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The Impact of Gazetting the Derema Forest Corridor in Tanzania on Community Livelihoods and Forest Conservation

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By Nangena Mtango and Adam Kijazi

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Abstract

This study examines the gazettement of Derema Forest Corridor (DFC) in the Usambara Mountains of north-eastern Tanzania to become a national forest reserve and how this process affected the livelihoods within local communities and forest conservation outcomes.

For decades the Tanzanian government has been acting to conserve the forests of the Eastern Usambara Mountains because of their biodiversity and importance as a water catchment. In the mid-1970s, the government realised that Derema, an unprotected forest corridor of 956 hectares, contributed to the fragmentation of the continuous forest belt which covered the mountains. To reduce fragmentation, the government sought to link the Derema Forest Corridor to Amani Nature Reserve (ANR). In 2000, the communities in five villages adjacent to Derema Forest agreed to abandon cultivation of high-value crops inside the forest— including cardamom, black pepper and cloves which were extremely important to household incomes and local livelihoods—and give up their land to the government for conservation in return for adequate compensation.

In October 2010, a team of two researchers spent two months in the field to examine the impact of the gazettement of Derema Forest Corridor on community livelihoods and forest conservation. The study involved 124 individuals randomly sampled from among the 1,128 farmers that received compensation payments in the five villages. Study methods included a household questionnaire, in-depth interviews and focus group discussions with individuals affected by the resettlement process, and interviews with community leaders and local government officials. The forest assessment involved 22 sample plots at sampling intensity of 0.04%.

The study results show that the resettlement and compensation exercise did not adequately address the interests of the affected farmers but rather set a precedent for future problems and conflict between conservation and livelihoods in the area. Although crops were compensated at replacement value, the poorest farmers were neither afforded the opportunity to improve their living standards nor their productive capacity, or even to restore them to previous levels. On the conservation side, regeneration is happening rapidly and the tree diversity index value of 3.2 signifies that forest species are recovering after abandoning crop cultivation.

The study recommends that baseline surveys be conducted to gain a better understanding of the importance of local livelihood opportunities and options in any area where new protected reserves are to be established or existing ones expanded. Such options and opportunities must be supported by relevant laws and regulations designed objectively for resettlement purposes. It is further recommended that procedures and processes for converting open and village land into conservation areas must take into account the immediate and longer-term impacts on local communities, especially in providing viable livelihood alternatives and opportunities.



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Table of contents

Abstract	iii
Acknowledgements	iv
List of Tables	vii
List of Figures	ix
List of Maps	x
List of Abbreviations	vii
1.0 Introduction	1
1.1 Background information	1
1.2 Research problem	4
1.3 Significance the study	4
1.4 Research objectives	5
1.4.1 General objective	5
1.4.2 Specific objectives	5
1.4.3 Research questions	5
1.5 Hypotheses	5
2.0 Literature review	6
2.1 Conservation and poverty	6
2.2 Sustainability, growth and poverty reduction	7
2.3 Poverty–environment nexus	7
2.4 Recent policy implications on the effects of resettlement due to conservation ..	8
3.0 Conceptual framework	9
3.1 The Sustainable Livelihoods Approach	9
3.2 The Sustainable Livelihoods Approach and poverty reduction	10
3.3 The choice and relevance of the Sustainable Livelihoods Approach to the current research	11
3.4 Sustainable livelihoods in the context of the communities adjacent to the Derema Forest Corridor	12
4.0 Research methodology	14
4.1 Research design and methods	14
4.2 Forest resource assessment	14
4.2.1 Sampling design and layout	14
4.2.2 Field data collection	16
4.3 Socio-economic data collection	17
4.3.1 Sampling design	17

4.3.2	Study instruments	17
4.4	Review of secondary sources	18
4.5	Data analysis and presentation	18
4.5.1	Forest assessment	18
4.5.2	Socio-economic data	19
5.0	Research findings and discussions	20
5.1	Impact of resettlement on community livelihoods	20
5.1.1	Reasons for migration into the area and year of settlement	20
5.1.2	Household size	20
5.1.3	Main economic activities and use of income	21
5.1.4	Farm sizes before and after gazettement of the Derema Forest Corridor ...	22
5.1.5	Housing quality	23
5.1.6	Sources of drinking water	24
5.1.7	Sources of lighting	25
5.1.8	Sources of cooking energy	25
5.1.9	Expenditure of compensation money	26
5.1.10	Ownership of assets	26
5.1.11	Transparency in the compensation process	27
5.1.12	Dissatisfaction with compensation payments	28
5.1.13	Impact of gazettement and compensation on quality of life	28
5.1.14	Access to new farm land	29
5.2	Impact of resettlement by gender	30
5.3	Impact of resettlement on forest condition	31
5.3.1	Stocking distribution	31
5.3.2	Forest regeneration	32
5.3.3	Shannon-Wiener diversity index of tree species	32
5.3.4	Index of dominance	33
6.0	Conclusions, policy implications and recommendations	34
6.1	Conclusions	34
6.2	Policy implications	34
6.3	Recommendations	35
7.0	Further research	36
8.0	Bibliography	37
	Publications by REPOA	40



List of Tables

Table 1:	Sample plots and diameter measurements	16
Table 2:	Period and reason for migration into East Usambara Mountains	20
Table 3:	Household size	21
Table 4:	Main economic activities in the five villages	22
Table 5:	Land/farm sizes (acres) before and after gazetting	22
Table 6:	Changes in type and quality of housing, 2002 and 2010	23
Table 7:	Number of rooms in respondents' houses, 2002 and 2010	24
Table 8:	Type of roofing materials	24
Table 9:	Sources of drinking water	25
Table 10:	Sources of lighting	25
Table 11:	Expenditure of compensation money above TZS 5 million	26
Table 12:	Ownership of Assets, 2002 and 2010	27
Table 13:	Reasons for dissatisfaction with compensation	28
Table 14:	Changes in livelihoods and quality of life	29
Table 15:	Reasons for lower livelihoods	29



List of Figures

Figure 1:	Sustainable Livelihood Framework	9
Figure 2:	Concentric sample plots	16
Figure 3:	Distribution of compensation payments in five villages of DFC, by gender	30
Figure 4:	Stocking distribution of ten important tree species in DFC	31
Figure 5:	Distribution of regenerants in DFC	32



List of Maps

Map 1: Location of Derema Corridor and the Amani Nature Reserve 3

Map 2: Location of sample plots in Derema Forest Corridor 15



List of Abbreviations

ANR	Amani Nature Reserve
DFC	Derema Forest Corridor
DFID	Department of International Development (UK)
EAMs	Eastern Arc Mountains
FBD	Forestry and Beekeeping Division
FGD	Focus group discussion
GoT	Government of Tanzania
ID	Index of Dominance
IVI	Important Value Index
MNRT	Ministry of Natural Resources and Tourism
NSGRP	National Strategy for Growth and Poverty Reduction
PA	Protected area
RAP	Resettlement Action Plan
SLA	Sustainable Livelihoods Approach
TZS	Tanzanian Shillings
WB	World Bank

1

Introduction

1.1 Background information

Since the mid-1970s, the Tanzanian Government has been conserving the forests of the East Usambara Mountains for their high biodiversity and important microclimates, as sources of high-value agricultural products, and for ecotourism. The forests of the East Usambaras act as a water tower for more than 300,000 inhabitants of Tanga City and surrounding communities. The conservation strategy envisages the gradual linking of 24 separate forest reserves in the mountains and adjacent lowlands, covering 32,352 hectares in all. The idea is to create as large an area of continuous forest as possible. The first link is the Derema Forest Corridor (Ministry of Natural Resources and Tourism (MNRT), 2006), which is the focus of this study.

The Derema Forest Corridor is a crucial conservation area situated in the East Usambara Mountains, specifically within Muheza district, Amani division of Tanga region. The corridor lies between latitudes 5°00' and 5°02' and longitudes 38°45' and 38°47', with an area of 956 hectares. The East Usambara Mountains are a core focus area of the wider Eastern Arc Conservation program, within which the famous Amani Nature Reserve (ANR) created in 1997 forms the centrepiece. Amani Nature Reserve is the largest forest zone under unified management in the Eastern Arc Mountains (EAM), and its dedication as a nature reserve (the first in the country) gives it a special mission in national conservation efforts. The Derema corridor connects the ANR with the rest of the East Usambara forest reserves up to the recently formed Nilo Nature Reserve in the southwest and Longuza in the north (Map 1). It forms one of the most important connecting corridors for biodiversity in the Eastern Arc Mountains. Others include Bunduki gap between Uluguru North and South, and the Matundu-Uzungwa scarp gap in the Udzungwa Mountains (MNRT, 2006).

