimacy from both sides. Furthermore, it could possibly lead to increased human capital due to access to medicinal plants and other NWFP. When it comes to avoidance of forest fires, erosion and irrational use of the conservation zones, the company could possible contribute with education to the people working with the maintenance of the conservation zones.

Hygiene awareness campaigns and hygiene awareness training are two good examples of how the company could contribute to improved livelihood of the locals. This measure is directly connected to human and physical capital since it aims to decrease diseases by education, construction of latrines and training. Moreover, it is possible to see a social capital increase through the use of campaigns. However, this depends much on how the campaigns are conducted. For instance, if they are done in collaboration with the traditional structures, the community leaders, and the pre-existing associations it might lead to an increase in networking and horizontal connectedness in between the company and the community individuals. Hence, it means that this measure would include the whole community and not
only the workers. This measure may be seen as an illustration of, how health of the workers is directly linked to the health of the community and thus, it is in the primary interest of the company’s future success to work with this issue.

When it comes to forest fires, the presence of investors can be beneficial for local communities since it is of mutual interest for the communities and the company to work together in order to combat this major obstacle.

An integrated part of the Social Corporate Responsibility of Lúrio Green Resources is an establishment of a development fund, which is seen as one of the many positive impacts that the forestry plantations will have on the local development. In terms of Carney’s capitals, this particular development programme could be an important accelerator for the local accumulation of financial, physical, social and human capital. One important aspect in the implementation process is that: local communities should be integrated in the whole process and involved through participatory methods. Furthermore, the money from the fund could possibly be used to finance projects in local schools. One possibility is to take use of the “local curricula” and involve workers in the forestry plantations to come and speak in schools about forestry and sustainable forest management. Furthermore, the development fund could possibly be used to contribute to the “one student, one tree” programme that students are performing. For instance, seedlings from one of the species used in the forestry plantations could be used in the local schools and the students could learn more about these particular species. Additionally, the follow up of the tree plantation could be done as part of the local curricula and facilities such as irrigation systems or, at least, water access could be a valuable investment for the local schools.

7.4 CONCLUDING REMARKS

When initiating the analysis of the findings of the study, an adjustment of the use of the theory was made. Hence, it was understood that environmental education was not merely a transforming structure – it was understood by the research team to be seen as a component of livelihood strategy of the local people. For this reason, the outcome of environmental education was analysed based on this understanding. Three themes of environmental
education were chosen according to the importance given by the respondents. These are: conservation farming, sanitation and hygiene and educational communication channels.

*Conservation farming* was identified to be an effective counter-measure to unfertile soil, bush fires and low productivity. However, few actors worked on educational basis with CF methods and it was identified a need to put more emphasis on accumulation of human, social and physical capital. Not to mention the need to increase access to information about CF. NGOs and formal education were identified to be important sources to knowledge transmittance in regard to CF. Based on the findings, the most fundamental capitals are social and human capital accumulation, and not financial capital.

When it comes to *sanitation and hygiene*, the problem did not occur to be possession of adequate knowledge, rather: limited or no access to important livelihood resources. Examples of this are; nonexistent or poor access to transportation, poor infrastructure, limited or no access to markets where the local people could sell their surplus production and buy the products needed to improve their personal hygiene. Local structures such as; traditional leaders, consultative councils, committees and association were found to be important actors in regard to sanitation and hygiene. Furthermore, very important sources to improvements were NGO’s and public workers from the health sector. The study furthermore revealed that, many of the households had latrines, this was not an issue as such. The obstacle to an improvement of their sanitation situation was the “correct use” of the latrines, use of latrine lids and access to potable water.

What regards *Educational Communication Channels* the study revealed that; important educational channels which were used to inform and transmit environmental education were: formal education and informal education, governmental actors, NGOs, committees and other civil society actors. The large scale investor was at present not seen as a direct channel. However, the LGR was found to be a potential educational communication channel for the future. The fact that large scale investor Lúrio Green Resources intend to start up a development fund in the future suggests that they may hold great potential to become a valuable actor in regard to environmental education. Hence, the development program may function as an accelerator for local accumulation of financial, physical, social and human capital. Furthermore, the large scale investor could in the future serve as an actor who contributed with environmental education by: campaigns for avoidance of uncontrolled bushfires, latrine training and they may take part of the “local curricula”. For instance, they
could collaborate with local schools and local structures. Interestingly, the study furthermore revealed that, the non-conventional means to transmit knowledge was found to be a significant channel for environmental education. Lastly, even though the governmental actors were found to be important, it was seen in the field that governmental actors had a potential to be even stronger sources to knowledge transmittance.
PART IV, CONCLUSIONS AND RECOMMENDATIONS

8. CONCLUSION

In this section, the key environmental challenges and forms of environmental education existing in the study area will be presented. A table illustrating the educational channels are given as well as a description of the outcomes of the existing environmental education. Following this, a reflection on future research and possible recommendations will be provided.

8.1 KEY ENVIRONMENTAL CHALLENGES AND FORMS OF ENVIRONMENTAL EDUCATION

Rural dwellers identified various environmental challenges directly affecting their livelihood capitals. This study revealed how the usage of environmental education in mitigating these environmental challenges was understood as a component of the local people’s livelihood strategy.

