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Declaration

I, Vegard Engh, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature.....

Date.....

Acknowledgments

This thesis is a product of the contribution of several people to whom I wish to express my gratitude.

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Abstract

*This Master Thesis describes and analyzes the Integrated Conservation and Development Projects operating in villages adjacent to Amani Nature Reserve (ANR). To improve compensation measures and increase equity and effectiveness of conservation policies and practices, various projects have been introduced from NGOs and other agencies. The focus is on improving livelihoods without harming nature, increasing environmental awareness and giving incentives for forest conservation. The paper is assessing these accordingly. The projects in the study are dairy production based on zero grazing, butterfly farming, fish farming, honey production, collection and selling of *Allanblackia stuhlmannii* seeds, and spice production. The lessons learnt are important factors to consider into forestry policies.*

A three-month fieldwork was conducted in villages bordering ANR during the fall of 2010. The study is predominantly based on qualitative interviews with villagers, project stakeholders, and key informants. Some quantitative information was also obtained. A total of 121 people were formally interviewed.

*My findings indicate that all the projects experience various challenges to such a degree that the overall objectives of conservation and livelihood improvement are seriously questioned. Some of the projects such as cattle keeping and butterfly farming improve livelihoods to a certain extent, but the scope, scale and outreach of the projects are not wide enough to include particular segments of the communities, and newcomers struggle to participate. The *Allanblackia* project is struggling to successfully establish tree nurseries. All projects depend on highly unstable or weak markets for their achievements, creating challenges for participants. Some projects seemed to have increased conservation awareness, even though this feeling was fragile. The projects in the study area are generally struggling in dealing with the actual motivations for using forest resources illegally, and there were little difference between participants and non-participants regarding dependence and use of forest resources.*

After NGOs formally have stopped funding the project activities, villagers have gradually stopped participating, particularly striking within fish farming and beekeeping. Other projects may experience likewise, as they institutionally and practically have changed somewhat detrimentally after funding has stopped. To various extents, all projects require quite good asset bases, such as larger lands, indicating a situation where already resourceful villagers are able to reap most benefits. Basic requirements for the success of a project, such as education, training, establishing systems for markets and sustainable provision and genetic maintenance of for instance dairy cattle and tilapia fingerlings, seemed to be weak in several of the projects. The projects' future is therefore uncertain, undermining the long-term efforts of forest conservation and community development. Even though there are some levels of livelihood development and increased conservation awareness, improvements and new ideas are needed to revitalize the projects to sustainably compensate for, and preserve the ANR.

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List of Abbreviations and Acronyms

ANR	Amani Nature Reserve
MNRT	Ministry of Natural Resources and Tourism
FBD	Forestry and Beekeeping Division
IBC MSASA	International Business Combined Msasa Village
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBNRM	Community-Based Natural Resource Management
CBFM	Community-Based Forest Management
EAM	Eastern Arc Mountains
EUCADP	East Usambara Conservation and Agricultural Development Project
EUCAMP	East Usambara Conservation Area Management Program
EUCFP	East Usambara Catchment Forest Project
EUFLR	East Usambara Forest Landscape Restoration
EUM	East Usambara Mountains
FAO	Food and Agriculture Organization
ICDP	Integrated Conservation and Development Project
FAIDA MALI	Faida Market Link
FINNIDA	Finnish International Development Agency
HDI	Human Development Index
ICBP	International Council for Bird Preservation
ICRAF	World Agroforestry Centre
IUCN	International Union for Conservation of Nature
JFM	Joint Forest Management
NDDP	National Dairy Development Project
NGO	Non-Governmental Organization
NDDP	National Dairy Development Project
NTFP	Non-Timber Forest Product
REDD	Reduced Emissions from Deforestation and Forest Degradation
SSM	Sikh Sawmills
TANAPA	Tanzanian National Parks
TSDDP	Tanga Smallholder Dairy Development Project
TAS	Tanzanian Shilling
TFCG	Tanzania Forest Conservation Group
TDL	Tanga Dairy Limited
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP	United Nations Development Program
UWAMA	Umoja wa Wauza Maziwa Amani. Union of farmers keeping dairy cattle in Amani.
VEC	Village Environmental Committee
VFR	Village Forest Reserve
WCED	World Commission on Environment and Development
WFP	World Food Programme
WWF	World Wide Fund for Nature

1.0. Introduction

Many of Tanzania's forests are now protected as reserves or parks on a local or national level. These protected forests are a treasury for biodiversity and biological resources, providing important habitats for great species richness including many threatened species. They also act as a buffer against climate change, as these forests function as carbon sinks, which means that they serve to take CO₂ out of the atmosphere and store it in trees and the earth. This function gives them a crucial role in deterring climate change both locally and globally. Forests also provide important ecosystem services such as water catchment and nutrient cycles. Degradation is still affecting many of the protected forests in Tanzania, some of the reasons being the need for energy through cutting trees for firewood and charcoal production, and agricultural expansion. Policing areas and forcing people to stay out entirely is unlikely to be possible, nor acceptable. Protecting biodiversity and forests in their natural states are nevertheless likely to affect local people living in adjacent communities to these forests. The outcomes are often that they lose rights and access to resources that previously have been important ingredients in their daily households. As such interventions rarely carries appropriate and sufficient forms of compensation (Vedeld 2002), Non-Governmental Organizations (NGOs) and other agencies have instead focused on improving livelihoods for local people in villages affected by the Amani Nature Reserve (ANR) in the East Usambara Mountains of Tanzania (EUM). Establishing only a legal status of a reserve is likely not to be sufficiently effective on its own. In order to increase equity and effectiveness of conservation policies and practices, these have to be applied to areas outside reserves, and economic development programs should be integrated with conservation strategies. This has led to an introduction of a variety of additional sources of income that should not threaten to deplete plants and animals within the Nature Reserve. Such activities were butterfly farming, fish farming and honey production, dairy production, and collection of fruits from the *Allanblackia* tree, of which are all assessed and analyzed in this thesis. These are additionally following the principles of Integrated Conservation and Development Projects (ICDPs), which recognizes that the solutions to ecosystem management problems is found with socio-cultural and economic systems, and views local people as part of the solution and not as a part of the problem. The initiatives intend to improve livelihoods, preserve biodiversity, and decrease forest degradation. Through establishing incentive measures in order for local people to see the direct benefits from conservation to their household, they are supposedly more

likely to conserve the forest. Therefore, the projects within the study area aims to both help people improve their livelihoods, at the same time as this is considered to enhance conservation awareness and behavior.

My aim in this research is to study the effects of these different initiatives from NGOs and other agencies on issues such as livelihood improvement and conservation awareness within the villages adjacent to the strictly protected Amani Nature Reserve. The initiatives are supposedly influencing livelihoods of local people in Amani villages at the same time as they are preserving forest resources through affecting conservation awareness and behavior which potentially could lead to less deforestation and forest degradation. All the projects have different stories, and by assessing several of these, it increases the possibility of grasping over more diverse dimensions and a greater general understanding of the overall situation. The study also includes spice farming as an activity with vast potential both for livelihood improvements and conservation, as it is already an established livelihood strategy in Amani villages, but which experience various challenges that may require some assistance to fulfill its potentials. Very few, if any, assessments have so far been done on all these projects, and it is important to enhance knowledge around these in the East Usambara Mountains in order to see if they actually contribute to protecting the vast range of endemic species and generally rich biodiversity in the region, at the same time as they improve livelihoods of poor people residing close to the reserve. These cases are of value to the research on this topic, as they may give answers also to how people relate to conservation and the protected area and how they find themselves in the whole process. My study is assessing the social, economical and environmental dimensions of the projects, attempting to understand the multifaceted nature of conservation and livelihoods development, particularly at the lower grounds of society. This is a relevant problem on several scales for various reasons, such as on the local level for the projects and their participants, and the effectiveness and equity of the nature reserve; on the national level as the country of Tanzania are concerned about both conservation of her forests as well as development of her people; and on the global level for values such as biodiversity protection and mitigation of CO₂ into the atmosphere. The findings may provide an understanding of what development-and conservation agencies may, or should consider in areas that are be protected for conservational purposes. A large amount of money and time is likely to be put in the efforts of protecting forests from deforestation and degradation, as in the REDD and REDD+ programs (Reduced Emissions from Deforestation and forest

Degradation; the additional plus sign standing for forest rehabilitation), and research is needed to assist policy makers and conservation practitioners in making sustainable, effective and fair decisions and solutions. This is a necessity that may contribute to solving many of today's imminent threats towards humanity and nature; by mitigating climate change through carbon sequestration; preserving a vast range of biodiversity; regulating local micro-climates; and sustaining other ecosystem services such as water catchment and nutrient cycling. It is therefore important to incorporate environmental, social and economical dimensions into development aid and biodiversity conservation, of which this paper will contribute to the discussion. To simplify this process, the paper follows several research questions.

1.1. Objectives and Research questions

The overall objective of this study is to assess the impact of the Integrated Conservation and Development Projects (ICDPs) that are operating in villages adjacent to Amani Nature Reserve. These are butterfly farming, fish farming and honey production, zero-grazing dairy production, and collection of fruits from the *Allanblackia stuhlmannii* tree. In addition, the study considers one of the main livelihood strategies for villagers in Amani, namely spice farming, of which is included to understand challenges, and to see potential for improvements that in effect can improve the lives of large segments of the communities adjacent to the ANR. The main objective is further divided into sub-objectives with its following research questions.

1) Describe ICDP activities in villages around Amani Nature Reserve, and consider how these are aiming at biodiversity conservation, reduced deforestation and improved livelihoods for local people.

- a. How is the project supposed to contribute to conservation and development and how is this perceived by the local people and the NGO?

The question is mostly replied to in the introduction to each project activity as well as under the various dimension headings.

2) Study the efficiency of the different ICDPs, looking at social, economic, and environmental perspectives.

- a. What impact do the ICDPs have on livelihoods?

The question is answered in relation to all the projects as well as to the chapter discussing the learnt lessons towards livelihoods improvement.

- b. What impact do the ICDPs have on conservation attitudes and behavior?

The question is discussed regarding all the various projects, while it is summed up in the chapter on lessons learnt towards conservation.

- c. What are the financial, social and environmental costs and benefits for the participants of the projects?

The question is answered in relation to each project activity and under the different headlines respectively.

- d. Do the benefits from the project activity seem sufficient to reduce the need to pursue illegal forest activities and collecting activities from the forest?

This question is discussed throughout the assignment, in relation to each project activity respectively, lessons learnt chapters, and in the concluding chapter.

3) Understanding the challenges and potential improvements of the different ICDPs.

- a. What are the financial, social and environmental constraints to participation in the projects?

This research question is answered in relation to all project activities under the various dimensions chapters.

- b. What lessons can be learnt about ICDPs adjacent to Amani Nature Reserve, and what can be improved?

This final question is discussed in the end chapters, discussing the learnt lessons and concluding the paper.

1.2. Thesis structure

The thesis is structured into 10 main chapters. Chapter 1 introduces the paper including problem statements and research objectives. Chapter 2 gives an overview of various background issues. Chapter 3 comprises the conceptual and theoretical frameworks that are relevant to the study. This is presented to understand some of the history of associated projects and conservation in relation also to the main elements of the livelihoods approach and REDD programs. Chapter 4 describes the study area and the Amani Nature Reserve. Chapter 5 explains the methodology and the fieldwork conducted in the autumn of 2010. Chapter 6 begins the analysis and gives an overview of the various local perceptions on forest conservation, which gives an understanding of levels of awareness and acceptance for preserving the forest, which are important background issues on natural resource management for studying the various projects. In chapter 7, the paper arrives into the actual analysis of the different projects. Here, each project is presented in relation to its own particular story, but they are all assessed and analyzed from financial, social and environmental dimensions. Chapter 8 summarizes the general trends and thereby discussing lessons that can be learnt on the ICDPs particular effects on conservation and livelihoods. Chapter 9 follows up with some recommendations, before chapter 10 rounds up with a conclusion.

2.0. Background

2.1. Social and political context of forest conservation in Tanzania

Biodiversity conservation in Tanzania is dealt with by several sectors of the government, especially wildlife and forestry sectors (Chiesa *et al.* 2009). Protected areas and reserves of different types have their own institutions and organizational structures, such as the National Parks, which is handled by the authority of Tanzanian National Parks (TANAPA). For forest control and conservation, the Forestry and Beekeeping Division (FBD) is the main authority and provides an overall guidance on policies for the forest sector, as well as some supervision. In the hierarchy of government, they are positioned under the Ministry of Natural Resources and Tourism, MNRT (Chiesa *et al.* 2009).

Tanzania is viewed as one of the countries with the largest coverage of protected areas (Vihemäki 2009). The World Resource Institute indicated that as much as 40 percent (39.6 percent) of the land area is protected¹, while another, Brockington (2005) suggested that 29 percent of the land area was protected in one way or another. The total landmass area of Tanzania is approximately 88.6 million hectares (ha), of which 35.3 million ha are forestlands (United Republic of Tanzania 2009). Within this forestland, approximately 16 million ha are forest reserves, 2 million ha are national parks, and the remaining 17.3 million ha (49 percent of all forestland in Tanzania) are unprotected forests in what the government deems as General Land, defined to be all “public land that is not reserved, or village land including unoccupied or unused village land, or what is considered as ‘open access’ in other terms” (United Republic of Tanzania: 2009: 2). According to the national land policy (1995), the President in theory owns the land in trust for present and future generations, and is administered by the Commissioner of Lands (United Republic of Tanzania 2009). The main form of tenure is ‘granted rights of occupancy’, and can either be obtained through a grant by the commissioner for lands or through traditions and customs. In theory therefore, it is the state of Tanzania that has ‘ownership’ to the land, but in practice the households inhabiting an area is the owner (United Republic of Tanzania 2009).

¹ <http://earthtrends.wri.org/text/biodiversity-protected/country-profile-178.html> (Accessed 1.3.2011)

Funding and implementing various conservation interventions in Tanzania have been both socially and economically challenging. Even though Tanzania has improved its performance in the last decade, the average income level is still low. According to the World Bank the average income per capita (GNI) is estimated to US\$ 509 (approximately 760,000 TAS)², thus categorizing the country as a low income country by the World Bank³. Additionally, UNDP's Human Development Index, which aims to understand and rank countries on the broader well-being of its citizens, has ranked Tanzania as number 148 of 169 countries with comparable data in the world⁴.

Not all of the reserves are controlled sufficiently in practice, and some types of management regimes have shown signs of more achievements than others (Madoffe and Munishi 2005). For instance, privately owned forest reserves, such as Tea Company forest reserves, are showing least disturbance in terms of pole and tree cutting and thus signs of more achievements than for instance district level forest reserves and proposed reserves, which both have shown much higher rates of disturbance in terms of both pole and tree cutting. Government managed and controlled forest reserves are positioned between these regimes, and are fairly successful regarding conservation of water supplies and biodiversity values. This is according to Madoffe and Munishi (2005) attributed partly to more resources available and higher levels of protection. Overall, the overall budget spent on activities related to forest conservation has actually been reduced over the past two decades (Vihemäki 2009). One reason for this is the poverty reduction focus of the national policies. By establishing further protected areas and intensifying the control of natural resources, this would inevitably also lead to considerable implications for the social and economic development of the country (Vihemäki 2009).

Tanzania has been dependent on development assistance in many of its government sectors, including the natural resource sectors (Vihemäki 2009). In 2005, the country received more than US\$ 39.3 per capita (approximately 58,000 TAS) or 12.4 percent of the Gross National

² Rate from OANDA.com (Accessed 11.10.2010): \$US 1 = 1476 TAS

³ www.worldbank.org (Accessed 10.3.2011).

⁴ <http://hdrstats.undp.org/en/countries/profiles/TZA.html> (Accessed 10.3.2011)

Income (GNI) in official development assistance (UNDP 2007: 292). Tanzania is however rich in other terms, as it is one of the most biologically diverse countries in the world (Newmark 2002). For this reason, conservation has been an officially important policy goal. It has been heavily promoted in the central government forest reserves, particularly in mountainous areas of high biodiversity, such as the East Usambara Mountains and other parts of the Eastern Arc Mountains (EAM) and coastal forests (Vihemäki 2009). Government funding for such projects have however remained low, and during the last few decades, there have instead been many conservation activities and projects set in motion and funded by external actors, such as donors, multi-lateral funding institutions, and environmental NGOs (Woodcock 2002, in Vihemäki 2009).

2.2. Causes of deforestation and forest degradation

A common view in the 1980s and until the mid-1990s was that poverty and environmental degradation were closely connected, meaning that poverty was seen as both a cause and an effect of natural resource depletion, and then in a downward spiral (Ellis 2000). Our Common Future (WCED 1987: 28) stated that: “Those who are poor and hungry will often destroy their immediate environment in order to survive; they will cut down forests; their livestock will overgraze grasslands; they will over use marginal land; and in growing numbers they will crowd into congested cities. The cumulative effect of these changes is so far-reaching as to make poverty itself a major global scourge”. Population growth is particularly seen as a critical factor, as it reduces farm sizes in densely settled areas, and leads to a growing class of driven out rural dwellers that creates pressure for people to move into marginal zones that cannot sustain permanent cultivation. Extraction of environmental goods such as firewood, building materials and fodder for animals is furthermore increased. The combination of increasing population density and landlessness may also cause cultivation by the poor of steep slopes, which accelerates soil erosion, as well as using the slash-and-burn conversion of land to farming at the fringes of the forest (Ellis 2000). All these factors may potentially contribute to a downward spiral as such environmental degradation increase the degree of poverty for the marginal groups, and further drives them to intensify exploitation of the resources that are accessible to them. From these experiences, it is possible to draw conclusions and thereby influence poverty agendas, which became increasingly popular during the 1990s. The most

important factor was to make alternative sources of livelihood available for the poor, activities that could reduce their dependence on gathering activities in the local environment, and remove their motivation to start cultivation in environmentally sensitive locations (Ellis 2000).

On the other hand, many researchers have contested this interpretation of the poverty-environment connection, and argue that these views are highly selective (Ellis 2000). Particularly was it concerning that by only looking at the micro level of behavior of the rural poor in pursuit of their livelihoods, one failed to recognize other large-scale disturbances that set off new behavioral patterns at local levels. Ellis (2000) mentions several examples, including timber concessions that are accompanied by sudden, unprecedented changes in road access into previously inaccessible forests and the division of land into ranches, estates, plantations and national parks. By making the poor people the scapegoat for deteriorating environments, it only lets the commercial and state behaviors off the hook for the truly large changes that leads to the switches in the dynamics of the interaction between people and the environment (Ellis 2000).

As it then became perceived that human cultures are important factors to consider in regards to natural resource management, the Convention on Biological Diversity of 1992 included a primary action framework in 1995 called the Ecosystem Approach (Shepherd 2004; Dudley 2008). This approach understands that protected areas are not seen as isolated units, and places people and their natural resource use practices in the centre of ecosystems and in decision-making. It is therefore used to find a suitable stability between conservation and the use of biological diversity in locations where there are both several resource users and essential natural values. The perception is that management of land, water and living resources should be integrated in order for conservation, sustainable use and fair and equitable sharing of benefits is all included for the most appropriate results of protecting ecosystem services. It is necessary that the approach follows an adaptive management scheme to handle the complex and dynamic nature of ecosystems and the lack of full knowledge or understanding of their functioning. It is understood that there is not a particular way of implementing the approach, as it depends on local, national, regional or global conditions.

Protected areas are still considered an important tool for reaching the particular goals (Shepherd 2004; Dudley 2008).

2.3. Causes of deforestation in Tanzania

The current rate of deforestation in Tanzania is estimated at 412,000 ha per year or approximately around 1 percent of total land area (United Republic of Tanzania 2009). Most of this deforestation is taking place in the general land areas of the country. This can be attributed to insecure land tenure, shifting cultivation, wild fires, harvesting of fuel wood and timber, and conversion of forestland to other land uses such as agriculture, livestock grazing, in addition to settlement and industrial development under the open access regime that is in place in these areas (United Republic of Tanzania 2009). Land tenure is of great importance to conservation of biodiversity because it is assumed that individuals, community groups, and institutions are not likely to invest both resources and labor in sustainable forest management without some reassurance that they will continue to obtain some benefits from it (Kessy 1998). Kessy (1998) further argues that it would be important to define tenure rights in public lands, as well as giving local people the right to particular economic benefits from forest resources if handing over the ownership of forest lands to local people is politically not a viable option.

Deforestation and forest degradation is also occurring on Reserved Lands due to illegal mining, pit-sawing, illegal harvesting of timber and fuel wood, as well as for herbal medicines (United Republic of Tanzania 2009). Furthermore, structural factors are contributing to deforestation in the country, of which includes lack of capacity to enforce rules, land ownership patterns, and economic interests. Corruption in the forestry sector, where some government forest authorities have been involved in illegal timber trade and other forest products, has also been a worrying factor. An environmental NGO did a study on timber trade and found that China actually imported ten times more timber products from Tanzania than actually appear on Tanzania's own export records (Milledge *et al.* 2007). This could mean that Tanzania also received only 10 percent of the revenue due from these exports. The forest loss in Tanzania is therefore now also considered to be linked to the increasing influence of economic forces and its commercial agents, and the demand globally for valuable species of

timber, thus making trade an important threat to deforestation and biodiversity loss (WWF 2005).

A large proportion, possibly 80% of Tanzania's population lives in rural areas (Chiesa *et al* 2009). Here the need for energy is largely covered by firewood and some estimates show approximately 90 percent, of which is mostly collected from natural forests. In cities, the most common energy source for cooking is charcoal, even though charcoal production is illegal if one does not own a special permit (Midtgaard Pers. Com. 2010). Dependence on charcoal and firewood is likely to continue increasing given low development of infrastructure and high cost of other conventional energy sources like kerosene, gas and electricity. This trend exposes the country to high costs in terms of value forgone in change of habitat, carbon sequestration, and changes in hydrology, local climate and loss of biodiversity. Much of the extraction of firewood and charcoal is not sustainable or renewable in the sense that firewood in the forest may be collected in the borders of reserves, usually as scrubs or understory trees that will not regenerate easily. The forests will therefore be structurally affected (Chiesa *et al* 2009; Midtgaard Pers. Com. 2010).

One must however bear in mind the millions of local people depending on biomass in their daily households and livelihood security. Without emphasizing alternative sources of energy and income, it is likely that these people will experience a range of negative effects (Chiesa *et al*. 2009). Women and children already spend a long time finding and carrying firewood, which affect women's time and ability to participate in direct income-generating activities as well as forcing their children to skip school some days per week. Experience in parts of the country has also shown that some households are forced to cook fewer meals each day, as well as changing their diet when firewood is difficult to obtain. This certainly will have an unfavorable effect on health and nutrition. Production of charcoal is also one of the main income sources for many rural villagers. This further necessitates a wide approach that can counteract such issues, one of the premises of the ICDPs under assessment.

2.4. Main threats to Amani Nature Reserve and its adjacent communities

Amani Nature Reserve is facing many of these challenges aforementioned, and the main threats include alluvial gold mining, illegal timber and pole harvesting, forest fires, firewood collection, poaching and encroachment (ANR New Management Plan 2009). Because it is illegal to cut timber, it is also very expensive to get hold of such products. Permits and licenses for harvesting timber are expensive, and the time it takes to finally get them, may not make the efforts worthwhile. One cubic meter of a hardwood indigenous tree species in Amani costs 140,000 TAS (approximately \$US 100)⁵ (Field interviews with ANR Staff and Amani farmers). Larger business men from out of town pay the whole amount, while local villagers pay 20 percent if they have ‘sufficient reason to cut down the tree’ (Field interviews with ANR staff 2010). Such licenses are also mandatory for reserved tree species on both village and general lands, and thus also on peoples’ farms. This attracts some people around Amani to harvest timber illegally inside the reserve as many hard-wood species are found here, and mostly during the night when the chances of being caught are lower. This is either for own use, or for sale in the villages. Other times, larger scale collectors try to cheat their way out with the timber on trucks, either by not using or having all permits that are required, taking more than they were allowed to on true permits, claiming that they have forgotten to bring the permits, or explaining that the trees were coming from somebody’s farm whose owner had decided to sell all their trees (Field interviews with local people and ANR Staff 2010). However, it is according to the ANR staff difficult for business people harvesting trees on larger trucks to succeed with misconduct, as they are usually controlled at the gate and stopped if there is noticed anything suspicious. If something illegal is observed, the police may be contacted, and either fines and/or jail may be given as penalty (Field interviews ANR staff 2010).

Particularly concerning is the gold mining in the area. Even though this is strongly illegal and may have reduced somewhat the last few years, it is according to various ANR staff in ANR and other documents still a pertinent problem. (ANR New Management Plan 2009; Field interviews Amani 2010). During my fieldwork, I was informed that several people had been

⁵ Rate from www.OANDA.com (Accessed 11.10.2010): \$US 1 = 1476 TAS

arrested for illegal mining activities various places within the boundaries of ANR. Both local people from Amani, as well as outsiders from other places in Tanzania were arrested. The income from this activity has been reportedly relatively high, and in addition to direct income, miners have also accessed additional businesses such as selling alcohol and foods (Vihemäki 2009), and some people are thus lured into the industry for a quick improvement of their livelihood. Gold mining is a destructive activity, in that it has destroyed the valley floor vegetation in many places. As a result of the high sediment load in the rivers, water quality has declined, creating problems both for people and wildlife (ANR New Management Plan 2009). Furthermore, the mining industry and its mining camps has brought a various negative social and economic problems to the surrounding communities, such as increased incidents of violent crimes, thefts, poor sanitation and diseases, damage to agricultural crops, rapid immigration and the following breakdown of the normal social structures which may contribute to an accelerated spread of HIV. It also makes the job of the policing staff in ANR dangerous, as encounters with miners could potentially be aggressive or violent. Some farmers have neglected their fields, and the East Usambara Tea Company's tea estates have also suffered from an exodus of workers. Some communities downstream of the mines have experienced lower water quality, and the same has the Tanga municipal town. Additionally, some miners have also reported using mercury in their activities, which has serious health risks for anyone using the contaminated water (ANR New Management Plan 2009). It is also perceived that the mining industry played an influencing factor in the decreasing number of tourists coming to Amani, as the gold miners had disrupted some of the social safety structures in the villages (Field interview Tourism Officer ANR 2010).

3.0. Literature review/Theoretical background

3.1. 'The Fortress Approach' to Conservation

The beginning era of Africa's national parks came with the 1933 London Convention; the Convention relative to the Preservation of Fauna and Flora in their Natural State.⁶ Here, several countries met and discussed that the natural fauna and flora of the world, and especially in Africa, were in danger, and that these needed to be protected by a regime of national parks, strict natural reserves, and other reserves within which "hunting, killing or capturing of fauna, and the collection or destruction of flora shall be limited or prohibited". This set the agenda for what would follow as management strategies which recognized people as the cause for biodiversity loss. One wanted to prevent people from destroying the nature or resource, often based on the ideas of Hardin's 'The tragedy of the commons', that people ultimately will exploit a resource until it is gone, if the resource regime is openly accessed (Vatn 2005). The main focus of this practice has been on preservation of species and the exclusion of people, thus separating the two through exclusion and punishment, and has therefore been named the "Fortress Conservation Approach". Agencies such as IUCN, the World Bank, UNESCO, and World Wide Fund for Nature (WWF) were main advocates of such policies for a long period of time. Even though such approaches dominated from the colonial periods and up to about 1980-85, it has remained a frequently used practice in Africa also today (Vedeld 2002; Hutton *et al.* 2005). Hutton *et al.* (2005) refers for instance to recent studies and reports that argues that strictly protected areas are the only option to preserve African forest primates, and that human presence in tropical forests are not compatible with conserving biological diversity.

These approaches views established protected parks as pristine areas, with the goal of conserving biodiversity. Local human livelihood activities such as grazing, hunting and gathering wild foods and collecting woods were made illegal. In the East Usambara, several colonial accounts attributed increasing population growth and its inevitable causation of

⁶ <http://www.jus.uio.no/english/services/library/treaties/06/6-02/preservation-fauna-natural.xml> (Accessed 5.5.2011)

encroaching on natural resources, as a strong threat to forest degradation and would continue if there would be no serious action taken to stop such activities (Moreau 1935, in Vihemäki 2009). In Tanzania during the first few decades of the 1900s, the British limited the local people's access to natural resources by establishing policies that reduced access to tree species and grazing areas (Conte 2004). Large amounts of the rural population were furthermore forcefully removed from various areas to make room for establishing wildlife reserves in their 'pristine wilderness areas'. The leaders in the newly independent countries in Africa internalized and followed up on these ideas, thus making the approach continuously used. The first president of Tanzania for instance, Julius Nyerere, was in much favor of wildlife conservation (Vihemäki 2009). Scientific discourse gave reason for reserving forests, and one also had concerns over the preservation of the watersheds in the Usambara Mountains (Conte 2004). This led to continuing and increasing the expropriation of land for the purpose of establishing forest reserves, and the size of these doubled by the year 1942 (Vihemäki 2009).

During the 1970s and 1980s, one saw that these policies did not work very well, and the approach slowly started to lose popularity (Vedeld 2002; Hutton *et al.* 2005). Because local people were prevented from using their areas and resources according to what they had always done, resentment and conflicts increased, both locally and nationally. The strict regulations imposed on rural populations in Tanzania were for instance not accepted without some resentment, and Conte (2004) describes herders and farmers occasionally confronted the boundaries of the forest reserves in the West Usambara. Numerous studies have estimated the economic costs for local people in relation to protected areas. For example, for people living around protected areas in Madagascar, it has been estimated that they have suffered a net loss of \$US 419 per household per year, for the most part due to the lost access to land potentially viable for agriculture (Sandbrook 2006). As the average household annually is \$US 809, this shows severe costs for the local people affected by the protected areas. Such Pas can be costly for local people also because of the conflicts with animals from the PA, of which may eat crops and livestock, as well as kill people in some instances (Sandbrook 2006).

Local people did not respect such rules and ideas behind conservation, and intruded on, and used vulnerable biodiversity resources in order to secure their livelihood. This was moreover enhanced by protected area expansions and increasing population densities, thereby leaving

less land available for people. This also made it increasingly difficult to make politically viable decisions on conserving nature from an approach similar to ‘fortress conservation’ that as a result would harm local people (Hutton *et al.* 2005). Hutton *et al.* (2005) also recognized that conservation scientists had understood that protected areas usually were too small to meet the requirements of either ecosystem or biodiversity conservation. It was therefore argued that conservation needed to reach outside of protected areas and over to the increasingly densely inhabited wider landscape of human communities, thus encouraging conservation based on participatory approaches. At the same time, some researchers fronted the idea that people are not always a threat to conservation goals, as was previously thought. Abbot (2005) for instance, showed that deforestation in Lake Malawi National Park was more strongly linked to commercial felling of firewood to smoke fish, than the previously assumed link between deforestation and domestic fuel wood consumption. In another setting, it has been shown that the extensive rate of deforestation in Borneo or the Amazon, have almost nothing to do with rural poverty in developing countries, but is caused by power struggles over valuable resources such as tropical timber, soy beans, oil and valuable metals, between large actors in businesses and governments both nationally and internationally (Ellis 2000). From the outside, one could also see a rise in NGOs, donors, and other advocacy groups starting to increase pressure on the behalf of local people.

3.2. Participatory approaches’ to conservation

These factors therefore played an important role in reforming the approaches to conservation, where the new beliefs and approaches tried to pay more attention to the role people play in conservation, through participation. It was based on the assumption that it would be easier to achieve conservation goals if local people have an incentive to support protected areas (Hutton & Leader-Williams 2003). Other reasons for this shift to participatory conservation discourses can be attributed to a belief that participation would lead to improved environmental control, economic efficiency as well as questions of social justice (Vihemäki 2009). It was assumed that the ‘local community’ would have more motivation for and knowledge on managing the forest or wildlife, because they were living close to it (Brosius *et al.* 1998). Furthermore, the benefits they would receive when involving in the management of protected areas would ideally also motivate them for taking better care of the forest (Agrawal

and Gibson 2001). Also, in order to increase management efficiency and legitimacy, Blaikie (2006), considers the importance also of incorporating local knowledge into management, as this knowledge is presumed to be 'environmentally sound'.

The goals of such participatory approaches were to be achieved through a decentralization of authority, resources, rights and duties from central to local levels of governance (Vedeld 2002). Involvement of private actors and market integration were increased, as well was the transfer of power and resources from public to the civil society. Participatory approaches vary however, and have throughout the last couple of decades been connected to many different names, models and concepts through a range of different researchers and authors. Concepts trying to involve local livelihoods and at the same time involve communities in the management of protected areas, forests, wildlife or biodiversity, are often called community-based conservation, participatory conservation, people-friendly and community conservation, people-oriented conservation, community-based natural resource management (CBNRM), and Community-based Conservation (CBC) (Adams and Hulme 2001; Agrawal and Gibson 2001; Hutton *et al.* 2005; Child 2006). These concepts are sometimes used under the same umbrella and may be used rather freely. However, they are underlying a broad range of slightly different methods, rationalities, terminologies, definitions, theoretical foundations, differences in terms of design principles and their actual outcomes, of which goes outside the scope of this paper to discuss in detail. Some authors argue that this diversity in the participatory conservation and development discourse weakens the whole approach and idea of participation however, as it loses some of its meanings, power and usefulness. This is especially true when 'participation' sometimes is used by large donors for example to increase their political correctness. This of course raises the need to continuously assess such approaches critically (Bøås and McNeill 2004).

The experiences with such participatory approaches are thus also mixed. Some of the experiences are good and can be used as appropriate pilot activities elsewhere (Vedeld 2002). One particular influential and fairly successful scheme in this regard came to be the CAMPFIRE⁷ program in Zimbabwe which began in the late 1980s, of which has also emulated in Eastern and Southern Africa (Osborne 2000; Bond 2001). Here, the local

⁷ Communal Areas Management Programme for Indigenous Resources

communities were effectively handed the responsibility for managing land under communal tenure, and particularly the wildlife resources. Together with government agencies, these communities were granted the rights to selling hunting rights to safari operators, provided ecotourism opportunities, as well as controlling poaching of wildlife. The decision-making arena was also local when issues such as allocation of land for raising cattle, crop production, and wildlife, and other conflicts occurred. Revenues were not sent to the central government, but rather used locally for development projects such as providing water, schools, health services and other facilities. This was an effective way to alleviate poverty, not only measured in income, but also through giving people a voice and sense of participation (Child 2006). The process also gave a route towards organizational development, and carried a democratic process much deeper than elections held at set timeframes. They freely learnt to distribute resources and selected leaders in an accountable and transparent way, at the same time as they learnt about financial management. This way of including local communities were in the end a way of also changing peoples' perceptions of wildlife, from a nuisance to an economic asset (Osborne 2000; Bond 2001; Child 2006).