In the mid-1970s, conservation organisations and the government of Tanzania realised that Derema being an unprotected forest corridor contributed to the fragmentation of the continuous forest belt which had previously covered the mountains. The fragmentation of the forests increased the loss of biodiversity; not just a proportional reduction in the numbers of animals or plants lost from the area, but a reduction in overall biodiversity, i.e., in the number of species present in the forest. Over time, the pressure on the forest and loss of species would radically disturb the ecological balance in this limited bio-region.

In 2000, communities in five villages surrounding Derema Forest Corridor—namely Msasa IBC, Kisiwani, Kwemdimu, Kambai and Kwezitu—agreed to abandon cultivation inside the forest and give up their land to the government for conservation purposes. In turn, the Government undertook that these people would be duly and adequately compensated (Tanga Catchment Forest Office, 2010). A participatory boundary demarcation exercise was carried out in 2001 involving community members from the five villages. The first compensation was paid for crops that were slashed in the course of demarcating the boundary in the same year. In 2002, crops inside the forest were counted for each farmer, compensation schedules prepared according to Government regulations and verified by each individual farmer. However, due to a lack of funding, payments only began three years later. That payment involved only 50% of the total compensation that was earlier envisaged.

In 2006, a few farmers were paid a further 25% of their crop values. Not surprisingly, this process of piecemeal payments led to frustration on the part of the farmers. To rescue the increasingly

contentious situation, the Government through the Ministry of Natural Resources and Tourism approached the World Bank in 2006 to seek funding for completing the compensation payments.

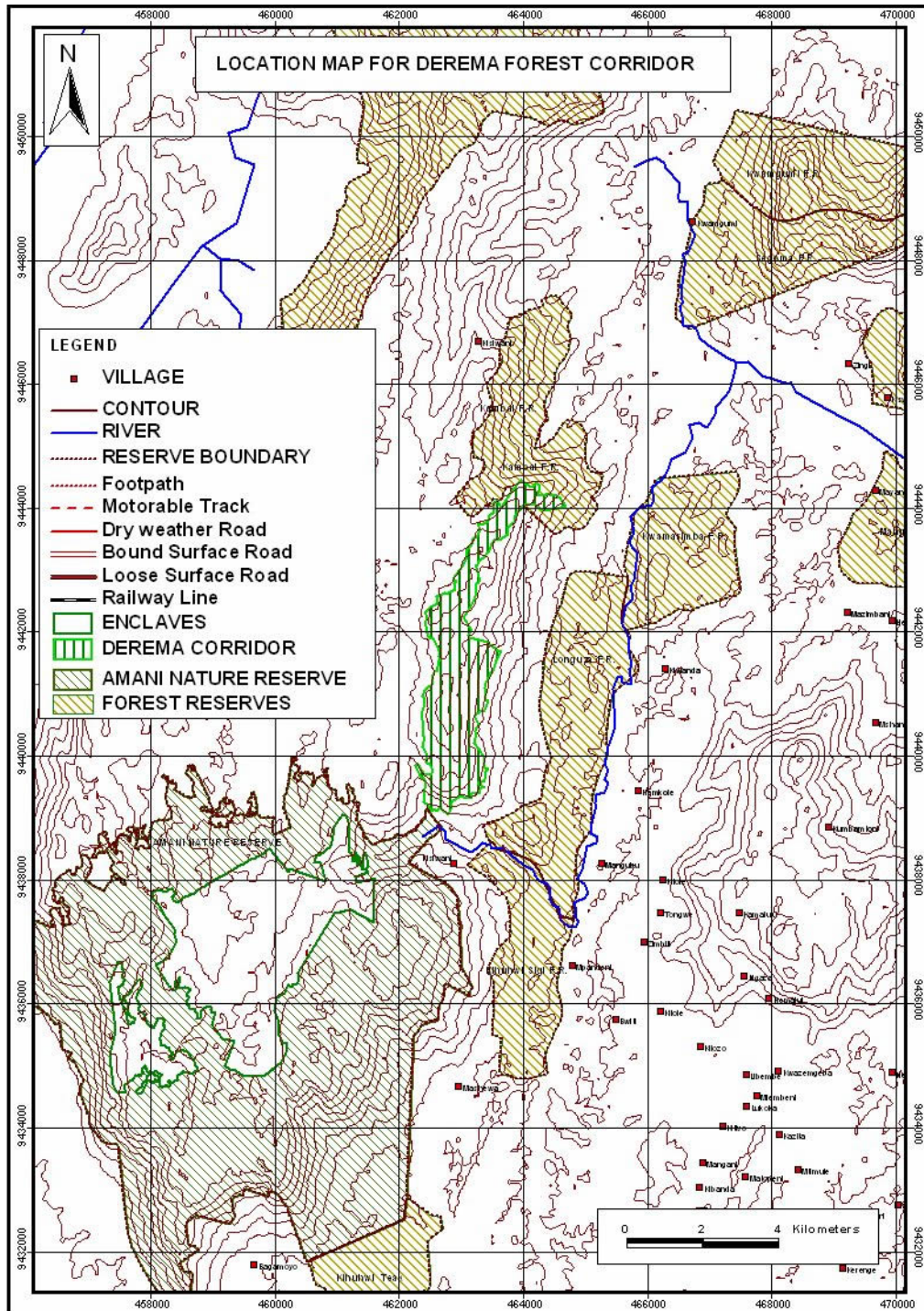
In 2006, the World Bank came up with a Resettlement Action Plan (RAP) with the following conditions:

1. That all aspects of the undertaking, including the action plan for compensation and asset replacement, be planned in advance and be fully transparent to all those affected.
2. That the assets be compensated at full replacement value.
3. That people who lose assets be afforded the opportunities to improve their living standards and their ability to exceed their productive capacity, or at least to replace them.
4. That action planning be done in a participatory manner, in which those affected by a project fully understand what actions will be taken throughout the compensation process; and
5. That accessible and affordable mechanisms for resolution of disputes are put in place.

The government and communities accepted the plan though some felt that this was further bureaucratic delay. Compensation schedules were recalculated and the compensation payment process was completed in mid-2008, some eight years after communities had abandoned their farm plots inside the DFC.

It is important to note that Derema Forest has been termed as an economic “backyard” for the adjacent villages, from which firewood and a wide range of non-timber forest products are obtained. Cardamom, a valuable crop, grows well in the moist and shaded conditions of the forest. Black pepper vines climb shade trees, and clove trees grow widely. These crops are extremely important to household incomes. There are also a variety of other food and cash crops, ranging from bananas, tubers, sugar cane and fruit trees.

Map 1: Location of Derema Corridor and the Amani Nature Reserve



Source: Mapping Section, Forest and Beekeeping Division, MNRT (2006)

In total, the five villages had 1,128 farmers with 1,547 farm plots in the DFC. These were targeted for compensation and resettlement. However, since payments were completed eight years after abandoning cultivation, a loss of income was inevitable among these farmers, thereby contributing to poverty and less capacity to save. As poverty increased and social security decreased, tensions and vulnerability inevitably increased, with women and children losing out disproportionately. In the long term, these experiences will militate against conservation.

This difficult situation justified carrying out this research. The study was conducted in the five villages surrounding Derema Forest Corridor located in the north-eastern corner of Tanzania within Muheza district, Amani division of Tanga region. The compensation and resettlement process involved 1,128 farmers who received cash payments to establish alternative livelihood options as well as play a leading role in conservation of biological resources in the forest. By doing so, an additional 956 hectares of biologically and climatically important forests would be added to the East Usambara Mountain chain.

1.2 Research problem

In 2010, the Forest and Beekeeping Division (FBD) of the Ministry of Natural Resources and Tourism gazetted the Derema Forest Corridor as a national forest reserve and linked the corridor to Amani Nature Reserve. A protracted gazettement and compensation process, which started in 2002 and took over eight years, generated high expectations on the one hand, and anger, anxiety and disappointment to local communities on the other. Beyond this tedious and lengthy compensation process, the conservation experience in other areas where access to land and forests was restricted has often failed to achieve its environmental objectives (Wilkie et al., 2006). Resource depletion by the former forest resource users has continued, hence, making the protection measures ineffective and defeating the purpose of gazettement and conservation.

The problem is that the practice of suddenly declaring some prior resource-use patterns (in this case cultivation of high-value crops such as cardamom and black pepper) as restricted and prohibited has in the past inflicted heavy opportunity costs on local people, reducing their livelihoods without adequately compensating for the losses. The social outcome has been the impoverishment of those affected and the generation of dislike for conservation. Such a situation is likely to militate against any conservation efforts. This study sought to assess whether this was the experience of the communities around Derema.