Land related issues were regarded as highly influential factors as households relied upon their agricultural production for food supply and for monetary capital. Thus, access to land, improved seeds and farming methods, increased productivity, and enhanced fertility of soil were all identified as significant aspects to be considered in environmental education. Secondly, sanitation and hygiene were seen to have a direct link with environment and the socio-economic situation. This can be based on the fact that the most deathly diseases in the area were directly linked to lack of sanitary and hygiene. Malaria, diarrheal and cholera were all reduced with an improved water and waste management. Thirdly, changes in rainfall and an increased occurrence of storms were found to be harming the livelihood assets in the study area. Finally, uncontrolled bushfires were depicted as an environmental challenge affecting the socio-economic condition negatively by destroying fields, houses, forests and other highly significant areas.
The study also revealed that while some of the concerns raised by the local communities were currently receiving environmental education to counter action purposes by various activities in the area, some of the focal concerns were not. The main discrepancy between the efforts made and environmental concerns identified, was the lack of support in conservation farming. Farmers who participated in the study were widely concerned over issues related to agriculture whilst acknowledging the great potential of conservation farming as an important component of their livelihood strategy.

### Table VI. Environmental Challenges and main forms of Environmental Education

<table>
<thead>
<tr>
<th>Main Environmental Challenges</th>
<th>Three main forms of Environmental Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Uncontrolled bush fires</td>
<td>Conservation Farming Methods</td>
</tr>
<tr>
<td>- Unsustainable use of natural resources,</td>
<td>Improved Sanitation and Hygiene</td>
</tr>
<tr>
<td>- Poor sanitation and hygiene,</td>
<td></td>
</tr>
<tr>
<td>- Uncontrolled deforestation,</td>
<td>Educational Communication Channels</td>
</tr>
<tr>
<td>- Unproductive soil due to unfertile soil</td>
<td></td>
</tr>
<tr>
<td>- Strong winds, heavy rains and droughts</td>
<td></td>
</tr>
</tbody>
</table>

#### 8.2 Environmental Education Actors and Outcomes

The study revealed that support given to local farmers in conservation farming methods was extremely low even though the need of it was evident. In contrast, a wide support in sanitation and hygiene related issues were prominent in the area – there were plenty of actors working towards an improved sanitation in the area. Formal schools, NGOs, governmental actors as well as civil society were all strengthening the capacities of local communities in this sphere. It was also clear that in this sphere, environmental education was functioning well and thus it was seen as a highly important factor improving livelihood assets. Environmental education seemed to function as a component in the livelihood strategy as the linkages between increased access to information and improved sanitary conditions had shown to decrease the number of sick people.

In formal education, local communities used environmental education as part of their livelihood strategies. Information dealing with environmental challenges was understood to
be transmitted relatively well. Students learned about agriculture, sanitation and hygiene as well as about sustainable environmental management. However, due to the prevalence of poverty and poor conditions for teaching, formal education was not found to enjoy full capacities to teach students of all the issues identified as important. Additionally, the fact that there is a high gender discrepancy in school attendance made female students less informed about the information provided by schools.

As for informal education, civil society, generational transmission of knowledge and NGOs working in the area were found to be vital in strengthening the capacities to counter environmental challenges and through them a wider scope of the society was enabled to reach supporting activities. As a large fraction of the society was illiterate and not able to attend a school, these informal methods of teaching were considered to be highly significant. As such, it was understood that environmental education functioned as a livelihood strategy for a wider scope of population. The strong social capital of the society reinforced the importance of this educational channel. This suggests that the informal education should be even further supported and taken into account in future intervention in the field.

Notwithstanding, even though there were governmental actors intending to enable the capacities of local communities in regards to environment, it was also found that low human resources in the public sector, as well as the lack of finance often hindered this means of capacity building. Thus, it is argued that a stronger approach from the public sphere should be undertaken, especially with regards to conservation farming. As it was seen in the findings, environmental education needs, many times, to be complemented by monetary support in order to realise the topics they learn through the education.

Out of all actors using environmental education as a counter measure this study suggests that the educational channels which covered the most types of environmental education were: schools, traditional leaders and NGO’s. This does however not mean that the other educational channels were inefficient. For instance, it was found that the youth to parent channel was seen by the locals to be an efficient form of knowledge transmittance. Table VI illustrates six types of environmental education and the actors (in the table addressed as “educational channels”).
### Table VI. Educational Channels and types of Environmental Education

<table>
<thead>
<tr>
<th>Educational Channels</th>
<th>Types of Environmental Education</th>
<th>Total numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avoidance of bush fires</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sustainable use of natural resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conservation Farming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sanitation and hygiene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Importance to re-plant trees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How to use and find NWFPs</td>
<td></td>
</tr>
<tr>
<td>In schools</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>Youth to parents</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>Parent to children</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>Religious leaders</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Associations</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Committees</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Agricultural technicians (from government)</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Agricultural technicians (from NGOs)</td>
<td>x</td>
<td>4</td>
</tr>
<tr>
<td>Traditional Leaders</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>The Consultative Council</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td>NGO’s</td>
<td>x</td>
<td>5</td>
</tr>
<tr>
<td>District authorities</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Province authorities</td>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>Public Sector Health</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>AMETRAMO</td>
<td>x</td>
<td>1</td>
</tr>
<tr>
<td>State Government Programmes</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td>Radio</td>
<td>x</td>
<td>2</td>
</tr>
<tr>
<td>Traditional initiation Rites</td>
<td>x</td>
<td>3</td>
</tr>
</tbody>
</table>

(Source: Findings from this study)

The potential influence of the large scale investors is however not considered in the table. This is due to the uncertainty of the actual influence on knowledge transmittance in regard to environmental education that the large scale investors will have in the future. The study
however found the large scale investors to be potential actors which in the future might be having a function as an educational channel.