Shackleton *et al.* (2002) furthermore showed that when local communities were well organized and were able to make alliances with NGOs, such decentralized natural resource management initiatives were able to secure greater benefits and control from the natural resources. Furthermore, it has also been suggested that systems of co-management in Tanzania, such as 'Joint Forest Management' (taking place on reserved land) and 'Community Based Forest Management' (taking place on village land where the village or individual farmers owns the trees), may actually 'empower' new actors and groups in the resource control, and change and challenge previous forms of control (MNRT 2006).

However, the main goals of maintaining and enhancing biodiversity have often not been met appropriately or successfully. In some instances, it has been a lacking benefit distribution among and to local people, and if the benefits actually are transferred, they have been shown to be too low in contrast to the larger costs carried by the local people when having conservation areas and wildlife close to their homes and crops (Vedeld 2002). Additionally, it has been recognized that 'local people' and 'local communities' in fact are multifaceted units with a vast heterogeneity of values, norms, interests and skills. Sometimes, participatory

approaches have failed to recognize that costs and benefits to and between people also tend to have social and political biases, and therefore ignore the existing institutions and complex power relationships behind them, when launching new, formal institutions or project activities. Efforts to enhance participation have also experienced that public authorities and leaders on the local levels have not been able to accept, understand, or handle participation in beneficial ways. For some of these reasons also, and because local elites or particular social networks have shown to be able to capture more of the resources available in several participatory projects, local people have questioned the legitimacy of public officials and the state. This has increasingly strained the relationships between these actors, further undermining efforts of conservation and participatory cooperation (Vedeld 2002).

In spite of all difficulties and challenges met with such approaches, rather than go back to the apparently failed 'fortress conservation' in management, it is rather important to learn from mistakes and difficulties encountered and improve the approach. Vedeld (2002) recommends a few steps forward on these issues, such as accepting that local participation is about facilitating a long term process of social change; that cooperation between conflicting interests and values is vital through the existing institutions on the local arena; and that it is important that interventions must have a clear aim of increasing incomes and reduce costs for involved actors. Instead of only calling the process participation, without actually taking communities into all procedures, Child (2006) argues that project practitioners follow a more representative democracy. Here, authority and benefits from forest or wildlife resources are devolved from the state to rural communities. The revenue distribution is organized from a bottom-up idea, of which organizes communities to use scarce financial resources and making decisions effectively and accountably on their own and without being held back by central governments or agencies. According to case studies performed by Child (2006), it was found great enhancements in conservation incentives, organizational performances and democratic empowerment associated with such distribution of revenues following the principles of representative democracy.

3.3. The livelihood approach

All ICDPs around ANR are different and require and utilize assets in different ways, of which some are limiting for particular people, while others are encouraging. At the same time do the projects seem to follow the notion that diversification of livelihoods is an important part of development, which also is a large part of these theories. Diversification is believed to raise the household's resilience and adaptation towards stress, crises and shocks, which is also particularly interesting regarding climate change and its possible challenges coming in the future. The importance of livelihoods and diversification is also directly related to the environment, and both influence each other considerably.

The livelihood approach have been used and developed by several authors, and even though there are minor differences between them, the frameworks are more or less the same (Scoones 1998; Ellis 2000; Cahn 2002). They approach the development process by focusing on people's assets and capabilities, what they have and do not have. These issues are fundamental to understand what options are available for them, the strategies they adopt for survival, and their vulnerability to adverse trends and events. From analysis, it can mean that a poverty policy should be about raising the asset status of the poor, or enable existing assets that are inactive or under-employed to be used productively. It furthermore emphasizes that measures based on income alone is not enough to understand whether people are able to achieve their goals or create a secure and sustainable livelihood. Ellis' theory and framework concerning rural livelihoods and diversification is an integral part of studying development and conservation interventions in developing countries. It has the advantage that it is possible to understand and consider the sustainable basis and particularly what assets and activities the projects should be emphasizing and improving in order to be successful. Ellis' (2000:10) understanding of the 'livelihood' concept is that "a livelihood comprises the assets, the activities, and the access to these (which are mediated by institutions and social relations) that together determine the living gained by the individuals or household". Scoones (1998:5) uses the term sustainable livelihood, which means that the livelihood "can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base".

The sustainable livelihood approach directs the attention to the links between assets and the options people possess in practice to pursue alternative activities that can generate the income level required for survival (Ellis 2000). The construction of a livelihood has to be seen as an continuing process, where the elements does not remain the same from one season, or from one year to the next. Assets can be built up as well as eroded. Available activities fluctuate seasonally, and access to resources and opportunities may change for individual households due to shifting norms and events in the social and institutional context surrounding their livelihoods, one example being an establishment of a protected reserve as a measure for protecting biodiversity. ICDPs in the Amani villages can particularly be perceived to be operating under the umbrella of the ‘sustainable livelihoods’ concept.

3.3.1. Sustainability

Sustainability is a widely used term in literature on environmental resources and human livelihoods, and has been very influential in research and policies the last two decades. The term first gained prominence when The Brundtland Commission (WCED) used the concept in their report from 1987 when they stated that “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987:8). The main aim of sustainable development is to generate and preserve rich social, economic, and ecological systems (Folke *et al.* 2002). Sustainability attempts to communicate stability in the long term of a system’s capacity to reproduce itself or expand over time (Ellis 2000). For an ecosystem, this refers to biomass and species diversity, while for human livelihoods and needs, it means sustaining outputs available for human consumption, and therefore the capacity of a system or a resource to keep the same or increase its contribution to human welfare and well-being. These systems are therefore closely linked, as mankind depends on ecosystem services for its wealth and security, but they can also change ecosystems into more or less desirable states. If people transform ecosystems in ways that these systems are no longer able to provide their original services, this will again create repercussions for people’s livelihoods, their vulnerability and security, with such negative changes leading to loss of resilience to all systems (Folke *et al.* 2002).

The term itself brought the environmental agenda to the world's concern and lifted it as a key issue in society to be taken seriously by the political systems. It opened up for a perception that environment and development, that is both ecological, economic and social sustainable, are interrelated and that it is of utmost importance to emphasize on all these factors to create suitable environments both now and in the future (Ellis 2000). It is however also a problematic term to define in practice, as it has been seen to have several different meanings and understandings from different actors, and is sometimes used for different purposes (Bøås and McNeill 2004). As terms are mainstreamed, they may sometimes be 'washed out' and thereby lose some of its original and strong meaning and idea. This does not however take away the fact that in order to understand systems and create resilient systems, policy makers and practitioners are somewhat required to think in accordance with the term sustainability.

3.3.2. *Assets- the basic building blocks of livelihoods*

The actual platform of the livelihood approach, are therefore the assets that households own, claim, control or in other means have access to (Ellis 2000). These can be classified as categories of natural capital, human capital, physical capital, financial capital and social capital. Natural capital refers environmental resources, both renewable and non-renewable, such as the water, land, metals and biological resources that people can use for their livelihood and activities. Physical assets comprises capital that is created by economic process of production, and may involve assets such as irrigation canals, buildings, roads, tools and machines, and can in certain circumstances substitute and/or complement for natural resources. Human capital involves one of the greatest assets that poor people hold, namely their own labor, and is often defined by education, skills and health, and can therefore be increased by investing in education and training. Financial capital involves the cash, savings and loans that the household either owns or has access to. Livestock and crops can also be a form of financial capital as it can be sold in times of difficulties. Finally we have the social capital, which may be the most difficult to define in other than in broad qualitative terms, but are however consisting of community and wider social claims that the individuals and households can use and receive help and knowledge from. Ellis (2000: 36) uses the definition of social capital as "*reciprocity within communities and between households based on trust deriving from social ties*". This would involve personal and family networks, such as committees and user groups. These formal and informal organizations may be a major asset of

the rural poor as it may enhance the access to input and output markets, insurance, trust in transactions, while even influence in political decisions (World Bank 2007).

All such assets may be described as capital stocks which can be used both directly and indirectly in order to sustain their material well-being at different levels above survival. For the purpose of this assignment, is it interesting to consider these as people have access to different assets in their lives which makes activities possible, or in other ways, challenging. Access is defined here as “*the rules and social norms that determine the differential ability of people in rural areas to own, control and make use of resources such as land and common property*” (Ellis 2000:9). Some assets are lost through the establishment and institutionalization of the Amani Nature Reserve, while others are gained through the new participatory forest management scheme and the new income-generating activities introduced in the villages. The projects of interest in the study are expecting people to have and use some of these assets when participating in the activities, which creates both opportunities and limitations for different people, as some may not have access to some of the necessary assets in their households. Increasing the asset base and helping farmers access these assets are a major challenge for policy makers, but is however worth pursuing.

3.3.3. Livelihood diversification and the environment

An important strategy for rural households to improve their standard of living is to diversify their range of activities, income sources and assets (Ellis 2000). This is called rural livelihood diversification and is found to be composed of a multiple of activities (*multi-activity*) and often over multiple locations (*multi-locality*). A livelihood of a household could be attained both on the farm (by for example multi-cropping or rotational cropping, such as cultivating different crops or including dairy and livestock, and as we will see in this paper, adding new activities set up by conservation agencies or others), but also off the farm where parts of the household participate in part-time or full-time work in industries (such as working in the tea-companies around ANR), or transporting produce to a market farther away. Diversification can be associated with several motivations, and mainly it is done in order to increase resilience and adaptation and thereby reduce the risk and vulnerability to different factors of stress and shocks to the livelihood. The concept of resilience originated in the agro-ecology

and natural resource management literatures and refers to the “ability of an ecological or livelihood system to ‘bounce back’ from stress or shocks” (Ellis 2000: 62). Biological diversity for example, allows balancing between and among species in processes such as formation and uptake of nutrients, reproduction of species, population size and intraspecific genetic variety, while reduces the risk of an irreversible ecosystem change from natural events such as insect infestation or droughts. Some species may be lost even though there is diversity, while other factors may contribute to system level resilience, thus showing signs of a necessity of looking at the system as a whole in processes. Lower order sub-components of a larger system such as individual species may not be sustainable, while the larger system actually is. This is because it may be able to make complementarities and substitutions that ensure system sustainability. Social resilience is the ability of human communities to cope with factors like political, social, economical or environmental changes including aspects such as institutional changes in property rights, rights to land, economy and the right to utilization of natural resources (Walker *et al.* 2004). Sensitivity refers to the magnitude of a system’s response to external disturbances (Allison and Ellis 2001). From these ideas is it possible to say that a livelihood system and a natural system is generally most robust and sustainable when it is displaying high resiliency and low sensitivity, while the most vulnerable shows low resiliency and high sensitivity.

Diversification may therefore contribute positively to sustainable rural livelihoods. This may not always be true however, as some activities carried out by the household, such as taking jobs elsewhere for pay, participating in new time-consuming on-and off-farm activities, or migration to other areas, may for example lead to a neglect of labor intensive forms of soil conservation activities such as terracing and irrigation canals (Ellis 2000). When people start participating in new alternative activities it is often believed that they may provide higher returns to labor because they switch their labor time away from activities of low return, such as collecting and gathering of firewood, wild fruits and vegetables, and hunting of wild animals. Access to higher cash incomes may result in substitutions in consumption, such as from extracting building poles or timber from the forest, to making bricks for building houses. The growth of non-farm income sources may reduce the need for rural inhabitants to carry out extractive practices in local environments for their survival, a policy stand called ‘substitution of employment for the environment’ (Ellis 2000).

3.4. Integrated Conservation and Development Projects (ICDPs)

The actual reasons for protecting an area differ and depend on which perspective one applies. For local people who are using an area, the reasons why they feel protection is important is often not the same as the objectives of the state (Salafsky and Wollenberg 2000). The government, ecological scientists and conservation authorities may have their focus set on maintaining biodiversity for future generations or reduce deforestation to minimize the release of carbon back into the atmosphere. On the other hand, the local communities may value biodiversity for satisfying direct household needs. Development and local community welfare has throughout history been considered to be one of the main harms to conservation goals and biodiversity (Vedeld 2002). In the last couple of decades however, management of protected areas has increasingly focused on the relationships with local people and communities. It has been recognized that it is neither ethically justifiable nor politically reasonable to exclude people with already limited resource access from parks and reserves without providing them with alternative means of livelihood. And as conservation and development objectives and practices previously were considered to be entirely at odds towards each other, it has been a growing recognition of a win-win solution combining the two objectives (Hutton *et al.* 2005; Sandbrook 2006). Salafsky and Wollenberg (2000) argue that in order to reach sustainability in conservation, there is a demand for combining preservation and livelihood activities.

A popular generation of projects thus started to appear, which reached outside the boundaries of the protected areas, thereby focusing on the welfare of local people by promoting social and economic development (Brandon and Wells 1992). Such projects have come with different and broad definitions and names, but for this paper, they will be referred to as 'Integrated Conservation and Development Projects' (ICDPs) and is related to income-generating activities for conservation purposes. These represent an approach where conservation of biodiversity is aiming to be linked with social and economic development outside of the protected areas (Brown 2002). Garnett *et al.* (2007: 1) defines ICDPs as "...approaches to the management and conservation of natural resources in areas of significant biodiversity value that aim to reconcile the biodiversity conservation and socio-economic development interests of multiple stake holders at local, regional, national and

international levels". ICDPs therefore seeks ways to convert conservation of resources into material benefits for local communities, and trying to compensate communities for ongoing costs of conservation, thereby also raising awareness and acceptance of conservation efforts (Sandbrook 2006; Blom *et al.* 2010).

Salafsky and Wollenberg (2000) argues that there are complementarities and trade-offs rather than conflicts between conservation and development. They identify three dominant understandings and linkages between human needs and biodiversity. The first, no linkage between conservation and livelihoods, leads to a strategy based on protected areas which exclude livelihood activities. This has been a main reasoning in historical conservation worldwide through 'fortress conservation' as livelihood activities are considered in conflict with biodiversity conservation. This has therefore lead to an adoption of 'fences and fines-strategies', of which account for more than 65 percent of all protected areas by 1994 classified by the IUCN (Brown 2002). The second approach, based on indirect linkages, prescribes strategies for conservation that are focusing on developing alternative sources of income or livelihood as a means of substituting for biodiversity resources. Usually, this may involve establishing buffer zones or biosphere reserves. The third and final approach is referring to direct linkages, which recommends coming up with dependent relationships between biodiversity and people living adjacent to it, such as the butterfly project under this study. Here, the income is based on a non-destructive forest activity, while the participants are taught the correlation between healthy forests and larvae production. This way, stakeholders will benefit directly from biodiversity and thereby also provide incentives for conservation. Conservation is here driven by livelihoods rather than only being attuned to each other, thus also being a basis for the ICDPs also in the villages adjacent to the ANR.

However, these broad classifications are not as straightforward in real case studies, where protected areas, stakeholders and agencies employ a variety of mixed policies and strategies with different management practices and outcomes as a result. Garnett *et al.* (2007) are worried that there has been a long history of concern about the effectiveness of ICDPs in meeting either development or conservation objectives. Failure of such projects inevitably leads to biodiversity loss, and claimed successes are seldom associated with lasting improvements in the wealth and well-being of the communities which has had access to such

interventions. Brown (2002) identifies that ICDPs has often made over-simplified assumptions about four key issues however naturally connected, which leads to a failure of meeting the objectives of conservation and development. First of all, it has been a problem that projects have defined communities only as small, homogenous and without internal conflicts. By seeing them as demographic and consensual units, project practitioners are thus not able to identify target and actual beneficiaries. Secondly, many projects have failed to involve communities as either partners or participants, thus failing to actively engage local people both in the activities and decision making, while also regarding sharing of ideas and experiences. Thirdly, some ICDPs fail to embrace ideas concerning empowerment. Brosius *et al.* (1998) show how issues of empowerment, sovereignty and citizenship, and the power relationships between and within institutions and individuals need to be more carefully considered in community-based conservation. This is especially true in cases where ICDP policies and activities have required communities to reduce their resource use in such a way that they incur economic or other costs to themselves. This raises questions regarding where the final decision-maker power over the use of resources actually lies. Finally, the assumptions regarding the sustainability of ICDP approaches are continuously simplified and not widely understood (Brown 2002). Social, economic and ecological sustainability in ICDPs are crucial in order to contribute to success of the objectives of protected areas, both in present and for the future. This creates a fundamental challenge in reaching the goals. As projects are supposed to lead to conservation of biodiversity, it is important that projects are sustainable over time. Long term horizons are important, rather than short term successes of projects. Oversimplifications of these aspects can in many instances also lead to a failure of projects to engage effectively with the appropriate people, and to address the processes that lead to poor management of natural resources, including biodiversity. Such projects must not be able to address the actual reasons why people resist efforts of conservation, or why they exploit resources unsustainably in the first place (Brown 2002).

Fisher *et al.* (2005) note that the economic benefits generated by ICDPs rarely have been enough, either as an incentive or as an alternative to prevent the activities that exert pressure on the protected areas. Garnett *et al.* (2007) also argue that where some projects have been able to provide the range of income-generating activities, benefits from such project activities have not been distributed fairly among the community. Most benefits have tended to be accrued by wealthier sections or elite groups within the community, rather than the poorest or

most marginalized classes. An approach where decisions are made through bottom-up revenue distribution, such as in the CAMPFIRE process, this could improve distribution of benefits within the community (Child 2006). A range of factors that have been associated with ICDP failure in the past have been identified through a broader series of examples by Wells and McShane (2004). These include over-optimistic goals, weak assumptions, unconvinced local participation, targeting of the wrong threats, uncertain financial sustainability, low benefit generation, lack of market access, and finally a heavy need for donors to have rapid success and thereby leaving the project sites before the ICDPs become sustainable. This is especially true when the ICDPs need a fairly high amount of financial inputs for people to engage in projects. Blom *et al.* (2010) refers to an example from Nepal, where ICDP outcomes were improved in relation to how long time the project lasted. According to the authors, this was able to change perceptions and attitudes towards conservation within the community. In such situations however, aid dependence may arise, which means that that project activities and participants depend on aid to continue (Tandon 2008). Whenever the donor then pulls out of the project with its financial capacity and technological knowledge before sustainability is secured, the participants may not be ready or able to carry all the costs themselves, and the project may slowly, but inevitably dissolve.

Blom *et al.* (2010) follows up with some evidence from historical experiences with ICDPs and which needs to be improved. This includes developing understandings of community heterogeneity and complexity; developing an understanding of community livelihood needs; designing projects that are adaptive and flexible, meaning that the projects are able to adapt to changes, contexts and outcomes, leading to more resilient projects; involving the community in all phases of the project, indicating that the whole community are participating in planning, monitoring, evaluating, and making decisions in order to enhance equity and ultimately effectiveness; enforcement as a continuously important tool for conservation of the forest; and finally that the projects are able to provide clear and visible community benefits (Blom *et al.* 2010).

3.5. REDD and ICDPs

In order to combat large-scale deforestation and degradation, the United Nations has launched the REDD Program which aims to deal with curbing deforestation, but also at working within the local levels to ensure the protection of livelihoods. It is based on the premise that “developing countries would, on a voluntary basis, aim to reduce the rate at which their forests are being lost, and receive compensation in proportion to the carbon emissions saved” (Chiesa *et al.* 2009:16). The governing credit-apparatus for each country, in theory, will then have the ability to trade or sell these carbon credits on the open market. Promoters of such programs estimate that this could generate large, cheap and quick reductions in global greenhouse gas (GHG) emissions by enhancing carbon stocks. The idea is basically to pay users and owners of forests, either through national governments or directly, to fell fewer trees or manage their forests better (Brandon and Wells 2009). The additional plus sign that is often used (REDD+) point to enhancing the forest carbon stock, which can also be referred to as forest regeneration and rehabilitation. Tanzania is one of the 14 pilot-project countries and is furthermore a “quick start” country under the program, meaning that REDD planning has already begun for this country.

Such a program is expected to use a mixture of repertoires in order to reduce deforestation. One component that may contribute to enhancing such programs is likely to be with the ICDPs (Integrated Conservation and Development Projects). Since REDD may be an overarching policy scheme between governments on the international level, it is certainly likely that REDD implementation will still require sub-national projects in its framework (Blom *et al.* 2010). REDD programs are foremost interested in recognizing that it is necessary to address local and indigenous communities when action is taken to reduce emissions from deforestation and degradation (United Republic of Tanzania 2009). By including local people in conservation efforts through ICDPs, it is anticipated that both development and conservation efforts are enhanced and thereby also a potential for reduced deforestation and enhanced carbon stocks. This certainly makes ICDPs a potentially important ingredient of the upcoming REDD-projects.

One particularly concerning issue for REDD on local levels is related to whether local people will perceive that REDD offers enough incentive for protecting the forest as an alternative for finding incomes from such as cutting down and selling illegal timber products. As this paper is looking into whether the ICDPs in and around ANR actually seem to provide these benefits or not, the findings may therefore provide foundations for other projects related to REDD.

Even though REDD is admirable at the international level for reducing the release of greenhouse gases, it is quite complex and difficult to structure at national, regional, and local levels. The implementation of REDD induces challenges that must be met and monitored, such as who, how and when to do payments, changes in land use, tenure rights, power struggles, corruption, technological and institutional capacities, knowledge formation and resistance to knowledge, and leakage issues at both national and local levels (e.g. Angelsen *et al.* 2008; Angelsen *et al.* 2009; United Republic of Tanzania 2009). The architectural design of REDD in policy formation, implementation, and compliance is very much still in its natal stages, as is the available research literature on REDD, especially at the national and local levels.

At local levels, the objectives of the REDD incorporates the ICDP concept of providing social and economic benefits, in order to reduce the pressure on biodiversity in protected areas (Brendan and Wells 2009). ICDP projects may therefore be an integral part of these upcoming REDD- related projects, as it is important to address local people's needs and development when considering conservation efforts, and thereby also enhancing forest carbon stocks. ICDPs in relation with REDD programs are also likely to have more long-term funding than what has been rare in implementations of ICDPs, thus increasing the likelihood of keeping the projects sustainable as many ICDPs have suffered from small timeframes (Wells and McShane 2004). The objectives of ICDPs and REDD do however differ slightly. The former seek to conserve biodiversity in and outside of protected areas, while the latter aims to reduce deforestation in specific areas, but not necessarily limited to protected areas. REDD deals with carbon as a commodity in ways that protected areas or ICDPs could never do with biodiversity (Brandon and Wells 2009).

Both ICDPs and REDD projects are however concerned with the terms of leakage, permanence and additionality, as they attempt to reduce the direct threats to forest ecosystems and to maintain their health so that they deliver sustainable ecosystem services and at the same time also provide tangible benefits to the local communities both now and in the future. Leakage happens when interventions to reduce deforestation in one area may lead to increase in deforestation in another (Angelsen *et al.* 2008). This is particularly troublesome regarding the establishment of parks, as villagers may utilize forests on village lands instead. Long term reductions of forests are certainly an important feature for protecting biodiversity as well as sequestering carbon. Permanence relates to making sure that that deforestation is reduced or stopped both now and in the future. Even if projects are able to reduce deforestation in the short term, it is little permanence if deforestation activities are happening later. If ICDPs life-time sustainability is short, or the projects are not able to incorporate the majority of the villagers residing adjacent to forest reserves, they may not be able to reduce deforestation in the long term, thereby showing low permanence. Projects should also have additionality. This means that they are able to show that they have reduced deforestation in the long term, of which would not have happened without the interventions. It is difficult to assess the performance of ICDPs in this regard, as it may often be other reasons that are more influential of reducing deforestation, such as the establishment of a legally protected forest with effective village and government patrolling.

Experiences and knowledge from protected areas and ICDPs can offer important lessons for REDD projects. Brandon and Wells (2009) present some further knowledge on these issues. Protected areas with forests have a potential of being effective in conserving forests, thereby avoiding deforestation and forest degradation contributing to carbon offset and also an opportunity of selling forest carbon credits. By expanding these areas, and by making protected areas more effective, by for instance including ICDPs, such efforts may therefore emerge as important components of REDD strategies on the national levels. Developing countries with large areas of forest areas have often also large areas under protection (Brandon and Wells 2009).

ICDPs have been viewed as a key strategy for mitigating threats to forest protected areas (Brandon and Wells 2009). The authors consider ICDPs as relevant for REDD projects

because they aim to preserve global public goods such as biodiversity and carbon, and are doing it by promoting social and economic development for livelihood co-benefits. Positive and negative experiences and lessons from such ICDPs may provide REDD programs-and projects with needed knowledge and information for enhanced achievements. The Climate, Community and Biodiversity Alliance (www.climatestandards.org), which is a partnership involving NGOs, research institutes and the private sector, are now making efforts of establishing projects based on the learnt lessons and experiences from ICDPs into REDD programs. These partners have implemented projects and developed principles and voluntary standards from forest carbon programs, which shall respect the rights of local and indigenous people, and also generated considerable social and biodiversity co-benefits.

Demonstration projects of REDD has created substantial excitement, a relatively large donor support and high expectations among stakeholders. But they may be implemented in a fairly hasty and impatient atmosphere, which increase the risk of failure and therefore undermining the REDD-initiatives altogether. The findings from this paper about the main ICDPs around ANR can therefore be used as experiences to be built upon in other and more wide-reaching projects under REDD.

4.0. Study area

4.1. Forest conservation and social setting in the East Usambara Mountains

The East Usambara Mountains (approximately 130,000 ha of land and 128,000 inhabitants) is a part of the Eastern Arcs Mountain chain spreading across Tanzania and southern parts of Kenya (Figure 1) (Burgess *et al.* 2007). It has been recognized by several international conservation organizations, such as the UNESCO, IUCN, WWF and ICBP, for their high level of biodiversity and high number of endemic or near endemic species of large trees and vertebrates. It is one of the global centers of biodiversity and endemism of both flora and fauna, and is now identified as one of the 25 “Biodiversity Hotspots” of the world classified according to a high concentration of endemic species (Burgess *et al.* 2007; ANR New Management Plan 2009). Burgess *et al.* (2007) furthermore recognizes the EUM as having the second most diverse fauna in Africa after Mount Cameroon. Due to their special flora and fauna, the EUM have even been compared to the Galapagos Islands, and according to a report of the Tanzania Forest Conservation and Management Project, the EUM represents one of the most highly valued and regarded natural treasures of Tanzania (Vihemäki 2009).

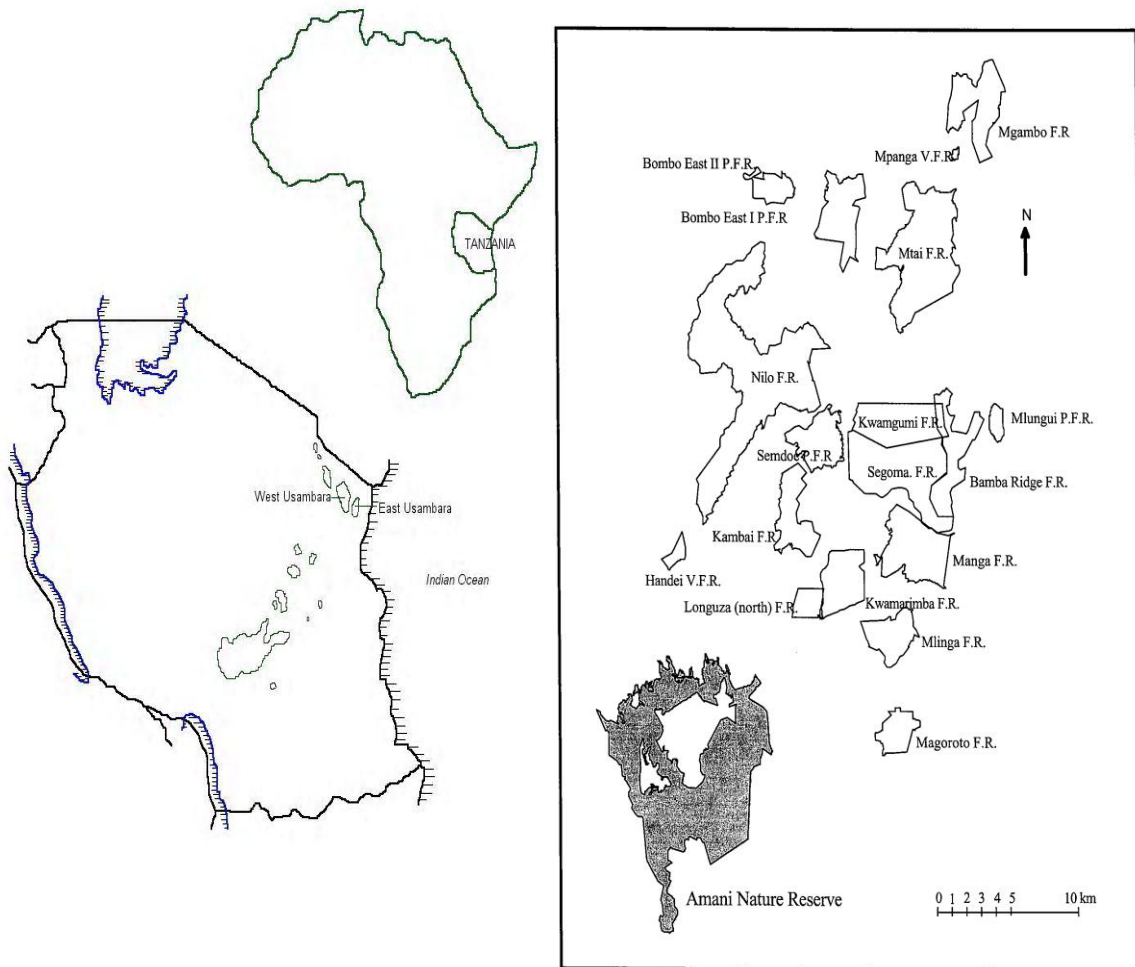


Figure 1 (left): The location of the East Usambara and the other Eastern Arc Mountains in Tanzania. Source: Vihemäki (2009).

Figure 2(right): The location of Amani Nature Reserve in relation to other somewhat fragmented East Usambara Forest Reserves. Source: Doody *et al.* (2001)

Of East Usambara’s original forest-cover, only 40 percent is estimated to be remaining, and only 30 percent is remaining within the whole Eastern Arc (Burgess 2007 *et al.*). The EUM’s central government forests and nature reserves are now largely forest “islands”, covering about 33 000 ha represented by 13 forest blocks, ranging from about 250 ha to 9000 ha, thus drawing the picture of a rather fragmented forest (EUCAMP 2002; Newmark 2002) (Figure 2). Outside the reserves, the forests are located in categories of village and general lands. This fragmentation of the natural forests has been perceived as a major challenge for conservation of biodiversity in the area. These forests have been under continuous human pressure for at least 2,000 years, and especially until the past 50 years, this pressure has been sustainable (Doody *et al.* 2001). But an increasing population growth and commercial logging in the area

has led to increased pressure and is thus considered the main threat to the ecosystems. Conservation corridors have been suggested by various experts, in order to connect the forest patches. One of these is the Derema corridor, which tries to connect Amani Nature Reserve and other forest reserves further north in order to secure gene flow through East Usambara (Newmark 2002).

In the EUM and other Eastern Arch Mountains there has therefore been a rapid deforestation during the latter half of the 20th Century. Rodgers and Homewood (1982) estimated early in the 1980s that the extent of forest loss in Amani was 50 percent between 1954 and 1978. An inventory of the EUM supported by the Finnish International Development Agency (FINNIDA), found that only 23 percent of the area surveyed was so-called 'intact forests', while nearly 50 percent was covered by 'exploited forests (Vihemäki 2009). For some of these reasons, there has been increasing signs of changes in the local climate in EUM, and also in Amani. Hamilton (1989, in Reyes 2008) found reliable evidence for a decreased annual rainfall since 1960. Field interviews with various farmers claimed that the rainy seasons are shorter and provides less rainfall. During the time of fieldwork, the short rains, which usually occur between October and December, came only in middle of November this year. The farmers were thus concerned about their crops as their prepared farms received less rain than what is required. It is reasonable to connect this climate change to the large forest clearances that has been going on for the last 60 years.

While there is great values attached to these forests on a global and national level, the forests are additionally also valued for its diverse set of other practical purposes on a more local and regional scale. The forests are perceived and utilized as a necessary source of water catchment, timber, vegetables, traditional medicines, building materials, firewood and other forest products. Majority of the areas classified as natural forests (about 74 percent), are reserved for protective purposes, mainly as Community Forest Reserves, but some also as Village Forest Reserves (VFR) (Vihemäki 2009). Conservationists and organizations supporting forest conservation within the EUM are concerned about the fate of the non-reserved forests, as they are considered to be threatened by fire outbreaks and unregulated utilization. Logging of timber and cutting of poles, mining, extensions of agricultural land,

grazing and hunting are particularly concerning within the EUM and also around ANR (Malugu *et al.* 2008).

4.2. A historical background emphasizing exploitation of the East Usambara Forests

Particularly since the German colonial era from the 1890s, the East Usambara forests have been increasingly exploited for various purposes⁸. Forest lands were cleared primarily for coffee plantations, but also for other crops such as tobacco, sisal, quinine and rubber. Commercial logging of timber in Amani was conducted mainly through the extraction of *Ocotea usambarensis*, *Milicia excelsa* and *Beilschmiedia kweo*. A railway line between Muheza and Zigi were built in order to transport timber, and during this period, two sawmills operated in Kwamkoro and Zigi. Furthermore, the Germans also planted a wide variety of exotic tree species in the area through the Amani Botanical Garden, of which some are still present and acts as rampant pests to the natural and native ecosystem.

During the British colonial area, tea plantations replaced the coffee production, which struggled in Amani because of the soil conditions.⁹ These new plantations however demanded increased clearing of forests, and they are still prominent in the center of the nature reserve. But at the same time, both during the German and English colonial rule, conservation of the forest were also emphasized. The Germans built a biological and agricultural research center (a first of its kind in Africa), and eight forest reserves were also established in the East Usambara by 1913. The British established more forest reserves, and by 1942, the EUM had experienced a doubling of reserved areas.