1.3 Significance the study

The main concern of the study was to examine the impact of the resettlement exercise in the Derema Forest Corridor on forest conservation and the livelihoods of local communities. Understanding the consequences of the resettlement and compensation exercise will contribute to identifying better ways of achieving sustainable forest management in Tanzania while improving the livelihoods of rural people living adjacent to the forests.

1.4 Research objectives

1.4.1 General objective

The main objective was to understand the consequences of the resettlement and compensation exercise on the livelihoods of communities adjacent to the Derema Forest Corridor and the subsequent impact on forest conservation.

1.4.2 Specific objectives

- i. Explore the extent to which the resettlement and compensation exercise has affected the livelihoods of the communities adjacent to the forest.
- ii. Assess which gender group was more affected by the compensation and resettlement exercise.
- iii. Establish the condition of the forest after the resettlement exercise.
- iv. Advise decision makers and conservation authorities on the impacts of resettlement on community livelihoods and conservation, and identify better ways and means of conducting future resettlement and compensation exercises in natural resources management in Tanzania.

1.4.3 Research questions

- i. What was the impact of the resettlement and compensation exercise on the communities living adjacent to the Derema Forest Corridor?
- ii. Was the resettlement and compensation exercise done at Derema as agreed by the parties involved (government and communities)?
- iii. Which gender group was most affected by the compensation and resettlement exercise? And how?
- iv. What are the attitudes of the different genders to the exercise?
- v. What is the condition of Derema Forest after the resettlement exercise?
- vi. Are decision makers and conservation authorities aware of the impacts of resettlement on community livelihoods?

1.5 Hypotheses

Null hypothesis: The Derema Resettlement and Compensation exercise did not have any impact on the livelihoods of people in adjacent communities or on forest resource conservation.

2

Literature review

2.1 Conservation and poverty

According to Sunderland, Ehringhaus and Campbell (2008), the dominant colonial approach to conservation was the establishment of protected areas (PAs) from which people were essentially excluded or resettled, often forcibly,¹ and many “protectionist” views remain within the field of conservation (Terborgh et al., 2002). In Tanzania, and elsewhere, the PA network is extensive and growing. In the process of expansion, however, many social conflicts have resulted from conservation initiatives. Despite protection measures, human impacts continue relatively unabated and local non-compliance is customary (Robbins et al., 2006). Tropical forest landscapes such as those found in the East Usambaras are often marked by poverty, and, therefore, undertaking conservation in these landscapes is not tenable if it further contributes to marginalization and impoverishment, and disregards the development needs of local people (Cernea & Schmidt-Soltau, 2006; Campese et al., 2007).

Although, as is the case of Derema corridor, there are valid ethical and biological arguments for biodiversity conservation at the regional and global levels, it is very unreasonable to expect the rural poor to bear the opportunity costs, restrictions and potential harm that are often imposed by global conservation programmes (Arjunan et al., 2006).

It is generally acknowledged that conservation cannot be undertaken without the support and participation of local people, and that livelihood concerns and future development goals need to be at the centre of any viable conservation strategy (Pimbert & Pretty, 1995; Hulme & Murphree, 2001; Barrett et al., 2005). The reality on the ground, however, throws doubt on the legitimacy of local people’s involvement in conservation efforts and protected areas (Wilkie et al., 2006) and the impacts of PAs on local communities (Brockington & Igoe, 2006; Cernea et al., 2006).

The silent debate and practical realities are still pitting strict conservation against human well-being. Sunderland and others (2008) stated that “this exchange is characterized in great part by polarized one-sided presentation of arguments by conservation biologists and social scientists, where both sides selectively use information to support their viewpoints”. This debate could be regarded as a regular scientific squabble with minor impacts on the world.

However, it is important to acknowledge the power that such conceptual debates have in shaping policies, institutional programmes and funding streams for conservation and development efforts. Sunderland et al. (2008) noted that it is important to move beyond polemic, anecdotal evidence and prolonged argument or inaction, towards a common framework in which all parties can examine and appreciate the multiple perspectives of conservation and development efforts. For this to happen, it is suggested that careful field-based, in-depth and multidisciplinary research are needed to provide a contextualized analysis of conservation scenarios from multiple and balanced perspectives. This is what the current study seeks to achieve using the Sustainable Livelihoods Approach (SLA).

The Tanzania National Strategy for Growth and Poverty Reduction (Vice President’s Office, 2005) notes that the country’s natural resource base has a huge potential for raising and sustaining rural incomes. However, it recognises that poor people generally rely heavily on natural resources and are thus more susceptible than other income groups to external shocks, such as weather extremes. In

¹See also Adams, 2004; Hutton et al., 2005

the course of reacting to disasters they can also be part of the process of damaging pristine natural resources such as catchment forests.

2.2 Sustainability, growth and poverty reduction

Vosti and Reardon (1997) noted that policy makers are faced with the need to simultaneously pursue three challenging goals: growth, poverty reduction and environmental sustainability. Poverty they argue is the main challenge that undermines development, growth and the environment. At the same time, natural resources must be made sustainable as an input into sustained growth. They also recognise that these three goals are complementary, i.e., sustaining natural resources will help growth, while growth will help reduce poverty and improve environmental management. However, in the short-run, there will be trade-offs among the three goals. For example, poverty is unavoidable if the natural resource base is degraded. Still, conservation of natural resources just for the sake of preservation may hurt farmers who depend on the natural resource base.

2.3 Poverty–environment nexus

The poverty–environment nexus is based on the notion that the livelihoods of the poor depend crucially on access to natural resources. A report by the U.K. Department of International Development (DFID, 2002) outlines how agriculture is the major source of income for poor people in the developing world. Indeed, for many African countries the prospects for growth lie in agriculture, tourism and mining. The main concept behind the debate is that “one problem is a significant determinant of the other”. Hence, so long as the degree of opportunities that nature offers and the scope of farming activities of the poor are environmentally unsustainable, the long-term resource base for their livelihoods will be eroded. The poor are more dependent on the natural resource base than other income groups, but they may themselves be the prime (direct) reason why the base is depleted. This hypothesis has, however, proven difficult to test due to the lack of valid and reliable data (Dasgupta et al., 2003).

Cavendish (2000) uses data from Zimbabwe to show how environmental resources have made a significant contribution to average rural incomes. He also argues that there is significant differentiation in the economic properties of different types of natural resources. Brocklesby and Hinshelwood (2001), as cited in Dasgupta et al. (2003), conducted a broader study to show how the poor at least *perceive* the environment and natural resources in general to be an important determinant for their general welfare and livelihood. Dasgupta et al. (2003) submit the nexus to an empirical test in relation to the prevalence of five so-called principal environmental problems: deforestation, fragile soils, indoor air pollution, unsafe water and sanitation. The study, which is limited to Southeast Asia (Laos and Cambodia), found mixed evidence; no clear association can be detected in the case of Cambodia whereas the effects are more pronounced in the case of Laos. Thus, one of their main conclusions is that the validity of the poverty–environment nexus varies significantly between countries.

In the case of Tanzania, the NSGRP observes that under-employment has led to unsustainable use of natural resources (VPO, 2005). A study by Korongo Ltd (2003) on the links between environment and poverty in Tanzania also concluded that it is mainly through profitable and sustainable use of

natural resources that Tanzania can achieve significant poverty reduction. Korongo Ltd (2003) argues that environmental degradation in Tanzania is caused by localized poverty and lack of alternative income opportunities. The research also points to additional factors such as lack of awareness in natural resources conservation and inadequate land tenure.

2.4 Recent policy implications on the effects of resettlement due to conservation

Cernea (2006) noted that, after considerable review of empirical data and evaluation analyses, the World Bank, the African Development Bank and other agencies came to the conclusion that people living in protected areas are made materially worse off and impoverished by the introduction of “restriction of access” to natural resources, that are enforced as part of conservation projects. Cernea (2006) describes and discusses a significant recent policy revision and development adopted by the multilateral development banks as a response to that understanding, which has direct relevance for international conservation activities. The revised policy redefines “restricted access” to certain resources in protected areas as a form of involuntary population displacement, even if the affected groups are not physically relocated. This broadens the definition of “displacement” beyond geographic relocation to include occupational and economic dislocation, which requires commensurate economic reconstruction activities.