As illustrated in table VI; avoidance of bush fires, sanitation and hygiene, sustainable use of natural resources and the importance to re-plant trees was brought up by most of the actors functioning as educational channels. Despite the high importance given by the local people to conservation farming and how to use and find NWFP, these types of environmental education was merely taught by few educational channels.

### 8.3 Future Research

With influences from Walker et al. (2001:298), a livelihood strategy can be defined to be an organised set of: lifestyle choices; goals; traditions; values; and activities influenced by biophysical, political/legal, economic, social, cultural and psychological components. From here, it is clear that environmental education can be seen as a component of a livelihood strategy and, more importantly, it was seen as such by the respondents. By adding environmental education in the SRL framework in such a manner, it could reinforce the chances of environmental education in strengthening livelihood assets. In other words, when initiating a developmental project by using the SRL framework and environmental education would be seen as an eminent part of livelihood strategies, the activities would be inherently strengthened. As the study suggested, when treating environmental education as a transformative structure, it becomes a separate part of other activities and might therefore be left out from the main focus - the strengthening of livelihood assets and strategies – of a development project. Instead, when environmental education is already a part of livelihood strategies as it was seen by the people living in Mecubúri, measures taken towards strong livelihood strategies would directly take into account the different aspects of environmental education as well. Here, the globally appraised ‘holistic environmental education’ would, accordingly, gain its real meaning.
8.4 REFLECTION OVER POSSIBILITIES AND RECOMMENDATIONS

Based on the findings, the research team elaborated possibilities and recommendation in regards to environmental education and its use as a livelihood strategy. First and foremost, it can be argued that the continuation of training Conservation Farming is of an utmost importance. Thus, CF should be transmitted to farmers in Mecubùri by using local structures and organised farmers’ groups such as committees and associations. Governmental support for this would be important, where demonstration fields could be provided for the established so that more people from the communities can take part in CF.

Additionally, the research team suggests that schools could encourage students to transmit environmental education which they learned at school to their parents and relatives. As transgenerational learning was seen an important educational channel in the area, this channels should be fully used. Furthermore, this would ensure that also people who do not attend in school, gain the benefits from the teaching. Schools could, for instance, introduce “parent days”, where students would bring their parents to the demonstration fields belonging to the school and show them what they have learned.

A need for an increased number of governmental agriculture and forestry technicians was seen in the field. This would be especially important in regard to improved cultivation methods.

As for the presence of the large-scale investor, collaboration with the investor in the creation of “nature conservation zones” could prove to be fruitful. These areas would function as a link between the local communities and the investors. Likewise, a collaboration of this kind could be used in health and hygiene campaigns as well as forest fire prevention and conservation. Finally, investor’s development fund could be incorporated and used for the local curricula.
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APPENDIX I, INTERVIEW LIST

INTERVIEW LIST

PUBLIC SECTOR

1. MINISTRY OF AGRICULTURE, MAPUTO
   - Maria da Conceição de Quadros

2. RESEARCHER, CFJJ (JUDICIAL TRAINING CENTRE)
   - Sergio Baleira

3. PROVINCE DEPARTMENT FOR COORDINATION OF INTEGRAL DEVELOPMENT, NAMPULA
   - Felicidade Muiocha, Development Coordinator at UCODIN, Unit for Coordination of Nampula Integrated Development

4. PROVINCIAL DIRECTORATES, NAMPULA
   - Directory of Agriculture
     o Imed Falumo – Head of SPFFB, Forestry and Wildlife Services,
     o Cristiano Macario – Head of SPCG, Provincial Services for Geography and Cadastre
     o Miguel Quintino – Technician, SPFFB, Forestry and Wildlife Services
     o Antonio Moronha – Technician, SPFFB, Forestry and Wildlife Services
   - Directory of Planning and Finances
     o Vicente Paulo – Coordinator of the Planification and Descentralised Finances Project,
   - Directory for Environmental Affairs
     o Vitor Lopes – Head of Direction of Environmental Evaluation, DPMA
     o Adelino Afonso Manuel – Head of Direction of Environmental Management, DPMA
     o Silva Correa – Head of Direction of Environmental Inspection, DPMA, 2011-04-05
   - Directory Education and Culture
     o Pedro Mugema Francisco – Technician at Direction for Planning, DPEC
     o Racia Assuate, Technician at Direction for Planning, DPEC