In the 1960s, commercial logging activities gained momentum. An Indian-owned company, SSM (Sikh Sawmills), contributed to large parts of this logging industry (Conte 2004). They had originated as a company buying up lands for tea plantations, but who also established saw mills to acquire enough wood for the production of tea. The firm was nationalized by the

⁸ <http://www.amaninature.org/about.htm> (Accessed 14.2.2010)

⁹ <http://www.amaninature.org/about.htm> (Accessed 14.2.2010)

Tanzanian state in the mid-1970s, which led to a monopoly situation which was more or less immune towards regulations or sanctions by the Forest Division. When the value of tropical hardwoods then increased, the Sikh's standards for logging declined considerably. As an effect of the large-scale mechanized logging operation, riparian habitats were damaged, soil erosion and compaction became extensive, and trees were generally cut without emphasizing the future of the forests. This forest exploitation was partly funded and assisted by external funding. The Finnish development cooperation (FINNIDA) started first with technical assistance and support for commercial forestry and funded the SSM directly for their logging activities in Amani through providing gifts such as bulldozers, chain saws, skidders, heavy trucks, as well as a high-capacity peeling plant for plywood. One reason for supporting such an industry was a general thought that this could provide both financial and social development to the area (Vihemäki 2009). Forest inventories were also supported, of which only focused on commercially valuable tree species, thus supporting only the commercial industry, and not conservative interests. Both inventories have been criticized for various reasons, such as over-estimating the cutting allowed, and the need for proper silvicultural practices (Vihemäki 2009). The aid strategy in itself can fairly obviously be criticized mainly for a complete failure in terms of financial and social development for the local people in Amani, at the same time as it has contributed to a heavy exploitation of biologically important and valuable forest ecosystems. This destruction of the forest is revealed today through for instance a changed local climate, and a general discontent with foreign aid (Field interviews Amani 2010).

The sawmilling operation ceased in 1986 with the growing global concern on the biological and watershed conservation values and the resulting public pressure towards the company (Conte 2004). However, at this time, pit sawyers rapidly took over the logging. These people were usually loggers from Iringa in the southern parts of the country, and were supported by local businessmen. They reportedly took some care in their harvesting of the timber, and their impacts were lower than what had been the case with the mechanized operation by Sikh. Some reduction in certain tree species were however reported, such as for *Khaya nyasica*, *Ocotea usambarensis* and *Milicia excelsa* (Conte 2004). In 1989, the negative effects and damaged caused by the large scale deforestation caused such heavy concerns among international agencies that all logging in the Amani division was banned by the Tanzanian government. Together with an influx of various conservation projects, this marked the

beginning of the process of establishing the Amani Nature Reserve (Conte 2004; Vihemäki 2009).

4.3. The prevalence of forest conservation projects

After new inventories were conducted by FINNIDA and the IUCN, it was revealed that Amani forests required a critical strategy for conservation, and the ideology of forest preservation was particularly influential (Conte 2004; Vihemäki 2009). Projects were proposed to restore the area, and the East Usambara Conservation and Development (EUCD) project began back in 1987 to slowly link up conservation of biodiversity with economic development (Conte 2004). Its main focus was on reducing the pressures towards the forests, which was believed to be caused by the growing local population, and their unproductive and non-sustainable agricultural practices (Stocking and Perkin 1992). They launched various approaches that were supposed to contribute to improved livelihoods and living conditions, at the same time as it would favor conservation goals (Vihemäki 2009). Agricultural practices were to be improved, and at the same time attempt to make villagers more sensitive towards conservation. Soil erosion control through terracing, conservation awareness, and tree planting were particularly encouraged. Small-pit sawing on village land was also encouraged by the project, and tried to establish groups to conduct it. This was not a particular success and has been criticized, mostly because the link between these activities and conservation actually turned out to be undermining the latter. The pit-sawyers were for instance only allowed to collect dead and fallen down trees. Collecting only dead and fallen down trees however may actually be harmful to biodiversity also. The remaining old-growth forest ecosystems have a diverse set of values for conservation of biological diversity, such as “diverse structural habitat for vertebrates and invertebrates, mature forest interior habitat for birds, and genetic reserves and colonization sources for plant and animal species” (Mladenoff *et al.* 1993: 295). Several of these species demand such habitats that are imitating primeval forests for their attribute of providing various degrees of decomposition stages. Other species further depend on such particular organisms, resulting in strong biodiversity in the natural forest ecosystem. The pit-sawyers still also cut down live trees of which they were not allowed to. The project also faced problems related to managerial and funding issues, such as relying too much on support from external actors, and lack of trust between the involved

parties. The EUCADP was connected to the influential East Usambara Catchment Forest Program (EUCFP) in 1997 (Vihemäki 2009).

EUCFPs main priority was to secure availability of water from the water catchments, and conserving biodiversity (Vihemäki 2009). The project worked intensively on expanding the area and control of the reserved forests, and during the first two stages of the project, they increased the area under reserved forests from 17 000 ha at the project start in 1991, to 30 000 ha by 1998. The first forest reserve was the ANR, primarily chosen because it was the most highly valued forest for biodiversity within the EUM (Field interview Conservator ANR). The EUCFP was also the most significant intervention in terms of budget and resources targeted to controlling forests in the 1990s, of which funding came from the Government of Finland and Government of Tanzania (Vihemäki 2009). From 1998, in the final stage of the project (out of total three stages), it changed name to East Usambara Conservation Areas Management Program (EUCAMP) and was also partly funded by the EU. This stage followed up the goals of conservation, but put more emphasis on improving livelihoods as a means for reaching the goal of conservation. The project upgraded the Amani Nature Reserve into Man and Biosphere Reserve, according to IUCN categories, while also introducing and encouraging a variety of ICDPs, some of which activities are discussed in this paper, such as fish farming and beekeeping. Other activities included improved wood-saving stoves, bio-intensive gardening, improving soil and water conservation practices such as reducing soil erosion-schemes, increasing use of organic manure, and reducing shifting cultivation, as well as continuing earlier practices of encouraging tree planting efforts.

Adoption of soil and water conservation practices in Amani was however not particularly promising even though farmers were trained. Very few farmers built terraces, and planted along slopes, rather than across them. The evaluation report by EUCAMP back in 2002 reported that out of 524 farmers who were trained on soil and water conservation techniques, only 159 farmers started practicing the acquired skills (EUCAMP 2002).

EUCAMPs farm forestry included tree retention and planting of commercial and other multipurpose trees in so-called ‘integrated land management’. The long term target was to make people self-sufficient in sustainable forest products at the same time as it reduced the

pressure towards the forest reserve. According to EUCAMP (2002), the planted trees in Amani Division increased from 10 702 in the starting year of 1999, to 22 000 by the end of the project in 2002. Many people have planted trees on their farms, and for the most part, my interviewees showed a certain interest in such tree planting schemes, mostly for the reason that firewood and building materials in the buffer zones were becoming scarce, and that the restrictions from the ANR made it illegal to go to the nature reserve. People were also noticing the changing local climate in Amani, and had been taught that this could be related to deforestation, and they were therefore ready to plant more trees in order to combat these changes. Farmers also planted trees most often in the boundaries of their farms, and often used inter-cropping with a mix of annual crops and trees, as some of these crops demand shade, such as the high-valued cardamom plant. Non-competitive trees species such as *Grevillea robusta*, *Cedrella odorata*, *Tectona grandis*, *Calliandra*, and the nitrogen fixing *Leucaena* and *Gliricidia* were among the most used tree species by local people in Amani (Field interviews with various ANR staff and local villagers 2010). However, farmers had also experienced that many of the trees that they planted had either died, or people had lost interest in the trees early and cut them down for firewood before reaching a larger size. The farmers were particularly blaming this on the lack of training and follow up, as they actually lacked the technical knowledge on how to care for the trees properly until mature stage, as well as being short of material support such as tree seedlings. The project duration of four years may have been too short for the project to be sustainable even though ANR is now in charge of a tree nursery, of which achievements are not yet fully clear. Some of the problems seem to concentrate on a lack of cooperation between the people and the ANR, as a few farmers were concerned that they were only told to plant trees, but not given any knowledge on how to actually plant and take care of the tree.

Fuelwood are the main source of energy in the EUM, and the collecting is mostly done by women and girls (TFCG 2005). In order to reduce the workload of women, and the pressure towards the natural forests, EUCAMP and TFCG trained a group of women on building, maintaining and using energy saving stoves (EUCAMP 2002; Woodcock *et al.* 2006). These groups trained other villagers, which again trained others, creating a sustainable chain of project continuation (TFCG 2005). The stoves are made from mud, and are easy to produce both technically and practically, and the financial costs are close to zero. They were therefore spread rapidly throughout the villages around Amani, and according to the field interviews,

most households used this form of stove. These ovens are supposedly cutting energy use in half, and less time is needed to collect firewood, thus giving time for other household activities for the women. They reportedly also improved sanitation of the kitchen because of less smoke spread around the house. For these reasons, such stoves may provide benefits both socially (e.g. time-saving, improved health), ecological (e.g. tree-conserving), and economically (e.g. saves fuel so that less must be purchased as well as the time saved can possibly be used for other income-generating activities). The reasons for success may however be attributed to the simplistic nature and low costs of the ovens, thus giving an easy incentive for households to use them and therefore giving the ovens a high level of sustainability. Whether these ovens are enough to reduce firewood enough is another issue, as they still demand fairly high amounts of firewood (Field interviews 2010). But as a start, these ovens have provided fairly good achievements for most people in the study villages.

Since EUCAMP ended in 2002, ICDPs have been promoted by various other organizations with support from various donors (Vihemäki 2009; Field interviews 2010). Some are led by the Forestry and Beekeeping Division and the Amani Nature Reserve, while others are led by NGOs and research organizations. One particular influential NGO is the Tanzania Forest Conservation Group (TFCG), which was established in 1985 for the purpose of conserving and restoring biodiversity and globally important forests in Tanzania (Woodcock *et al.* 2006). Some of the projects are seeking to continue already started processes, whereas others are fairly entrepreneurial. An ICRAF-led project that are implemented by TFCG, supports and conducts research on ‘participatory land use planning processes’ in the villages, thereby also aiming to integrate and improve livelihood and conservation outcomes (Vihemäki 2009). The TFCG and WWF Tanzania, with funding from the Finnish Foreign Ministry, started in 2004 to implement the East Usambara Forest Landscape Restoration Project (EUFLRP) (Vihemäki 2009, Field interviews WWF Staff 2010). Here, they aim to contribute to both poverty reduction and biodiversity conservation, at the same time as they seek to improve the connectivity between certain forest blocks, such as the Derema corridor. These are particularly done by conserving the fairly fragmented forest land in the ‘gap’ between reserved forests. When doing this, they also aim to support diverse income generating activities and environmental education, thereby attempting to integrate development and conservation to achieve the set aims (Field interviews with WWF staff 2010). Most of the income-generating activities fronted by these organizations are the actual activities discussed

in this study. As particularly the ICDPs of WWF and TFCG were in the process and not yet fully underway regarding implementations during time of the fieldwork, this paper’s findings on actual experiences regarding the activities may provide knowledge and thereby function as learnt lessons that these and other organizations may consider both in the study area and elsewhere.

4.4. Ecology and people of Amani Nature Reserve

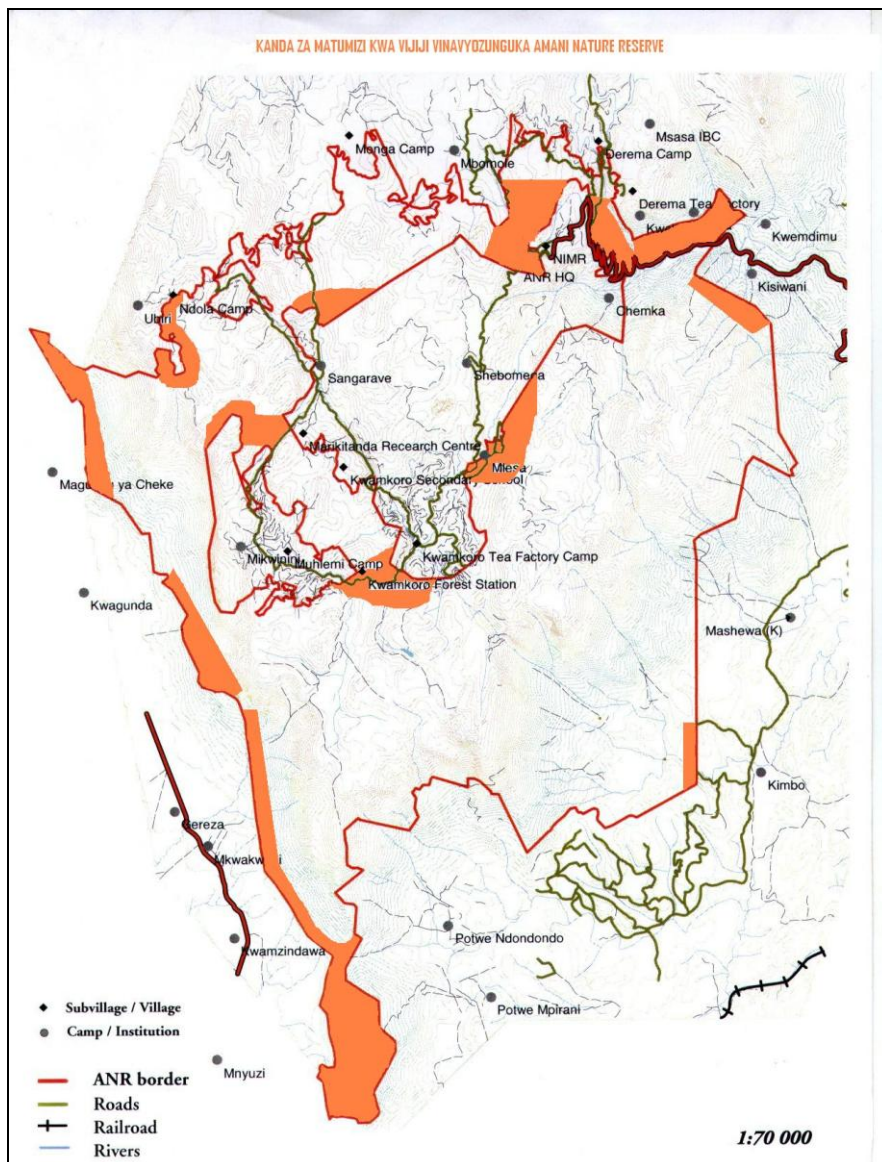


Figure 3: Location Map Amani Nature reserve and adjacent buffer zone villages. Source: ANR New Management Plan (2009).

4.4.1. Ecology

Amani Nature Reserve (ANR) was established in 1997 with a protected area of 8,380 ha, and forms the southern and largest mountain block of the East Usambara Mountains, located within Muheza and Korowgwe districts in the coastal Tanga Region (Figure 2 and 3) (ANR New Management Plan 2009). The reserve ranges from approximately 190m to 1130m above sea level, and covers sub-montane evergreen rainforest in the mountains with higher rainfall (above 750 m; about half of the reserve), semi-deciduous forests in the lowland with lower rainfall (app. 1/3 of the reserve), as well as plantation forests. The non-forest biotypes such as dry woodlands, grasslands, and ponds and rivers are scarce in the ANR, and covers less than 3 percent of the total land area. About 6 percent (520 ha) of the former sub-montane forests have been invaded by exotic species, such as the *Maesopsis eminii*, which was introduced to the area as a way to facilitate the regeneration of the shade-dependent, climax species *Cephalosphaera usambarensis* in the 1960s. Other exotic plant species have also been invading the area as a result of the presence of Amani Botanical Gardens, threatening the natural ecosystems.

As the ANR is close to the Indian Ocean, the rainfall in the area is considerably high (Doody *et al.* 2001). The distribution of rainfall is bi-modal, peaking in the period between March and May, when the main rain season occur, and between September and December, with a second smaller rain season. Precipitation however occurs in all months, and the rainfall is greatest at higher altitudes, as well as in the southeast of the mountains, ranging from 1,200 mm annually in the lowlands, to more 2,200 mm at higher altitudes. Because of East Usambara Mountain's age, level of isolation (together with West Usambara) and their role as condensers of the moisture generated from the Indian Ocean, they are playing an important role maintaining the ancient and unique forests rich in endemic species (Hamilton 1989, in Doody *et al.* 2001). Furthermore, these forests are in essence forest "islands" as they provide habitats for many species that have been separated geographically from their closest relatives for long periods, and additionally serve as a refuge for formerly widespread flora and fauna that have become extinct throughout much of their former areas of habitats (Doody *et al.* 2001).

The soils of the EUM and the ANR are largely clay and clay-loams, generally red and rich in iron, and well drained (Doody *et al.* 2001). Soils at higher altitudes are acidic (pH 3.5-5.5) and highly leached, and may not be very suitable for long-term agriculture, except for crops that favor very acidic soils, such as tea (Reyes 2008). Calcium, magnesium, potassium and phosphorus levels are normally low or very low in the area. The undisturbed natural forest covers however, prevents leaching because of the highly effective circulation of nutrients. Most of the soil nutrients are moreover associated with the organic matter. Natural forest cover protects soils against erosion because the multilayered canopy stops the velocity of falling water drops and dead leaves on the ground further hinders droplets from eroding the clayish soils. Exposed to direct impact of rain, such as when the land is used for temporal crops, maize being the most common, soils cannot withstand prolonged repetitive cropping without rapid loss of nutrients. For this reason, and because the reserve is steep and mountainous, erosion control mechanisms are crucial for production and yield to be sustainable for the ecosystem, as well as reducing risks of landslides. These efforts were started already in the colonial period by researchers and agricultural experts, but the farming methods are still considered poor, as soil conservation activities such as terracing and extensive use of manure to reduce area demands, are commonly not used. If this is not improved, soil infertility and low crop production is likely to be the result, which may lead to land abandonment, which may increase pressure on forest land as search for more fertile land elsewhere is intensified (Reyes 2008).

ANR is an important area for conservation as it functions as a habitat for several endemic and endangered species. Within the East Usambara, the area around Amani has been identified through research as the most diverse and from a conservationist perspective, the most important part of the East Usambara (Doody *et al.* 2001; Burgess *et al.* 2007). According to Doody *et al.* (2001), the reserve is home to seven endangered and 26 vulnerable species according to IUCN categories, while six animal species and one subspecies are considered endemic to the Usambara Mountains. Thirteen endangered bird species are found in ANR, of which are endemic to either the EUM or EAM. This has made the International Council for Bird Preservation (ICBP) identify the EAM as one of the three most important sites for endemic birds in Africa and the most important site in Africa for globally threatened bird species, such as the long billed tailorbird (*Apalis moreaui moreaui*) and the Usambara eagle owl (*Bubo vosseleri*). The reserve also provides habitat to a high diversity of reptiles and

amphibians. When considering the flora, three percent is strictly endemic to the EUM and the rate for species that are near-endemic is as high as 22 percent. Additionally, ANR is also a good example of a forest block ranging from lowland to sub-montane forest, as well as playing an important role in the hydrological cycle of the Tanga Region. The Zigi River, which originates in the ANR, drains the ANR ecosystem, and also connects to Pangani River which provides domestic water to Tanga town, as well as its adjacent communities and industries.

4.4.2. *People and livelihoods*

There are nineteen villages in the immediate neighborhood of the ANR, surrounding the ANR or inside the enclaves (about 10 percent of the total population) (see figure 3), residing a total population of 26,798, spread over 5,876 households, with an average village population of 1,410 individuals (ANR New Management Plan 2009). The estimated average population density in the Amani area is 132 people per km² with some villages having more than 300 people per km². The regional average of Tanga was in 1988 in comparison, 47 people per km². The majority of the population is *Washambaa* (Swahili, plural for Shambaa) by their ethnic background, but there are also other ethnic groups, such as *Wabondei* and *Wazigua*. Additionally, immigrants from other parts of the region and the country have moved to the area looking for land, and/or work in the tea fields or other jobs over the last few decades. Swahili is the most common means of communication in public matters and meetings.

The villagers generally perceive that they own the plots they cultivate, but usually they do not have official documents on them (Vihemäki 2009, interviews fieldwork 2010). Land is traditionally “owned” by men, but women can also access rights to land use through inheritance and marriage. People that do not have access to land must usually rent or buy land from others. Inheritance of land is also the most usual way of transferring land, and most of my interviewees answered when asked about this issue, that they had inherited their land from family. The nature reserve can however provide some challenges in the future concerning these issues, as the land is usually divided into pieces under inheritance, and because many families tend to have several children, there is continuously less land to hold for the children, which may lead to increased pressure on land, as well as outmigration.



Figure 4: Amani Nature Reserve in the background and typical smallholder agricultural lands in the hilly landscape outside Shebomeza village (Picture taken by the author September 2010).

Most of the people in the surroundings of Amani depend on small-scale farming for their livelihood (Figure 4) (ANR New Management Plan 2009). Food crops such as maize, cassava, bananas and beans, and cash crops such as sugarcane, cardamom, cinnamon, cloves and black pepper are the most grown crops, and many households also keep some type of poultry, mostly for own consumption. The average farm size is 2.7 ha, with a range from 1.1 ha to 10 ha, which has changed from a maximum of 20 ha a decade ago. According to the ANR New Management Plan (2009), the relatively poor soils, heavy rainfall, steep slopes, and generally poor and unsustainable farming methods, leads to further impoverishment of the soils and reduced productivity. The existence of the tea estates that are found both within the enclaves and on surrounding areas, have caused land scarcity for the adjacent villages. These are also however major employees of both local people and immigrants in the upper plateau of Amani. Wages paid to the workers here however, are reportedly low, and may not be a sustainable income for the local people (Vihemäki 2009; various formal and informal interviews Amani 2010). In addition to this activity and other agricultural crops, other forms of employment include dairy farming, sale of firewood from planted species such as of *Eucalyptus*, small businesses, petty trading and wage labor. Because most activities around

Amani is related to subsistence farming, or other means which retains low income, and because the management regime is considering conservation of ANR to be impossible without the support of local communities, there has been great potential for promoting and improving participation, income generating activities and benefit sharing in the villages. As is discussed in this paper, several agencies have introduced various projects to the villages, such as fish farming, beekeeping, dairy cattle, butterfly farming, and collection of *Allanblackia stuhlmannii* fruits/seeds, thus enhancing employment opportunities in the villages. Within some of these projects, collection centers for some of the products are established mostly closest to the ANR Headquarter, such as the milk collection center in Amani, and the butterfly collection center in Shebomeza village.

Local people still use the forests, both reserved and non-reserved, to realize their needs for their households, for such products as fuel- and firewood, building poles, timber, wild vegetables, fruits and traditional medicine (ANR New Management Plan 2009). Some villagers conduct slightly more serious environmentally degrading activities such as gold mining and illegal timber harvest as a “quick-and-easy” way to escape poverty.

4.5. Amani Nature Reserve – facts and current use



Figure 5: Sign explaining the legal status of the ANR, with some of its rules and regulations (Picture taken by the author November 2010).

Amani Nature Reserve (ANR) with an area of 8,380 ha was officially gazetted by the Government of Tanzania in 1997 in order to protect the unique and biologically important sub-montane rainforest ecosystem of East Usambara, and maintain its biodiversity with its endemic plants and animals residing in the forest, genetic resources, natural processes and cultural values in an undisturbed and sustainable fashion (Figure 5) (ANR New Management Plan 2009). It was established as a Central Government Forest Reserve under the Director of Forest and Beekeeping Division, and was supported financially by the Government of Finland, and was also given implementation support from the Forest and Park Service. The ANR New Management Plan (2009) furthermore states that the main goal of the ANR is to conserve the area's biodiversity as untouched as possible for future generations. This goal is also supposed to be reached in such a way that the living conditions of the local people are ensured, and that their activities have a sustainable basis (ANR New Management Plan 2009).

The more or less endemic flower genus African violet (*Saintpaulia* sp) of the Eastern Arc was chosen to be the logo of the ANR, in this way demonstrating the importance of conserving endemic species (Vihemäki 2009). However, it is also important to note that in spite of the rich diversity of species and the wide range of forest types in the area, some of the areas are far from intact, as they have been under considerable utilization and management also in the past. Different types of vegetations and land use is an integral part of the ecosystem of today. Through informal conversations in Amani, natural scientists conducting research in Amani had now just proven that many of the endemic species of birds are residing in areas that actually have quite a large degree of human intervention in the past, instead of more 'intact' ecosystems (Field interviews Amani 2010). However, habitat selection in birds may be more dependent on forest tree dimensional structure than actual tree species present, while this may not be the case for many other groups of organisms (Midtgaard Pers. Com. 2010).

However, one of the greatest challenges posed to the management of natural resources both inside and outside of ANR is that it is actually surrounded by densely populated villages (Reyes 2008; ANR New Management Plan 2009). The needs for more farmland and forest resources have increased together with population growth. Many areas outside of the reserve have experienced an accelerated rate of deforestation, which is also supported by the

inventory conducted by Doody *et al.* (2001). The remaining forests are therefore mainly inside the strictly protected ANR or in other Forest Reserves. According to the ANR New Management Plan (2009), and further supported by formal and informal conversations with people around the Reserve, the communities continue to collect forest products, such as firewood, building poles, medicinal plants and vegetables, as well as hunting for bush-meat such as blue-monkey (*Cercopithecus mitis*) inside the ANR. The pressure towards the forest is therefore regarded to be considerable, even though people supposedly are aware of the needs for conservation. People use the forest for their basic livelihood needs, and if the forest becomes strictly protected and no alternatives are provided, it increases tension and may be harmful to peoples' livelihoods.

Because it is well known that local communities utilize the forest for household purposes, one way of reducing the pressure towards particularly important forest areas and to enhance the objectives of the reserve, was to divide the ANR into various management zones with different levels of local community participation (ANR New Management Plan 2009; Vihemäki 2009). The idea was to create spaces with differentiated levels of management intensity, and thereby reduce gradually the overall human impact, as well as making sure that conservation and utilization does not compromise each other. The ANR was thus divided into four zones, with different status of conservation, including a strict *biodiversity preservation zone* (87 percent of the reserve), *restoration zone* (5 percent of the reserve), and a *local use zone* (3.5 percent of the reserve). The Amani Botanical Garden is additionally occupying 4.5 percent of the reserve. The village land and villages within and around the ANR, including the enclaves, were then defined as *buffer zone* areas (Figure 3).

The biodiversity preservation zone is considered an area where the least, or no, human action is allowed, following the exclusive agenda of conservation (ANR New Management Plan 2009; Vihemäki 2009). Only ecological monitoring and controlled collection of medicinal plants are allowed. These areas are the parts of the ANR with the highest diversity of species and concentrations of endangered and endemic species, and are also the least disturbed part of the forest ecosystem. The objective of this zone is according to the ANR New Management plan (2009: 35) to “maintain biodiversity, genetic resources and natural processes in less

undisturbed, dynamic and evolutionary state and offer possibilities for research and monitoring of undisturbed forest ecosystems”.

The nature restoration zone is comprised of various kinds of disturbed forests, and has the objective to restore the natural vegetation in the disturbed areas either through natural succession or by accelerating natural succession with management activities, such as reforesting gaps of areas that are affected by fire and/or invasive plants, with a mixture of several indigenous plant species. After this has been successful, these areas are included in the preservation zone. Since the original general management plan was made in 1998, eight percent of the restoration area has been incorporated into the preservation zone, reducing this area in 2009 to five percent, thus showing signs of improvement of the forest ecosystem (ANR New Management Plan 2009).

There are more possibilities for human activities within the local use zone of the reserve. Here, the objective was to “temporarily contribute to the local communities needs for forest products by allowing ecologically sustainable utilization of forest products without jeopardizing the primary conservation objectives of the ANR” (ANR New Management Plan 2009: 38). The idea was to provide local residents from the nearby buffer zone villages with limited access to certain minor forest products as they have no other alternative sources for these. People are allowed, under supervision, to go into selected and clearly defined areas to collect what they can carry twice a week, on Wednesdays and Saturdays. The zone includes both disturbed areas, *Maesopsis*-stands, as well as areas with less disturbed forests. According to the ANR New Management Plan from 2009, the local use zone will last for five years starting from July 2007. After this time, the alternative sources of forest products are expected to have been created by the local communities, as well as a reduction in the overall need for these resources, by less wood-consuming buildings and improved cooking-techniques, and effective land use practices, which reduce the need for more land. It remains to be seen however how this will work in practice when this period is over. At the time of the fieldwork, people were concerned that no such initiatives, such as providing seedlings, has been provided by the park management, which will be slightly further discussed in the sections regarding local people’s perceptions of and emotions towards the forest and the reserve.

The last zone of the management zones, the Amani Botanical Garden, has the objective to “maintain and develop its cultural, historical and biological values in order to promote research, environmental education, recreation, ecotourism and conservation of endemic and threatened species in the ANR” (ANR New Management Plan 2009: 35). This garden was established in 1902 and is one of the oldest and largest of its kind in Africa. It covers 360 ha, and might originally have constituted of more than 1000 species of plants from all over the world. Today, there are between 100 and 200 tree species present, but some of these, such as *Cedrela odorata*, *Maesopsis eminii*, and *Clidemia hirta* have however spread to the surrounding mountain forests and become rampant pests to the natural forest (Conte 2004; ANR New Management Plan 2009). In addition to research, in some defined parts, this zone is also allowed for people to use, as for the local use zone to collect important household resources.

Outside of the Nature Reserve is the area of the buffer zone, an area comprising 19 villages adjacent to the ANR as well as in the enclaves of the Reserve. This is where the activities and different projects are involved, trying to implement the specific objectives of the zone, which are to “promote sustainable land and natural resource use practices through implementation of the Village Resource Management Plans, farm forestry activities and tree planting, to decrease the dependency of the local communities on the natural resources of the ANR and to contribute to the social and economic development of the communities by involving them in the management of the ANR” (ANR New Management Plan 2009: 41).

The Conservator of the ANR (Mr. Masi at the time of the fieldwork 2010) is holding the general responsibility of the reserve, and is positioned directly under the FBD (ANR New Management Plan 2009). The administrative structures to promote community participation include different models and strategies, such as an ANR advisory board and the establishment of the Village Environmental Committee (VEC) under the village councils in the buffer zone. The responsibilities of VEC (members changed principally every five years, together with the elections in the village councils) was to formally secure that the villages carry out their role in protecting both the buffer zone and the reserve, by supervising the natural resource use, looking after availability of clean drinking water and sanitation. They are also supposed to make sure that the management plans were followed, as well as controlling illegal activities,

organizing people to fight forest fires, and encouraging people to plant trees on their farms. Cooperation with the village government is encouraged, and the staff members and officers of the ANR are also supposed to regularly participate in their meetings. Village leaders and environmental committees also gathered to occasional meeting at the ANR head quarters in so called Village Conservation and Development Committee meetings. Other forms of cooperation between the ANR and villages includes what they call joint patrolling and fire control extension, making sure illegal activities and fire outbreaks are controlled. Because local people were affected with reduced access to forest resources, all buffer zone villages were to be compensated by both involvement in protection activities in the Nature reserve, as well as receiving a 20 percent share from the entrance fees, guiding fees, and research fees paid by tourists and permitted researchers (ANR New Management Plan 2009). This money are supposed to be targeted to improving the village, for such as classrooms, roads, water pumps, village council offices, and also the running costs of the VEC. Additionally, people appointed to the different roles, such as the tour guides, watch- and patrolmen, and members of the VEC, were all local people registered in any of the buffer zone villages, thereby attempting to make the protected reserve as local as possible, hence the term local participation in conservation.

4.6. Derema corridor

Animal and plant species in the ANR should technically be capable of migrating to and re-colonize also other forests in the EUM. However, because of the problem of forest fragmentation and forest “islands” in the mountains, ANR is largely isolated from other forest reserves. The only forested connection linking ANR from the south to other central government-owned reserves (Figure 2) in the north is the Derema ecological corridor. Representatives of conservation organizations, forest authorities and many researchers, consider the corridor as one of the largest unprotected tracks of sub-tropical forests in the EUM (Newmark 2002). This land is also pressured from villages on all sides, as people use the forest for their daily household necessities and livelihoods. Nevertheless, the necessity of pure gene flow between the reserves in order to reduce the risk of extinction of several species of birds in particular, has therefore justified the goal of reducing the fragmentation of forests in the area through the establishment of the strictly protected corridor. Most farmers handed

over their lands in 2001, and were supposed to be compensated with money and land elsewhere, which unfortunately is perceived to be insufficient. Land has particularly been difficult politically to expropriate elsewhere (Reyes 2008; Vihemäki 2009; Field interviews IBC Msasa 2010).

Derema corridor is surrounded by tea fields, and more or less open lands for farming, and includes five villages, including IBC Msasa, one of the three villages I personally conducted my fieldwork in. The Derema corridor was created out of 1,300 ha, including about 800 ha of village land where the main land-use (approximately 50 percent of total land area) had been cultivation of cardamom in the forests, a relatively high-income generating activity for the farmers. This activity has according to several conservationists and researchers however, been viewed as threatening forest ecosystem (Reyes 2008), of which will be somewhat elaborated further in later chapters on spice production.

The feud over compensations and failed promises in Derema Corridor villages has created resentment and, according to many villagers interviewed, lots of challenges for them by making them increasingly impoverished. Both land and income were significantly reduced. Cardamom plots in the forest for example, which accounted for 74 percent of the value of all compensations, is difficult to replace, as there are little availability of land elsewhere, and most of the areas are either belonging to the tea-estates, or are located in the less productive and suitable open areas (Vihemäki 2009). People therefore had to settle in the villages, increasing the population pressure, and decreasing peoples' average land size. Some villagers were living on rocky grounds, making agricultural production difficult. Income was certainly reduced. Even though many interviewees were likely to overestimate their total loss of land, income and quantity of plants, it is however clear that less land size and general land suitable for high-income crops such as cardamom created increased challenges for people's livelihoods. Villagers are still expecting and waiting for the compensations in the form of money or new lands elsewhere, which they say they are entitled to. A particularly concerning issue is that some villagers are not cultivating or planting their land as productive and sustainable as they would if they owned the land. Interviewees explained that this was because they expect to move to new lands when compensations go through, and that they spend their time on the farm only temporarily.

4.7. Monitoring the health of ANR forests since the establishment of ANR and the introduction of IDCs

Data available on changes in forest cover and health of the forests around Amani, and particularly around the study villages, are unfortunately fairly insufficient to make any conclusions on the rate of ecological achievements regarding the reserve establishment and the IDCs, which are collectively trying to improve conservation in the ANR. The Eastern Arc website¹⁰ gives access to various publications regarding ecological data, but most are unfortunately from the 1990s, or early 2000s. Madoffe and Munishi (2005) realize that despite of many studies in the past, there is an absence of general summaries of the levels of forest disturbance to the forests in the Eastern Arc, and consequently there is no scientific telling whether there is a decline or an increase in the intensities of disturbances.

It would have been interesting to conduct ecological measurements and surveys of the condition of the forest in order to see if there had been any changes before or after the projects started. Originally, it was planned that this study would be connected to a team with other researchers looking more extensively on issues concerning species' habitats and forest fragmentation, but as individual plans changed, this was however not possible on this occasion. The study by Doody *et al.* from 2001 is one of the papers that have conducted such a comprehensive and detailed survey, but which may be a little too old to use by its own in relation to many of the actual projects today. However, there is work in the process regarding these issues, but which are not yet fully completed (Midtgaard, Pers. Com. 2010). These results may still not prove any causality between IDCs and forest recovery, as it is fairly likely that it is the establishment of a strictly protected reserve that has improved the forest. IDCs are however an integral part in the process of protecting the ANR, indicating that it is unlikely that there is a single cause-and-effect factor. Instead there is a range of interrelated factors which has contributed to the apparent improvement of the forest cover.