Quite often, the substantial opportunity costs and losses incurred by residents of protected areas are not compensated. Economic and social analyses have demonstrated that the benefits of biodiversity conservation through protected areas tend to be highest at the global and national levels and lowest at the level of local communities, while, conversely, the costs are highest for the local communities and lowest at the global level (Cernea, 2006). Closer to the current study area, Jambiya and Sosovele (2001) studied and followed the conservation and local livelihoods situation in the Amani Nature Reserve and cautioned against lack of active participation and exclusion of local communities in that process.

The new policy of the international banks including the World Bank is more relevant here as it contains self-obligations and prescribes means correlated with ends. In this vein, among other measures, the World Bank adopted in April 2004 a new land financing policy that, for the first time, allows the use of Bank financing for land acquisition in displacement situations. The new policy on access-restriction with its institutionalized new procedures does broaden the options for compensation and economic/livelihood reconstruction, and enhances the capacity for sound protected area co-management arrangements. However, this practice is only relevant to multi-lateral institution funding and not government initiatives.



Conceptual framework

3.1 The Sustainable Livelihoods Approach

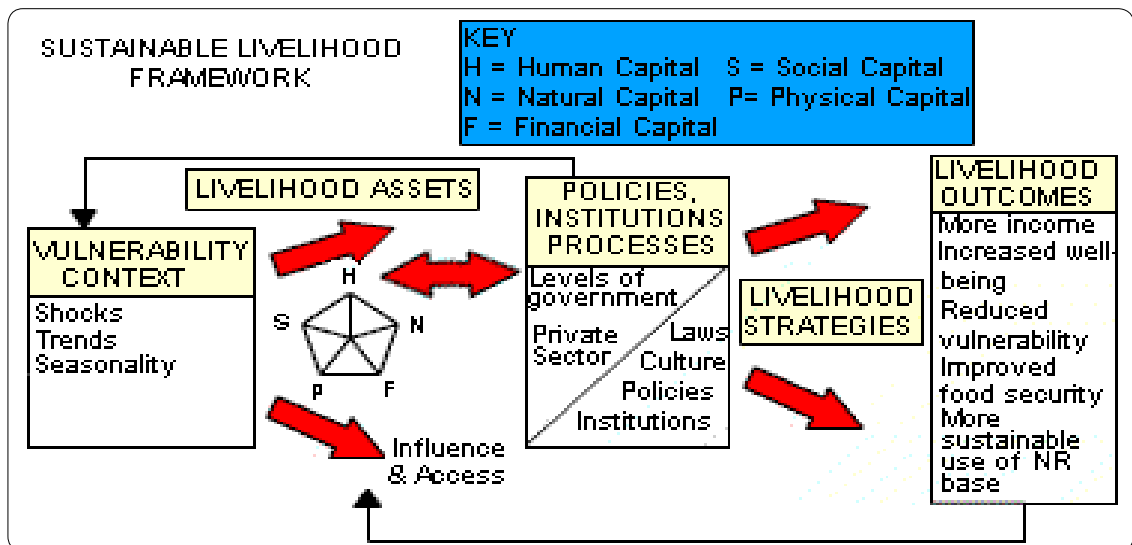
A livelihood is the set of capabilities, assets and activities that provide the means for people to meet their basic needs and support their well-being. The building of livelihoods reflects and seeks to fulfil both material and experiential needs. Livelihoods are not simply a localized phenomenon. They are connected by environmental, economic, political and cultural processes to wider national, regional and global arenas. The sustainability of a livelihood is ascertained by its sensitivity, hardiness and resiliency in the face of short- and long-term challenges (Carney, 1998). Thus the existence of various livelihoods options and their sustainability is of critical importance for the existence and sustainability of rural communities. Access to livelihoods can be a way of getting out of poverty or keeping poverty at bay, or the threats to livelihoods can lead to the opposite situation.

Chambers and Conway (DFID, 1999) point out that: “A livelihood is sustainable when it can cope with, and recover from, shocks and stresses and maintain or enhance its capabilities and assets both now and into the future, while not undermining the natural resource base.” The question of a livelihood’s capacity for sustainability involves evaluating current circumstances and assessing future trends, as well as past conditions and patterns.

Chambers and Conway (1992) discuss not only the complexity and diversity of individual livelihoods, but also the social and environmental sustainability of livelihoods in general. They suggest a measure of “net sustainable livelihoods”, which encompasses “the number of environmentally and socially sustainable livelihoods that provide a living in a context less their negative effects on the benefits and sustainability of the totality of other livelihoods everywhere.”

Livelihood assets are important in assessing the socio-economic aspects of local communities and how these influence livelihood outcomes. Figure 1 provides a visual representation of the Sustainable Livelihood Framework highlighting the main factors that affect people’s livelihoods.

Figure 1: Sustainable Livelihood Framework



Source: DFID (1998).

Based on this framework, the key livelihood assets are natural, human, physical, social and financial. As might be expected, those with larger asset portfolios have more livelihood options, as well as less vulnerability, than those with fewer assets. The prevention of access say to land or any natural resource that provides livelihood options is likely to have profound and negative impacts.

The Sustainable Livelihoods Framework is characterised as an improved way of thinking about the objectives, scope and priorities of development, so as to better meet the needs of the poor at both project and policy levels (DFID, 2000a). The application of the Sustainable Livelihoods Approach (SLA) is likely to help reveal the extent to which communities' livelihoods have been affected by the gazetting of the Derema Forest Corridor.

3.2 The Sustainable Livelihoods Approach and poverty reduction

The sustainable livelihoods definition adopted by Carney (1998) and others suggests the need to understand the livelihood strategies and vulnerability of the poor as the starting point in a livelihoods analysis. Within this literature, there is an assumption that the poor behave as “strategic managers” in negotiating their livelihood outcomes by selecting from a range of options available within a particular locality and context (Moser, 1996; DFID, 1999). However, the poor do not always make “rational” choices in the construction of their livelihoods. Beall (2001) suggested that a broader view is required that takes account of the resources that people require in order to make a livelihood. He goes on to suggest that mechanisms for redistribution may be more critical for the alleviation of poverty than production and reproduction.

It could also be argued that extrapolating the idea of “net sustainable livelihoods” to the global level captures far more of the political trade-offs that would be entailed in the creation of sustainable livelihoods for all. As it is, the idea of sustainable livelihoods has been reduced to a more gentle conception of the way in which individuals or households manage their resources. This view, however, makes it far easier to develop management theory and practice for changing livelihoods.

Bryceson (2000) argues that livelihoods analysis emerges from the responsiveness to neo-liberalism demonstrated by the livelihood strategies of African peasant societies. Indeed, developing an understanding of the livelihood strategies of the poor is seen as key to supporting such strategies in order to alleviate poverty. De Haan (2000) uses a livelihoods lens through which to view migration and argues that livelihoods theory enables us to better understand the contribution that migration can make to poverty reduction. A growing body of work by Frank Ellis considers the diversification strategies of rural households in developing countries. He argues that such households depend on a range of income sources and activities. Poverty reduction strategies should, therefore, promote the opportunities of the poor to diversify such activities through reform to improve governance so as to create facilitating and enabling environments (Ellis, 1998, 1999a, 1999b, 2000).

Hussein and Nelson (1998) propose that livelihood strategies are constructed in three main ways: agricultural intensification, diversification and migration. The key to understanding how the three intersect is in understanding how institutional arrangements determine people's entitlements.

Common themes emerge from these works: that the poor make strategic choices according to their entitlements and access to resources as mediated by the parameters of institutional contexts. Therefore, the poor are central to their own development. According to DFID, “people rather than the resources they use or the governments that serve them, are the priority concern.” (DFID 2000a, p.7) The focus appears to be centred on individuals’ rights and responsibilities.

Operationalizing the theory of livelihoods is an ongoing process. Much of the literature sets out normative aims and features of livelihoods interventions, but there is only a small (but rapidly growing) pool of experience on which to draw (DFID, 2001; Turton 2000a, 2000b; World Bank, 2000).

3.3 The choice and relevance of the Sustainable Livelihoods Approach to the current research

The adoption of the Sustainable Livelihoods Approach arises in part from dissatisfaction with and shortcomings of previous development policies, including integrated rural development, basic needs, and others. The SLA comprises three interrelated components:

- 1) Some combination or portfolio of capabilities, assets (including physical and natural assets and social resources or capital) and activities;
- 2) that enables people to deal with events and trends as well as the development of various strategies to pursue desired livelihood outcomes;
- 3) while maintaining or enhancing their capabilities and assets over time.

Based on this concept, the Sustainable Livelihood Framework helps to chart out the various inter-relationships among the events and trends affecting people’s lives, as well as the structures (levels of government, private sector actors, etc.) and processes (laws, policies, institutions, etc.) that influence people’s access to and use of livelihood assets.