5. ADMINISTRATION OF THE DISTRICT GOVERNMENT OF MECUBÚRI
   - Nerinha John Bustan – District Administrator
   - Ernesto Selemane – Deputy Director of District Services for Education, Youth, Science and Technology
   - Soares da Costa – Advisor to the Government of the District for Social Affairs
   - Antonio Pedro – Head of Planning and Local Development
   - Isaac Armando – Technician in the Planning and Infrastructure sector
   - Antonio Pedro – Responsible for District local development planning
   - Elisio V.M. Manuel – Head of District Administrative Office

6. DISTRICT POLICE, MECUBÚRI
   - Cornelio Moisés Macauaca – District Commander of Police

7. SERVICES FOR ECONOMIC ACTIVITIES IN MECUBÚRI DISTRICT
   - Mateus José – Director of SDAE, District Authorities for Economic Activities
   - Fernando Manuel Namuaca Hulua – Forestry Technician, SDAE
   - Sr Edmundo – Technician Commercial activities, SDAE
   - Antonio Pedro – Extentionist worker
   - Simão Selvestre – Planification technician
8. ADMINISTRATION OF NAMINA ADMINISTRATIVE POST
   - Ana Alberto Sabonete – Chief Administrative Post
   - Augustine Leite – First Secretary of the Frelimo Party Headquarters Namina
   - Carlitos Inácio – Head of Locality Namina
   - George João – Regulo Muquino
   - Luis Francisco – Representative Education Authorities at PA
   - Simião Parino – Representative Economic Activities at PA
   - Ernesto Vechiva – Representative Health Services at PA
   - Rafael Torres – President Community Court, Namina
   - Rainha Mirápue – Female traditional local leader

EDUCATIONAL SECTOR

9. SECONDARY SCHOOL IN THE CITY OF MECUBÚRI
   - Sualei Muhumoria Mussa – Deputy School Director
   - Valeri selemane – Teacher in English
   - Maurício Abel Manuel – Teacher in Geography
   - Milton Alberto Bitão – Teacher in Biology
   - Approximately 60 students (girls and boys) living in the boarding school of the secondary school in Mecubúri.

10. BOARDING-SCHOOL OF THE NUNS
    - Seven students from 10th, 11th and 12th grade

HEALTH SECTOR

11. MEDICAL STAFF IN MECUBÚRI DISTRICT
    - José Aurélio – Doctor in Mecubúri,

12. DISTRICT HEALTH SERVICES AND SOCIAL WELFARE
    - Alice da Costa Tomo – Director of District Services Health and Social Welfare
    - Francisco Mutata – Agent for Preventive Health Care

CIVIL SOCIETY

13. ADVISORY COUNCIL OF MECUBÚRI ADMINISTRATIVE POST
    - Lopes Sipaneque – Traditional Leader
    - Diogo Gonçalves - President of the advisory council of the village of Nacuacuane
    - Juliet Edmundo - a member of OMM
    - Avelino da Silva Alberto – no info
    - Maria Isabel Rafael – no info

14. ADVISORY COUNCIL OF NAMINA ADMINISTRATIVE POST
- 18 members present (15 men and 3 women) and four members of the Advisory Council of the City of Ratane.

15. COMMUNITY LEADERS, NAMINA
- Daniel Raja - the district unit secretary of the Mozambique Regulus Muquino
- Jose Celso Aivano - Secretary of the neighborhood I adjust Ivalane Canhaua
- Teresa John - Queen Mirapue, Female traditional local leader
- George John - Regulus Muquino
- Peter Inquivo - Secretary of the neighborhood Peto - regulus Muriape
- Celestino Bento Piquena - Employee Civil Registration

16. LOCALITY LEADERS MOMANE
- Carvalho Inácio - Deputy Head of the Localiity and Pedagogical Head at school
- Alexi Albert - Head of Locality Administration Office
- Community Authorities - Meeting with 7 female and 21 male local leaders

17. LOCAL LEADERS, TOCOLO
- Erestide Maprato - Regulo (chief of Tocolo)
- Mario Eurico Mahassa – Secretário
- Valeriano Silva - Village chief
- Ancha Imita - Judge at the community court
- Mariana seveleque - Adviser to the Regulo
- Mariana Lopez - Responsible at Local Water Committee
- Alexandre Javier - Assistant to Regulo
- Alves Ernesto - Adviser to the Regulo
- Horacio Calisto Mualola - Community Police, Tocolo
- Ernesto Lucas - Fiscal (Inspector)
- Macario Fonseca - President of farmers association do IKURU
- Amarar Waz - President of School Council
- Castro Zacarias - ‘Animador’ Local Catholic Church

18. RELIGIOUS LEADERS
- 40 religious leaders representing 10 different Christian churches and Islamic Mosques.

19. AMETRAMO - ASSOCIATION OF TRADITIONAL DOCTORS OF MOZAMBIQUE
Interview with 40 traditional healers present (9 of them are listed below)
- Mark Muhinate, Delegate District; Adam Roberts Injate Secretary; Regulus Namitil - Delegate Namitil; Mussande Artur, Delegate Nicuabe; Felisberto Araujo, Fiscal; Elisa Diamond, Protocol; Ernesto Massicari, Social Affairs; Peter Matthew, Legal Secretary; Rosalina Meteliua, Secretary in Momane

20. FOREST FISCAIS IN THE MECUBÚRI NATURAL RESERVE, COMMUNITY OF PUPUÊ NATALA
- José Camisa, Fiscal; Albino Macova, Fiscal; Rendez Agostinho, Membro da comunidade; Mario Musassequere, Fiscal; Fernando João, Fiscal e chefe dos fiscais; Faustino Puanhereque, Fiscal; Mario Quatieque, Fiscal; Pedro Macitora, Fiscal.