Some research on forest health have been made, of which may give indications on how the reserve is doing in terms of maintaining and enhancing biodiversity. Because a fairly large

¹⁰ www.easternarc.or.tz (Accessed last time 7.5.2011)

area (eight percent) of ANR has gone from a 'restoration zone' and is now integrated into the biodiversity preservation zone from 1998 to 2009, it gives an indication that the forest ecosystem within the reserve has been improved. Comparing Kessy's (1998) findings from 1998, where he reported that 70 percent of respondents in his study obtained their building poles and firewood from the forest reserve, with Killenga (2007) who reported 24 percent did the same 10 years later, it gives an indication that the access to building poles from the reserve have been reduced somewhat. These findings cannot however be used as a complete and direct comparison because these are two independent studies. These changes may still give indications of the situations, and the decrease in access to the forest may particularly be attributed to the establishment of the reserve, which illegalizes human activities. Tree planting schemes in the villages since the 1990s may further have reduced the pressure towards the forest. Such factors could have reduced dependence on forest products. It is difficult to draw conclusions on the causes and effects, especially regarding the ICDPs, but these are also an integral part of the strategy of conserving ANR through JFM, and collectively, these may have provided some positive factors regarding conservation improvements to the reserve.

The remote sensing methods used by some researchers to investigate forest cover changes over time have its limitations, such as that it may not be good enough at checking for understory deforestation, which are often caused by local peoples' livelihood activities which are often reported as the main threats to deforestation and ecosystem disruption. However, the results give an indication of distribution of forests and its changes. Results from Mbilinyi and Kashaigili (2005) show that across the East Usambara mountains; 5590 ha of forest was lost between the 1970s and the late 1980s/early 1990s. Since the 1990s, the amount of forest loss has been considerably smaller, with 1210 ha of forest lost until the 2000s, and deforestation particularly taking place on land outside the networks of forest reserves. Since then, the rate has slowed down further. The authors believe this can be attributed to a situation where people have cleared forests up to the boundaries of the established forest reserves, which is why little forest is left outside of these reserves.

Killenga (2007) assessed the effects of human disturbances on endemic and threatened plant species in Amani Nature Reserve in 2007. His methods included laying out 278 (10m x 50 m) sample plots in five transects, as well as interviewing 101 households randomly selected in

five villages, including both Shebomeza and Mbomole. His results showed that a total of 15 endemic and/or threatened species were used by the local communities for making domestic items, such as for constructing houses and selling, medicines, fuel wood, as well as collecting 84 tons of seeds. His findings showed that local people still enter the forest reserve illegally to extract forest resources for both domestic and commercial purposes. This goes somewhat hand in hand with some of the responses in my study, that even though some people are not usually willing to admit going to the forests for cutting timber, other people such as ANR staff and some villagers, claim that this is still an ongoing activity conducted by several individuals. Changes in forest health were difficult to properly conduct, but his findings do provide an indication of the general health and use of the forest a few years after many of the projects started operating. Trees such as *Allanblackia stuhlmannii* and *Beilschmiedia kweo* were among the ones reported to be used for house construction, both of which are both endemic to the Eastern Arc and threatened tree species according to the IUCN (2001, in Killenga 2007). Kessy (1998) pointed out in his study that collection of building materials is described as the most damaging of forest product collection. Killenga (2007) also concluded from his interviews that as many as 93 percent of the respondents in the study had no knowledge that endemic and threatened plant species occurred in their area. The study furthermore found that, out of 4001 evaluated tree stems, 3474 (87 percent) of the trees were alive, 207 (5 percent) were recently cut (less than 6 months ago), 90 (2 percent) were old cut, and 230 (6 percent) were naturally dead. The average number of timber-sized trees cut per ha in intact and disturbed forests was 18.5 and 24.3 respectively. Intact forest was understood to be the forest set aside strictly for biodiversity conservation, where no cuttings of any kind were allowed. In addition, out of 3959 of the poles evaluated, 3515 (88.8 percent) were alive, 282 (7.1 percent) were recently cut (less than 6 months old), 113 (2.9 percent) were old cut, and 56 (1.4 percent) had died naturally. In the intact forest, 23.7 ha was the average cut poles, while in the disturbed forest area, the average was 29.1 ha. The study concluded that there was still high species diversity both for the disturbed and intact forests. This may indicate that the forest health is fairly good, but that illegal harvesting from the forest could be continuously discouraged, as there is still a challenge that people are continuing to use the reserve for endemic and/or threatened tree species. These activities may both fragment and generally disrupt the forest ecosystem, and lead to an eventual extinction of endemic species to the East Usambara. According to Newmark (1998) forest fragmentation is considered to be one of the main reasons for biodiversity loss together with forest loss.

5.0. Methodology

5.1. Methods for data collection



Figure 6: Welcome sign one meets close to the Amani Nature Reserve Headquarter (picture taken by the author November 2010).

I conducted my research between September 11th and December 3rd 2010 (Figure 6). Most of the materials were collected through qualitative semi-structured interviews and thematic interviews of groups and individuals (see Appendixes), as well as participatory observation. The questions contained mostly open-ended, but also some closed questions that covered household background, social and economic activities, and strategies for solving general challenges. Natural resource use and dependence were included, together with peoples' perceptions on the park and the different use zones. Project activities were however the main topic for the interviews and different questions regarding these in relation to different issues as well as attempting to grasp a range of dimensions from all economical, social and environmental perspectives were thus included. This interview guide was however as the name says, only a guide. Each ICDP needed its own approach and a different set of questions in order to understand them correctly. Follow-up questions were also created, and changes to the questions were made continuously. At the same time as I conducted these semi-structured interviews, I made an effort to make sure that I got some quantitative data from my interviewees, such as age, gender, education, acreage, income, and natural resource

dependency, since I was interviewing a fairly large number of farmers in total. But for the purpose of this paper, semi-structured interviews were chosen as the most appropriate method to be used in order to reach the goal of answering my research objectives. Interviews with forest officials and leaders of projects involved a different interview guide, but which also tried to grasp a range of dimensions regarding the paper's objectives (Appendix 2 and 3).

The reason for using qualitative interviews was because of the range of information possible to obtain in comparison to quantitative methods. The semi-structured interviews provided me with a rich material for the research, which again was contextualized and 'enriched' by other sources of information, such as written texts, observations and interviews with key informants, as well as some quantitative information. This process is called triangulation, a way of increasing the reliability of the data by getting information from different sources using different methods (Bryman 2008). It was important for the study to understand and get explanations for the different opinions, understandings, attitudes and challenges individual people perceive and experience. They also gave me an opportunity to ask follow-up questions regarding comments interviewees made, which is something quantitative methods cannot do in the same way. Bryman (2008) follows this argument by explaining that an interview is also flexible and allows the interviewees to express their own interpretations. These interviews can also help give a rough estimate of how general their responses are (Desai and Potter 2006). This was true, as once I had interviewed a certain number of people, the answers started to be continuously similar. So even though qualitative data cannot be generalized over larger population as good as quantifiable data can, it may still give a fairly good indication and estimate of what other people feel and do, together with collective experiences and challenges. Furthermore, many of the projects were in too small scale, thus making the quantitative numbers of participants too low to give any statistical analysis from these projects.

There are some inherent differences between quantitative and qualitative data that I had to consider before heading out on my fieldwork. The 'pros and cons' of the different methods are fairly contentious, but were also important to know in advance. While quantitative methods originally derived from experimental and statistical methods within natural science and economics and follows a positivist approach of doing research, qualitative methods on the

other hand, have origins in the humanities, such as sociology, anthropology, geography and history and follows to a larger degree the principles of interpretivism (Bryman 2008). The qualitative differ mainly from the former in that it is not aiming at precise measurements of predetermined hypotheses, but instead a more holistic understanding of complex processes and realities where the questions and hypotheses can emerge increasingly throughout the investigation process (Desai and Potter 2006). One cannot however assume that more information is necessarily better information, as long interview schedules may give very inaccurate responses, as both the interviewee and interviewer becomes tired. In order to reduce this, I tried to stay within a certain time period for my interviews, which lasted on average around 90 minutes, but ranging from approximately 30 minutes to more than two hours, while almost three hours for some of the focus group interviews. The time of interview depended mainly on the purpose of the interview and the respondent. Very precise answers may also not give the most accurate answers as the people simply do not know or recall, or they are suspicious of the amount of details that are required from them, which I especially found true for people when considering what they used the forest for. This may have been more accurate if they had been totally anonymous by filling out a questionnaire. However, many people were also concerned that if the management of the reserve found out that people collect firewood from the forest through such research, that they would increase the patrolling and guarding of the reserve. Careful considerations are thus necessary in order to make these methods work properly. From my point of view, qualitative methods gave me many interesting experiences and good knowledge in how to conduct interviews and talk to people in a developing country. I also found it good for the information that people actually were able to hold a conversation and talk about issues concerning them, instead of just hooking off answers from a questionnaire. Many of my interviewees told me that they appreciated this, as they felt personally listened to and were more participating in the process. Doing qualitative research is also a fairly demanding and time-consuming task, as I as a researcher was always required to be present in the process. I could not let any of my assistants conduct parts the research, which questionnaires on the other hand may have allowed.

Because I unfortunately do not speak Swahili, it was also very useful to have most of the contents of the questions ready for the assistants/interpreters, who also cooperated in translating the interview guide in order to make the interviews flow more naturally and thus easier for all involved. Participatory observation included listening to people, observing their

behavior and asking questions (as explained in Bryman (2008)). It was also interesting to make observations regarding practices of resource use both in the study villages and the reserve. As I was walking to all the villages of study, I was able to observe cultivation practices, local culture, as well as people carrying firewood from the reserve. In addition I observed certain power relations within the households, particularly when interviewing women. They sometimes either knew very little or wanted to wait for the husband to answer, as he was the one that supposedly knew the incomes and activities.

In addition to the individual interviews, I also conducted in total five small group interviews, also called focus groups (Figure 7). These were regarding *Allanblackia* fruit collectors and spice farmers in IBC Msasa, butterfly farmers and dairy cattle farmers in Mbomole, and spice farmers in Shebomeza. The focus groups in IBC Msasa were also concerned partly also with the experiences and attitudes that people had regarding the Derema corridor. Such ‘focus groups’, however fairly small, provided a good method for accessing perceptions and point of views for a group of people (Desai and Potter 2006). They are useful for demonstrating that there is rarely a single community viewpoint that can be universally applied in public policies, thus making it an important part of developmental research. They are also good for exploring the importance of social networks, peer pressure and community politics. The groups included between four and six participants, a number which I considered appropriate in order to more easily being able to handle the group’s dynamics. In a few of the cases, I used the ‘chairman’ of the different project groups to find the participants and organize the location and gather the participants according to certain criteria. These were that the location should be as neutral and calm as possible without too much interruption, and that the participants should be somehow different in terms of social background, especially educational background and age. I tried to separate men and women in the groups, as previous research has shown that women are often less likely to speak their minds loud when men are present (Desai and Potter 2006; Bryman 2008). However, again the social networks of the ‘chairman’ may have been affecting the selection. Nevertheless, this proved to be the simplest way of conducting these group interviews, as this person knew the people participating in the projects. I also wanted to talk to him beforehand to obtain some basic information about the activity in the village. And he did select interviewees of different social backgrounds. I had to be aware that there was likely to be both group pressure and more difficulties for some of the participants to speak their opinions, which actually proved to be true. I therefore had to take the word and give it others

in the group up to several times, so that they also gave their opinions. I found group interviews to be a quite interesting and informative approach, as the ‘brainstorming effect’ took place to much larger degree than in individual interviews. As someone said something, others were quick to reply or continue the argument and also take it to other issues. The participants could however have been influenced by others, and may not have dared to speak their actual opinion in front of other members, or agree with other informants when they actually did not. These group phenomena are important to consider as limitations, but it was however interesting to have some small plural discussions around the subjects, which also gave me the chance of trying out different methods of interviewing.



Figure 7: Meeting with dairy cattle farmers. It was normal to experience several newcomers to the site wanting to discuss further after an interview. In Mbomole village (picture taken by the author November 2010)

By staying at the rest house, I naturally became familiar to people working there, such as the guides and other staff, but also other locals that were visiting and meeting for socializing. These encounters and informal discussions and conversations were also important, as they could give backgrounds and ideas regarding the projects and experiences related to forest conservation, and general relationships on the issues of interest. In an informal setting on evenings, without the notebook and over a beer, some of the local people were more likely to share their ideas on the reserve, confrontations between management and villagers, and how this affects them and others, on a slightly more critical manner than what I experienced during

my formal interviews. These conversations however, are only considered informal, as they certainly are not following all the ethical regulations, and are therefore more interesting as observations and field experiences.

An essential part of my research and my stay in Amani was provided by the role of my research assistants, the tour guides of ANR (Figure 8). These were Ramadhani Daffa (chairman of the guides), Alloyce Mkongewa, Lucy Mdoe, and Salim Hizza. With limited skills in speaking Swahili, I needed interpreters in the interview situation. In total, I worked with four assistants (three male and one female), who joined in different projects on the criteria that some knew more about one project than others. They were all from the East Usambara Mountains, and some of them were from the neighboring villages. I considered this to be a positive attribute, as it would perhaps make my way around the villages easier and increase my acceptance in the local communities. They functioned as gatekeepers, introducing me to different suitable people for my research, but also to the village authorities before conducting research in their villages, an important part of rural research. They also provided me knowledge on the local culture and customs, while also contextualizing ideas, people and places. Furthermore were they very good at arranging meetings with leaders of different projects, making all the practicalities easier during my stay there. Their knowledge of English was reasonably good, and it was therefore easy to discuss experiences and challenges with them, including in the interview situation, which functioned well for the most part. Sometimes, it was necessary to ask the questions up to several times, especially the follow-up questions outside the interview guide, but after some time out in the field, the level of understanding and communication grew, and it became increasingly easier to handle these issues also.



Figure 8: Tour guide chairman and research assistant Ramadhani Daffa on the way to new interviews in Mbomole village (Picture by the author September 2010).

Their main tasks as tour guides were to take tourists to visit the forests and provide them with information on the environment and history of the region. This was also a reason for having them as my assistants, as they had quite good knowledge of the ecology and background of the area, which gave me many interesting insights into the area's biodiversity, people, conservation efforts, challenges and accomplishments, according to their opinions.

However, some challenges remained with working with these assistants, who were not professional translators, which must also be addressed. Some of them had however been given some training on working with research, which certainly helped. I was concerned that the translated parts of the interviews sometimes were not as detailed as the actual response by the interviewee. It was fairly clear that the translated part provided to me was sometimes much shorter than what was said by the interviewee. On several occasions, I had to tell the assistants that they needed to give me larger parts of the response, and not just the small parts of it. I understood that this could be difficult, but after communicating that they also should take small notes, they were more successful in giving me more of the information that had been said. I also think this made it easier for my research assistants, who were sometimes given long answers of which some parts could be forgotten in the time it was actually translated to me.

I needed to build up a communicative relationship with my four assistants, explaining my ideas and what I was expecting from them. The level of difficulties encountered was different related to which assistant I was working with, especially regarding the information lost in translation. However, they were speaking to each other throughout the whole process, so they continuously also learned from these conversations, thus making the process easier for both me and them.

Because they are were all working from the ANR Headquarter, and therefore had frequent contact with the conservator and others responsible for protection of the park, it is also possible that the interviewees were concerned about their position. They may therefore have been reluctant to share too much information on their conservatory behavior and use of the forest. This would perhaps have been a likely with whomever assistant I brought out to the interview situations, as they would be likely to have different educational background than the interviewees anyways, which may also have given questions about positional stands. I recognized however that when the assistant introduced her-or himself and their job and background, the interviewees thought this was a good thing, smiling and acknowledging their presence as locals themselves. The positive sides of using these local tour guides in my research were in the end considered to outweigh the negative, thus justifying the choice.

5.2. Villages of study and recruitment of interviewees

The most important sites of research were the villages surrounding the ANR, thus in the buffer zone of the Nature Reserve, as it is here that most interventions are located in order to improve conservation efforts and protecting the reserve, and also where people in some ways are affected by the reserve. Here, mainly three villages were chosen for the study, after different sets of criteria, and differences between the villages. These were Shebomeza (1599 inhabitants), Mbomole (2299 inhabitants) and IBC Msasa (IBC meaning International Business Combined for historical reasons) (2200 inhabitants)¹¹ (Figure 9). According to the ANR New Management Plan of 2009, some of the main problems in the village of Shebomeza and Mbomole were attributed to wetland destruction through illegal mining and cultivation. In IBC Msasa, some of the largest challenges were wetland destruction for

¹¹ Number of inhabitants according to village leaders and documents shown to me personally (November 2010)

cultivation and inadequate land for extensive agriculture. However, I also included another village named Maramba, previously a sub-village of Mbomole, but who now controlled themselves. This village was chosen only for a few interviews because there had not been any CDIs implemented so far, except for people themselves choosing to keep zero-grazing livestock and farm fish. They had so far furthermore not received any benefits from the 20% fees from the ANR as they had become independent only during the last year.

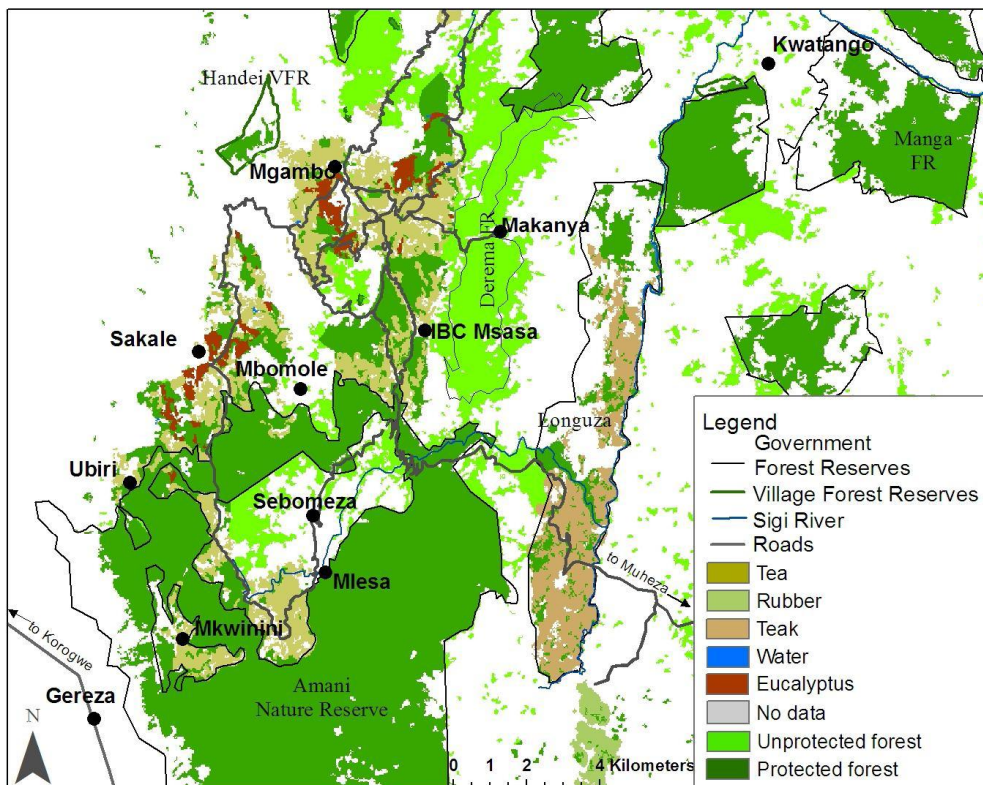


Figure 9: Location of the study villages (Shebomeza, IBC Msasa and Mbomole) in the southern part of the East Usambaras, as well as land patterns. Map obtained from Vihemäki (2009).

It was necessary for the study that the villages had some participants in the ICDPs, but the villages were also different regarding physical location in relation to the ANR boundaries, altitude and different patterns of land use. I used the ANR headquarter as a main base camp for the research, which also limited some of the distances I could be traveling. I also found it more appropriate in order to become more accepted by the local people, to walk the distances, both as this is normal for people in Amani, and because arriving in a car for instance could automatically have built up a larger ‘social wall’ between myself and the interviewees. The

ANR is a fragmented area, with two enclaves which are basically on non-reserved land, used by people for cultivation. Shebomeza is an upland village located within the Enclave 1 of the ANR (1807 ha), where small-scale cultivation is common both in open land and under the forest (ANR New Management Plan 2009). The tea estates occupies about one fifth of the area, and there is little natural forest left. Mbomole is also an upland village, but is located approximately two kilometers outside of the reserve boundaries, while they also have access to a village forest reserve, of which inhabitants may collect some resources, such as firewood. Maramba is located relatively close to Mbomole, but approximately 4 km from the boundaries of the ANR, and according to the chairman of the village, receives less rainfall than other villages closer to the ANR. Finally, IBC Msasa is located at around 6 km from the original ANR boundaries, but is also close to, and affected by the Derema corridor, where people have lost substantial acreage for farming, and thereby lower potential income, and the mentioned struggles over compensations. This was considered to give another dimension to the ICDP-considerations, potentials and experiences. Additionally, IBC Msasa is largely surrounded by tea-estates in the buffer zone, giving less potential land for villagers to use and collect resources from.

Some further social differences could also be observed within the villages. For example, as Shebomeza is closer to the ANR Headquarter, more projects and cooperation with ANR seemed to have been conducted here from the late 1990s, than in some of the other villages (Field interviews ANR staff 2010). They are also the closest village to the milk collection center close to the ANR Headquarter, and the butterfly collection center positioned in the centre of Shebomeza village, thus giving the participants a shorter way to travel to deliver their products. Collection of butterfly pupae are also done in IBC Msasa however, even though there are some challenges with this, of which will be further discussed in a later chapter. Shebomeza is apparently also the only village in the study that has the secondary school, installed electricity, as well as having a water pipe running in the village.

Villagers in the study were chosen firstly by their participation in a particular project, which created some challenges, and each project activity needed its slightly own considerations and way of recruiting interviewees. The most important methods of recruitment was particularly the purposive sampling technique called snow-ball sampling, non-probability method of

sampling, identification of key informants, as well as ‘random encounters’ around the villages in order to cross-check information or highlight different perspectives on the issues related to the projects and forest conservation. Some of the projects, such as the dairy production, had many participants and it was easier to choose small- or larger scale participants on my own, by walking around in the hills of the villages trying to recruit approximately every fifth farmer or so in order to have some degree of representativeness or spreading of the participants, even though this may not be a hard criteria for qualitative studies. This is called the non-probability method of sampling (Bryman 2008). The number of interviews in each project was also too low to give any representative and valid data to quantify for the particular activity. The same method was also attempted with the spice farmers, as almost all villagers cultivated some spice. Projects such as beekeeping and fish farming were on the other hand, as will be explained later in the paper, not functioning as well, and quite few people were participating. This made it particularly necessary to use snowball-sampling, which means that one contact suggests others, so the list of potential interviewees gets longer, and longer (Desai and Potter 2006; Bryman 2008). This was the method most intensively used during my research, as it was necessary to know the villagers actually participating in the project, and one of the better ways of doing this was to use the networks of the farmers that actually participated, as they share some common meetings and interests. This was therefore mostly done when studying the butterfly project, fish- and beekeeping, and the *Allanblackia*/Unilever project, as well as a few times on the last the two; spices and dairy production, especially when investigating the participants that were highly successful.

However, I had to make sure that I had as much diversity of contacts as possible, and not follow one contact’s network, as the influences to the interviews and findings can easily be biased. I therefore tried to ask contacts of different age groups and gender in order to increase the diversity. Sometimes the village authorities would help me find participants of the relevant projects, which of course also could have been affected by the existing social networks. In my questions I made, as mentioned, quantitative data available for all my interviewees in order to have the opportunity to go back and look at potential personal characteristics for particular answers given to see if there were any relationships, or simply to contextualize the interview and responses. I also chose to interview villagers that were not participating in the different projects. This was done because it was important for the study to get perceptions and understandings on the different issues provided by people not

participating in projects, both to consider the project itself from outside, as well as perceptions on conservation. Many of the villagers did participate in one of the project, so again it necessitated using snowball sampling to find people standing entirely outside of all projects. But I also asked villagers participating in one project to give their opinion on other projects in order to get as much feedback as possible during my interviews.

In total, I interviewed 104 local villagers, of which were 85 participating in projects (decided to incorporate spice farming into these as they were responding to questions related to particularly this activity), and 19 villagers were not participating in any project, meaning that their livelihoods were mostly based on a wide range of other activities such as transporting products for villagers, working as electricians, taking care of children, local businessmen, sole agricultural activities, hired and contracted workers on farms, and tea pluckers. The number of interviewees related to the different projects can be shown in Table 1 below:

Project activity	Number of participants in Shebomeza	Number of participants in Mbomole (incl. Maramba sub-village)	Number of participants in IBC Msasa	Total
<i>Allanblackia</i> farmers and collectors	5	5	6	16
Fish farming	1	10 (5 in Maramba sub-village)	1	12
Beekeeping	2	1	1	4
Spice farming	5	5	7	17
Dairy cattle	8	7	6	21
Butterfly farmers	6	4	5	15
Total				85

Table 1: Number of interviewees within each project activity

The general demographics of the study are summarized in table 2:

	Shebomeza	Mbomole	IBC Msasa
Total interviewed	37	35	32
Age	20-30: 9, 31-40: 11, 41-50: 6, 51-60: 5, 61-70: 3, 71-80: 3	20-30: 7, 31-40: 12, 41-50: 5, 51-60: 5, 61-70: 4, 71-80: 2	20-30: 7. 31-40: 9. 41-50: 8. 51-60: 4. 61-70: 4, 71-80: 0.
Gender	Male: 23. Female: 16	Male: 22. Female: 14	Male: 20. Female: 12.
Land size (ha)	4.4 ha	4.9 ha	3.3 ha

Table 2: Demographics of interviewees

In addition, I was able to conduct interviews with the project managers in various projects (two related to butterfly project, one related to *Allanblackia*); the Conservator of Amani Nature Reserve; all four guides working in the reserve; secretary and chairman of the UWAMA; village leaders in the study villages (four); and various ANR staff involved in policing and tourism. Overall then, the study is based on qualitative interviews of a total of 121 individuals.

5.3. Analyzing the data

After collecting the data I tried every late afternoon and evening, or at least within the next couple of days, to write down the interviews from my notes, in addition other field notes such as observations and experiences when it was still fresh in mind. It was helpful using a translator in my interviews, as it gave me time to write down the answers when s/he was asking the next questions. I did however try my best to appear engaged continuously on what was going on around me in the interview. By taking notes throughout the interview, it also made it easy to write down observations about the behavior of the interviewee or the surroundings that helped me contextualize my analysis later. So when analyzing the contents of the discussions and interviews, an important dimension of qualitative study is to be reflexive and open to what has been said or happened, and try to reduce my own biases as

much as possible over the knowledge and diversity of local views and perceptions (Desai and Potter 2006). I focused on the issues, experiences and challenges that were of most interest to the study and used the theoretical frameworks and literature explained in chapter 3 as a background. It was therefore necessary to consider my objectives and research questions while going through the interviews, separating the different issues from the interviews into ‘fragments’ that I created according to the research questions, and a potential way of structuring the thesis. This was done in order to have a better overview of all the data collected, while at the same time making sure the research questions and objectives were continuously worked on and responded to. The notes on experiences and observations during the fieldwork were also included in the analysis where it was most suitable.

Analyzing the data from the focus groups were also challenging in the way that the data are obtained, and that the unique unit of analysis is a group instead of an individual. I therefore tried to look at the different group dynamics, together with writing down the notes from the interviews, as it was an individual interview, but this time attaching fixed numbers to the different participants, thus knowing when going over the data, who was actually saying what. Having a translator therefore made it much easier to keep control of the flow of notes, while still having the chance of observing the group.

The social arena of analysis in the study is chosen to be the household. The household is conceived as *“the social group which resides in the same place, shares the same meals, and make joint or coordinated decisions over resource allocation and income pooling”* (Ellis 2000:18). Here, the interviewees are treated as individuals, but at the same time representing their household. This is because it is a site where intense social and economic interdependencies is happening between a group of individuals, and individual action cannot be viewed separately from the social and residential space that they actually live in. One has to note that a household is certainly not a homogenous unit, as it is composed of different individuals with different backgrounds, knowledge, ambitions and interests. Power and gender relations are another issue to consider, as some parts of the household may not be as involved in economic activities as others. Sometimes the woman of the household refused to participate in the interview without her husband present. For the purpose of the research, it was however important to have respondents with knowledge around the ICDP activities and

actual benefits and challenges met regarding these, which therefore made the head of the household as usually the preferred subject of the interview.

It has been interesting to rely on quotes given by the interviewees as part of my analysis. These are both rich and direct examples of perceptions and attitudes that people have shared during the time of research. The idea of using quotes is therefore to support and explain some of my findings, as they may provide a thicker description.

5.4. Issues concerning position and ethical considerations

Because I was more occupied with the social aspects than the natural science part of the ICDPs, the level of ethical considerations necessary in such research certainly increases. Before starting the interviews, it was therefore always important to go through important issues for the sake of the ethical quality of the study, but also to make the informants feel more at ease and ready to be interviewed. The interviewee was through my translator given information about what the research is about and who I am, by asking for their informed consent. They were assured about the confidentiality of the study, meaning that their name and answers would not be used against them in any way, that I was a student only looking to write a master thesis about ICDPs and related challenges and benefits as well as its connections to conservation. Furthermore, it was explained that I therefore was not there looking for supporting any funds or projects. I also informed them that they could choose to leave the interview anytime or not answering a question if they did not feel the appropriateness, as well as informing about using a tape recorder if it was used (however not very often). In the end of the interviews I always asked the interviewee if she or he had any questions or comments to me.

Most interviewees seemed to be content with the study and accepted to be interviewed, even though a few did ask for money and other benefits as previously mentioned. This was however not surprising as I was taking some of their time for the research. Normally, only the person I was interviewing was present, but occasionally children, other relatives, friends or neighbors were hanging around together with the interviewee (Figure 7). If she or he did not tell them to leave, I chose not to do it either, as I considered this to be rude and that it would

do more harm than good. However, if they started to demand too much attention, depending on the person, I told them that they could talk more afterwards if it was friends, or if the interviewee was clearly busy with the children or some other task, I politely thanked for the interview, and asked if another time would be more appropriate. Sometimes, the bystanders sometimes added informative details to the interview, which could be interesting to the study. However, when having other people present, the same group dynamics as mentioned about the focus group discussions may be present, and must also be considered in the analysis of the interviews.

Even though I stressed my role as a student doing research and not part of the management staff or NGOs, the emphasis that people used to put on the projects and conservation, gave me an indication that they unfortunately considered me as representing or being connected to the projects. They were very interested in the challenges they received with the projects, the low prices received and lack of equipment, and what they furthermore need from NGOs or project practitioners. I considered this to be good information that in fact answered my questions, but I still sat with an idea afterwards that they actually were hoping these issues of funding and access to certain resources would be sorted out through me working together with the donors. After the interviews also, by letting the interviewee come up with any additional questions or comments, many asked what the benefits are to them, if I could bring them any afterwards, or perhaps bring their concerns to other stakeholders. Furthermore, I encountered a slightly surprising pro-conservationist attitude by quite a few of my interviewees, who put special emphasis on the importance of conserving the forest, that they do not collect any resources, and that the Nature Reserve did not affect them much. Informal conversations and other formal interviews providing other perceptions, together with previous research done in the area however, may possibly show that these people did not paint the whole overall picture of peoples' perceptions on the reserve, especially if some people considered my positioning as someone bringing benefits, or someone that may tell the government in case they used the forest quite intensively.

When asked the question regarding the benefits the research would provide to my interviewees and other farmers, I usually explained that I could not promise when, what or how, but that the information I obtained can possibly be used to inform policy makers, donor

representatives and other stakeholders, as well as the ANR staff, which maybe would give indirect benefits. Also, because I chose not to pay my informants unless I had made an appointment beforehand, I told them about all the fees I paid to the ANR and villages around (entrée fees, paying for staying at the ANR Rest house, tour guide fees, research fees), of which 20 percent of it would benefit the farmers' villages, in that way justifying the time and help I had taken from the interviewees. Not everyone was satisfied with this answer though, thus giving me an indication that they were not particularly pleased about the eco-tourism part of the ANR and how it gives benefits to people affected by the forest. I chose the approach not to pay for the interviews because I didn't want to have people connecting research with income, making it more difficult for researchers coming later. I furthermore did not want to create social unrest by paying only some, thus making other people nearby or in the household unhappy. On quite an often occasion did other people, either members of the households, or friends, gather around the site of the interview (Figure 7). From research I have conducted before, these people are also often likely to expect payment too, because they may have thrown out an idea or two, and stayed there the whole interview. I am however aware that I have been interviewing poor people with low incomes, so it had to be considered a strict case of principles, which can be slightly hard and sometimes unpleasant to follow continuously.

The reasons for people perceiving me as someone else however, are likely to reflect some of the common perceptions and expectations from 'westerners' in Africa (*mzungu* in Swahili), which are often considered to be involved in, or connected with, development projects and funding agencies (Vihemäki 2009). My own age, gender, education and language were also likely to have been influencing the interviews. At the same time, there seemed to have been many researchers from actual developmental organizations that had been paying villagers fairly good amount money for the interviews before. I had to be aware of these issues when analyzing my data, by critically contextualizing my responses because of this possible strategic response-bias to the research.

5.5. Limitations of methodology

One of the particular concerns about qualitative research, are the issues around the reliability and validity of the interview material, particularly regarding representativeness and accuracy.

Small selections of interviewees that is used to discuss wider trends in a group or in a community, increases the necessity of considering how representative these respondents are for the entire group. I have tried to balance some of these biases by incorporating a diversity of social backgrounds in the study, but it may however be difficult to prove the generalizations of the findings. It is still possible to use this data as indications of what others also think. Quantitative data is better for this purpose because random sampling techniques are good at minimizing the likelihood of biases, and are measuring and analyzing with a fairly high objectivity (Desai and Potter 2006). Such data may however only appear to do so. The researcher is almost always influencing the process in social research, which is difficult to eliminate. One has to be precautionary and limit these biases and challenges as much as possible.