The current study aims to apply the Sustainable Livelihoods Approach because the approach “puts people at the centre of development” and focuses on the impact of different policy and institutional arrangements on people’s livelihoods. Its starting point is a need to understand the livelihoods of people in context. From this starting point, it will attempt to identify the specific constraints which prevent the realisation of people’s rights and consequently the improvement of their livelihoods on a sustainable basis. It will start with an analysis of people’s livelihoods and how these have been changing over time. In this study, however, the approach will also analyse to what extent the communities have secured or lost access to natural resources and have taken part in the management of natural resources, as well as assess the existence and extent of a more supportive and cohesive social environment. The approach seeks to be holistic through seeking to identify the most pressing constraints and opportunities open to people.

Apart from that, the Sustainable Livelihoods Approach works to support poor people to achieve their own livelihood goals. It focuses on the impact of different policies and institutional arrangements upon people and households and upon the dimension of society they define. It further stresses the importance of these policies and institutional arrangements so that they promote the agenda of the poor (Farrington et al., 1999).

3.4 Sustainable livelihoods in the context of the communities adjacent to the Derema Forest Corridor

The SLA is used as a tool to better understand the livelihoods of the poor who live adjacent to the Derema corridor. In Tanzania's rural areas, natural resources, such as forests, are of critical importance for the poor. Therefore, it is important to identify the linkages between the poor and the utilisation and management of natural resources. The SLA presents the main factors that affect people's livelihoods and the typical relationships between them. In particular, the framework provides a checklist of important issues and sketches the way these link to each other. It draws attention to core influences and processes, and emphasises the multiple interactions between the various factors which affect livelihoods. The main elements of this framework are a typology of local benefits, an identification of the ways that local benefits can enhance environmental benefits, and a model that links both local and global benefits to the dynamics of local people's livelihoods.

The typology identifies improvements in the five generic categories of livelihood capital—natural, financial, social, physical and human—which can be seen as the core of local benefits in environmental projects (refer Figure 1).

- a) Improved access to **natural capital** harvested from the local resource base, fuel-wood and environmental services such as carbon, water, biodiversity and ecotourism. Such changes will increase the sustainability of resource management, reflected in factors such as the reversal in deterioration of ecosystems, retained biodiversity values, the regeneration of forests and improvement in water quality. In Derema, this includes access to lowland areas, alternative farming incomes and access to forest resources.
- b) Increased livelihood opportunities, income and **financial capital**. These include increases to the productivity of existing activities and opportunities for new livelihood activities such as farming and agro-forestry, increases in cash income, and improvements in the ability to save or generate capital. In the context of the Derema communities, the increased livelihood opportunities, income and financial capital includes the compensation and resettlement packages and how this process was managed/mismanaged with consequences on their livelihoods.
- c) Improved **social capital**, equity and institutional capacities in local communities. This reflects the enhancement of community-level institutional capacities and contact networks and the improved ability in local communities to deal with outside agencies. It also reflects improvements to gender and social equity at the local level, especially through the empowerment of women and minority groups in decision-making. For the communities in Derema, this relates to the social capital built or otherwise during the process of securing compensation and resettlement.
- d) Improvements to **physical capital**, including investments in tools and equipment, access to or the ownership of land and buildings, and access to infrastructure such as transport, telecommunications, markets or water supply.
- e) Improvements to **human capital**, i.e., the skills, knowledge, work ability and management capabilities of local community members. There is a need for a gender focus here, one that

emphasises issues such as functional literacy and management skills of women (Carney et al., 1999). Compensation invested in the development of human capital is included here. In Derema, this is reflected in increased investments in children's schooling and health.

Increases in the various types of livelihood capital available to communities will promote improved health and food security, including improvements to key indicators such as child and infant mortality, reduced morbidity from diseases that reflect poor environmental conditions, and improvements in both nutritional intake and a balanced diet.

Strengthened livelihood capital and improved health and food security together with practices to sustainably utilise natural resources, will, in turn, increase the resilience of local communities to withstand shocks from external factors that are beyond their effective control. Increased resilience, in turn, promotes reduced vulnerability to, for example, natural disasters such as floods, droughts, environmental degradation, loss of ecosystem integrity, deforestation and climate change and variability as well as to such forces as social, political and market disruption.

4

Research methodology

4.1 Research design and methods

The study applied a multi-disciplinary approach to collect primary data. A resource assessment was conducted to collect bio-physical data in the Derema Forest Corridor while social survey methods were used to capture socio-economic data of the populations in the affected villages. An intensive desk study was also completed to gather secondary data.

With respect to the social survey, quantitative data were used to develop benchmarks and evidence relating to socio-economic variables, such as incomes from compensation payment, investments and livelihood streams, as well as to identify clear winners and losers. Qualitative data assisted in exploring perceptions and opinions of participants and in obtaining clearer insights on specific matters.

Given the complexity of the research topic, the study employed a combination of participatory research techniques commonly used in qualitative studies, including face-to-face interviews and focus group discussions with various target groups—men, women, youth and the elderly (Mikkelsen, 1995; Borrini-Feyerabend & Buchan, 1997; Salkind, 2002).

Official permission to conduct the study came from the Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism, regional and district authorities and lower-level local authorities, including village governments.

4.2 Forest resource assessment

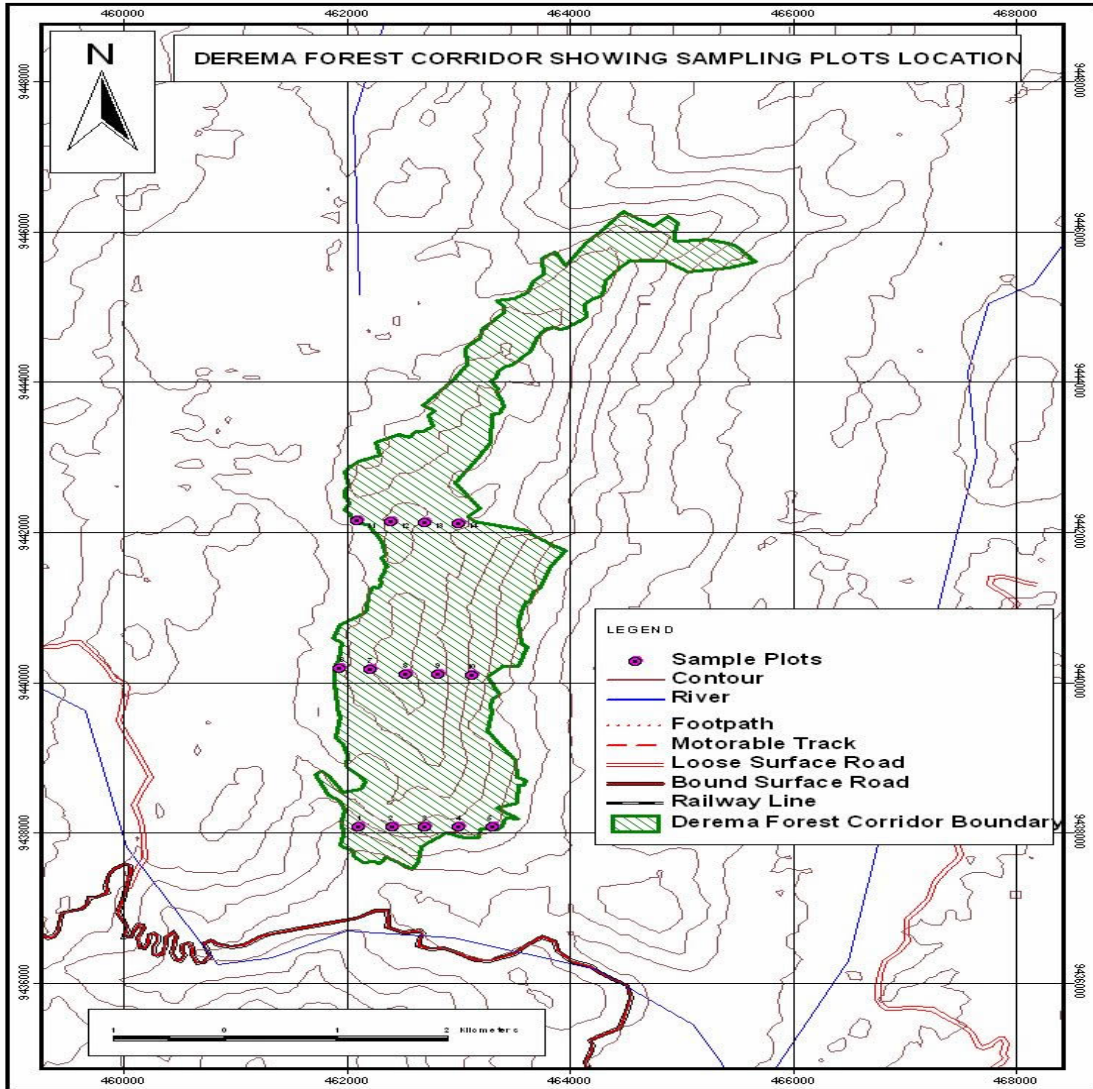
A survey of the diversity of vegetation types and plant species found in Derema Forest Corridor was conducted. Human disturbance within the forest was assessed and recorded and compared with a baseline from a survey conducted in 2002.