21. ASSOCIATIONS
- Former member of an association planting Eucalyptus trees (Woman), 2011-04-08
- Association of Prospectors of the Village of Natuco
  - Patricio Antonio - Farmer member of the Association
  - Adrian Isaac - Farmer and member of the association
- Association of Lumberjackers, Natuco village, Namina
  - Selvestre Adriano - president of the Association of Lumberjackers
- Farmers Association in Mutápua
  - João Renha, President of the Association
  - António Namorioa, Secretary in the Association
  - Ernesto Muacinco, Treasurer in the Association
  - Members in the Association (both men and women)

22. NON GOVERNMENTAL ORGANISATIONS
- ORAM, National NGO (Organização Rural de Ajuda Mútua)
  - Calisto Rebeiro, Provincial delegate
  - Sedonha Bonito, District Regional coordinator
  - Célia Palmira, District Regional coordinator
  - Faustino Kunhonha, District Regional coordinator
  - Claudio Caetano, Programme officer
- SCIP (Strengthen Community Through Integrated Planning)
  - Lopes Vieira Muquera – District coordinator of SCIP in Mecubúri
- OLIPA
  - Bacílio Amissé
  - Claudina Laurencia
  - Momade Adamo Monapar
  - Ilda Marques, ITC/OLIPA
  - Luis Sapula de Olipa, ITC/OLIPA
- Centrum Terra Viva
- Forum Terra
  - José Pascoal, Agricultural technician, Namina

23. SCHOOL COUNCIL OF EPC NAMINA
- Mendes Rocha – Responsible for Pedagogics

24. COMMITTEES
- Water and Sanitation Committee, Niheia community
  - Joaquim Carlos Almeida – Presidente do Comitê e mais 6 membros presentes
- Committee for Management of Natural Resources in Natuco
  - Temóto Adriano, President
  - Maria João, Vice President
  - António Chikuau, Treasurer
  - Patricio Prata, Secretary
  - Lena Calistro, Membro
  - Fernando Odieque, Membro
  - Gicas Jaime, Membro
  - Olimpio António, Membro
- Management Committee of Natural Resources, Momane Administrative Post
  - Luis Wuatita, President
  - Ernesto Moacinco - Vice President

25. GROUPS OF LOCAL FARMERS
- Women farmers (approximately 17 women), Momane Administrative Post
- Group of small scale farmers – (9 men), Momane
- Group of small scale farmers - 17 Women, Momane
- Group of youths - 15 girls and 11 boys in SCIP activities, Momane

26. FAMILIES FROM TOCOLO
6 family interviews about family socio-economic situation

PRIVATE SECTOR

27. INVESTORS AND OPERATORS
- Forestry Company: Lúrio Green Resources S.A
  o José Pablo Unterpertinger, Project General Manager, 2011-04-05
  o Marcelo Garcia, Planting Manager,
  o Cassimiro Manique, Manager Community development Unit
  o Jefferson H. Azevedo, Expert,
  o Afonso Alberto Wilson Nipuete, Technician Lurio Green Resources, Soja production
  o José João, Technician Lurio Green Resources, Soja production
  o Valentino Mário, Supervisor Lurio Green resources, Namina
  o Inácio da Silva Supervisor Lurio Green resources, Namina
  o Plantation workers (8 men), workers at Lurio Green, Namina
- Forestry Operator in the District of Memba
  o Ramadane Alito Ramadane – Operator of a forestry concession of 63 000 hectares

28. LOCAL ENTREPRENEURS
- Owner of Mill, Restaurant, Small Grocery Shop, and Blacksmiths
  o João Mucateira Momade
- Small scale entrepreneurs, Namina
  o Amisse Mussa, Shopkeeper and trader, Namina
  o Joaquim Muaprato, Shopkeeper and trader, Namina
  o Alfredo Felix Manuel, Seller of charcoal
  o Joaquim Manuel, Seller of charcoal
- Informal traders association Momane President, vice president, members

29. RURAL BANKS
- Six representatives from the Rural Bank, Namina
  o Supervisor, president, treasurer, clerk and two service provider
- Caixa Rural, Mecuburi sede
  o Adelino Muatrigo, President
  o Catarina Celestina, Tesoureiro
  o Silva José Alberto, Accountant
- Female Saving and credit group Wiwanana do projecto Ophavela, Mecuburi sede
  o Adelia Balanta, President
  o Margarita Feliz Responsible for the ‘Key’
  o Christina Pedro Responsible for the ‘Saving Box’
  o Esmalda Antonio Pedro, Registrar
  o Binca Bussmane, Registrar