Other concerns regarding these issues, are the questionability whether interviewees are telling the 'whole truth', or is giving me the answers that they think I want from them, or which presents themselves in the 'best light', as was especially interesting regarding the concept of conservation in my study. Household members may not know about the activities of other members and may give false answers. Especially women proved difficult to interview at several occasions, as they sometimes wanted to wait for their husband to come home, or did not want to say or knew the answers. It is important to reflect on respondents' answers and that all answers are in fact partial and reflect the context in which they are given. Answers may therefore be influenced by the research process itself, as discussed above. During analysis, the qualitative data are likely to be filtered by the external analysis which itself may be subjective through the researcher, who may bring her/his own biases as well as some main research questions and objectives to be answered. These are all certainly likely to influence the analysis. By asking for clarification whenever contradictions occurred, discussing findings with appropriate individuals, cross-checking information from different interviewees and sources, and by including other methods such as observation, focus groups and some quantitative data in my interviews, some of these limitations towards reliability and validity in my study may have been reduced.

The lack of ability to speak the local language was affected my thoughts towards the interview process, thereby creating one of the largest challenges in my research process. It could feel particularly frustrating to only have a conversation and interview through a third

person, and it was affecting my chance of asking follow-up questions and follow the interview more in detail. During long answers for example, I could only sit and observe, and I felt as being outside of the whole conversation, making the whole interview sometimes fairly superficial. At the same time, this also increased the possibility of misunderstandings, ideas lost in translation, as well as affecting the quality of analysis. I was probably not able to analyze the actual discursive practices of the farmers in the same in-depth manner as could have been possible using direct conversations in the same language. This is however a fairly typical problem conducting research in developing countries when not knowing the local language, and perhaps especially through qualitative interviews. However, balancing the pros and cons regarding this, I still felt these qualitative interviews provided me with better responses than what I would retain using questionnaire. The issues around language are however an important limiting factor worth acknowledging.

In order for this study to have been more complete, a more elaborate quantitative study about the ICDPs rate of success could have been interesting. Quantitative studies on farmers' dependence on the forest, detailed use of forest products, and how they are affected by the reserve would also have been interesting. This would especially be helpful in terms of the livelihood approach, which often necessitates a wide range of quantitative data on the households' assets. It would however have been necessary to have done this before people joined a project, or after the park was gazetted in 1997, as well as some time afterwards for comparison. This is because people were unlikely to remember their income and assets many years ago, as I frequently experienced trying to figure out for instance farmers' income. Some farmers were reluctant to answer on these issues, while others struggled with counting the whole income for a year as it is changing through crop situation, while also forgetting about previous incomes of the year. The information obtained is nevertheless contributing to sufficient indications to draw out some ideas. My way of going around this therefore was to ask people what benefits or challenges they thought they had received, or increased/decreased, after joining the project, making people elaborate more on the subject and give their answers regarding perceived life changes. Because the data is not obtained quantitatively by investigating every piece of peoples' livelihoods, these findings may give indications of the general point of views. I considered this method fairly sufficient in order to understand the situation of the projects, because deeper elaborations on farmers' experiences should certainly not be taken for granted for the reasons mentioned throughout this chapter.

Findings and analysis

6.0. Local perceptions on the forest; utilization, dependence and conservation

This chapter is discussing the findings from studying local people's perceptions and use of the forest, and also in relation to conservation. Most interviewees perceived forest conservation as a positive thing, as the forest provided various important benefits for their livelihoods. Such benefits included protection of water sources, secured rainfall, and good weather. The rainfall was evidently connected to the health of the forest, which farmers understandably considered important as the availability of rain was the key condition for their agricultural production. Many of my respondents had also recognized that there were more cuttings of trees before the reserve was established, which some of them connected to what they perceived as less rainfall now. People did not look favorably back to the mechanized and large-scale logging that was happening in the late 1970s and 80s, as the results can be seen today in the form of lower rainfall for instance, and very little benefits provided to the villagers from the industry at the time. They were certainly concerned about the changing local climate, and were generally therefore accepting the role of conservation of the forest. Some of this can also be attributed to the public awareness campaigns on conservation that has been going on in the villages since the 1980s (Vihemäki 2009). These campaigns have been conducted in schools, public village meetings, as well as being available on informational posters and even conservation related calendars, which was observed in various homes in the villages. Various organizations and institutions have been responsible for arranging such information campaigns and at different times, such as the IUCN, EUCAMP, WWF, TFCG and the ANR. British and German colonial rule may also have influenced some of the conservation thinking among the older people also, as these powers recognized conservation of biodiversity as a fairly important issue and conducted a range of ecological research in Amani.

In relation to the actual protection of the forest, most people were agreeing to protect the forest and thereby accepting the restrictions imposed on peoples' use of it. This I found somewhat surprising in relation to much of my readings before on conservation activities. My interviewees often also mentioned that the forest cover had grown, and that it was now 'more'

forest than before the reserve establishment. This can however be attributed to the interview situation, as many perceive me as the researcher who is looking for specific or ‘correct’ answers. However, this may not be the whole truth, as people seemed to understand and see the importance of the forest for the activities they pursued in their livelihoods. When studying environmentalism in Tanzania, Brockington (2005) found that actual ecological conditions influence people’s conception of the world, which also gives reason for their environmentalist friendly discourse. A few of my interviewees mentioned that they compared Amani to other places in the country, with much more difficulties in terms of less rainfall and higher temperatures, and that Amani was blessed with better climatic conditions because of the trees. People were allowed to collect dead firewood twice a week, which certainly reduced their resentment towards the reserve. Most of my respondents said that they were satisfied with the restrictions on the forest products as they are still allowed to go to the forest and get most of what they need.

However, some concerns exist and one of these is that some farmers feel that the nature and people are two kinds that cannot be integrated and live side by side any longer. People were considering the forest as an illegal place to go except for these two collection days per week, and this idea may follow some of the thinking from the ‘fortress approach’ to conservation. People saw the forest as something that provided benefits, but also as a place no people should go, as they would be caught and given fines or jail time. Some unhappiness was therefore present, as people before could go into the forest and collect what they needed. This was certainly considered easier, and this loss of institutional rights was considered “not fair to them as human beings living off their lands” (Field interview IBC Msasa 2010). Even though conservation campaigns have explained the importance of conservation, answers provided to me indicated that much of the reason why people are not going into the forest are the threat of being caught and fined by fairly intensive patrolling conducted by ANR policing staff and members of the Village Environmental Committee. Now, they were not allowed to do any cuttings of any kind, and the most problematic resources that people lacked access to were mentioned to be timber and building poles. These are expensive commodities and difficult to get hold of, which has created some difficulties for particularly some younger farmers who wanted to build a new house or cow shed.

It is a growing problem and concern that farm lands in villages adjacent to ANR are becoming smaller and smaller as a result of growing population, inheritance issues and the ANR. People may particularly experience problems getting the firewood they need. Studies around strictly protected national parks in East Africa has shown that when people have lost all access to the forest resources, there has been incidences of sabotage, increased illegal activities, conflicts and generally more resentment towards both the forest itself, but also to the government authority (e.g. Vedeld 2002). Such findings may have bearings for what may also happen in the villages around ANR if the stricter regulations are applied, but also in relation to the inevitable decreasing farm sizes. People who are more dependent on the forest resources, such as the most poor and those owning or renting smaller farm lands, are likely to be most affected by the restrictive use of the reserve, which should create concerns among policy makers. From the analysis of the qualitative data, compared to peoples' farm acreage, people with less land had more problems successfully participating in the ICDPs and were mostly resenting the restrictions imposed by the reserve. My interviewees participating in projects on average had access to land sizes of 4.2 ha, while the village average is 2.7 ha (ANR New Management Plan 2009)

Some utilization of forest products were reported in this study and it is quite clear that local people use some forest products in their daily livelihoods (Figure 10). The ICDPs themselves do not seem to have had any particular effect on the dependence on forest product utilization. Utilization here does not mean illegal harvesting, such as timber- and pole cutting, or gold mining. Instead it means the forest products, such as dead firewood, medicines and fodder, of which are mostly collected within the forest reserve; especially in the local use zones where they are allowed to get resources twice a week.

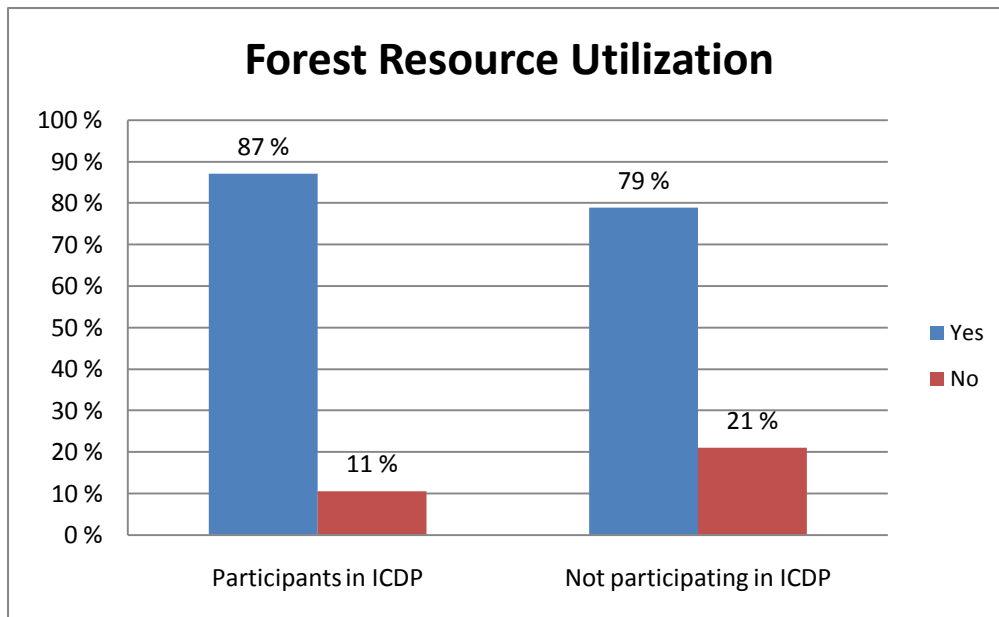


Figure 10: Forest Resource Utilization
(Sample size: 104; 85 participants, 19 non-participants)

Many people in Amani villages do not have enough land to plant enough trees. At the moment these villagers do not seem to stay self-sufficient with firewood and building poles, and some unhappiness could be observed. According to some of these farmers, collection days were too few, and others considered this zone to be too far away from their farm, and it was therefore challenging and time-consuming for them to walk all this distance carrying the fairly heavy firewood. This was especially true among some of the older respondents. People can only go into the forest empty-handed and carry what they are able to, which may not be very much, creating concerns about the time it takes to conduct this activity, which could be used for something else, such as working on the farm.

These issues may provide large challenges in the future, and partly if ANR will impose stricter use after 2013, when it once again will be considered whether it will be allowed or not to collect dead firewood within the forest (ANR New Management Plan 2009). One farmer in Shebomeza village explained that; “The allowance of collecting firewood twice a week in the reserve is very important for my family. I do not have enough land to plant that many trees, as my other crops would suffer. If this use is restricted, I assure you that more resentment and sabotage activities are likely to increase. We do not want this”. As follows from some of Vedeld’s (2002) findings, this also gives an indication that it is too early to stop this practice,

as people are not self-sufficient in access to firewood on their farms or on the village lands at this time. Trees have been planted on public lands and on farms, but this seem not to be enough at this point, as deforestation on public lands are large according to various staff and as confirmed by observations made by the various researchers visiting in Amani, including myself.

Deforestation on public/village lands is a serious problem which may create a higher dependence on the ANR in the relatively near future. It can be attributed to several explanations, such as a growing population, with growing demands for timber both among the local people, and from timber businesses from other towns. Various staff at the ANR Headquarter attributed the deforestation on public lands also to the agricultural practices conducted by many farmers, who often fell the trees on their farms in order to increase their crop production rather than to keep the trees on the plot (Field interviews various ANR staff 2010). Some interesting points that was mentioned in relation to this was given by a male farmer in Shebomeza; “We do not like the trees on our farms anymore. We think it is important to take care of the forest, but after ANR was established, they are very protective of their trees, even on peoples’ farms. The ANR may take our trees and put them under the custody of the reserve, and we will lose our farm, just as it is happening in IBC Msasa (Derema corridor)”. Another farmer in Shebomeza mentioned that; “We do not own the trees on our farms anymore. If we want to harvest them we need a variety of permits, and the application process is long and difficult and expensive, even if the trees are on my farm! I am not even allowed to saw trees that have fell down on my farm, I can go to jail. So why should we be planting trees? If I cannot use the tree for anything, I may as well use my land for other crops”. From these quotations, it is fairly obvious that an easier process regarding harvesting timber should be encouraged, so that people do not feel that they lose their property rights, farm space and income if they plant trees. If people knew that they were trusted, and then feel the ownership of their trees, they would most likely also be more willing to plant more trees.

Because there is a large amount of cattle manure in the villages, a few informants requested biogas to be introduced in order to reduce some of the requirements of firewood, and which would make many peoples’ lives easier. This manure is on the other hand also used as an excellent organic fertilizer for crops, creating two opposing interests in the use of manure of

which are not likely to be highly sustainable towards each other. Both the farm and the biogas require a large amount of manure to work efficiently. More research should be conducted regarding this in Amani. If one finds a fair method to use the manure for both activities, it could potentially provide several benefits to the villagers as well as the forest.

Villagers in the study villages showed some 'adaptation' to the limitations on the access to forest products. Both EUCAMP and government authorities have continuously pursued a strategy of reducing the dependence on timber and building poles by promoting the use of bricks as a material for constructing what is perceived as 'modern houses' among villagers. This is both a cheap and fairly efficient way of building a house, and is at the same time made from mud. This mud is made into bricks locally, sundried and is then ready to be used for construction. This activity was observed to be used around the villages, satisfying most of my respondents, and may reduce some dependence on indigenous hardwood trees from the forest. Some timber products are still required for windows and doors in the house, but is still less than what seemed to be used before. However, according to some respondents, because timber is now a commodity which is expensive and difficult to access, a new trend is occurring. This trend views timber as a fairly 'luxurious' good that 'richer' villagers would be more interested in using for their houses, as it may somehow be considered 'better looking' than using the bricks (Field interviews 2010).

Higher levels of dissatisfaction towards conservation, protection and imposed restrictions on their livelihoods were particularly found in IBC Msasa village, where many villagers had been recently moved as a result of the established Derema Corridor. They had lost a large amount of acreage from their original lands, and were not given sufficient compensations in neither money nor land, and were angry at the government, and even the forest for 'destroying their lives' (Field interviews IBC Msasa 2010). People in IBC Msasa generally explained that they were agreeing to the overall goals and importance of conserving forests, as they provide benefits in the form of rainfall for improved agricultural production. However, the resentment was high because people were angry that the process had been unfair and that they had been cheated and mistreated by various stakeholders and institutions regarding the establishment of the corridor. This may show that when people controversially lose institutional rights and opportunities, such as their lands, their resentment towards protected areas understandably

grew. Many of the villagers interviewed were also clear in their threats towards the actors responsible or interested, that if not compensated with more land or money, they would move back to the forest and start up cultivation again, clearly putting pressure on donors and government, and used myself as a perceived part of the system as the one to bring these thoughts to the right actors. This is in comparison slightly different to Mbomole and Shebomeza, whose most people have not been moved in regard to the reserve, and that they are also living closer to the local use zone of the ANR, and for some of these reasons had less negative attitudes towards the reserve.

Not all farmers in IBC were agreeing to the establishment of the corridor, but were willing to openly express their feelings towards it. One older female farmer was questioning what she saw as colonial control once again when she explained that; “what is really the motive for Derema corridor and forest protection? Why is this forest important for countries in Europe? The ‘wazungu’ (Swahili for ‘westerners’; author’s note) are very far away, and do not consider the people who suffer for what they do. People here have used the forest in their lives for a long time, and we have not destroyed it, we have taken care of it, as we also see the importance of a healthy forest. As you can see, the forest is healthy and big. The government does not trust the people on the ground” (Field interview with female spice farmer IBC Msasa 2010). Another person mentioned that; “When people see the forest now, they will always look at the Derema corridor as something that made them poor and made their lives more difficult. Only a very good income or compensation will improve this view.” Furthermore, some farmers were threatening to move back into Derema corridor and take their lands back if they do not get the compensation they are entitled to. Others were threatening to sabotage the forest and do some damage as a reaction to the unfair treatment they have been given since the corridor was established. Some of these threats may be attributed in some part to the interview situation, but quotations and observations are interesting and could truly show that people were not satisfied.

Before people were moved by the Derema corridor, many farmers cultivated cardamom on their forest farms. This plant demands a good amount of shade to grow well, and is generating good income. When people were moved, the new lands were not big enough, had poorer soils,

and/or had fewer trees, which made it difficult to restart the cardamom activity. This certainly increased the resentment towards the process of conservation particularly concerning Derema. Another issue that was concerning for informants in all the study villages was the intrusion of forest wildlife on their farms. According to some farmers, this problem has grown since the reserve was established, and particularly problematic were the blue-monkeys (*Cercopithecus mitis*), various types of forest rats, and yellow baboons (*Papio cynocephalus*), which raided peoples' crops at night. People could before remove the animals by killing and hunting them without the threat of being caught, but now this is illegal, and more opportunistic animals see the chance of easy and nutritional meals. This is complicating livelihoods somewhat. According to some ANR staff, the people still remove animals from their farm by killing them, but this is difficult to prove and is likely to continue going on silently.

6.1. Local perceptions on revenue sharing and other JFM-mechanisms

Most informants knew about the 20 percent of ANR fees that the villages receive as a compensation for the nature reserve. The point of views differed among villagers. Some say that this money is good enough, both because they feel that they get access to the resources they need from the reserve and that the money is used for good community development in the forms of building classrooms in the schools, building or improving village offices, as well as improvements and upgrading of the roads, bridges, and water pipes. Furthermore, many informants were fairly satisfied with the level of involvement of local people in the forest management (JFM), such as hiring and using locals in positions of watchmen, fire control maintenance, informants, ANR rest house employees, tour guides and members of village environmental committees. This was viewed as important for reducing the level of destructive forest use as; “local people tend to cooperate better together, and when both benefits and responsibilities are given to the villagers, other villagers are less likely to use the forest illegally. If you are caught by someone you know, it would be embarrassing, words would spread, and soon everybody in the village would know about it” (Field interview with female dairy farmer Shebomeza 2010). Additionally, some farmers considered the improvements of the forest cover and thereby improvements of the climate for agriculture more than good enough benefits for people, as “everyone has conservation as their best interest, and is

something we all collectively have to be working for” (Field interview with male dairy farmer, Mbomole 2010).

A common view was that the money received is not enough to conduct any village improvements, and that people are affected too much by the restrictions imposed to them compared to what they receive in benefits from the ANR, indicating that the money is therefore not enough as compensation. There were approximately 40 international tourists or researchers visiting ANR during my three month fieldwork, and of these 40, there were two groups of about 10 visitors in each group only staying one night. Most other tourists also stayed only one night, and did not leave much money in Amani. Talking to the tourists during my stay at the rest house, it was fairly clear that they were all impressed by the beauty of the nature in Amani, and that it was possible to reach viewpoints and hike in the rainforest at night. However, they were mostly dissatisfied with the very high costs of entering the reserve (US\$ 30 per person), the high guiding fees (US\$25 per person per day), and the difficulty of actually reaching ANR, as there was only one bus a day from Muheza town per day, and this bus was both ‘crowded and uncomfortable’. These issues are concerning as it stops people from visiting the reserve. As one middle-aged male visitor from Israel noted; “Amani is beautiful place for all people, but for the young people who may not mind the bus ride up here, they may not afford to pay for all the fees required of them, while the older people who can more easily pay all the fees, they may have a problem with the infrastructure here. It stops a lot of people from coming”.

For some of these reasons, the financial benefit each village adjacent to ANR (now 19 in total) receives annually varies, and in 2006/07, each village received 215,500 TAS; in 2007/08, they received 333,162 TAS; while they in the year 2008/2009 received 153,647 TAS¹². These benefits are not much when related to the number of people living in the villages and the costs of conducting community development. It is mainly only an extra contribution to the village community, and is hard to prove what the money is actually used for. Almost all farmers explained that this 20 percent revenue sharing is not enough to reduce forest dependence and use, as people are not compensated individually and the money has not been used for any village forest reserve that people could use instead. This may not be entirely

¹² ANR document shown to me personally during interview with ANR tourism officer

true for all villages, as the village of Mbomole for instance has access to a forest reserve in the village, which is used rather intensively. One farmer in Shebomeza criticized the village leadership, the imposed restrictions and the general a lack of enough compensation to do any real improvements when he claimed that; “We consider the money as lost when they are given to the village council. We as villagers do not get any money or benefits even though it is in fact us who are mostly affected by the restrictions. This money is therefore not enough to compensate us.” This may indicate that the transparency in the villages should be improved in order for this view to improve somewhat. However, the money each village receives are in fact fairly small, meaning that larger changes must take place, such as improved benefit sharing mechanisms, as well as increased tourism to Amani, which at the time is too low to provide any real benefits for villagers. A common view was that the percent given to the villages should be raised to 40 percent, thus making the compensations slightly more acceptable. Some villagers do not know about any community development going on in their villages (similar responses were given in all study villages), thus again indicating that the benefits are not sufficient and that the transparency level among the village leadership is not good or widespread enough to involve the whole community in what is going on in their village.

A fairly small number of villagers are actually attending village meetings, and for this reason does not know about what is going on. This is problematic both as they are not updated to what is going on in the village, but mostly that they may also miss new ICDPs attracted to the villages, as these always go through the village councils before they start implementing their projects. Interviewees were also concerned that there were too few available positions to hire larger parts of the village community, thus benefitting only a few people through JFM. They were recommending to somehow increasing the number of available jobs through different mechanisms, such as increasing tourism or any other forest-conserving industry or activity.

7.0. Integrated Conservation and Development Projects adjacent to ANR

Here, each ICDP will be discussed together with the actual qualitative findings the study was able to assess. The different projects got their own story, history, and dimensions, which means that each have their own way of entering into discussion. All projects are assessed from financial, social and environmental dimensions, and sustainability is an important concept in this regard. Without sustainable projects, conservation efforts may certainly be undermined in the long term. Some projects were to certain extents operating together with a NGO or conservation agency at the time of the interviews (butterfly project, *Allanblackia* collection, and to a certain degree the dairy cattle project); some were withdrawn from donor and NGO support (fish farming and beekeeping); while spices cultivation, may request support to be able to break through as a secure and viable livelihood income. Donors are again trying to revitalize some of the projects, of which the findings from this thesis may provide some assistance. By being different and giving diversity to the common efforts of improving livelihoods and conserving the rainforest, it is possible to look at the multifaceted nature of forest conservation, and draw on learnt lessons for similar efforts also elsewhere.

Some general quantified results were possible to obtain, through some categorized questions asked towards all my informants. It was particularly interesting to look at how the ICDPs affected peoples' incomes, and if these benefits reduced their need to continue collecting forest products. The interviewees were therefore asked to rate the performance of the ICDP towards their livelihood improvement (Figure 11 and 12). These graphs show some of the relationships in order to get an overall idea on people's thoughts around these particular questions. Generally, most people saw that their livelihoods had improved to a certain degree, while quite few thought their demand for forest products had gone down. Most people still demand some collection of forest products in their daily livelihoods, as was also discussed in a previous chapter. Certainly, some people may have interpreted the questions differently and put different meanings to their replies. However, supporting these replies with the vast qualitative data obtained from the study, it is possible to give a fairly accurate picture of what my respondents were saying and meaning in the interviews.

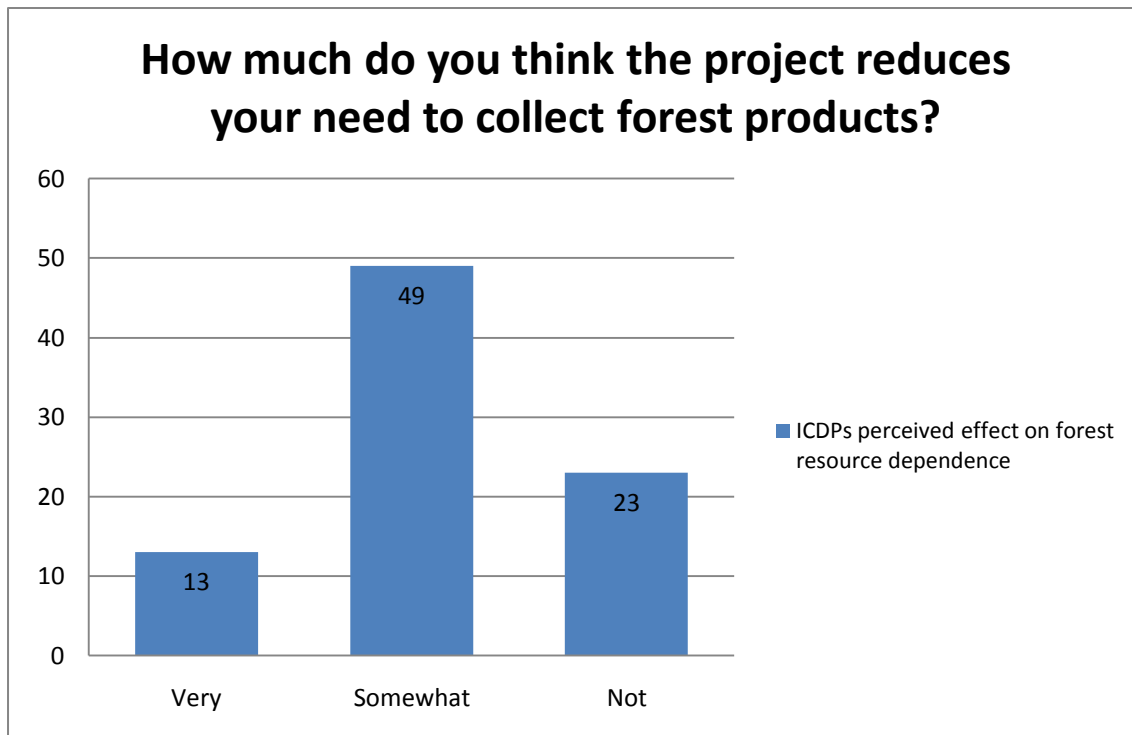


Figure 11: Perceived effect of project activity on forest utilization. Number of respondents
Sample size 85

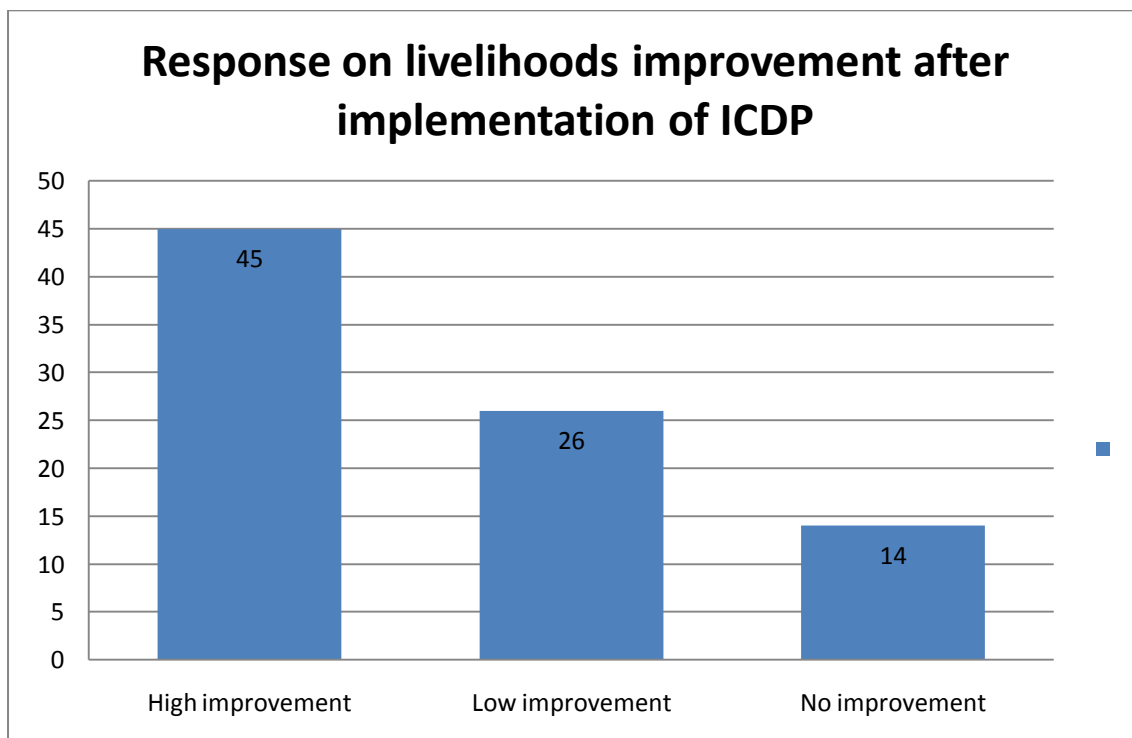


Figure 12: Perceived livelihood improvement after ICDP. Number of respondents
Sample size 85

7.1. Zero-grazing dairy cattle

The ‘zero grazing dairy cattle project’ in adjacent communities to ANR was promoted by Tanga Small Scale Dairy Project, and was operated by “Umoja wa Wauza Maziwa Amani” (UWAMA), which means ‘union of farmers keeping dairy cattle in Amani’. This project started up already in 1985, when run by a Dutch NGO (NDDP; National Dairy Development Project), and received money to establish a cooperative and a milk collection center. The money was provided mainly by the WPF and the UNICEF, but stopped already in 1987, and was then taken over by the cooperative to run themselves, with some funding and extension service by NDDP and TSDDP (Tanga Smallholder Dairy Development Project). In order to get access to the market for milk, the cooperative made an agreement in the mid 1980s with Tanga Dairy Limited (TDL), a milk processing company in the city of Tanga, who then purchased the milk from the collection center, transported and processed it, and then sold the milk products all over Tanzania. In 2000, the cooperative made an agreement with Tanga Fresh, who took over the market access for the milk. According to the secretary of the project, this was also the year NDDP ended their activities in Amani. After this, the project slowly experienced emerging difficulties of keeping the project sustainable, as will be more discussed below.

The main objective of the project was to promote milk production and through this also enhance household income, decrease malnutrition and protect the areas through zero grazing, meaning that there should basically be no disturbance of the natural areas. The project furthermore provides training and extension services to farmers. As the project has been running for more than 25 years, it seems as it is both sustainable and well run even though challenges seem to be piling up continuously.

More than 600 households in villages around ANR are participating, and some are living as far as 20 km from the milk collection center, which is located close to ANR Headquarter. The project is fairly well received among the local population and many farmers have adopted the technology innovations. The basic idea of the scheme is that the cattle are standing within a closed enclave, where the farmers provide the fodder by bringing it to the shed from different sources of fodder (Figure 13). The most used cattle breeds were reportedly Friesian, Ayrshire,

Jersey, and the East African Zebu, and various indigenous species. Many farmers have access only to indigenous species, which often have low genetic potential for milk production. These can often only produce between 1-3 liters, while improved dairy cattle often produce more than 15 liters of milk per cow per day, depending on the management (Njombe *et al.* 2010). The grasses that are found most used are the guatamala grasses (*Tripsacum laxum*), which is nutritious and fast- and fairly easy -growing. But when such plants are planted in steep areas, it functions well hindering soil erosion. Farmers also use concentrated animal foods found in shops and mineral supplements bought at the cooperative, but also from crops grown on the farm, such as green maize, cotton plants, and banana leaves. The cow therefore does not need to graze in open areas. This reduces the need for the cattle keepers to cut down the forests in order to generate grazing areas, of which could be a tremendous negative challenge for the forest and biodiversity. This reduced need to open areas for ‘ranching’ is likely to reduce soil erosion in the hilly landscape in Amani. Furthermore, as the cows are kept inside all year round, they are to a certain degree prevented against tick-borne diseases and other health hazards.



Figure 13: Dairy cattle-keepers next to the zero-grazing scheme in Mbomole village (Picture taken by the author November 2010).

7.1.1. Financial dimensions

The average milk production and income among my interviewees ranges from 20,000 TAS per month and up to 700,000 TAS per month. From 30 informants who shared this information, the average income was 160,000 TAS per month. By removing the two extremes in the scale, the 20,000 and 700,000, the average was 145,000 TAS per month from cattle keeping. The cow produces between 1.5 and 18 liters per day, with an average of approximately 6-7 liters per cow. The farmers receive 418 TAS per liter, which many of my farmers thought were slightly low, and not enough to cover the running expenses of the project. These numbers on income seem to be fairly good and high, but for a farmer to successfully conduct the project, several expenses are necessary, so that the net income is severely lower than the amounts mentioned here. Such common expenses are mineral concentrates, medicines, mineral salts, veterinary services, spray for ticks, and down-payments on a purchased cow. According to the secretary of UWAMA, a normal installment per month for paying a cow was approximately 50,000 TAS. It also costs newcomers in the project some membership fees to UWAMA in order to start up with the project. According to both farmers themselves and the secretary of UWAMA, these fees were however both acceptable and necessary, as it is important that the farmers pay some money in order for them to “prove” that they can be able to take care of the cow, at the same time as they show a clear interest in the project. Willingness to pay can be an important ingredient in adaptation of new technology or participating in a project as it increases the feeling of ownership and responsibility. This is therefore supposed to increase the likelihood that the new cattle keepers will succeed keeping cattle sustainably.

7.1.2. Social dimensions

There is little doubt that the project has been beneficial to the farmers and has had a very high potential to household food security, income generation through a secure market and continuously producing cows, and also soil fertility improvement through extensive use of farm manure. The latter has also potential for a biogas project in the future. A study in the East and West Usambara in the mid-90s showed that the gas produced after the introduction of biogas saved up to 50 percent of energy required for cooking (Rutamu 1999). The study

furthermore observed that five hours of household labor were saved each day after biogas was introduced. The study argued that the costs to set up the project would possibly be recovered in a range of 9 to 18 months. Such schemes are also likely to reduce the cutting of forest hard wood and are thus likely to protect the environment in that way.

Many of the farmers were particularly satisfied that they were able to use some of the milk that was produced to give to their household, friends and neighbors, thus reducing malnutrition by increasing vitamins and minerals in the diet. As long as the cow is producing enough and is healthy, it increases people's income, and many cattle keepers were satisfied that they could more easily send their children to school compared to before joining in the project. Such a zero-grazing scheme has also its advantages that more sections of the demographic society are able to keep cattle. Both women and men, young and fairly old, are able to participate and continue the project continually, as it is a fairly simple way to keep cattle. Many informants, both those keeping cattle and those not, were also satisfied that the social relations was improved as people could swap different products for milk, thus generally raising the nutritional status in the community. Furthermore, a general tendency in the study villages was a sense of cooperation regarding both sharing cattle to neighbors and family, while also allowing neighbors and friends to fetch fodder grasses on their lands, even though they had cattle themselves.