4.2.1 Sampling design and layout

The sampling unit was the forest area of the Derema Corridor consisting of approximately 956 hectares. The area of the DFC was established after a preliminary survey with reference to the map of Amani Nature Reserve and consultations with Tanga Catchment staff who were involved in preparation of Draft Management Plan of the Derema Forest Corridor. The sampling intensity was 0.04% making a sample size of 38 hectares with a total of 22 plots. Sampling intensity of between 0.01% and 0.05% is common in natural forests depending on the budget and time constraints (Kijazi, 2006).

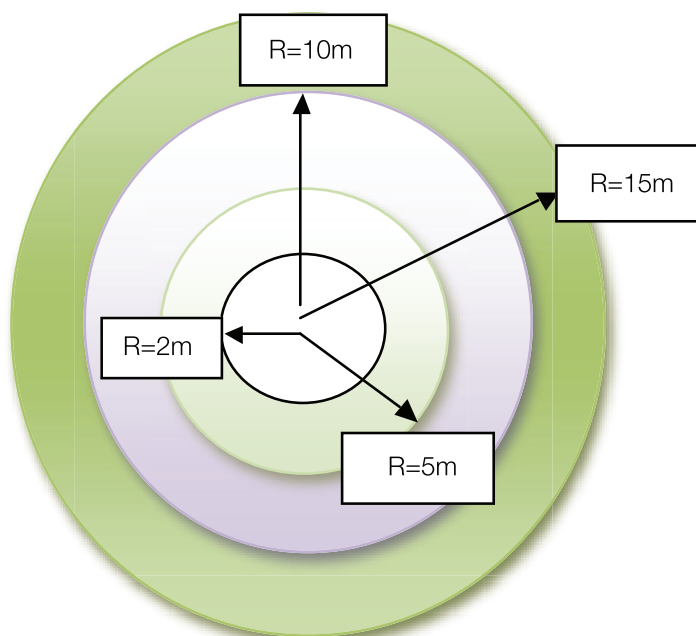
Systematic sampling techniques were employed on transects located at a predetermined interval of 2 km, together covering a total distance of 8.3 km (Map 2).

Map 2: Location of sample plots in Derema Forest Corridor



Plots were laid in transects running in east-west direction using GPS co-ordinates at an interval of 300 metres, ensuring coverage of all effects of altitude and humans on the vegetation composition, abundance and quality. The sampling plots were circular with a maximum radius of 15 metres. Measurements were taken at a radius of 2, 5, 10, and 15 metres (Figure 2).

Figure 2: Concentric sample plots



The use of concentric plots in forest inventory aims at increasing the accuracy of the measurements and sampling intensity of large trees, while simultaneously saving time (National Forest Resources and Management Assessment (NAFORMA), 2009). Tropical natural forests are characterised with having negative exponential diameter distribution such that there are several small-size trees and the number of trees decreases with increasing tree size. Concentric plot design ensures that small trees are measured in small plots and large trees are measured in large plots. This arrangement results in measuring approximately the same number of trees for the different size classes.

4.2.2 Field data collection

Field data collection in Derema forest corridor was conducted over two weeks in October 2010. Data for each plot, including tree diameter at breast height (dbh), species names (local and botanical), number of stems and plot location, were entered into a field inventory form. In all plots and along transects, human disturbances were assessed by counting cut stumps, evidence of fodder collection and presence of agricultural crops. Table 1 indicates sample plots and measurements.

Table 1: Sample plots and diameter measurements

Plot radius	Trees (dbh)
15 m	≥20cm
10 m	≥10 cm
5 m	≥5cm
2 m	≥1 cm

4.3 Socio-economic data collection

4.3.1 Sampling design

Purposeful and stratified sampling methods were applied to select respondents in the five villages around the Derema Forest Corridor. This research design was employed to ensure that representatives from various strata within the affected communities were included in the study and to ensure that the overall sample was as representative of the communities as possible in terms of gender and other socio-economic categories. The sample size was based on the number of affected households in the five villages and the sample framework was based on obtaining at least 10% of the households affected by the resettlement and compensation exercise.

A list of 1,128 affected farmers was obtained and divided between men and women. Thereafter, an 11% sample population of 124 individuals from different households were randomly selected. The adequate representation of each gender was important, as men and women typically had different access to and use of forest and land resources, e.g., timber, poles, firewood, medicines, food and so on.

4.3.2 Study instruments

Four instruments—a household questionnaire, in-depth interviews and focus group discussions with persons affected by the compensation and resettlement process, and interviews with community leaders and local government officials—were used by the study. Data collection took place during the month of October 2010.

Questionnaire

A questionnaire was administered to all 124 participating individuals. The questionnaire included the following key sections: household profile including household sizes; key household economic activities; property ownership; farm sizes; crops grown; quality of houses and building materials; prospects for socio-economic improvement; value of compensation, plans for utilization of compensation and opinions of compensation process; and values of crops and farmland taken over by government authorities; and household overview of the overall resettlement process.

In-depth interviews with individuals affected by the resettlement process

Semi-structured interviews were carried out with individuals who possessed relevant knowledge, experience and interests related to the compensation and resettlement process. The key informants consisted of youth, the elderly, women and village leaders, all of whom were farmers and directly or indirectly affected by the resettlement process. A checklist of open-ended questions was used to obtain qualitative and quantitative information related to the compensation and resettlement process. Twenty (20) in-depth interviews were conducted, privately and face-to-face. These interviews were used to obtain clarifications and opinions as well as advice, and helped to gauge the feelings and moods of the affected persons on the resettlement and compensation process.

Interviews with community and local government leaders

The in-depth interviews were supported by interviews with knowledgeable persons in the community, including religious/faith-based leaders, schools teachers, mid to senior level local government officials (at hamlet, village, ward, district and regional levels), and employees of tea estates residing in and

around the affected villages. These were open-ended discussions used to obtain clarifications on various issues relating to the resettlement and compensation process.

Focus group discussions (FGDs)

Focus group discussions were conducted with homogeneous groups of people to obtain in-depth information on the effects of the Resettlement Action Plan (RAP) on different stakeholder groups, including youth, women, men and the elderly. The discussions focused on the benefits/losses and opportunity costs incurred as a result of resettlement by comparing the situation before and after resettlement. The FGDs allowed the study team to gather more comprehensive information on participants' knowledge, attitudes and practice related to resettlement in relatively less time than individual interviews. Each focus group consisted of between 8-10 persons on average. A qualitative report was produced for each of the 4 FGDs held.

4.4 Review of secondary sources

Prior to fieldwork, the researchers reviewed both published and unpublished documents on forest livelihoods, conservation and poverty. These included grey literature, as well as studies and reports concerning the Derema Corridor establishment and implementation of the Derema Resettlement Action Plan with a focus on the five affected villages. One important source was the Participatory Monitoring and Evaluation of RAP (WWF, 2009). The information gathered through the review of secondary sources was used to provide a general overview of the existing social, economic, institutional and ecological settings of the study area. The information collected was used to complement and supplement the data collected through primary methods.

4.5 Data analysis and presentation

4.5.1 Forest assessment

Species diversity is the foremost method for ecological and conservation assessment (Kent & Coker, 1992). The Shannon (or Shannon-Wiener) index of diversity was used as this index is not affected by sample size and puts more emphasis on rare species. Diversity indices provide more information about community composition than simply species richness. They also take the relative abundance of different species into account (Magurran, 1988).

The first step was to calculate the Importance Value Index (IVI) of each tree species as the average relative frequency, relative basal area and relative density. The Shannon-Wiener index was calculated using the following formula (Kent & Coker, 1992):

$$H' = -\sum_{i=1}^s (p_i) (\ln p_i)$$

Where: H' = Shannon-Wiener diversity index

's' = total number of species in the community (richness)

' p_i ' = proportion of s made up of the i^{th} species

ln = logarithm to the base e

The larger the value of 'H' the greater is the diversity and vice versa. The index increases with the number of species in the community, but, in practice, for biological communities it does not exceed 5.0.