30. COTTON COMPANY MECUBÚRI
- Momade Lucia, Technician at Cotton Company SANAM
OTHERS

- Participation in Seminar organized by the Provincial Governor about use, administration and management of land, Nampula April 4, 2011

- Participation in Seminar organized by the District Administrator about use, administration and management of land, Mecuburi April 22, 2011

- Seed-Bank Seminar, District Government of Mecubúri
APPENDIX II, EIA MATRIX

MATRIX SUMMARISING THE PROBABLE LONG-TERM IMPACTS IDENTIFIED IN THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF LÚRIO GREEN RESOURCES’ FORESTRY PLANTATION IN NAMPULA PROVINCE

Note that all potential impacts depends on how the measures to avoid/improve possible results, are taken. According to the EIA the right measures taken to avoid/improve the risks/possibilities may be minimized or increased. Since the Lúrio Green Resources project intend to become both Forest Stewardship Council (FSC) certified and intend to sell carbon credits through the Clean Development Mechanism (CDM) the criteria’s given imply a strong socio-economic responsibility.

In this matrix only the impacts classified as: “definitive”, “highly probable”, “probable”, “long-term” or “permanent” will be included in the below illustrated matrix. Overall, the matrix gives a clear overview over both the possible positive sides and the possible negative sides of the project.

<table>
<thead>
<tr>
<th>Potential impacts</th>
<th>Classification</th>
<th>Probability</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Creation of a feeling of involvement by the communities in project planning</td>
<td>Positive</td>
<td>Definitive</td>
<td>Permanent</td>
</tr>
<tr>
<td>2. Interference with other land concessionists.</td>
<td>Negative</td>
<td>Probable</td>
<td>Permanent</td>
</tr>
<tr>
<td>3. Outbreaks and spread of gastrointestinal disease and other diseases arising from poor sanitation conditions.</td>
<td>Negative</td>
<td>Probable</td>
<td>Short to long-term</td>
</tr>
<tr>
<td>4. Employment creation.</td>
<td>Positive</td>
<td>Definitive</td>
<td>Long-term</td>
</tr>
<tr>
<td>5. Increase the quota of manpower trained in the areas of project implementation.</td>
<td>Positive</td>
<td>Definitive</td>
<td>Permanent</td>
</tr>
</tbody>
</table>
6. Stimulation of the local, regional and national economy. | Positive | Probable | Medium to long-term |
---|---|---|---|
7. Growth in fiscal contribution. | Positive | Probable | Medium to long-term |
8. Integration of the local working force to the social security net. | Positive | Definitive | Medium to long-term |
9. Income opportunities and diversification in the livelihood strategies at local level. | Positive | Definitive | Medium to long-term |
10. Development and improvement of the economic infrastructures. | Positive | Highly probable | Medium to long-term |
11. General improvement of the local peoples living conditions | Positive | Highly probable | Medium to long-term |
12. Inadequacy in relation to employment scheme | Negative | Probable | Medium to long-term |
13. Reduction of the availability of timber natural resources and NWFP | Negative | Probable | Long-term |
14. Difficulties in accessing plots for cultivation, natural resources and sacred places | Negative | Probable | Long-term |
15. Pollution of the local populations’ water sources | Negative | Probable | Long-term |
16. Creation/occurrence of conflicts and diseases derived from social influx of outsiders | Negative | Probable | Long-term |
17. Loss of sense of belonging is derived from the local landscape alterations. | Negative | Probable | Long-term |

### POTENTIAL BIOPHYSICAL IMPACTS

<table>
<thead>
<tr>
<th>Potential impacts</th>
<th>Classification</th>
<th>Probability</th>
<th>Duration</th>
</tr>
</thead>
</table>

92
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Vegetation loss in favour for construction of infrastructure.</td>
<td>Negative</td>
<td>Definitive</td>
<td>Permanent</td>
</tr>
<tr>
<td>19. Limitation in erosion in areas previously suffering from degradation.</td>
<td>Positive</td>
<td>Definitive</td>
<td>Long-term</td>
</tr>
<tr>
<td>21. Increase the aesthetic value of the project areas, resulting from the conversion of areas with no vegetation or with sparse vegetation on forest.</td>
<td>Positive</td>
<td>Definitive</td>
<td>Long-term</td>
</tr>
<tr>
<td>22. Erosion</td>
<td>Negative</td>
<td>Probable</td>
<td>Permanent</td>
</tr>
<tr>
<td>23. Reduced (média annual in english?) annual water outflow</td>
<td>Negative</td>
<td>Probable</td>
<td>Long-term</td>
</tr>
<tr>
<td>24. Reduction of peak flows (rain season)</td>
<td>Negative</td>
<td>Probable</td>
<td>Long-term</td>
</tr>
<tr>
<td>25. Reduction of minimum flows (dry season)</td>
<td>Negative</td>
<td>Probable</td>
<td>Long-term</td>
</tr>
<tr>
<td>26. Increased sedimentation in waterways</td>
<td>Negative</td>
<td>Probable</td>
<td>Long-term</td>
</tr>
<tr>
<td>27. Increased risk for forest fires</td>
<td>Negative</td>
<td>Probable</td>
<td>Long-term</td>
</tr>
<tr>
<td>28. In case areas with native vegetation are converted to forestry plantation the project region may suffer from modification of its esthetical value.</td>
<td>Negative</td>
<td>Definitive</td>
<td>Long-term</td>
</tr>
</tbody>
</table>


(all data has been translated from Portuguese)
APPENDIX III, INTERVIEW GUIDE

Interview Guide for semi-structured Interviewes

Mecubúri, April 2011.