Keeping dairy cattle as a single livelihood activity is hardly recommended in case of sudden diseases or death to the cattle, and most farmers understood that diversification was necessary. However, many interviewees were concerned that the project demanded fairly large lands, especially for fodder plants, but also for the cow shed. In an area with continuously higher pressure for good land because of population growth (both natural and migration), and the ANR itself, land is smaller for each household. This creates some difficulties particularly for younger generations to join, as they usually only inherit small areas of land. Several of my informants in younger age groups had difficulties seeing their future livelihood in Amani as there are few jobs, and it may be too late to join many of the projects that are still operating, such as cattle keeping. Many farmers were also concerned that the growing of fodder plants took up lots of space on their farms, so much that they were not able to grow as much vegetables and spices as they wanted. Other farmers did not agree, and meant that people

needed more knowledge through extension services, on how to better grow on their lands, through for instance multi-cropping in lines.

Many informants were concerned that the collection center was very far away, especially among those in more remote areas. Milk has to be delivered every day, and as the roads are often in bad condition, and as some may not own a bicycle, some struggle to deliver the milk or spends a large part of their day delivering it. Others again see the positive sides, as they get to meet friends on the way that they can talk to and share ideas and experiences with. Especially at the collection center, where the queues can be long, interesting interactions are likely to occur which naturally raises the sociality in the villages. I frequently observed younger children (aged approximately 7-14 years) carrying the milk during school hours. I therefore asked many of my respondents about this experience, and many were open about sending their children with milk instead of to school. Some even claimed that this did not matter, as the children did not learn anything particular there anyways, and that a few days a week was okay to miss. As education is an important part of a country's or an area's development, it is important that parents also understands this. The UWAMA cooperative could even be educating parents on these issues, but which at the time seems less likely as the communicative distance between the cooperative and the farmers have been growing continuously in the later years.

7.1.3. Environmental dimensions

The objective of reducing disturbance to the natural habitat through zero-grazing has definitely reduced the need for open areas for grazing, and is a direct measure to reduce deforestation in the area. Experiences from other countries, such as in the Amazon, can tell that cattle ranching is one of the most predominant reason for forest degradation. About 70 percent of the clearing activities are caused by these ranches, where the profits from beef cattle are one of the main income sources that make deforestation profitable there (Fearnside 2005). These large ranches result in forest degradation through heavy logging, which again facilitates ground fires, and the effects of fragmentation and edge formation. Looking at the topography of Amani however, such intense ranching options may have been difficult in this area, but the project has nonetheless created a situation where a large number of farmers do

not release their cattle in forest areas, while it at the same time as it enhances their livelihood income and options.

My informants generally claimed that they spent long days and earned enough income from the project, so that their dependence on illegal forest products was reduced. Even though it is hard to prove otherwise it seemed to be a rational thought, as the project was both time-consuming, and the income received could well make them less attracted to participating in illegal activities such as mining or timber harvesting. Before joining such a project, one of the main possible activities was to work in the tea fields for low payments.

Most farmers who were interviewed had a general idea that conservation is important because they receive tangible benefits from a 'healthy' forest. Such ideas may stem from conservation activities in the area and education in school, which promotes this way of thinking, and may not mean that their lives and activities are solely pro-conservation. However, the basic ideas concerning importance of forests have again been picked up by local people in the villages, and it is important that the attitude and awareness towards conservation is enhanced. Their livelihood of keeping cattle depends on healthy forests with secured, stable, and enough rainfall, good general climatic conditions, and steadily flowing water in the streams, which provides both feed and water for their animals. Many informants used their own land to plant more grasses and trees, and thereby reducing the need to find such products in the forest.

In general, it seemed as most farmers fetched fodder grasses on their own plots of land. However, as the fieldwork lasted over some months, it became clear that more farmers were increasingly attracted to entering the forest borders for fodder, and used both grasses and leaves growing inside the nature reserve. One of the reasons for this, was that there had seemingly become less rainfall in the area over the last years, the grass had become drier, and what many farmers considered unusable. They were therefore attracted to fetch fodder elsewhere. Collecting fodder from the forest could be a challenge for biodiversity, both as people may cut down trees in itself, and also step on plants on their way into the forest, but also because many insects, worms and other organisms have their habitats on the ground floor of forests. Fetching fodder within the forest can also be a problem to the cattle keepers. One thing is the potential snake bites and cuttings, but researchers have now also discovered

reasons for a certain disease among the cattle characterized by urination of clotted blood (Karimuribo *et al.* 2008). Even though it was difficult to find the exact reasons for this, the researchers found that bracken fern (*Pteridium aquilinum*) was widespread in the forest areas, and also widely used as a source of animal fodder. Because of the presence and distribution of bracken ferns in addition to what informants in their study described regarding clinical signs and post-mortem lesion, the researchers argued that chronic bracken-fern poisoning is very likely to be associated with the syndrome affecting dairy cattle in Amani. Thus, fetching grasses in the forest may in fact lead to ecosystem disturbance and livelihood stresses. As been argued earlier, if households lose their cattle to disease they can experience severe challenges within their household economy and security, such as paying down debts.

Many farmers were also attracted to fetching grasses in the wetlands, which could pose a problem if more farmers continue or begin this activity. Wetlands are an important source of water, biodiversity, and ecosystem cleansing, and human disturbance should be held to a minimum. According to the reserve management, such disturbances are illegal, but can also be difficult to control. Also, not all wetlands are protected. Such fodder fetching activities may therefore affect the forest ecosystem, and education through the cooperative should perhaps be extended regarding such issues.

7.1.4. *The end of a NGO – changes in project structures*

A cow in the project of today costs 800,000 TAS, which means that for every liter of milk the farmer delivers to the cooperative, a fee is deducted until the farmer has paid down his loan. These loans are naturally based on interest rates, which mean that a farmer must have a good breed of cow in order to be able to handle the loan. The breeds the local farmers get access to frequently produce low amounts of milk, creating a difficult challenge for the farmers, who may struggle to finish the payments, and many of my informants claimed that they and others they know had sold their cows as meat in order to succeed paying back their loan. In the beginning, when the project was funded and operated by the NDDP, the cow was continuously provided to the farmers as support. The system was in itself a clever idea, as the farmers received a pregnant cow from the cooperative, and were allowed to keep the cow after it gave birth. The farmer then took take care of the calf and were required to give the calf

back to the cooperative, who then gave it to local villagers who wanted to join and participate in the project. If the cow gave birth to a bull, the cooperative would not take it, but if it was known to be of a good breed, the bull could be used for artificial insemination. By following such a system the project stayed sustainable and basically everyone that wanted to join could do so.

However, in 2000, when the NDDP, operated through the TSDDP, pulled out of the area (because they considered the project to be a success and would continue to be so), the system changed and the focus became much more on an industrial business of selling milk products than an actual development project. A series of occurrences and motivations led to changes in the system, which may harm the sustainability of the dairy cattle project in the future. Veterinary services became increasingly difficult to access, both in terms of decreasing availability of services and increasing actual costs to the farmers. Particularly concerning however it is how the newcomers now struggle to join the project. Individual farmers themselves became increasingly selfish and many lied about having calves, or did not want to give away the calves that they had raised as they considered them their own, while others again failed to take care of the calves with all the required feeding and expenses as they had to give it away anyways. This created a situation where more and more farmers started to buy their own cows, and a group of entrepreneurs called Farmers' Friends bought cows from different areas and then sold it to the farmers. This system seemed to be more difficult for many of the farmers because the breeds were often of poorer quality, and the interest rates could be difficult to handle. The cooperative still tries to find cows for new participants to the project, but this has according to board members in UWAMA proved difficult as there are now fewer cows for them to get access to. The waiting lists to join the projects are long, which has further created a situation where farmers accept the cows they get without investigating on the breeding history of the calf, leaving many farmers with cows producing low amounts of milk. Agents from other parts of the country and surrounding countries have also come to the area buying up the cows from the area. Higher demands leaves the cooperative unable to compete with the prices offered by the foreign agents.

Furthermore, the price offered to the farmers is perceived by them to be fairly low, and they feel Tanga Fresh basically is only interested in selling the milk further for higher profit.

According to many of the farmers interviewed, the UWAMA has become only a bridge towards the market, and has become less occupied with helping the farmers in times of distress or need. The farmers were also dissatisfied that the communication between the three parties (farmers, UWAMA and Tanga Fresh) had become worse, and that the UWAMA now only was trying to stay on good terms with Tanga Fresh, and therefore not being able to speak for the farmers' views and requests. As the farmers were dependent on a market to sell the milk, the monopoly situation with Tanga Fresh created a difficult negotiation card for the farmers. The farmers and Tanga Fresh knows that the former will get into trouble if the project stops. One cattle farmer responded that: "Both Tanga Fresh and the UWAMA says that 'if you are not satisfied with us or the prices, you can go sell to other places, you are totally free to do this, so stop complaining so much'. I am sure competition would have helped, but there are really no other ways to sell the milk. It is difficult to get our voices heard; they are not interested in helping the farmers as long as they keep getting their milk".

The development aspect of the project has thus mostly vanished, and the challenges are continuously increasing both for the farmers participating, and for the population waiting to start participating in the project. According to many of my informants, the only way to now join keeping cattle is to have family or friends that will provide cows for them. An example that was mentioned by many farmers, and was quoted by one female farmer in Shebomeza waiting for a cow, expresses some of the feelings and experiences regarding this situation; "I have been waiting for six months (for the cow; authors note), I have paid the membership fees, the fees for training, I have bought and built the cow shed, and the worst thing is that I have also paid for the cow... a first-time fee of 50,000 TAS... That was expensive for me, and I have not yet seen the cow. I have talked to some friends, and they are also still waiting... We do not know what to do about this. I am afraid I will not see my money again, and the project needs to go find cows. Where is the management in all this? Of course there are cows available, just look beyond Amani also! The management is the problem, and it is harmful." Some of the problems are attributed to the lack of communication between the farmers and the cooperative. The stories on who was actually responsible for providing and getting hold of the cows and veterinary services were both many and fragmented. Some thought there was corruption in the cooperative, either alone, or together with Tanga Fresh, some wondered where the money in the project had gone, while others generally complained about the management of the project in terms of lack of planning and interest of helping farmers.

7.2. The Amani Butterfly farming Project

In 2003, Tanzania Forest Conservation Group (TFCG) initiated the Amani Butterfly Project with the aim of improving livelihoods of rural communities and promoting biodiversity conservation adjacent to ANR. The idea is to give people an opportunity to earn good incomes by harvesting natural products in a non-destructive way. The objectives of the project are according to the project manager to

- Improve the livelihoods of women and men in remote rural communities
- Create a sustainable butterfly cooperative as a model for future projects in Africa.
- Promote the conservation of a biodiversity “hotspot”.

Villagers were to participate as butterfly farmers, which involves raising butterfly larvae in butterfly cages (Figure 14). These are then sold in two particular types of markets in Europe and North America; live butterfly exhibits and dried specimen dealers. The former represents the largest part of the market share. The butterflies are sold in their *chrysalis* (pupae) phase, and emerge as adult butterflies upon arrival to butterfly houses. These exhibits then charge tourists and schools to see tropical butterflies from all over the world. Live exhibits need shipments every two to three weeks, as the life span of most butterflies does not exceed this time period. The average price paid per pupae in such a market is between \$1.50 and \$1.75 (2000 TAS to 2,580 TAS), with a range from \$0.75 (1,100 TAS) for a small common species, to \$2.5 (3,700 TAS) for endemic species such as *Hypolimnas antevorta*. Dried specimens are sold to buyers who then resell them to individual collectors (Interviews with Project Manager).

The project has its roots from a study carried out by Theron Morgan-Brown in 2001, a biologist affiliated with TFCG (Scurrah-Ehrhart and Blomley 2006). In addition to the study, TFCG and Morgan-Brown obtained some funds from various donors, such as the McKnight Foundation, FAO, and Critical Ecosystems Partnership Fund. They also got monitoring skills and training from the already established Kipepeo Butterfly Project in Kenya to help the project in Amani to get started. In 2003, the project exported their first butterfly pupae to Europe. In the beginning, few farmers dared to take part in the newly established project, but as those who participated began to increase their incomes, more and more farmers decided to begin farming. According to the project manager, there are now around 250 farmers in

villages adjacent to the ANR, a number that has gone slightly downwards the last couple of years however. The annual sales steadily increased during the first couple of years, from 40,000 USD in 2004, to 90,000 USD in 2009, and with a slight decrease down to 89,000 USD in 2010 (Field interview with Project Manager 2010). This indicates that between 60,000 and 90,000 pupae had to be sold to arrive at these numbers. Whether this is going to be realistic in the next few years, time will show, but this project is running into challenges that must be overcome if the butterfly farming will continue helping local communities in the area.

The project has shown a fairly good fit between the stated objectives and the ground activities. It has for instance improved household incomes, community development, and raised awareness towards forest conservation. An average income of 45,000 TAS are reportedly accrued per household per month, while the revenues from the sales are furthermore distributed to an agreed principle; i.e. 65 percent goes to the butterfly farmers, 28 percent is retained to run the field office, while 7 percent goes to the village in order to support community development projects. However, the project has run into various challenges that may seriously alter the sustainability of the project.



Figure 14: Butterfly cage in IBC Msasa (Picture taken by the author November 2010).

7.2.1. *Financial dimensions*

The average monthly incomes retained from the project activity was a technical question many informants struggled to give a correct estimate on. People used different scales for their incomes, where some counted their expenses, while others did not. There is both good and bad seasons for butterfly farming, and some years are naturally providing better or worse productivity. But the income level may in itself not be representative for the whole group of farmers. Most farmers have other incomes in their households together with butterfly farming, and as the overall income therefore has increased, it has given many households a good diversification strategy.

The price for the pupae differs according to the species, and ranges between 800 TAS to 1800 TAS. From a total of 17 butterfly farmers who responded to the question, the monthly income ranged from 30,000 TAS to 100,000 TAS, with an average of approximately 60,000 TAS. On average, this covered between 30 and 50 percent of the household's overall income. According to the project manager, the actual average was approximately 50,000 TAS per month per farmer. When asking farmers not participating in any of the projects, the average income was reportedly around 80,000 TAS. This indicates that this extra income has the potential of total increased household income, as it seems possible to conduct this project together with other income-generating activities, such as vegetable farming, selling cloves, and keeping dairy cattle. Most farmers that were interviewed in the study were satisfied with the income the project had given them, that the project is consuming fairly little time, and that the project have offered employment to the under-employed in the village. This new opportunity has helped many stepping out of activities such as tea-plucking, mining, and selling timber. The project has thus helped many villagers diversify their livelihoods and thereby made them increasingly secure in terms of present and future expenses and challenges.

The project provides the farmers with training, market access and to some degree tree seeds required by some species of butterflies. However, the costs for the farmers to participate in the project can for some potential participants be overbearing. The cage costs 38,000 TAS, while an annual membership fee costs 3,000 TAS. Because of such costs, several of my interviewees who were not participating in the project could not or did not want to participate

in it. Some of my informants considered this to be unfair, as the project was an establishment to compensate the farmers for the restricted access to forest resources, and “not an industrial business only the middle-class or above are able to participate in” (Interview with a male agricultural worker in Shebomeza 2006).

The market is seasonal, from March through to October, which is the warmer period on the northern hemisphere. The most significant decline in production occurs during the hot season in Amani (Dec-March), which also harmonize with the cold season in Europe, when the demand for live pupae is low. In lower elevation villages such as in IBC Msasa, humidity and available water decreases during this period to a point where frequencies of egg-laying and availability of host plants are reduced, with the result that butterfly larvae dies (Interview Project Manager 2010). These factors may contribute to fairly long periods where nothing is sold and exported. Many farmers thus abandon butterfly farming and instead pursue other sources of income during such periods. For many however, it is difficult and time-consuming to recover the project as they often have mismanaged the cage, larvae and plants during the winter, and has to start all over again, finding host plants, catching butterflies and repairing potential damages on cages and other equipment. Additionally, the market is at the moment not experiencing a strong demand, and some farmers thus experience that some of their pupae is not collected. Some informants also claimed that they often experienced that half of their produce is not collected. Obviously, the buyers want variety in their samples, and if the project has enough of one type of butterflies, the collectors stop buying when they have enough, and ask the rest of the farmers at the collection site that they must come back later. This can be difficult for many farmers, as they have spent both time and resources, of which they do not retain any income from. Many farmers are thus left discouraged and questions whether they want to continue the project. Many have already left, for the main reason that the incomes are continuously decreasing. It is therefore questionable whether the project is strong enough to raise the incomes of large enough parts of the village so that it will help towards both overall community development and forest conservation.

One major contributor to the insecure and limited markets is the difficulties of shipping the pupae to Europe. Since 2004, DHL transported the live pupae to European and North American exhibition centers. However, in 2009, European countries posed a restriction on shipments of live animals, which included butterflies. The project thus had to make the

transportation through Air-cargo, which is more expensive and also more time-consuming. Pupae export packages are highly time-sensitive and must be shipped out as fast as possible before the butterflies hatch. As it is the buyers who pay for the transportation, smaller exhibits and individual collectors have difficulties paying for these expenses. The project had two big buyers before, and seven smaller exhibits, but they now only sell to one big buyer, the UK-based Stratford Butterfly Farm. If the project would lose also this buyer, the project may in fact end its operation. The sales are already lower than in previous years, and the project is now only collecting pupae once a week, compared to twice before. According to the project manager, the project is not able to collect the same amount of pupae as before, and confirms the farmers' views that many have to leave the collection site without being able to sell any of their pupae.

Marketing is a difficult task for such a project, as the market itself is fairly small, and the NGO (TFCG) may not be strong enough to spend much time and money to advertise for products in Europe and North America, even though the project office in collaboration with TFCG is trying to get more contacts. According to the project manager, this has been a slightly difficult task so far. It may be slightly problematic to explore the international market with the aim to increase income levels for poor communities and with an overall aim of reducing community deforestation. As some farmers use both large parts of their land and time to farm a variety of butterfly larvae, it gives them difficulties when the project experiences such challenges as market declines and poor seasons. If the project now fails, many of the farmers who have depended on the project incomes are required to look for other sources of incomes such as restarting their agricultural farming. Some farmers were seriously considering entering activities that are considered illegal, such as going back to harvesting timber, capturing or hunting wild animals for sale, or mining activities. The NGO therefore must assure that they continuously try to find solutions for continuing the project sustainably, and also offer environmental education to keep building conservation awareness in the villages.

7.2.2. Social dimensions

For the villagers who started participating in this project from the beginning, their incomes have increased, which have given them increased livelihood security. Through this

diversification of household income, people have been able to build new, or improving houses (particularly brick houses), pay school fees for their children. Some have been able to pay workers to work on their land, while others again have been able to save up enough credit to expand other activities such as establishing businesses. Good relations in the village seems to be important for the project, as some farmers are required to borrow land from friends and neighbors to store host plants for the butterflies. This is especially true for the participants with smaller pieces of land.

The project is so-called “gender-neutral”. Both women and men are equally encouraged to participate, with a clear emphasis on female farmers. There are according to the project manager slightly more women than men who have signed onto the project. This is an important feature of a project, as many other occupations in the villages adjacent to ANR are basically conducted by men. In addition to farming the butterflies, some women are also taking part in making jewelry from the butterfly specimens. These are then potentially sold to visiting tourists. Even though there may not be a very high numbers of tourists at times, some of these women were fairly excited about this opportunity, as it gave them an extra income on the side for work that they appreciated doing. One of the female informants in Shebomeza mentioned that it was a “nice social activity working with other women who she could gossip on community issues with”. Such an encouragement to women to conduct a project themselves and get a decent income may lead to an increase in female empowerment, an important part of general community development. It has been recognized by several authors, that when women themselves acquire incomes through their own work, a larger share of the money is spent on household activities and necessities (Ellis 2000). However, such increased empowerment with higher income levels among women could in some instances lead to an intra-household conflict. It was difficult to make any valid observations regarding this, but informal conversations with different village members suggested that such conflicts may in fact appear. This could especially be true in households where the husband considered himself as the sole income earner, and where the households were particularly hierarchical.

The fact that parts of the sales in the project comes back to the villages for community development were highlighted by both participants and non-participants of the project. However, very few could actually say what the money had been used for. Most argued that this money went into a pot, which in total went to project that was good for the village, and

some had seen that the villages (all three villages) had improved the village council offices and built new classrooms at the schools. This was seen as a very positive thing, but whether this was enough for villagers unable to join the project, is harder to say.

The butterfly project is in fact fairly limited in scope, scale and outreach. There are few opportunities for new and more participants to join, the income levels are limited, and the market is at the moment small. Obviously this makes it more difficult for large segments of the community to join and accrue benefits. This may also affect the potential for such a project to help other villages that are adjacent to other protected areas, or even for the villages surrounding the Derema corridor. Many villagers here (IBC Msasa) were clear that the butterfly project was a great idea when it started, but that it is now few opportunities in the business, especially for newcomers. The market is decreasing, and the farmers who have been farming for some years are more experienced and carry more knowledge in how to run the project in a good manner. The project can certainly be established other places where there is other species of butterflies, as the project is hoping to do, in areas such as in the cities of Morogoro and Arusha, but at the moment, such an entrepreneurial project may run into difficulties regarding two of the main objectives, to contribute to community development and conserve important forests. Another butterfly project is also operating on Zanzibar. However, here the activities are mainly for tourism, where they arrange tours for tourists to visit their exhibits. The community development part of the project has been reduced drastically, as the project now for the most part hires managers and tour guides only. As the butterfly project is one of the best known projects among the communities in the ANR area, and which clearly has shown income potential, it could among some respondents remain a feeling of disappointment regarding not participating. Some informants were complaining that the project could in fact impact on the patterns of socio-economic differentiation between households, and thus increase jealousy within the community.

People started to join the project after TFCG made an announcement through a village council meeting. According to various village chairmen, villagers, and also the Conservator of the ANR, there are some characteristic differences on who actually participates in such meetings which is affecting those also beginning to participate in projects. Some villagers are certainly more active on meetings on community issues, but especially women, both fairly young and old villagers, and also the poorer segments of the community are particularly missing from

such meetings. When such project announcements are made, large fractions of the communities miss the opportunities. Some respondents from IBC Msasa also claimed that only the villagers closer connected to the former chairman of the village or project coordinators were given the opportunity to join in the beginning, and that these were given more benefits, or more equipment. At the moment of interviews, a few villagers were also complaining on the slow bureaucracy of the project, as they for a long time has been waiting for a cage and training. These farmers were complaining that only the villagers that were “friends” with the leaders of the project were given what they needed on time. This is a heavy acquisition and difficult to prove, but could still indicate that there has been some communicative issues that have created some difficulties for a few villagers to start participate in the project. It is fairly clear that both parties must improve by increasing participation among the villagers and an increased openness regarding project operations may be a start. The project in itself is supposed to contribute to social development and increased conservation awareness, and thereby include all segments of the community. It is therefore necessary to both make it easier to join the project, as well as making an effort of encouraging the whole community to join.

The particularly poor villagers have experienced some difficulties joining the project, according to both the project manager, and villagers interviewed in all villages. The cage in itself is expensive, many do not participate in public meetings where announcements are given, while both the cage and host plants take up some space on the farm, thus lowering villagers with smaller lands an opportunity to join. Some parts of the farm have to be given up, and subsistence households thus cannot afford market declines and poor seasons. The actual land they inhabit must in these cases be used for agricultural plants, or trees for firewood.

After the time of the fieldwork the leaders of the project have engaged in a new tourist development, where they take tourists on daytrips from Tanga town to see the butterfly exhibits run by the project. Several buses are reportedly arriving every week, which carries vast income potential for the project, enhancing the share given out to the community to a certain degree, as well as giving crafts-making women an influx of potential buyers of their products. It is likely that this will provide financial support and security for the future of the project. It is however questionable how this will affect the rest of the participants and the

wider community in the coming future. This income is likely to contribute more to the budget than from selling butterflies, and it is a concern that butterfly farmers will receive small benefits, if any, from this new development. It could actually also mean that the butterfly project in Amani will follow some of the principles from the scheme in Zanzibar, where one is mostly engaged in tourist activities with little emphasis on community development and following up individual butterfly farmers. Additionally, because the project uses their own guides from Tanga town, and seems to have made an agreement of not paying the fees of the ANR, the spillover effects do not get realized, and very few actors are likely to accrue benefits from this new project development. Following this development is therefore interesting, but it is too soon to make any conclusions.

7.2.3. Environmental dimensions

One of the main quotations I met in the interviews of butterfly farmers were: “Protect the forest – protect the butterfly”. It seemed that the idea of conservation had gone home to all the butterfly farmers I interviewed in all the villages adjacent to ANR. They saw that butterflies habitats are in healthy forest with native plants and trees, thus connecting ideas of ecosystem conservation with income earning possibilities. Because the butterfly farmers are provided with an extra source of income whose impact on the natural environment is minimal, it follows many of the principles of a classical ICDP and thus carries a vast potential. Such a viable alternative source of income should decrease the villagers’ reliance on illegal forest-related income generating activities such as timber extraction and chameleon poaching. According to the project leaders, this project was especially good for the villagers that previously were involved in such activities, and who now has left these and entered the butterfly farming practice.

According to the project manager, and the Conservator of ANR, the only instances of potential forest disturbance are the capture of female butterflies for breeding, or collection of seed or leaf for feeding the larvae when farming begins. Farmers are breeding their own female butterflies after an average of six months, and have often also established their own nurseries for host plants. Most species of butterflies needed for breeding can also be captured on forest-bordering roadsides (Scurrah-Ehrhart and Blomley 2006). This is also where most butterfly larvae are found, as they feed on forest-edge species. This should make it less

necessary to spend much time in nearby, or inner forest areas searching for host plants, butterflies and their larvae. Farmers most often also release the butterflies back to the forest after they have mated or laid eggs.

Farmers have also planted more native trees particularly for providing habitats for butterflies and their larvae. They have learnt that endemic species has the highest value in the market, and that they depend on a healthy forest with especially native species of trees. It was a general idea of my interviewees that they would not destroy the forest or cut down any native species for this reason. In the village of IBC Msasa, 34 butterfly farmers came together and bought up a plot of land where they planted trees attractive for butterflies in order to increase the larvae fodder and butterfly populations within the village. The farmers furthermore understand that if the forests are destroyed, it will be the end of butterfly farming. It seems quite certain that the farmers want to protect the forest because they are afraid of losing income. Some respondents claimed that they are willing to act as police as well educational teachers in order to persuade and teach others about the importance of forest conservation.

Many farmers would have no problems with telling the authorities about illegal harvesting activities in the forests. Butterfly farmers also believed that people not involved in the project were more likely to enter the forest and harvest forest products illegally. This was heavily argued against among the non-participants, but the butterfly farmers were particularly of the opinion that others are more likely to cut down the wrong trees as they did not know which ones are native, as well as the necessity of finding other sources of income.

The project also holds informational meetings in schools and the villages in order to increase the awareness of forest conservation importance. As some of the earned money is allocated to the villages, they are trying to increase the community support for local and global forest conservation. Interviewees standing outside the project were however not entirely sure about the successfulness of that idea. The money accrued was basically too small to make any significant impact, and the individual villagers did not receive any particular benefits. However, these interviewees also saw an importance of the forest ecosystem. Mostly, this was also because they saw the tangible benefits they received from a healthy forest, such as increased agricultural production. The butterfly project may put extra emphasis on these issues, but forest conservation may still be a general interest among all villagers.

This *feeling* of conservation can however be fragile. Because many interviewees saw that the income now decreased continuously and that the market was clearly in decline, they were in fact losing some of their consciousness and attitude to forest protection. Surprisingly many informants wanted to remove both trees and plants from their land or village forest land, and start planting other agricultural crops instead. Some farmers in IBC Msasa started to lose the interest in the village forest reserve they had restored, and was seriously considering changing it to agricultural land. People have thus only seen conservation as important in order to get the income. This may show that increasing incomes based on a non-destructive harvesting of natural products is good, but may be particularly dangerous if the project is not sustainable.

7.3. Fish farming and beekeeping

In collaboration with the FBD (Forestry and Beekeeping Division in the Tanzanian government), EUCAMP began in the mid-1990s to initiate particularly two income-generating activities for the villages adjacent to ANR as compensations for reduced access to forest products. These were beekeeping, and fish farming in dams and ponds (Figure 15).

Before any intervention in the Amani area, fishing was mainly carried out in rivers both outside and within the Amani Nature Reserve. The first objective of the fish farming project was to reduce disturbance to streams and wetlands from fishing and catching of crabs. This would give positive impacts on conserving the aquatic life forms, as well as enhancing the water quality. Secondly, fish farming would also give the participating farmers an improved household nutritional diet, as well as an increased and sustainable income source. Community groups were trained on modern fish farming technology, and a fairly high number of villagers were reported to be either interested or actual participating in the project. As late as in 2006, ANR considered that more than 65 individual or group ponds received fingerlings of the fast growing tilapia species (*Oreochromis*) (ANR 2006). Farming of tilapia was reportedly not affecting the environment, and would instead have the potential to increase availability of improved nutrition and household income once sold or consumed. Integrated systems of aquaculture, in this case the tilapia ponds together with agricultural crops and livestock, are considered to have a vast potential worldwide, and carried much potential also in the fairly

rain-fed lands around Amani. In order for these systems to be sustainable, they should imitate as much as possible the way natural ecosystems are functioning, with a fairly small import and export and substantial internal recycling of materials (Folke and Kautsky 1992). Edwards (1998:5) defines integrated farming involving aquaculture as; “concurrent or sequential linkages between two or more human activity systems (one or more of which is aquaculture), directly on-site, or indirectly through off-site needs and opportunities, or both. Such systems may bear positive relationships with the environment and the household farms, as ponds dug on small-scale farms may trap nutrients, as well as make water available for irrigation for agricultural crops (Edwards 1998, Bryceson 2002). Vegetable wastes from the farm’s agriculture may be used to feed the fish, while the bottom wastes from the pond can be used as fertilizer on agricultural land. By also including animal production, where animal wastes are used as fish feed and pond fertilizer, such integrated systems have the potential of reducing the costs and increasing productivity. Such integrated systems experience low incidences of diseases, and consequently, less medicines and chemicals are needed (Bryceson 2002).

Edwards (1998) considers some difficulties when establishing such systems, of which were also influential towards the fish farming scheme in the villages adjacent to the ANR. One challenge arises from the fact that small-scale farmers need to use most of their crops for feeding the livestock, while using the manure on the crops instead of using these products on a pond. It can therefore be difficult to conduct such integrated systems, particularly on small lands and after technical and/or financial project support is removed. Edwards (1998) refers to a study in Thailand with a system integrating ducks and fish, where they were able to accomplish quite large fish yields, and thus providing the families with enough animal protein to support their nutritional demands. However, since the technical and financial advice left the project, the farmers were not able to sustain the integrated system. Various reasons were accounted for, but the marketing problems were especially influential. The farmers had problems getting access to inputs and selling their produce from their small ventures, as well as experiencing competition from larger scale, or intensive, agro-industry. The same author furthermore argues that a growing population together with degradation of the environment, inevitably results in a decline in the quality of the resource base. As an effect, available land is continuously minimized and establishing fish ponds are often quite difficult for many villagers.



Figure 15: Fish pond with tilapia in the village of IBC Msasa (Picture taken by the author November 2010).

As illegal hunting and collecting of wild honey by local villagers were increasingly observed in villages adjacent to ANR, a beekeeping project scheme was initiated. The illegal activities were typically conducted by burning hollow trees habituating bees (*Apis mellifera*; Bradbear 2003). The smoke has a calming effect on the bees, which makes it easier to take out the honey products. This of course is harmful both to the trees themselves, but can also increase the incidence of fires which are likely to harm other elements of biodiversity. The farmers used traditional beehives made from tree logs, thus creating a slight demand for timber products. Therefore, the objectives of the project were to establish community apiaries in fire prone areas, which logically may reduce the incidence of forest fires caused by honey hunters, as well as giving the beekeepers themselves the motivation of protecting their beehives from fire (ANR 2006). Locals would also obtain access to a new source of income and food, which should provide a better relation with core biodiversity areas.

Collecting of honey is regarded as a coping strategy for food insecurity in the households (Bradbear 2003). It draws upon all categories of capital assets and fits well together with several other livelihood activities. There is no direct competition between beekeeping and other activities such as forestry, agriculture, and conservation activities, or with other insects or animals. It therefore has the potential of playing a large role in socio-economic development and environmental conservation. Beekeeping provides a source of food (honey, pollen and brood), raw materials for various industrial purposes (beeswax candles, cosmetics,

lubricants, textiles etc.), medicine, as well income for beekeepers (Jacobs *et al.* 2006). Estimates showed that beekeeping in Tanzania generates on average \$US 1.7 million from sales of honey and bee wax every year, and estimated that employment is provided to around 2 million people (Masanja 2004). Beekeeping is mostly done in coastal regions, and especially around Rufiji and Bagamoyo. Bees are important for the ecosystem, as they provide pollination to both cultivated and natural plants. Beekeeping can thus for instance easily be combined with agroforestry, a system in which trees are intermixed with agricultural crops and/or animals (Jacobs *et al.* 2006). This may give even smallholders an opportunity to incorporate beekeeping into their overall land management strategies and farming systems, in order to ensure abundant nectar and pollen for a thriving apiculture. Planting additional trees on land plots can contribute to a productive (extra food, fodder, firewood) and protective (soil and water conservation and soil fertility improvement) benefits to the farm, and thus also in addition create a living environment for the honey bees which may supplement the diversification of household livelihood strategies. Together with bringing a potential to economic and ecological objectives, beekeeping may also give an improvement of the social dimensions. Beekeeping may allow for all social groups, also the poor, to gain a livelihood under fairly good working conditions. Little land is required and the project is not especially time-consuming.

EUCAMP introduced modern beehives and equipment to improve the local beekeeping industry, and reportedly more than 200 individuals were signed up for participation at one point (ANR 2006). Beekeeping groups were initiated in 13 villages around the ANR (EUCAMP 2002). In order to make sure that people were truly interested in joining such a project, potential participants were required to make (or purchase) three traditional beehives which they would exchange for one modern beehive. According to ANR (2006), modern beehives would reportedly increase the production of honey by approximately 75 percent. Bradbear (2003) recognizes that such modern beehives (top-bar hives) are likely to open up beekeeping to new groups of people, as groups of women for instance are likely to prefer such modern hives as these can more easily be kept close to home in addition to its simplified methods of use. Some beehives were set within the reserved forests, while others were set in the general or village land.