Index of Dominance (ID) was used to measure the distribution of individuals among the species in a community. The greater the value of ID, the lower is the species diversity in the community and vice versa. The Index of Dominance was calculated using the following equation (Ambasht, 1988; Misra, 1989):

$$ID = \sum (n_i / N)^2$$

Where: ID =Index of Dominance

n_i = Importance Value Index of individual species

N = Total Importance Value Index of all species

Values of the Shannon-Wiener diversity index (H') and Index of Dominance (ID) describe the impact of resettlement on conservation of forest resources. The impact on regeneration potential was also analysed from tree species with $dbh \leq 5$ cm measured in the 2 metre radius of the sample plots.

4.5.2 Socio-economic data

Qualitative data, such as people's perceptions about the RAP and its implications on their livelihoods and conservation, were analysed and presented in a descriptive and analytical form. Quantitative data obtained from the questionnaire are presented in the form of charts, tables and graphs.

5 Research findings and discussions

5.1 Impact of resettlement on community livelihoods

5.1.1 Reasons for migration into the area and year of settlement

Most of the migration to the five villages occurred between 1961 and 1980 (Table 2). Discussions with local communities revealed that this movement coincided with the time when news of the availability of land in the East Usambara Mountains reached the densely populated areas of the West Usambara Mountains. Subsequently, a large number of the Wasambaa and Pare people from the West Usambara immigrated to the East Usambara Mountains.

Table 2: Period and reason for migration into East Usambara Mountains

Year moved into the village	Agricultural land	Marriage	Employment	Family attachment	Business opportunities	Frequency
<1950	3	0	2	0	0	5
1950-1960	7	0	10	6	0	23
1961-1970	12	5	12	8	0	37
1971-1980	9	2	8	12	2	33
1981-1990	5	1	5	4	1	16
1991-2000	4	1	0	2	3	10
Total	40	9	37	32	6	124
Percent	32.3	7.3	29.8	25.8	4.8	100

The main drivers for migrating to the study area were the need for land for cultivation (32%) and to secure full or part-time employment (30%) in the nearby tea estates. An important push factor was also the Arusha Declaration of 1967 that made land available to people in land-scarce areas.

5.1.2 Household size

The average household size in the five villages was 7.6 persons, which was slightly larger than that derived from a social impact assessment done in 2006 by Misana (2009), which estimated the average household size to be 6.5 persons. Table 3 shows that the household sizes with the highest frequencies were those with between 5 and 8 persons per household. The average for this study is also much larger than the district average of 5.2 persons per household (GoT 1997), and the regional average of 4.6 persons per household. The drivers could be high dependency on employment in the tea plantations and highlights the importance of cash crops and especially cardamom, black pepper and cloves as cash crops for household economies.

Table 3: Household size

Number of persons in household	Frequency	Percentage
1	2	1.61
3	4	3.23
4	12	9.68
5	17	13.71
6	21	16.94
7	13	10.48
8	14	11.29
9	12	9.68
10	11	8.87
11	5	4.03
12	1	0.81
13	3	2.42
14	2	1.61
15	2	1.61
16	2	1.61
19	1	0.81
20	2	1.61
Total	124	100%

5.1.3 Main economic activities and use of income

Agriculture was the dominant economic activity in the study villages. For most of the affected farmers, agriculture was a full-time activity with a small proportion of people engaged in non-farm activities. The coping mechanisms for many households involved doing more than one type of work, but agriculture was clearly the most common source of employment/work. As the data in Table 4 show, almost half of respondents were engaged in agriculture to produce food (48.4%). A further 37% of households worked in cash crop production and slightly less than 6% in commerce/business. Only small percentages of households were engaged in casual labouring or livestock keeping.

Table 4: Main economic activities in the five villages

Employment activity	Frequency	Percentage
Agricultural (Food)	60	48.39
Agricultural (Cash crop)	46	37.1
Wage employment	1	0.81
Commerce/Business	7	5.65
Carpentry	1	0.81
Casual labourer	4	3.23
Butterfly farming	1	0.81
Livestock keeping	3	2.42
N/A	1	0.81
Total	124	100%

The study also revealed that 68.5% of the households were engaged full-time in agricultural activities throughout the year, while only 18.5% were engaged on a seasonal basis. Furthermore, most of the economic activities indicated in Table 4 took place within the respective village areas (81.5%). This finding was both indicative of the geographical difficulty of going further afield to generate incomes or obtain livelihoods, short of migrating, as well as the scarcity of land within the Derema villages.

5.1.4 Farm sizes before and after gazettement of the Derema Forest Corridor

The majority of farmers experienced a decline in land holding as a consequence of giving up their farm plots in the DFC. Table 5 shows that the mean land holdings declined from 8.84 acres to 4.07 acres between 2002 and 2010. The range of land sizes also narrowed considerably during this time. The fall in land holdings had implications on incomes from the sale of cash crops and on food security. The decline in farm size is likely to have increased households' vulnerability to food insecurity and reduced their capacity to combat food shortages.

Table 5: Land/farm sizes (acres) before and after gazettement

Size of land/farm plots	n	Minimum	Maximum	Mean	Std
Land size (2002)	122	1	47	8.84	6.981
Land size (2010)	123	0	19	4.07	3.588

The testimony of participants in all focus group discussions clearly spelled this out, for example:

“Most of us have lost a lot of land with good potential.”

“Most of us are now much poorer and have to seek other less paying alternatives, such as hired labour in teak and tea plantations, or having to do without some things that we enjoyed in the past.”

Participants in the FGDs often showed their frustration and disappointment in the resettlement and compensation process.

5.1.5 Housing quality

After all the compensation payments were made in 2009, housing conditions of most study participants improved. This suggests that a good number of respondents invested in building or improving their houses. Table 6, for example, shows that the proportion of cement-walled houses almost doubled between 2002 and 2010 (i.e. from 12% to 22%), while the purely pole and mud houses declined from 77% to 44%. Houses made from burnt mud bricks also increased from 10% to 32% over the same period.²

Table 6: Changes in type and quality of housing, 2002 and 2010

Type of House	Before gazetting		After gazetting	
	Frequency	Percent	Frequency	Percent
Cement blocks	15	12.1	27	21.8
Poles and mud	95	76.6	55	44.3
Burnt bricks	13	10.5	40	32.3
Stones	1	0.8	2	1.6
Total	124	100%	124	100%

Evidence from the focus group discussions helped explain this change. Having undergone some very difficult times and procedures, one of the unplanned or unintended benefits was that the communities had ample time to reflect and plan how they would spend their compensation payments.

Data further show an increase in the number of rooms per house. Table 7 shows the percentage of houses with 1 or 2 rooms decreased, the percentage of houses with 3 rooms remained the same, while the percentage of houses with 4 or 5 rooms increased. This further supports the proposition that households invested their compensation payments in house improvements. These houses were not just within the respective villages. Some of the well-compensated respondents built or purchased houses in towns such as Muheza.

²Some of these houses are of pole and mud or clay bricks and then the walls are covered by cement.

Table 7: Number of rooms in respondents' houses, 2002 and 2010

Number of rooms	Before gazetting		After gazetting	
	Frequency	Percent	Frequency	Percent
1	6	4.84	2	1.61
2	28	22.58	18	14.52
3	49	39.52	48	38.71
4	30	24.19	36	29.03
5	3	2.42	13	10.48
6	2	1.61	2	1.61
7	1	0.81	2	1.61
8	0	0.00	3	2.42
Total	119	95.97%	124	100%
Missing	5	4.03%	0	0%
Total	124	100%	124	100%

In line with the improvements in the materials used in the walls of the houses, the study showed a decline in use of mud floors by 17% and an increase in cement floors by 18% between 2002 and 2010. It is likely that further improvements in flooring will occur in the near future. Given the way houses are built in the area, floor improvements typically come much later.

Data on roofing materials before and after gazetting further support the observation those compensation payments were used to improve housing. The percentage of grass/thatched houses declined by almost 50% with a corresponding increase in the percentage of houses roofed with corrugated iron or metal sheets.

Table 8: Type of roofing materials

Roofing materials	Before gazetting		After gazetting	
	Frequency	Percent	Frequency	Percent
Grass	34	27.4	18	14.5
Corrugated iron sheets	76	61.3	96	77.4
Tin or metal sheets	11	8.9	10	8.1
Asbestos	3	2.4	0	0.0
Total	124	100%	124	100%

5.1.6 Sources of drinking water

Virtually no changes in sources of drinking water before and after gazetting were observed. This finding was expected as most of the respondents continued to reside in the same area and the houses that some respondents built or purchased in towns were mainly used for renting. The two most common sources of drinking water were and continue to be rivers/streams and open wells (Table 9).