A general guide used for interviews conducted with local communities and, to a limited extent with people from the District Government in Mecubúri.

Environmental education
- Which are the major environmental problems where you live?
- What is done about them?
- Have you ever received any training in how to avoid these problems?
- How do these environmental challenges affect your life?
- Have you perceived any changes over the years you have lived here?
- If training has been given, who did it? For how much time? Regarding what problem?
- Do you apply the knowledge you got from the training in your daily life?
- If not, why?

Water related questions
- Where do you get your drinking/household water from? Distance?
- Where do you get your irrigation water for agriculture?
- How would you describe the accessibility to water in your region?
- Has the access to water changed over time? If so, how?
- Are there any means of water regulation? What? How did you learn this?
- Can you describe and locate important water sources, such as river and streams?

Forest and environment related questions
- Which resources do you use from forests? Who in the family collects and what? Why?
- Where do you get your firewood/charcoal from? Why/ how?
- Which trees are used for firewood/charcoal? Why? How did you learn this?
- Do you know what forest management is?
- How would you describe the means of forest management? How did you learn this?
- How do you prevent bushfires? Where did you learn this?
- Have you heard of one leader/one forest programme? Opinions?
- How the accessibility to forestry products is? Distance? Changes over time?

Agriculture related questions
- Which crops do you grow in this area? How? Cash crops vs food crops?
- Where do you grow your crops? How large is are the plots? How did you acquire them? Do you own the land?
- How is the access to cultivation land? Changes over time?
- Where do you get your seeds from?
- Which pesticides, if any, do you use? From where?
- If not, why do you not use them?
- Where did you learn to the methods you use in cultivation? To improve fertility?
- Do you participate in any extension activities? How? Opinions?
- Have there been any changes in agriculture over time? What? How? When? Why?
- Gender specific tasks in the field? What? How? Etc?
- Soil and fertility -> opinion? Means to improve?
- How do you clear the land? Have you ever used fire?
- Has there been any bushfires in this region? Why? How did they start?
- Challenges? How to overcome these? Opportunities?

Animals and Insects
- Can you describe the wild life in this area?
- Which wild animals are there in this area? Which ones are hunted?
- Any changes over time?
- Fishing? How do you fish?

Materials from nature
- From which material is your house made? Where did you get the material from?
- How are your pottery etc household equipments made? Chairs, mattresses, carpets
etc?
- Do you collect any natural medicines? Which? From where? How did you learn this?
- Do you collect plants/roots/leaves for other purposes than medical? Which? For what?
- How did you find out which plants/roots/leaves to collect?
- How do you use different products collected from forests? How did you learn this?

**Environmental Management**
- How do you improve the soil fertility? If yes, how did you learn this?
- How do you dispose your waste water/garbage? How did you learn this?
- How does the sanitation system look like?
- Which environmental challenges do you have in the area? How to mitigate them?
- How many houses have latrines here?
- How are the latrines constructed? Material, knowledge?

**Semi-structured Interview Guide**
Mecubuí, April 2011.

**Semi-Structured Interview Guide for Schools**

**Teachers**
- Do you teach environmental education? If yes, how?
- What kind of environmental education do you teach? Methods? Material? How many hours?
- How did you learn about the environmental issues you are teaching to the students? Why are these topics important to teach?
- How is the local context taken into account? Why?
- Opinions on environmental education?
- Challenges?
- Are you able to teach what you think is important to teach? Why? How
- What about the one tree one student programme?
- Reflections upon gender? Any differences in relation to learning?

**Students**

- Which environmental issues have you learnt at school? How? When? Opinions?
- How important, in your opinion, it is to learn about environment? Why?
- Do you speak with your parents/relatives/friends about what you learn? If yes, how do they perceive it?
- How do you use, in practise, the knowledge you learn at school? Why?
- What would you like to learn in relation to environmental education?
- Have you heard of the one student/one tree programme? Opinions?
- Do you learn environmental issues outside school as well? If yes, which issues? From who? How?

Semi-structured Interview Guide
Mecubúri, April 2011.

**Traditional Healers**

- Tell us about your work in general? Patients?
- What and how do you use natural medicines?
- Where do you collect them from?
- Who collects?
- When? Any means of preservation?
- How accessible the plant/herbs are? Changes in time?
- How do you transmit the knowledge to future generations? Teaching, books etc?
- Gender specific tasks, plants?
- Are there any sacred places in Mecubúri? If yes, where? Why?
- How do you look upon future? Challenges and opportunities?
- Are you working together with the public health clinic?
Semi-structured Interview Guide
Mecubúri, April 2011.