7.3.1. The end of project funding – the end of sustainability: Effects on livelihoods improvement and conservation

When EUCAMP and its attached funding schemes stopped in 2002, the projects have slowly, but steadily dropped in terms of the actual income potential and numbers of farmers participating. According to various sources in villages and the ANR Headquarter, it was the ANR that took over the responsibility of the project. Generally, this has not worked out well. The conservator of the ANR attributed a lack of financial and administrative strength of the ANR as the main weakness for running these projects. At the time of the interviews in 2010, it was reportedly only 15 farmers having fish farms across all the study villages, and only four or five villagers keeping bees (Personal communication with various personnel and farmers in ANR, Shebomeza and Mbomole 2010). The reasons for such a decline of the projects are certainly multifaceted, even though both projects shown a somehow similar path towards non-sustainability.

Most of the fish farmers and beekeepers interviewed in the study had all initiated their activities on an individual basis without the assistance from outside partners, although some had carried out the activities for many years and started out with a partnership with EUCAMP representatives. However, and especially regarding fish farming, the farmers were not satisfied with the cooperation. They claimed that they did not receive any equipment and received very little assistance regarding digging the pond, feeding and catching of the fish. The farmers were given fingerlings from the project, but during the harvesting season, the project representatives took a fairly high number of fish from their ponds that were going to be used for further breeding. According to one older farmer in Mbomole, this was “regarded as harmful to the farmer, as well as principally rude. This is not supporting us, but only giving us a small loan.” He therefore decided to stop cooperation with EUCAMP, and continued himself. He now has three ponds of which he has a fairly high production and a good income. According to several villagers, he was also the main or only fish farmer in Mbomole selling fish for the market.

After the project support ended in 2002 most of the farmers that were participating in the beginning of the project decided either to stop farming fish entirely, or the project phased out when new generations of family took over the ponds. Even though the fish farmers were

satisfied that they were able to provide a healthy diet for their households, several problems have arisen since the end of the EUCAMP project. Quantity and quality of good tilapia fingerling breeds were increasingly difficult to get access to, information and advice stopped, and the potential of acquiring access to other markets was severely hampered. For some of these reasons many farmers decided to withdraw from fish farming altogether. As fairly large areas of suitable land are required for ponds, many villagers are again left with difficulties in joining the project. It thus seems as such an ICDP again have helped a few farmers with already large farm sizes with more potential for diversified income activities and tree plantings. Observing these farmers' lands, it was noticeable that they had a high production of both agriculture and milk, and to some degree, the fish ponds were either only an additional benefit or a hobby activity on the farm for self-consumption.

Most of my interviewees regarding fish farming complained that the species of tilapia were of poor quality. The fish rarely grew larger than a ring finger, and it is difficult for the farmers without any assistance to find or breed fish that will grow larger. This also reduces the likelihood of selling the fish in markets further away. The market in the villages is decent every harvesting season (usually twice a year when the fish has grown to a certain size), meaning that the fish farmers are able to sell some of their fish to villagers. The villagers have no options for storing the fish and little purchasing power. They are therefore not able to buy high quantities or pay high prices for the fish. Usually the farmers sell the fish for low prices, or exchange it for other food items. The levels of income from fish farming were thus low and showed very little financial sustainability. The tilapia requires a regular feeding of grain, which has to be purchased at the milk collection center in Amani town. This can be fairly costly especially compared to the incomes from selling fish. Most of my informants actually earned less than the costs of running the project. On an average, the farmers only earned between 12,000 TAS and 20,000 TAS each year on selling fish, but other expenses such as purchasing of grains was on average approximately 30,000 TAS per year.

Most of my interviewees consumed the fish themselves without entering the markets in any way. The reasons for continuing the project were therefore basically different than the opportunity for gaining any income from the project. The main reason was usually that the fish improves the nutritional value of the household's diets. Others continued fishing for

religious reasons, as particularly one farmer in Maramba explained that “withdrawing from the fish pond for financial reasons and let the fish die would be a sin and against my religious beliefs, and I would certainly not do this”. Generally, it seemed as the ones undertaking the project had began themselves, by digging ponds and receiving fingerlings from friends or neighbors. They considered it a nice and interesting project to carry out; many farmers harvested the fish they needed for food for a day with a fishing pole, assembling the way people had done it before in the rivers and streams of ANR. They considered this both as fun and relaxing, as well as a social activity with their children or grandchildren. As the project has turned into an individual activity with little impact outside of the household except perhaps for friends or neighbors, it is highly questionable whether this project has turned into a high-potential scheme for increasing the general nutritional value within the village community, nor a general improved attitude for conservation.

The remaining scope, scale and outreach of the beekeeping project in the study villages have decreased continuously and very few beekeepers are now participating. WWF, in close cooperation with TFCG, are now trying to revive beekeeping as an alternative income source in different villages, which could have a potential for village groups and thus some level of community development. However, this is only in the beginning phases and results of the campaign are yet to be seen. Beekeeping as a livelihood activity is also conducted in larger scales in other regions of the country, and it remains to be seen if the project in villages adjacent to ANR is able to enter the markets in a required fashion. At the time of the interviews, villagers in IBC Msasa complained that they were promised a beekeeping project with modern beehives for groups of villagers some years ago, but had not yet seen any efforts to get this started. WWF/TFCG personnel however remained determined that they would get the project started within a short time. Around the time of my departure in December, they were holding meetings with interested villagers in IBC Msasa. Reportedly a high number of villagers showed a great interest in the project, which should increase the likelihood for succeeding establishing beekeeping groups and thereby bringing a higher potential for the future.

The beekeepers generally complained that they did not have access to good equipment, such as modern beehives, protective clothing and harvesting tools. The modern beehives reportedly

cost about 35,000 TAS, an amount higher than many villagers could afford. These would however increase production manifold, and would be necessary for serious participation in the beekeeping business. The beekeepers also experienced unreliable markets for their products both within and outside of the villages. Bradbear (2003) also cited limited access to transport and market information as the main reasons for beekeepers in remote rural areas to receive low prices for their produce. Such factors are strengthened as rural communities such as Amani rarely have access to market information and capital investments. As the beekeeping business in Amani is only local, the beekeepers have not been able to sell to other villages in other parts of the region or country, thus weakening the profitability and willingness to keep bees.

The project may well have been a good source of nutrients and income for the beekeepers during the time of the project and donor. As the farmers worked in groups, accessing modern beehives, they were able to produce more honey and could sell to other villagers continuously. However, when project support decreased and ended entirely, the project has not been able to continue sustainably. Villagers who had either stopped keeping bees, or stayed entirely outside the project were particularly concerned about beestings and lack of knowledge on how to keep bees sustainably. Too few participants, whose income is too low to improve household income significantly is the result of the project some years after the donor left.

Like the fish farming scheme, the project is most likely not strong enough to build up community awareness towards neither conservation, nor a sufficient compensation for reduced access to forest products. A cooperative, which is the interest of the WWF/TFCG also, could be good idea if done transparently in terms of benefit sharing, both politically and for divisions between different groups in the villages. Such cooperative groups may in fact help villagers get started in the project, receive advice and help regarding administering the project, as well as saving up credits during times of difficulties or distress for the beekeepers, or their households. Beekeeping activities could therefore be promoted in line with market promotion for bee products.

When the project failed in the study villages after the EUCAMP program ended, the WWF/TFCG must take the causes of this into consideration in order to not experience similar pathways again. For villagers to be encouraged to invest already scarce resources to join the project of either beekeeping or fish farming, some improvements regarding markets, equipments, information and training must be in place. Political, social and gender relations should also be taken into consideration, so that all parts of the community are able to participate and get access to the project. This would include both the women and the poorest segments of the community. New beekeepers need to training and knowledge on how to work with bees if the project is going to stay sustainable. Bradbear (2003) cites particularly important fields of improvements, such as teaching beekeepers how to maintain honey quality, how to separate honey from beeswax, how to render beeswax, and how to manufacture secondary products. Experiences from various areas including Amani villages have shown that farmers are taught basically on theoretical aspects of beekeeping and emphasizing changing the type of hive rather than providing practical guidance and follow up (Bradbear 2003; Field Interviews IBC Msasa 2010).

Establishing groups in both activities that can work as a cooperative could be an important step forward, as individual lands often are too small, or have too few trees. More sustainability and openness regarding such cooperatives, improved market access where the activities can be promoted in line with market promotion of bee and fish products, accompanied by a good educational and informational flow between farmers and the NGO, are likely to enhance such projects in the future. The NGOs, like TFCG/WWF, should represent the interests of beekeepers and fish farmers, and institute communication between producers and traders and thus facilitate marketing. Villagers who were previously engaged in beekeeping, and who foremost became alienated from the business by the protected forest, should particularly be encouraged to participate. Their knowledge and motivation could potentially influence other villagers to join and simplify implementation of the projects. Such factors are also likely to enhance the overall sustainability of the project both financially, socially and thus also environmentally. It would most likely be more effective for the facilitators, such as donor and conservation agencies, if their financial and technical assistance were better coordinated with what the villagers themselves perceive as needed, as well as the actual potentials for beekeeping and fish farming in the villages. This means that the agencies are required to do an assessment of the farms' resource base, as well as the needs of the

farmers themselves. Local participation and focus upon the local resources, will potentially revitalize these projects.

7.4. Collection, growing and selling of *Allanblackia stuhlmannii* seeds

Named after a Scottish botanist Allan Black, *Allanblackia* is genus of nine species that grow in the tropical forest belt which stretches across West and East Africa (FAO 2008). The trees bear large fruits which may hold up to 50 seeds and the kernels contain oil which is high in stearic acid (Figure 16) (Unilever 2009). The seeds have traditionally been used by local communities for cooking and making soaps, but this high-value oil which is far healthier than for example palm oil, has also started to attract international attention. So far the seeds of *Allanblackia stuhlmannii*, the species found in the East Usambara, have been supplied from the wild, but trees are not always easy to access and do not fruit every year. Therefore, the Unilever has supported the established a private-public initiative, Novella Africa, to set up supply chains and to cultivate the trees for commercial seed production (Attipoe *et al.* 2006). Here, the commercial company (Unilever), international NGOs (such as IUCN), local NGOs (Faida MaLi), local businessmen, collectors and processors all should be involved in order to make the project successful and provide benefits for all actors in the chains.

Harvesting fruit from the wild trees in natural forests or from naturally regenerated trees in fields involves identification of female trees (approximately 50 percent of *Allanblackia* population), daily collection of fallen fruits for a 10-20 day period per tree, seed-extraction from the fruits and carrying the seeds back to the house for drying.¹³ Between 100 and 150 fruits are commonly collected from a single tree, but for some trees, it is possible to collect up to 300 fruits. *Allanblackia* trees do not seem to experience biennial fruiting patterns, where an abundant fruiting year is followed by a poor year. The individual fruits weigh between 1.2 to 4.0 kg and may contain 25 to 40 seeds. Three fruits provide approximately 1 kg of air-dried seeds, which gives 35 percent oil on average.

¹³ www.allanblackia.info Novella Africa Initiative. (Accessed 18.3.2011)

Unilever is a co-founder of the Novella Partnership, a program founded in 2002 to scale up production of *Allanblackia* oil in Ghana, Tanzania and Nigeria. This is partly done by establishing a private-public initiative, Novella Africa, and setting up supply chains and tree nurseries for cultivating trees for commercial seed production (Attipoe *et al.* 2006). Unilever and organizations such as the ICRFAF, the IUCN and others continue to provide inputs and have invested more than €12 million in the partnership (Unilever 2009).

In 2003, the *Allanblackia*-project, or Novel Development Tanzania Limited, was introduced to the East Usambara by the TFCG in cooperation with ANR, Unilever and the World Agroforestry Centre (also known as ICRAF) (Field Interviews with Faida Mali chairman Mr. Keefa 2010). In 2009, the management of the project has been handed over to a local group, Faida MaLi (Faida Market Link), to strengthen decision-making, local ownership and implementation. Faida MaLi thus functions somehow as a cooperative and connects the farmers and Novella, and creates linkages between farmers themselves and towards the market. Together with Novella, they also provide training regarding the methods for collecting and processing the seeds after harvest. The idea was to create income through commercial use of the seeds of *Allanblackia shuhlmannii* tree. The seeds are collected mainly in the forests and on people's farms, and sent to Tanga town to be further processed, shipped out and used in oil production by Unilever. The seeds contain edible oil that is suitable to make food products like spreads or to make detergents like soap of which Unilever sells. The *Allanblackia* oil is high in stearic acid, approximately 53 percent, and has therefore a relatively high melting point, which is a unique attribute that can be used in several products. It can furthermore be used for producing margarine with less chemical processing and refraction than palm oil, thereby decreasing energy use and chemical waste, and thus potentially reduce Unilever's 'ecological footprint'.¹⁴

For some time, Novella did not have any representative in the villages as the person that was put in the position "did not like the rural environment of the Amani villages, and left without any replacements coming in" (Interview with Faida Mali chairman Mr. Keefa, who as a result was given two workloads). According to him, there are now more than 7000 collectors in the East Usambara, with 28 collection centers, but so far only 17 farmers have established their

¹⁴ www.allanblackia.info Novella Africa Initiative. (Accessed 1.3.2011)

own nurseries from the project. The objectives of the project have been to contribute to a structural reduction in poverty (through fair prices, fair business practices and income diversification of rural communities), and to promote sustainable management of forest areas and maintenance of biodiversity (Attipoe *et al.* 2006). According to these authors, the initiative should encourage local communities to protect both the *Allanblackia* trees and other trees in the forest as the farmers see a potential sustainable income from the trees without removing them.

The project is continuously trying to find good methods of cultivating the trees and thereby provide local communities with an opportunity to grow *Allanblackia* also on their homesteads. They would also encourage farmers to plant *Allanblackia* trees in degraded land areas, secondary forest areas, and border planting. This would give the individual households an opportunity of having a sustainable income in the future. The FAO (2008) has also identified *Allanblackia* as a crop of high potential for developing rural communities, while the oil has a potential to become a new, profitable and internationally recognized sustainable raw material, which only can be found in the high forest zones of tropical Africa. Particularly promising is the fact that Unilever and its partners are continuing to offer a sizeable and commercially attractive market to the project, which may provide financially sound basis for the future.

However, the project in Tanzania suffers from not finding satisfactory methods of propagation for shortening the trees' growth rate. Domestication is constrained by propagation techniques due to poor and long germination and rooting periods, dioecism and slow growth of the species¹⁵. The seeds take more than three months to germinate and from 15-20 years to begin bearing fruits. Vegetative propagation techniques such as rooting (juvenile cuttings) and grafting on *Allanblackia floribunda*, which was developed by ICRAF scientists particularly in Western Africa, are now also being researched and tested out on *Allanblackia stuhlmannii* in the East Usambara, so far without success (Interview with project manager of the Faida MaLi, Mr. Keefa 2010). This method made cuttings start rooting from 8 weeks, while grafting would be successful after 6 weeks, and the growth rate of the tree itself would be substantially

¹⁵ <http://www.worldagroforestry.org/projects/allanblackia/tree.html> (Accessed 3.3.2011)

shorter.¹⁶ To propagate successfully, experience has shown that it depends on certain factors such as the propagation environment, propagation medium, the origin of the ex-plant and the physiological state of the stock-plant. The natural environment in the East Usambara differs slightly with environments in West Africa, and in addition to slight inherent differences in the species, the efforts for successful propagation methods in the former are thus complicated.

More research and testing are therefore necessary in the area, which in itself can be harmful to the project and conservation efforts. If research takes too long and no positive results are found, and no profits are obtained within a reasonable period, there is a risk of Unilever pulling out of the area and the *Allanblackia* project actually ending. Unilever is not basing all their *Allanblackia* activities on holistic motives entirely, but is instead reflecting a combination of a sense of social responsibility and enlightened self-interest (Mehra, in Unilever 2009). Large investments and research has been conducted into the project and without profits in return, it may be questioned whether the project will continue sustainably in the Amani area. This is especially true if people do not get the opportunity to grow the trees themselves, and continue to depend on harvesting *Allanblackia* fruits illegally in the forests and on adjacent farms.



Figure 16: *Allanblackia stuhlmannii* tree with fruits (Picture taken by the author October 2010).

¹⁶ <http://www.worldagroforestry.org/projects/allanblackia/tree.html> (Accessed 3.3.2011)

7.4.1. *Financial dimensions*

Unilever expects to gain large profits from the *Allanblackia* oil industry, which is mostly why they also spend large amounts of funds researching and paying farmers to collect the wild fruits. They do however guarantee to buy specified quantities of the oil fat at a present pre-set price from the processors, something which allows the collectors to focus on collecting seeds instead of looking for buyers (Attipoe *et al.* 2006). This increases motivation among all actors as they know that the markets are present. Unilever claim that since the start of the project, over €350,000 of direct income has been generated for local communities in Ghana, Cameroon, Nigeria and Tanzania (Unilever 2009). For poor communities such incomes are certainly a positive contribution as an additional source of income.

According to Mr. Keefa, chairman of the Faida MaLi, the project had collected 400 tons of *Allanblackia* seeds in 2009. The farmers received 300 TAS per kg of seeds, which indicates that 120 million TAS (about 80,000 USD) was earned by the local communities in the area. This indicates that each collector on average earned 11 USD per year, approximately 18,000 TAS per year. According to the farmers themselves, these numbers seem fairly decent. However, some put more efforts into the collecting activity and are able to earn perhaps 20,000 TAS per month for the four harvesting months (February-May) in the year. As the collecting activity is not particularly time-consuming and requires little investments, it gives an additional income and diversification strategy for household security, especially for the women who seemed to be most likely to be 'collectors'. However, there were issues concerning the prices of the seeds, as some reported to receive 250 TAS per kg, while others reported between 300 and 350 TAS. All interviewees claimed this price was too low even though it had been steadily growing the last few years. The different price received by different collectors was certainly concerning for the farmers and their thoughts concerning the project. The interviewees believed that the clerks took some of the money themselves. These were reportedly not paid well, and some misconduct may have proceeded in the process. Some of the farmers experienced not being paid according to schedule and at the collection site as agreed. Because the clerks are not given enough money from the project to pay all the collectors at one time, many collectors must go home without being paid. The project had understood that without heavily policed collection sites, it could be risky to leave large amounts of money to individuals (the clerks) and they rather decided to pay collectors later.

Some communicative issues may therefore have created some tensions, as there were some different perceptions and understandings of the terms between the collectors and the Faida MaLi and Novella. People did receive the money after some time however, but several interviewees claimed that they often needed the money at the time of collection. As they had relied on the income to come in at a certain time to pay important fees or goods for the household, it could create stress for them when money was not received when it was supposed to.

There was no contract between *Allanblackia* collectors or any other institution about payment or legal rights. The contracts were only established for farmers growing *Allanblackia* on their farms, which at the moment were quite few. Faida MaLi wanted collectors to own their own farm, but it is not clear whether this was followed in practice. Mostly this is because there are often issues concerning the legality of tenure rights. Except for the head of the household, it can be difficult to prove that they inhabit a farm or have a legal ownership to the farm. So far therefore, the contract situation for the collectors is not clear. The collectors were not particularly concerned about this, as they had always received their money, and they experienced the demand to be good. Some collectors however seemed to lack the overall knowledge on how to treat and process the seeds after harvest and struggled slightly regarding selling their seeds. They were thus told to come back later, which may be difficult in terms of time spent on drying and walking to the collection site, but also as the seeds must continue to be dried. Finding decent storage areas for many of the poor villagers is difficult, and especially during heavy rainfall, the drying process could be particularly damaged. The project is mostly interested in farmers growing their own trees, leaving the collectors somehow outside of the access to extension services. However, for the project to stay financially and to some extent socially sustainable, increasing flows of advice and information should perhaps be encouraged and given also to the collectors.

7.4.2. Social dimensions

Collectors of *Allanblackia* seem to have gained an additional income which has given them some slightly better opportunities in their daily lives. Some argued that they had more money to improve their houses, purchase timber, pay for school fees and school uniforms, spend less

time fetching firewood, and being able to set off some credits for potential periods of distress. Although they receive a decent income during times of harvest, there are many collectors in the villages, but quite few do actually have *Allanblackia* trees on their farms. The trees are mostly found in the forest, but because the ANR forbids people to enter the forest for *Allanblackia* fruits, they collect the fruits on other villagers' farms instead. This is not always a popular activity. According to informants in the study villages, there had been conflicts regarding entering on people's farms. Some landowners want to collect the fruits themselves, while others had experienced destroyed crops as people had stepped on them in the process of gathering the fruits. Some had however made agreements with neighbors that they could pick the fruits, mostly in situations where the landowners did not have any interest in the fruits themselves. It may be a challenge if the price increases, as conflicts may arise because more people will be attracted to the business. Some people claimed that this would not be a problem, as land is private property and it is illegal to steal other peoples' crops altogether. They would therefore engage the police if someone trespassed into their properties to steal their agricultural products, precisely as they would do today.

Quite many villagers in the study claimed that they were very interested in getting the tree nurseries on their own farms started. There was however some concerns related to peoples' actual understandings of the project. Some informants claimed that they would plant *Allanblackia* trees all across their farms, leaving little space for other agricultural crops. The trees grow large, up to 45 meters tall with round crowns and straight branches, causing quite heavy shading as a result (Schulman *et al.* 1998). It reportedly grows best standing alone, thus leaving plants such as the popular clove tree out of the picture. Some considered the waiting time for the trees to start bearing fruits as entirely unproblematic. Some had perhaps a farm with only 1 ha, thus questioning their potential for serious plantings. The project wishes to plant in larger fields, or small plantations in order to increase and simplify the production of seeds. Once again, in similarity with several other projects, this leaves people without available or sizable homesteads outside of the project and thus less access to the potential income. If farmers have their own nurseries, they are likely to be extra protective of the trees, while the villagers operating as collectors today will lose access to both village and forest trees.

As the project struggles to find good enough methods for propagation and reducing the growth rate, some villagers were concerned about the time it takes for the trees to start bearing fruits. Because the trees must be planted on the farm, some other crops on the homestead will have to be removed. This is an investment many farmers are concerned about, especially if they have to wait for several years. Some were considering their children into the equation, making the sacrifice somewhat easier. This is however also difficult, as the project's future is uncertain, and the farms are often split in an inheritance issue, potentially creating tension regarding which children gets what. The remaining pieces are often small, and should perhaps be used for food crops rather than the *Allanblackia* trees. Because the tree yields good timber, it is questionable whether peoples' actual willingness to plant trees on their farms generally is particularly enhanced, by looking at their interest in the tree-planting scheme of *Allanblackia*. So far, few tree nurseries are established, and no private nurseries are likely to be established in the immediate future. Some farmers have shown genuine interest in the project and have even taken seedlings from the forest and planted on their own farm. This has however been a difficult procedure, as they have not grown well, and they do not know the trees' gender and thus cannot tell whether the trees will bear fruits or not.

Depending on the breakthroughs in research, some uncertainties concerning the project exists. For the time being, the Faida MaLi does not encourage farmers to start planting *Allanblackia* trees, as there is no certain way of propagation and thus reducing growth rates of the trees. For now, most villagers therefore continue collecting fruits from forests and private village land. Other collectors claimed that there would be no reason to use the space on the farm for the *Allanblackia* trees, which would hurt other crops, when there are plentiful of trees and fruits in the forests and villages.

In addition to the social difficulties, and environmental consequences, people experience health challenges in relation to the slow development regarding individual tree nurseries. These may be slightly reduced when more people are able to grow trees on their own farms. Some collectors complained about snake bites, falling fruits and thorns on trees and plants, which may be harmful for individuals trying to gain additional income. Some plants in the forest are known to give skin rashes, leaving needles in the skin, which could be very uncomfortable.

The situation adjacent to the Derema corridor is an interesting factor regarding the *Allanblackia* project. Even though there is little encouragement regarding the tree nurseries at the moment, it is likely to be so in the future. One thing is the continuously decreasing sizes of farms because of immigration and inheritance issues. But people have also lost access to their farms of origin during the establishment of the corridor, which certainly creates challenges for planting the *Allanblackia* trees on their farms. There is likely to be only the people with larger sizes of lands who are potentially the ones being able to plant several trees on their homesteads. Additionally, the housing and property situation in villages such as IBC Msasa is unclear at the moment. Several households do not know if they will receive land elsewhere, or if they will again be moved from the areas they now inhabit. Uncertainty concerning their properties does not encourage planting of trees, neither *Allanblackia* nor others for conservation purposes. People were of the opinion that it would be better to have the trees on their own farms, as it was illegal to enter the forest, because neighboring quarrels regarding collection was common, and because it was uncertain whether it would be legal to fetch *Allanblackia* fruits in a tea-estate-owned forest in the future (at the time of the fieldwork people were allowed to pick fruits from *Allanblackia* trees in that particular forest regime).

7.4.3. Environmental dimensions of *Allanblackia* collection

Interviewees in the study, both the collectors, potential participants in a tree nurseries and the chairman of the Faida MaLi, were especially satisfied that the project enhanced conservation awareness and behavior. People had understood that standing trees also could provide economic benefits. Some informants argued that as the *Allanblackia* trees had become a source of benefits, other trees in the area could also be important for donors or international companies in the future. Some informants even drew comparisons between the *Allanblackia* trees and gold, as the income is potentially high, and they would therefore not cut down the trees anymore. Previously, interviewees had used the trees for constructing houses and toilets as the trees do not decay easily. According to informants, education and information regarding the valuable trees are spread within the community, and an internal justice within the community also seems to be present. “If somebody cuts down the *Allanblackia* trees, we will hunt them down and turn them in to the authorities. They deserve that for damaging our

livelihoods”(Male *Allanblackia* collector, in IBC Msasa 2010). People also considered planting trees as environmentally sound practice and important for the forest ecosystem as well as for regenerating open areas. Some even considered it important that the *Allanblackia* tree is a native species.

As tree nurseries in the East Usambara so far has not succeeded in propagating the *Allanblackia*, people continue to use the forest to collect the fruits even though it is termed illegal. Even if people have trees on their farms, they may still continue to do so. First of all this is because regardless of germination period, it will take a fairly long time before people can actually harvest the fruits on their farms. The illegal harvesting is difficult to control, and in a contract situation where the farmers are required to have some trees on their homesteads, they can still say they have collected fruits from their farms, at the same time as they continue to use the forest for additional fruits. An older female collector within the Shebomeza village told that she observed some signs at the forest edges saying not to enter the forest, but she questioned; “who would actually arrest an old lady for walking in the forest? It is not like I am cutting down large areas of forest”. She therefore did not have any problems admitting her activities in the forest, which she considered to be harmless. She also told me that she certainly was not alone with these activities and thoughts. Again it seems to be difficult to inform and advice the large numbers of what can be termed ‘collectors’ only, and the difficulty of establishing nurseries and serious contracts for these. It is a challenge as the market will continue to demand more oil. Faida MaLi and Novella needs to show that they are able to continue the collection of *Allanblackia* seeds for Unilever to continue being interested in the project. Controlling peoples’ activities and thereby forbidding people from collecting are therefore not likely, even though they do seem to discourage illegal activities informally.

Collecting *Allanblackia* fruits in the forest, whereby large quantities of fruits are removed from the forest ecosystem, could in fact impact the rainforest’s fauna (FAO 2008). The fruits and their seeds (both still in the trees and fruits fallen down) are heavily predated by wild animals, which may lose this food source as increasing numbers of people collect from the forest. Animals such as the blue monkey (*Cercopithecus mitis*) and the zanj elephant shrew (*Rhyncochyon petersi*), may increasingly look for food elsewhere, such as on village farms. This could result in exacerbating the problematic interactions between local people and

wildlife. These issues are not researched well to date, and scientists can so far only assume how the fauna is responding to the decreased availability of energy-rich *Allanblackia* fruits and seeds (FAO 2008). It will therefore be important to carry out ecological impact assessments for *Allanblackia stuhlmannii* seed collection as this activity seems to steadily increase in popularity. FAO (2008) has also recognized some potential challenges regarding illegal hunting techniques and *Allanblackia* fruits. Researchers have seen that hunters exploit the attribute of *Allanblackia* trees' popularity among wild animals. They have set up traps around fruiting trees and use the fruit as bait in bush-meat traps. When people enter the forests for *Allanblackia* fruits, they also tramp on the vegetation in the forest, thus disturbing the forest ground flora. If vegetation is thick, some people may chop down vegetation to make ways to the *Allanblackia* trees in the natural forests (Field Interviews Shebomeza 2010). As there is good income to be obtained from selling the fruits, this may be a potential challenge towards the forest ecosystem, especially near the forest edges.

FAO (2008) recognizes that an increased incentive to retain and establish more trees within a farmed landscape will be likely to have positive effects on fauna and faunal diversity. This is likely also to be true even if only a small proportion of the fruit will be available to wild animals. Restoring landscapes through enrichment plantings may promote species of wildlife that are dependent on the fruit. Whether more animals will be attracted to the farms and thus an increased conflict between people and wildlife is also not certain so far, thus creating some potential unforeseen challenges in the future.

7.5. Spice farming – a general livelihood option with actual potential for NGO intervention

The Arabs have been trading with tribal people in the Usambara for several hundred years, particularly for spices. This is today reflected in the extensive spice cultivation in the area. It is also seen by the fact that a dominant tribal language in the Usambara, kisambara, is the most prominent contributor to Swahili, the East African language that originated as a means to communicate when trading (Midtgaard, Pers. Com). The most grown spices in the Amani area are cardamom, cloves, cinnamon, and black pepper. There were no NGO or any particular conservation project working with spice cultivation. This made it interesting to

investigate the situation for the spice farmers, and to look for potential NGO activities as there are several spice farmers and thus an important livelihood strategy for Amani households. Walking along the roads and trails around the Amani villages, it was clear that most villagers grew spices within their farm plots, and almost all my interviewees had some sort of spice cultivation on their land plots, independent of size (Figure 17). Most people had multiple sources of income, and therefore did not depend solely on such cash crops. The most valuable crop is cardamom, which needs shade and a suitable microclimate (e.g. a surrounding forest) to thrive. This could encourage farmers not to cut down more trees than is necessary for profitable cultivation. For farmers without trees on the farm, such cultivation may be difficult. Some interviewees with relatively large farm sizes had therefore planted trees solely for cardamom production, which also goes along well with the conservation efforts of the ANR.



Figure 17: Clove trees in a typical agricultural landscape outside of Shebomeza (Picture taken by the author October 2010).

7.5.1. Spice cultivation and its impact on conservation

A general point of view among spice producers was that they are fulfilling their part of conservation efforts through spice cultivation. All the spices had some attribute which enhanced this attitude. They argued that they would not remove forests and trees because they can grow valuable cardamom under them; black pepper uses trees to climb and thus grow;

cloves are trees themselves, which is also true for cinnamon. Cinnamon is also used as firewood after harvest, thus potentially lowering the demand for firewood in the natural forest. Obviously farmers receive an income for cultivating such cash crops, which may increase the motivation for conserving the forest, according to some ICDP research (Salafsky and Wollenberg 2000; Brown 2002; Sandbrook 2006; Garnett *et al.* 2007).

The ANR claims that especially cardamom cultivation has threatened the forests for a long time (ANR New Management Plan 2009). Such cultivation has involved clearing of the forest undergrowth and smaller trees, with the establishment of cardamom under a canopy formed by the remaining large trees. Cultivation usually becomes unprofitable after about seven years, while on some areas it could be less (Reyes *et al.* 2006). A new site is then prepared for cultivating cardamom, leaving the old area completely closed and converted to annual crops such as sugarcane, cassava, or maize. When these fields are abandoned altogether, they degrade into *Lantana camara*, *Clidemia hirta*, and *Psidium guajava* scrub, which make regeneration of other species very difficult (Stocking and Perkin 1992; Reyes *et al.* 2006). This therefore has the potential of radically changing the composition of the forest, and thereby threatening endemic species within the forest (Conte 2004; Reyes *et al.* 2006). Comparative analyses concerning cardamom-growing practices in India and Guatemala show that deterioration of the forests is a common denominator (Reyes *et al.* 2006). Agencies for conservation purposes took action against cardamom cultivation in the forest when Derema corridor was established, thus describing the seriousness of the activity. Farmers lost land in the forest where they used to cultivate cardamom. Now, many villagers are complaining of land shortage, and a higher population pressure, which reduces the land available and suitable for cardamom cultivation. Reyes *et al.* (2006) argue that increased and improved implementation of agroforestry systems, the harmful effects of cultivating particularly cardamom on the forests could be reduced dramatically.

7.5.2. Financial and social dimensions to spice cultivation

The spice cultivators in Amani sell directly and individually to middlemen such as collectors or agents from other regions of Tanzania and/or neighboring countries. According to previous studies by Reyes *et al.* in 2006, it was found that the contribution of for example cardamom to

average household income was approximately 30 percent, and account for more than half of the total incomes from cash-crops. The prices received are usually around;

- Cardamom: 10,000 TAS-15,000 TAS per kg
- Cinnamon: 1,000 TAS-2,000 TAS per kg
- Cloves: 3,000 TAS-4,500 TAS per kg
- Black pepper: 3,000 TAS per kg.

These prices were considered low among the spice cultivators, and the price could also fluctuate dramatically, where in some seasons they could go heavily downwards. Some farmers had mentioned that prices for cardamom could be dropping to half of the previous month's level. The producers were more likely to get higher prices when they were able to travel to town to sell their products there, but this was difficult for many as transportation to Muheza town is time-consuming, expensive and difficult. Spice farmers still relied on spices as a cash crop in spite of low market prices, but they were less likely to intensify their production if the prices or market did not improve. The prices in the cities and other markets are considerably higher, and according to spice collectors in Zanzibar, the prices in the markets in Dar es Salaam could be approximately 50,000 TAS per kg of cardamom, 35,000 TAS per kg of cinnamon, 20,000 TAS per kg of cloves, while black pepper was sold for approximately 20,000 TAS. Spice collectors within the Amani villages mentioned that the transportation from Muheza town center to for example Dar es Salaam had a cost of approximately 500 TAS per kg on a bus or truck. The prices in the city markets thus seemed relatively high compared to the farmers' wages. This indicated exploitative market relations, where traders negotiate low prices from each individual, where the individuals have little saying regarding prices. As there were high numbers of spice sellers in the study villages, and most farmers sold fairly small quantities of spice, they were without good negotiation opportunities with the purchasing collectors and agents. The farmers were also not given any price differential for products of higher quality. Instead, high-quality products could be mixed with lower-quality products, resulting in an overall low quality of the products, and the price premiums for high-quality products were lost. If this continues, there will be no incentives for the farmers to improve the quality of their products, creating a vicious circle where they continuously experience losing market access, or are forced to sell for low prices.

The collectors are usually local villagers acting as links between the local farmers and the agents from other regions in Tanzania or neighboring countries. Most farmers interviewed claimed that they had no other choice than accepting the prices offered, otherwise the collectors would just go elsewhere. Losing incomes from spices could be detrimental to the households as the profits were important for household security. The income from spice cultivation could for some be quite high compared to the average income levels in the villages, but normally the spice production was a side-income which gave higher diversification to the household. For some of the collectors in the village, the situation was also difficult, as they also considered the prices to be low, but could not protest as it was the agents who mainly decided the price. They could feel guilty for charging a low price, thus leaving the sellers angry or disappointed at them, thereby weakening their social position in the village community.

There are several reasons for potentially improving both the spice industry and peoples' livelihoods in the Amani villages. Thousands of small farmers already have the knowledge and experience about cultivating spices within the East Usambara. The potential for increasing spice cultivation here in a short time is therefore good. Spice exports do in fact contribute to a substantial part of Tanzania's foreign exchange (Reyes 2008). Business Times (2003, in Reyes 2008) indicated that the spice industry sector has been growing in Tanzania by more than 10 percent per annum in value terms since 1997. The export value was 11 million USD in 2001. The paper also stated that the spice industry presents a good opportunity for Tanzania to reap economic benefits in a fairly short term, and with only small input in investments. Therefore, encouraging sustainable cultivation of spices could be an important strategy for improving the economic situation for the rural people in Tanzania. Tanga harbor, which is facilitating exports of the products, is only one and a half hours away from the East Usambara Mountains. There has been some export of some organic spices from the East Usambara to Europe through the Tanzania Zanzibar Organic Spices Producers before, thus indicating that functioning market links actually exist (Reyes 2008). According to collectors and agents, the demand is also high. Spice cultivation in the East Usambara is done organically (without chemicals), which gives the area vast potential also in the international market, where demands for organic products is continuously increasing (Reyes *et al.* 2006). Studies have furthermore showed that Tanzania has the lowest percentage of land areas under certified organic crops (0.01 percent) of the total agricultural area of 14 developing countries

studied in Asia, Africa and Latin America (Reyes 2008). Further studies have estimated that certifying and promoting organic cardamom cultivation would raise the value of the product on the market by up to 30-40 percent, which will help secure a satisfactory livelihood income (Reyes *et al.* 2006).

A lack of decent transportation opportunities and infrastructure, such as storage areas, among the individual farmers causes vulnerability in relation to the spice markets. The spice producers in the study villages all wanted better organization among the producers. They were not satisfied with the low prices and the exploitative market relations. Even though they were all united with this idea, it would be difficult to establish such cooperatives without external assistance. Mainly this is because entrepreneurial establishments such as cooperatives carry large investments and costs, and therefore substantial risk. To poor households, such risks on behalf of a whole community may be overbearing and could be disastrous if the project fails. Some farmers requested better extension regarding cultivating spices. They thus wanted closer collaboration with research institutions and extension officers with factual and empirical knowledge surrounding sustainable spice cultivation.

7.5.3. Cooperative organizations and their potentials for assistance

The main factor contributing to the relative and long-lasting success of the dairy cattle project was also an available market for processed milk. UWAMA cooperative organized training and extension services to the villagers wanting to participate in the project. The milk processing and marketing to Tanga and Dar es Salaam were only initiated when enough milk was produced. A strong cooperative organizing spice farmers could be an important development for communities and producers of spice in Amani, and the East Usambara in general. Such farmers' associations may assist in buying and selling bulk products, standardizing production, improving marketing infrastructure, storage areas and drying techniques, as well as facilities for rural transportation (Reyes 2008). Through cooperation with research and recognition of local knowledge, cooperatives can also help enhance sustainability, production and quality through improved methods of cultivation (such as harvesting at the right time), application of organic manure (available through the cattle keepers), and better methods for post-harvesting processing. Improved quality and processing

should raise the price, and improved application of already large amounts available manure, would enhance yields.

Such organizations also have the potential of providing support and increased price awareness, which in turn would improve the bargaining power among farmers. This is done elsewhere in rural Tanzania, where producers' organizations link members to new markets and provide access to financial services, collective crop marketing, and new technologies (Reyes 2008). Uliwa and Fisher (2004) found that farmers have difficulties identifying the best crops for growing and in accessing extension and marketing services when there is no cooperative to unite all the farmers. A study conducted by the FAO in 1995 furthermore claimed that producers of non-timber-forest-products (NTFP) often lack price awareness (Reyes 2008).

Cooperatives would also be likely to enhance the negotiation power of the farmers in relation to spice buying agents from elsewhere. Rather than having large transactions costs through negotiating with each and every individual, the collectors or agents may talk directly to the cooperative, which would be more likely to set a higher, fixed price on the products. This would also make it more simplified for the buyers, who have been said to prefer contracts with organized farmers' groups in matters related to quantities produced and quality standards, as well as being assured of the farmers' commitment (Reyes 2008). In the study of Reyes *et al.* (2006), it was found that a kind of cooperative was established in the East Usambaran village of Antakae, where the farmers sold their produce with a fixed price that was 12.5 percent higher than the average price in the area.

A cooperative may also be able to control the quality and production activities, as well as improving infrastructural facilities, such as storage facilities and transporting trucks. Transportation of the products to the towns of Muheza, Tanga, or even Dar es Salaam, where the prices potentially should be higher, could be a strong improvement. The cooperative may also assist in saving up credits, which can be used in times of difficulties or need among the members. Such organizations for spice farmers may assist in developing some type of business strategy, such as designing a proper product label or promoting the products as

‘organic’ in trade, which may make the products more attractive in both national and international markets (Reyes 2008).

However, the cooperative should be aware of political, group and gender differences. It is important that the cooperatives are democratic, and able to include all segments of the community into management, hearings, participation and general governance. Reyes *et al.* (2006) refers to a study where it was found that several marketing societies and boards for spices existed until 1984 in the East Usambara, but which were dissolved for various reasons. Some of my interviewees had experienced some of these previous attempts, which resulted in leaders taking large shares of the incomes and many farmers being rejected at the collection site because they either were not ‘friends’ of the leaders of the cooperatives, or because their produce was not considered ‘good enough’. They also claimed that these cooperatives lacked management and business skills and were not able to find other markets, and that they also sold the products for exactly the same price as before. For the farmers it was therefore more practical to continue their individual business. Some spice producers were therefore fairly suspicious to such interventions, but thought that attempts from objective, experienced and knowledgeable parts from elsewhere, such as donors, would enhance the cooperative’s sustainability.

In order for motivation to improve land husbandry and quality of products to be maintained among farmers, it will be important for farmers to receive a larger share of the market prices for spices. Farmers’ groups, or cooperatives, may play an important and effective part in this development, especially if management and governance issues (e.g. transparency and accountability) are taken seriously. The cooperatives may assist in improving the marketing systems as well as providing credits for investments, such as in storage areas, one of the most considerable problems for farmers in the humid conditions in the Amani villages. Hazell *et al.* (2007) found in their studies that this way of organizing farmers are likely to facilitate advocacy and service delivery as the cooperatives have a higher potential for providing services for more affordable costs to large numbers of farmers. Cooperatives may potentially stand stronger in negotiation with middlemen buying the products as they can prove high-quality products and operate with fixed prices, and also lowering the transaction costs for both producers and buyers.

In terms of the different ICDPs in the villages, it may seem that established additional activities sometimes does not fit to the villagers' interests and opportunities. Many of the projects demands fairly large farms and land sizes, or capital to start participating, which leaves out perhaps the most important segments of the community. Changing practices and enhancing opportunities in an already well established livelihood activity may be just as important as projects coming from outside. These projects are in themselves important and a good additional source of income for some villagers, but policy makers should also strive to enhance people's livelihoods through building on the opportunities and interests already existing in the villages. Spice production in agroforestry systems therefore comes with a potential for development, which may assist and support large parts of the Amani communities and create complementary effects on both livelihoods and conservation.

8.0. Discussing lessons learnt

8.1. ICDPs influence and impact on local livelihoods

In accordance with the theory on diversification of livelihoods as an important livelihood strategy for poor farmers, it was on a general basis true that the ICDPs created a more diverse and potentially more secure household livelihood. Incomes were reportedly somewhat higher in most of the activities compared to other subsistence activities. People participating in projects claimed that their lives had improved after joining the projects, as they could use the extra income on activities such as housing, school fees, various materials, assistance on the farm, as well as on increased nutritional security. Farmers of dairy cattle, butterfly farmers and *Allanblackia* collectors seem to have increased their income to a certain degree so that they can buy some more of their necessary products without using the forest, which differs from many farmers who are not participating. Farming of dairy cattle has also become one of the main sources of income for large parts of the population around ANR and contributes to improved livelihood for many villagers.

As each project was different from the others, it is difficult to claim universal conclusions. It is however important to look at things beyond the income, and through discussing each of the projects, it seems as if there are issues that affect the participation and success of the projects. Two of the projects in the form of fish farming and beekeeping had very few participants; therefore the projects had little scope outside of the individuals actually participating. Income was here basically absent. Keeping of dairy cattle provided people with both incomes and milk to the household, but because of weak cattle breeds producing low amounts of milk, together with the additional expenses on the cows; many farmers have expenses that more or less are equal to the incomes. Butterfly farmers struggle with declining markets, while the *Allanblackia* project struggles to actually find appropriate ways on how to grow the trees on peoples' farm, thus creating situations where people are required to get the fruits on others' plots or in the forest, both creating conflicts. There are social impacts also on many of the projects, as these demand effective social capital for its participants. One example is for instance on who wants to participate in cattle farming. It is more likely to get a cow if villagers have friends or family who can personally provide them with a cow.

One of the most concerning issues regarding the projects in the study is that they demand quite a large amount of the different assets that Ellis (2000) mentioned. Individual land sizes are already quite small for several farmers, and they are likely to decrease in the future. Almost all ICDPs require large lands with enough trees (natural capital), some financial capital to purchase certain equipment, social capital for borrowing land or being able to access cattle or fingerlings of tilapia, physical capital in the form of for instance storage capacity, as well as human capital because the projects can include fairly heavy, difficult and time-consuming work. Such constraining issues are worrying because one of the objectives with the projects is to help poorer segments of the community to increase their incomes through participation. These people are also likely to struggle with their agricultural production, experience unemployment and potentially be involved in illegal forest activities. It is important to include these people more in the projects. In line with the experiences explained by Garnett *et al.* (2010) of uneven community distribution within project participation, it seemed as the most successful participants in the different projects were the ones who had the opportunity to invest early in the project history. They had since been able to hold up the efforts and income levels, and even invest in increasing production and further activities. For new participants, especially those being evicted from the Derema corridor, with smaller lands and uncertainty about future compensations and farm plots, it has been particularly difficult to join the projects. The dairy cattle project is also challenging to begin with at this point in time because of the lack of good cattle breeds that are possible to access in the market. As a compensation measure for the loss of land and income, the ICDPs as they are now, are probably not strong enough to improve the livelihoods sufficiently for these villagers.

The projects have also showed a tendency to evaporate within a fairly short time. There has been little sustainability in the various projects, thus seriously undermining the common efforts of reducing forest dependence, destructive forest activities and improving livelihoods, especially in the longer terms. This is unfortunately a fairly common mistake within ICDPs, as explained by Brown (2002) and Wells and McShane (2004). Because permanence has been low, it is unclear whether these projects will have any long term positive effect on livelihoods and forest conservation. The example from the butterfly project, where people no longer were able to sell most of their pupae, and they therefore claimed that they would rather cut

down the village forest and use it for other agricultural crops or timber, are particularly concerning. Quick results and quantitative numbers of participants are often possible to achieve, but the real success of a project should only be measured by its long term quality and effects. After donor support has left the projects, two of them have failed to materialize, and the cattle project has experienced unfavorable changes. The butterfly project has shown to do a fairly good job without the financial funding, but is sensitive to insecure markets, which are threatening the project to continue in the future. The *Allanblackia* project is also operating at present, but can quickly be stopped if the project is unable to find good propagation methods, and Unilever thereby decides to leave East Usambara altogether.

It is essential that the projects are not solely giving people the necessary capital to start up project activities, as people also need to feel an ownership towards the project. Aid dependence and total reliance on foreign donors and NGOs for financial and practical support will only harm sustainability and people's willingness and ability to continue projects in the longer timeframe. It is necessary that donor agencies or practitioners take their time investing in institutional capacity, meaning that they consider what the villagers themselves are interested in doing; and putting emphasis on constraints people may or may not have. All the projects are dependent on markets for their sustainable achievements. Improving and/or finding access to markets may assist all the projects, which may also lead to larger participation within the different ICDPs. Some of the largest assistances the NGOs could contribute to in the projects are in fact to facilitate communication between farmers and traders, and thereby enhance market access. One of the main reasons for the decline in participation in fish farming and beekeeping were the ultimate lack of reliable markets for the products. Connected to enhancing market access; issues such as improving or establishing new institutional arrangements such as groups or cooperatives, and improving access to credits and insurance issues, could also help projects stay sustainable over time. The spice farming these seems especially in need of such facilitating actions.

Projects are advertised and informed about in the village meetings. Brown (2002) already argued that ICDPs often fail to identify target and actual beneficiaries, and which is also a challenging factor for the projects under this study. Not all segments of the community as well as individuals are present in such meetings, and miss out on the first introduction to new

projects. This is very often the poorest parts of the community, while it is the ones with most political power and influence and possibly more land who are likely to be present at such meetings, even though such can vary substantially. It is still important to see the heterogeneity of communities and not perceive them as demographic and consensual units. The united cooperation between WWF and TFCG is now starting to involve particular groups that are less likely to participate in such meetings, such as those recently reaching adulthood. One opportunity has been to arrange football tournaments for the villagers and at the same time inform about possible and actually upcoming project activities and other village information. This gives the NGOs the opportunity to listen to what the younger people feel about issues regarding conservation and activities. It is also important to include women in the informational campaigns, and one possible opportunity could be to hold small meetings at the milk collection site, which already functions as a social meeting-place for several women who carries the milk there every day. This is likely to be somewhat more time-consuming for the project practitioners, but is an effort worth emphasizing.

8.2. ICDPs influence and impact on conservation

On a general basis, it seemed that people both conducting these projects, and people standing on the outside of the projects altogether, were considering forest conservation to be important as they all received different forms of benefits from the forest, such as rainfall and source of water both for domestic and agricultural use. It seemed therefore that at least the mentioned attitudes were slightly the same whether one is part of a project or not. However, the perceived reasons for conserving the forest are different regarding each project activity, which again is different from people not participating in the activities. Cash benefits could be small, but nevertheless significant, and thus creating some positive attitudes towards conservation. It is still argued that such attitudes, which are difficult to assess as these reasons very well may be just words, may not reflect any behavioral response in accordance. Attitude and actual behavior is not the same, and may not correlate. It could seem from interviews that dependence on forest resources and products vary slightly in different projects as well as for people not participating in the projects. One of the ideas concerning the ICDPs is to generate enough income for people so that they would reduce their illegal activities in the forest. Some activities may have contributed to that, such as both dairy cattle and the butterfly project. In

the latter, villagers in IBC Msasa have planted their own forest in IBC Msasa particularly for butterflies. This conservation awareness is as mentioned fragile as several of the owners of the forest considered using this forest for other purposes if markets for butterfly farming are continuing to decline.

One of the factors that make the ICDP a necessary contributor in conserving the reserve is that it keeps people busy with an income aiming a non-destructive forest use. Many villagers have no or small land plots, the job opportunities in the Amani villages are scarce, and if these people are left not doing anything and remaining jobless, destructive and profitable activities may be attractive. They may be more likely to conduct illegal activities, such as gold mining or harvesting timber which potentially can provide good incomes, but which are also harmful to the forest ecosystem. Activities such as butterfly farming, beekeeping and collecting *Allanblackia* fruits are for these farmers possible to undertake. This could in effect reduce some of the harmful illegal activities going on in the reserve. Some of the butterfly farmers were for instance reportedly involved in destructive activities before joining the project some years ago.

Many of the activities can be harmful to forest ecosystems in various degrees, such as collecting *Allanblackia* fruits, butterfly host plants and cattle fodder in the forest. This may particularly become a problem when many villagers conduct such activities. These may be considered small compared to the potential high levels of destruction from other illegal activities, such as gold mining and timber harvesting. There were reportedly a higher number of migrants coming into the reserve conducting illegal businesses, which falls outside of all the projects. These people provide possibly the largest threats to the reserve in the present situation, and the ICDPs may have smaller effect. It seemed however that people got information and knowledge about conservation and the importance of protecting the forest ecosystem by participating in the projects. This was usually provided either by project practitioners such as the UWAMA and the butterfly project manager or through the tangible benefits the projects received from the forest and wetland ecosystem. This may assist creating higher environmental awareness and thus increase the likeliness of reporting observed illegal activities to the policing staff of the ANR.

Dependence on forest products does not seem to be particularly reduced, and there is little difference between participants in projects and non-participants. Households still use timber, poles and firewood, basically now obtained on village land, in their daily livelihoods. It is generally perceived among the villagers that they lose access to various resources needed for the household after the establishment of the reserves. Both ANR and the more recently established Derema corridor have seemed to affected people's livelihood options to certain extents. People are thus also depending on the weekly collection days of dead firewood in the local use zones within the forest reserve, with one consequence being that some people have to travel quite far distances to access these. As has been mentioned previously in the paper, such collecting activities can also be fairly harmful to biodiversity as the natural forest ecosystem is disturbed.

Reports from various staff and researchers claim that the areas outside of the reserve are fairly deforested or degraded. The ICDPs collectively may therefore not have been able to hinder leakage. Generally, it is possible to say that the projects to certain extents have failed to address the actual reasons for why people exploit the forest resources in the first place, as little is done to actually reduce dependence on these resources. Even if the reserve may be protected, areas outside are also required to remain fairly intact to reduce challenges such as soil erosion and edge effects. Examples from other places in the world show that deforestation can be severe up until the borders of the reserve, which itself can be entirely intact. Such issues may create edge effects, which can harm the forest ecosystem, particularly the various species habituating the edges of forest. Forest edges have often other environmental conditions than deeper within the forest, such as less moist, increased light penetration, fire incidences, and colonization by fast-growing creepers and vines (Osborne 2000). Tree- and plant species composition is therefore also likely to be altered. Tree planting schemes may therefore be furthermore encouraged in the villages and on individually owned plots of land. Agroforestry production, training and extension, and changes in the institutional arrangements (such as personal ownership of trees on farms) may increase the likelihood that villagers will participate.

The ICDPs are operated in such ways that many people are unable to participate in some of the projects because they either lack the financial capital or enough land to start and run the

project. These attributes very often explain their high dependence on the forest and its resources as they may not be able to either purchase resources, or plant trees on their farms. This will probably increase the likelihood of entering the forests illegally to collect the necessary forest products, also outside of the allowed collection days. Statistical significant results have been found difficult to obtain in such a study, as it is hard to actually measure the correlation between attitudes and behavior outside of the interview situation. It was fairly clear from the conducted interviews that the general situation is one where people demand firewood, and also timber, as well as other forest products in their daily livelihoods, of which mostly are found in the forest, and regardless of participating in an ICDP or not. Some ICDP activities may even contribute to less space on farms for trees, or increase collection of forest and wetland products, thereby questioning the potential and actual bridging of conservation and development.

It is difficult to state whether the forest ecosystem itself has improved since the establishments of the ICDPs even though some reports were mentioned (e.g. Mbilinyi and Kashaigili 2005; ANR New Management Plan 2009). The ecological integrity of the ANR should be maintained on the long-term basis by regularly assessing and monitoring its status to evaluate the extent of nature changes that are taking place. Finding correlations between causes and effects though, is difficult, and probably unnecessary. The establishment of the Amani Nature Reserve has reduced people's access to forest resources, and destructive activities have been illegalized. These policies are likely to have led to an improvement in both forest cover and biodiversity, of which the ICDPs may have played smaller parts and thus showing quite little additionality. The ICDPs instead acts as a way of compensating people affected by the reserve, increasing a sense of participation and possibly less resentment. The projects may to a certain degree have succeeded with this, but in relation to the more recent expropriations in the Derema corridor, the people are not satisfied with the situation, and are also complaining about the many challenges within the ICDPs, and the slow development of assistance. Many are also critical that the conservation agencies are only 'introducing' the projects that have been there for a long time already with all their challenges, and which are now difficult to begin participate in if there are no wider improvements to them . When the ICDPs do not function well, and may even create additional problems for the participants, increased anger and frustration may easily spread. According to several interviewees, sabotage activities in the forest could be a result of this. The fact that

several people have poor breeds of cows and are heavily indebted as a result; that butterfly farmers who has invested in time, equipment and land for producing butterfly pupae must quit because of small markets; that two of the main income generating activities in the form of beekeeping and fish farming have more or less gone down in the drain, makes it fairly obvious that the ICDPs in Amani needs to be injected with new solutions, project ideas and improvements for sustainability.

9.0. Achievable improvements and recommendable ways forward

Larger changes and improvements within the Amani villages and the projects themselves, both institutionally and structurally, may be necessary. Both the agricultural and energy sector should improve in order for projects to be sustainable, and levels of forest dependence to be reduced. Institutional arrangements should be enhanced, for example with regard to land tenure and the difficulties of obtaining permits for timber on peoples' farms. The latter seems to discourage tree planting efforts. The paper would like to encourage people to plant more trees on their land, as this is likely to reduce their need to use forest products from the nature reserve somewhat, which may very well be necessary if the reserve become additionally stricter by law and patrolling. Providing farmers with training and education on suitable agroforestry systems and follow-ups should also be a fundamental policy for the ANR management. Furthermore, ANR management should play a role in continuously increasing awareness on the importance of and knowledge on what is endemic and threatened plant species in order to reduce the use of such species by people residing adjacent to the nature reserve.

Land tenure is a complicated issue, but it seems clear that speeding up the process of 'finding' new land for the villagers affected by the Derema corridor will increase their chances of participating in projects and continuing their ordinary agricultural livelihoods. Related to this, it could be argued that the large areas filled with tea plantations in the area may seem quite unfair to many villagers. Monocultural *eucalyptus* forests and vast sizes of land are used for this purpose, thus contributing to less land for villagers and for forest ecosystems, as well as limited community development. However difficult, politically brave decisions to expropriate some of this land for the purpose of establishing village land could take away some of the pressure for land in the area.

Institutions such as village groups, farmers' organizations or cooperatives (as was argued in relation to several projects), credit facilities, insurance facilities, and systems for maintenance (e.g. genetic, physical) are important factors to establish or improve for successful adaptation of new projects and sustaining them towards the future. Many of these improvements are also

in themselves related to the overall scheme of organizing the farmers. Cooperatives may for instance assist spice producers reducing their transport costs to town, which may increase farmers' abilities and empowerment in the markets, and potentially thus give them the opportunity of receiving higher prices for their products. Cooperatives, if run well in regards to transparency, accountability and responsibility, will in this regard also make it potentially easier for the farmers to get access to credits, insurance and training. Following up on the participants and listening to their ideas and challenges, while at the same time provide training and capacity building, seem to be areas for improvement in all the projects. Finding markets which potentially will bring higher incomes to the villagers are related to all these aforementioned issues, and would contribute manifold in all the projects. Such issues are also basic building blocks for a project's sustainability.

Higher agricultural yields may make more space available for trees on peoples' farms, and it would be possible to maintain high yields even if inheritance- and forest protection issues reduces a household's farm size. Many farmers are able to harvest fairly high yields on their lands, while others struggle more and complain about low yields and too little rain (Field interviews Amani 2010). One opportunity is to assist farmers with the methods for conservation agriculture. Even though it seems as many farmers already some of these methods, multiple sources both among the farmers themselves and the ANR staff argue that improved agricultural practices would be a way of dealing with land shortage and low yields. Conservation agriculture tries to mimic a natural ecosystem in its practice, and is for instance based on no plowing, use of mulch (cover) to protect the soil from soil erosion, accept some use of mineral fertilizer, at the same time as it uses direct sowing, and encourages integrated pest management and crop rotations, where trees and agroforestry also can play a role, especially at the borders of the farm (Shetto and Owenya 2007).

Improving irrigation methods in the villages and on individual farmers' land is likely also to contribute to simplifying people's lives. The rains in Amani have been fairly unstable over the last years according to various accounts in the study, but Amani is still blessed with a quite high rainfall compared to other regions. Heavy rainfall was very often observed during the time of fieldwork, and assisting villagers with trapping this water in a cheap and simple manner is likely to overcome some of the agricultural challenges people seemed to

experience. Some villagers, particularly the richer households, showed that they had good methods that worked for them, but larger interventions are likely to assist broader segments of the community.

It may be necessary that the Amani villages also receive some support that are more directly aimed towards forest conservation in that it actually reduce people's dependence on forest products, with regards to energy sources and use. It seems clear that people use and depend on forest products whether they are part of a project or not. It may therefore seem as the project activities themselves alone are not likely to be enough to reduce dependence on forest resources even if attitudes towards conservation as well as income is improved. Other solutions may be required, such as biogas or even improved solar panel technology, which potentially could reduce some of the dependence on firewood for cooking. Particularly biogas could be an option as the villages have access to large amount of manure.

10.0.Conclusion

The main objective of the paper was to assess the impact of the ICDPs operating in villages adjacent to Amani Nature Reserve, and various aspects have been discussed related to this, particularly how the projects have affected livelihoods (financially and socially) and contributed to conservation. The establishments of the ANR and the Derema ecological corridor have both affected people's access to forest products, and the projects are considered in relation to this. In relation to issues such as REDD it seems clear that such projects as they are now most likely are not enough. People still use forest resources illegally regardless of their project participation. Low incomes and various challenges in the projects can be detrimental to both community livelihoods and forest conservation. The paper discusses some aspects regarding tree planting schemes, which REDD+ is likely to incorporate in its programs. The various challenges the projects have run into, indicate that they show potential high levels of leakage, low permanence, little additionality in relation to forest conservation, and question their sustainability.

The various projects show different degrees of achievements regarding compensation measures. The projects have given farmers a wider variety of diversifying their livelihoods, which is providing more security and resilience. Some projects, such as dairy cattle and butterfly farming, have increased people's income for some years, while collection and selling of *Allanblackia stuhlmannii* seeds have given several villagers an additional income. The future of these projects is however uncertain. Villagers residing in IBC Msasa for instance and who have been affected by the established Derema corridor are reacting with resentment towards this movement process, and the projects' measures of compensation are regarded to be insufficient. Some villagers are threatening with sabotage and to take back their land. Some compared conservation with new colonialism, while others felt severe personal loss with regard to land ownership and community feeling. Many of the projects seem to fail in accruing enough economic benefits which may create a sense of compensation and thereby reduce the pressure on the forest resources.

It has been recognized that after project support has stopped, several projects have run into heavy challenges. This undermines the goal of conservation and development, which has to be

assessed by its long-term achievements. This questions the work by development agencies, as it seems as the period of support generally is too short, that there is too little emphasis on local conditions, and they are unable to include wide enough segments of the communities. Basic requirements for the success of a project, such as education, training, establishing systems for markets and sustainable provision and genetic maintenance of for instance dairy cattle and tilapia fingerlings, seemed also to be weak in several of the projects. Even though there are some levels of livelihood improvements on a general basis, it is clear that improvements and new ideas are needed to revitalize the conditions for affected villagers of the ANR. The projects in the study area are generally struggling in dealing with the actual motivations for using forest resources illegally. Projects that are more directly related to lowering forest resource dependence should also be actively introduced and encouraged for forest degradation to be reduced.

ICDPs can be important tools for continued involvement of local people in the protecting of forests. They emphasize on environmental awareness and give incentives for forest conservation. Many local villagers did feel that they were participating in the improvement of local climatic conditions. The forest have shown some signs of improvement since the establishment of the reserve and with the introduction of the various projects, even though it is argued that the main reason is likely to be the establishment of a strictly protected reserve. Both people participating in projects, and those who did not, shown fairly similar signs of dependence on forest resources in their households. It seemed as the projects had done little to reduce people's actual dependence on forest products.

The paper introduces several recommendations and suggestions for ways forward for policy practitioners and conservation- and development stakeholders. Revitalizing the projects require improvements related to markets, establishment of cooperatives, more and better information, and adequate training. Maintenance of promises as of project goals and objectives is especially important. Project practitioners should build on local institutions and local conditions, interests, opportunities and established suitable livelihood activities and assist with enhancing these, such as with spice cultivation. The heterogeneity within the community should be recognized and addressed in every phase of the projects and within conservation work, on issues such as sharing of ideas, planning, monitoring, evaluation and

decision-making in order to enhance equity and efficiency. This must all go together whilst encouraging new ideas and improved institutional arrangements for the Amani villages. Improvements in the agricultural and energy sector, and tree planting schemes could play valuable roles.

By incorporating wide arrays of ideas and solutions based on more equity and efficiency in relation to the communities residing close to protected areas, it is likely that valuable rainforest habitats can be protected from degradation. Addressing local people's needs and development of their communities as well as conservation of natural resources, are critical values and motivations. By learning from research and integrating research findings in practical work, it would be possible to cooperate on these two interrelated issues towards achieving positive results for people, biodiversity and the climate in the future.

11.0.References:

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- 12.0. Since when were you involved in the project and how did you come to get involved?
- 13.0. If yes, in which ways are you involved in the project?
- 14.0. What benefits have you realized from the project you are involved in, and how much does this compare to your overall income?
- 15.0. To what extent has the project served to improve your livelihoods strategies?
 - a) Low improvement
 - b) Medium improvement
 - c) High improvement
- 16.0. Do you use forest products to support household needs?
 - a) Yes
 - b) No
- 17.0. Is tree cutting harmful to the project?
- 18.0. How helpful is living near the forest for the project?
- 19.0. How difficult would it be to continue the project if forests are cleared?
- 20.0. How much do you think the project activity reduces your need to collect forest products? Why/why not?
 - a) Very
 - b) Somewhat
 - c) Not
- 21.0. How do you feel the project is affecting the awareness towards conservation? What does the forest mean to you? What do you think those that are not participating in any of the NGO activities consider conservation of the forest?
- 22.0. Estimate the monthly income from the revenues from the project, and/or per piece of produce.
- 23.0. How much time do you spend on the project? Does this affect other livelihood options?
- 24.0. Do you consider this to be a safe income? What challenges follows from the production and income?
- 25.0. Does this income change throughout the year?
- 26.0. Who takes part in the work?
- 27.0. Have you and other participants in the projects received any formal training and follow-ups before or during the project? What?
- 28.0. What about equipment and running costs? Did you receive this, or did you pay yourself? What are the costs on this?
- 29.0. Has your production of food crops or other income changed after joining the project, or have you changed your farming methods? How do feel about this?
- 30.0. If you were not participating in the project activities, what other alternative income sources would you pursue? Does engagement in this activity translate into better income than other income sources?
- 31.0. Do you have a contract on the products produced from the activity? Do you receive money on a monthly, annual or per piece basis?

With whom?

Do you feel that this is a fair contract?

- 32.0. How do all the participants in the activities organize themselves? Individual selling or cooperation? Could this be done differently?
- 33.0. If you are not involved in any of the projects, what could be the reasons for not being involved?
- 34.0. How do you perceive why some are a part of the project and some are not? From your point of view, how do the NGOs choose their participants?
- 35.0. What are your general opinion/comments about the project? What can be done to make it better?
- 36.0. Do you consider the NGO-projects to be dedicated to the conservation of the forest?
- 37.0. How do you consider the cooperation and communication with the NGOs in your village? Positive and negative challenges?
- 38.0. How far is it to the boundaries of the nature reserve?
- 39.0. Do you or any member of your household interact with the park and what benefits and resources do you obtain from the forest reserve? How? Why not?
- 40.0. How do you consider the buffer zones to be working? Do you feel this is fair or does it complicate your livelihood? Can you collect similar products outside the Nature Reserve boundaries?
- 41.0. What are the challenges when collecting from the park or outside the park?
- 42.0. Are there any important resources you have to buy that cannot be collected?
- 43.0. How is the park impacting on the livelihood of your family/community? List the positive and negative impacts.
- 44.0. Do you or your village receive any benefits from the park, from such as tourism and park fees? How, and if not, what can be done to make this better?
- 45.0. If the park was not protected, would you use the park more, and take out resources? Have this changed after the park was established?

Appendix 2 – Interview guide Development intervention stakeholders/project coordinators

1. Name of the stakeholder/project Website:
2. When was the project established? (Age of the project).
3. Who is the donor of the project (source of funds)?
4. How many farmers do you have in your portfolio?
5. How long is the contract period?
6. What are the goals/general objectives of the project?
7. What are the specific activities carried out by the project?
8. What is the annual budget to implement the above mentioned activities?
9. What is the proportion of the above budget (in %) allocated to?
 - a. Administrative plus salaries
 - b. Project activities
 - c. Allocation to local people (if any)
 - d. Others (if any)
10. In what ways/mechanism does your project benefit local people?
11. How/what criteria used to identify and involve local people in your project?
12. So far, what have been the impacts/successes of your project? What is your comment to the performance of your project?
13. What has been challenging?
14. How would you describe your working relationship with the surrounding communities?
15. What is the consequence if a farmer withdraws from the contract?
16. How is the price that is offered to the farmers determined? Fixed price? How much?
17. What are your expectations from the farmers?
18. Are the farmers satisfied so far?
19. Where is the potential for improvements, both for farmers and the NGO?
20. How do you cooperate with farmers union or the governmental extension service?
21. Explain the logistic from the farm to the market?
22. Who carries the costs caused by transport?
23. How much did you produce in 2009? Has this changed?
24. Contacts for further investigation?

Appendix 3: Interview guide/checklist for Forest Officials

1. Name:
2. Role/ employment:
3. Education:
4. Which division/ area do you work in?
5. Approximately, how many communities are living adjacent to the forest reserve boundaries?
People?
6. How long have you worked here?
7. How are boundaries defined?
8. What are the main objectives of forest management?
9. How are decisions made? As of level. Nationally, district, locally?
10. What are the regulations for extraction of resources from the forest area for the people surrounding? License and agreements
11. How would you explain the importance of the forest resources for the people surrounding?
12. Is anybody allowed to use the areas inside the reserve for agriculture?
13. Is anybody allowed to use the areas inside the reserve for grazing?
14. Is the collection reported? To who?
15. How are regulations monitored?
16. Does anybody in the local community participate in the monitoring? Are there benefits?
17. How are illegal activities handled?
18. Does anybody in the local community participate in sanctioning? Are there benefits?
19. Are the people in general informed of violation/ sanctions that are carried out?
20. If changes occur, how is the information given? (Through leaders, elders, media, etc?)
21. Do you feel that the local communities agree in the regulation?
22. Do you see the regulations as sustainable for the resources and the livelihoods?
23. Does the forest management create any specific opportunities or challenges to the local people?
24. Are there any agreements with bigger companies? As of industry?

Appendix 4: Conversions

\$US 1 = 1476 TAS (Mid-fieldwork October, 11 2010). www.OANDA.com

10,000 TAS = \$US 6.75 (Mid-fieldwork October, 11 2010). www.OANDA.com

1000 TAS = 3.9 NOK (Mid-fieldwork October, 11 2010). www.OANDA.com