NGOs working with environmental issues

- Tell us about your work? Tasks? Areas? People involved?
- Which are the major environmental changes over time?
- How do local communities perceive your work?
- What kind of challenges have you faced? How did you deal with them?
- What is your view on land accessibility?
- What is your view on environment? Sanitation? Water?
- Where do you get your knowledge from?
- If you teach local on environmental issues, how do you do this? Since when? Why?
- How do you reach the people? Do you work with local leaders?
- How do you get financial support?
APPENDIX IV, TERMS OF REFERENCE

Field study on land issues in Mecubúri District in Nampula Province, Mozambique

Introduction

Education for development work is an important tool for long term international development co-operation. The School of Social Science at Linnaeus University, Sweden, is running a one-year Master programme in Peace and Development Work - for students, who aim at a future profession within developmental activities in organisations, institutions and social movements dealing with international peace and development issues.

The Master programme comprises a training fieldwork to be carried out in Mozambique. A group of students will, together with their teachers, carry out field-studies in the Mecuburi district in Nampula province in April 2011. The work starts already in Sweden with an introduction to development and participatory methods, followed by fieldwork in small Swedish, rural and urban, communities. The fieldwork in Sweden and Mozambique is an important part of the professional training, thus to make the students better prepared for their future tasks in the international development cooperation.

Background

The aim is to perform socio-economic field studies in order to develop skills to describe and understand the conditions under which people live, how people manage available resources in their efforts to improve their lives and how their striving for a more sustainable life is influenced by different activities in the development process.

Context

Four different field studies will be carried out guided by the perspective related to the importance of the access to and different use of land in the development process. Grounded in the local socio-economic situation and the land issue, the studies will highlight the following topics:

1) Implications of small, medium and large investments in land and forestry, focusing from a local and participative perspective on
   a) ecosystem services, socio-ecology and sustainability and
   b) environmental education: its role, importance and potential for creating sustainability and its integration in different educational systems.
2) How changes in access to land in Mecubúri may affect young people’s educational situation, pattern and possibilities by looking at
   a) direct and indirect positive and negative effects and
   b) which strategies that are applied by concerned stakeholders (among them public sector, private companies and local communities) in order to improve young people’s educational situation and social development.

3) Pros and cons of foreign investments in land in Mecubúri from a local perspective, considering its influence on local development planning and implementation. One specific task to look at will be how large investors and companies could support, and create potential for local small scale business activities and firms to be sustainable and competitive.

4) Benefits for local communities from large scale investments, looking specifically at how local communities can make use of the 20% of the fees which the government derives from the concession of natural resources in their area, for example from forestry exploration and investments, and how these 20% can benefit local communities in an economic and business perspective.

   - An issue to be looked into by all four studies is: How to prevent future conflicts between large companies and local communities, resulting from changed use of land and other natural resources?

Objectives

The overall objective of the studies is to analyse the social and economic situation in the local community and identify how different scales and forms of investments in land, may influence the living conditions for different socio-economic groups in the concerned area/district.

Scope of work and methodology

In terms of theoretical approaches, the studies will have two points of departure. On the one hand, it will follow a “Sustainable Rural Livelihood” approach, in which the actual development capacities in a community will be identified, described and analysed. Another and complementary model is based on an “Empowerment” approach, in which the linkages between the household economy and the societal economy are the centre of attention.

The studies will be carried out by applying a multi-level analysis, looking at the interaction between different levels of the society and between different socio-economic groups and actors. In this context, when analysing the impact of different development activities, the concept of territorial and functional development principles will also be considered and the analysis will look at both vertical and horizontal actions and interactions.
Tasks

- Describe ongoing national and international developmental efforts regarding land use.
- Discuss the role of the state, civil society, private sector, and international aid organisations regarding the different directions of the studies.
- Literature review and desk study: analysis of existing project documentation (reports, studies, evaluations and policy documents); identification and analysis of ongoing or planned initiatives in Mecubùri, identification and analysis of government and other relevant policy.
- Interviewing relevant stakeholders at different societal levels: provincial government and institutions, district and municipal government and institutions, local community authorities, traditional and contemporary local leaders, community based organisations, key persons, private sector representatives, women and men carrying out different activities.
- Give a general description of the district and local communities in the area, for example existing infrastructure, public service, economic actors, residence patterns, demographic statistics, migration trends and land issues.
- Describe the most important economic and social activities at individual, household, community and district level, and relate it to the prospects for poverty reduction in a gender perspective.
- Collect information, opinions, expectations and priorities expressed by women and men in different social groups and local authorities about the different aspects and activities to be studied.
- Generate information and experiences, which can be used in future planning and implementation of projects and activities in regarded areas.
- Provide input and proposals, which can help to improve impact on poverty reduction in future efforts.

Team composition

Gunilla Åkesson (team leader and senior lecturer), Nélia Taimo (sociologist) Josefin Ryde, Emelie Blomgren, Jessica Lindkvist, Helena Fransson, Ameer Feezi, Maria Elfving and Sanna Ristimäki.

Time schedule 2011

30/3 - 3/4  Arrival and preparation work in Nampula
4/4 - 6/4  Meetings in Nampula
6/4 – 27/4  Field work in Mecubùri District
28/4 -30/4  Meetings in Nampula
1/5 – 4/5  Meetings and work in Maputo

The final reports will be delivered to relevant partners in Mozambique; district, provincial and national authorities.