Table 9: Sources of drinking water

Source of drinking water	Before gazettement		After gazettement	
	Frequency	Percent	Frequency	Percent
Communal standpipe	4	3.2	2	1.6
River/stream	84	67.7	85	68.6
Covered well	0	0.0	1	0.8
Open well	35	28.2	35	28.2
Rain water harvesting	1	0.8	1	0.8
Total	124	100%	124	100%

5.1.7 Sources of lighting

As in the case of water, hardly any changes were noted in the sources of lighting energy used by households. The situation in 2010 was basically the same as in 2002. All villages, with the exception of Kisiwani, do not have electricity. The principal type of lighting is the kerosene lamp, which is used by 95% of households (Table 10).

Table 10: Sources of lighting

Source of lighting	Before gazettement		After gazettement	
	Frequency	Percent	Frequency	Percent
Kerosene	119	96.0	118	95.2
Candle	2	1.6	1	0.8
Electricity	1	0.8	2	1.6
Solar	2	1.6	3	2.4
Total	124	100%	124	100%

5.1.8 Sources of cooking energy

The main source of cooking energy is firewood. A big proportion of the population (98.4%) around Derema Forest Corridor use firewood as source of cooking energy. The data show no change in the proportion of respondents using firewood between 2002 and 2010. This percentage is consistent with most rural households in Tanzania. Rural communities continue to rely on firewood for cooking, warmth and food processing. One implication of the gazettement of the Derema forest is not only loss of land but also reduced access to firewood. This issue is likely to manifest in longer walking distances to obtain firewood which will impact more on women in the affected villages. The focus group discussions indicated that some households have already been affected in this way, but they are still able to collect firewood from the permitted areas (utilisation zones) of protected forests of Amani Nature Reserve.

5.1.9 Expenditure of compensation money

The most common major expenditures (i.e., those in excess of TZS 5 million) from compensation payments were, in order of ranking, spent on: children's education, house repairs/improvements; investing in alternative incomes/non-farm activities; building or buying new houses (often outside the village); purchasing land within the village; and buying land outside the village (often in the lowlands and neighbouring districts (Table 11).

Table 11: Expenditure of compensation money above TZS 5 million

Expenditure	Frequency	Percentage of responses
Acquire land in the village	17	6.9
Acquire land outside the village	14	5.6
Children's education	38	15.4
House improvements	34	13.7
Alternative incomes/ Non-farm activities	25	10
Buying/building house	22	8.9
Spent on health	1	0.4
No answer	97	39.1
Total	248	100%

Data on the major categories of expenditure are consistent with the earlier findings on the improvements/investments in respondents' housing (Refer section 4.1.5).

5.1.10 Ownership of assets

No substantial increase in assets other than housing was recorded, although possession of mobile phones had more than doubled. It is difficult to say whether this increase is a result of compensation money alone, given the fact that several mobile phone operators are now covering the area compared with 2002 (Table 12). However, in the focus group discussions, it emerged that expenditures on mobile phones were slowly taking up an important share of household incomes.

Table 12: Ownership of Assets, 2002 and 2010

Asset type	Before gazetting		After gazetting	
	Yes	No	Yes	No
Flashlight	103	21	108	16
Radio	102	22	107	17
Iron	66	58	67	57
Bicycle	39	85	39	85
Wheelbarrow	8	116	12	112
Mobile phone	36	88	78	46
Television	1	123	4	120
Motorcycle	6	118	3	121
Motor vehicle	4	120	8	116
Table	102	22	110	14
Chairs	98	26	107	17
Bed	107	17	108	16
Mattress	93	31	102	22
Cupboard	51	73	56	68
Farm implements	90	34	93	31
Lumber/Chainsaw	21	103	26	98
Sofa couch	28	96	38	86

There is a slight increase in wooden furniture, and a marginal increase in farm implements and farm animals, suggesting that the reduction in land holdings reduced the incentive to own implements and livestock.

5.1.11 Transparency in the compensation process

The study found that 67% of respondents were dissatisfied with the degree of transparency in the compensation process. The provision of information was not managed well, and it further emerged during focus group discussions that women and poorer groups were often not clearly informed of the process. Whether this was by design or due to poor preparations is not clear, though it seems this is a classical situation of poor governance, in which certain groups, especially the more vulnerable and poor, tend to be excluded from active participation and access to information. Also, it was revealed that most respondents (89%) did not understand the formula used for paying the compensation, i.e., how the amounts due to them were calculated. This led to suspicions of being underpaid. This situation was made even more complicated by the fact that most respondents expected a flat payment of TZS 28,500 per cardamom cluster stem, regardless of its condition. However, the government valued a cardamom cluster stem at TZS 3,350. This significantly lower amount was paid to farmers which often led to dissatisfaction.

From the focus group discussions, it emerged that when the forest boundary payments were made in 2002, the substantially higher figure of TZS 28,500 per cardamom cluster stem was paid to farmers whose crops were slashed in the process of surveying and demarcating the boundary. This figure does not feature in any official compensation payments, and appears to have been based on some ad hoc calculations and the availability of donor funds from East Usambara Catchment Management Project which was coming to an end. However, raised farmers' expectations that the gazetting compensation payments would be the same, and also led to farmers not understanding (or not wanting to understand) how and why the later payments should be lower.

5.1.12 Dissatisfaction with compensation payments

The majority of respondents (94%) were not happy with the compensation payments. Most of them still believe that they deserved TZS 28,500 for a mature cardamom cluster stem, regardless of its condition, not TZS 3,350 which they were paid. This led to suspicion and resentment, a situation in which the farmers are unlikely to be agreeable partners in conservation of the Derema forest; instead they are more likely to be adversaries.

The various reasons given by respondents for being dissatisfied are interrelated; they all converge on farmers believing that the calculation mechanism for compensation was not clear and therefore unfair. Most farmers (60%) said that the main reason for not being happy with the compensation payments was the low value that was put on their crops. About 12% of the respondents were excluded in the valuation and calculation process and therefore could not understand how values were arrived at, while a further 16% thought that calculations and payments procedures were poorly done. Furthermore, 11% of respondents were confused as to why different values were used between the boundary crops and the gazetting payments.

Table 13: Reasons for dissatisfaction with compensation

Reasons	Frequency	Percent
Low value for crops	75	60.5
Did not participate, therefore amounts not understood	15	12.1
Poor calculation and payment procedures	20	16.1
Confusion why different values were used in current payments	14	11.3
Total	124	100%

5.1.13 Impact of gazetting and compensation on quality of life

Most respondents felt that their livelihoods and quality of life were worse as a result of losing the land they used to cultivate and that the compensation payments did not sufficiently recompense them. In the focus group discussions, it emerged that the farm gate prices for cardamom, black pepper and cloves are much higher compared with 2005. Most respondents (78%) said that they were now worse off compared to 2005 (Table 14). About 10% reported to be in the same condition as they were before, while 5% said they were now better off.

Table 14: Changes in livelihoods and quality of life

Change	Frequency	Percent
Better off	6	4.8
Same	13	10.5
Worse	97	78.2
No answer	8	6.5
Total	124	100%

Further inquiry revealed that the process of gazetting and compensation had led to respondents having fewer livelihoods options (40%), and, in some cases, a loss of their main livelihood (40%). Together, these two factors have resulted in lower quality of life and greater insecurity among a large majority of farmers (Table 15). During the focus group discussions, it was revealed that apart from payments being below farmer's expectation, the payments were made in instalments over a long period of time such that most farmers could not make any meaningful investments.

Table 15: Reasons for lower livelihoods

Reasons	Frequency	Percent
Fewer livelihoods options	49	39.5
Piecemeal payments	5	4.1
Loss of main livelihood	49	39.5
No answer	21	16.9
Total	124	100%

5.1.14 Access to new farm land

The 2006 World Bank Resettlement Action Plan (RAP) recommended that as part of the compensation process—and also as a way of reducing population pressure in the area—the government should make alternative land available in the lowlands. Two areas were selected, Misozwe and Mkwajuni. However, since more than 800 farmers registered for farms, the two areas were inadequate to fulfil this demand. A request has been made to the President to make available the abandoned Kibaranga sisal estate but so far this land has not been made available to farmers. Some farmers, often those who received better compensation payments, have obtained land in the Kwa-Tango, Misozwe and Mkwajuni areas.

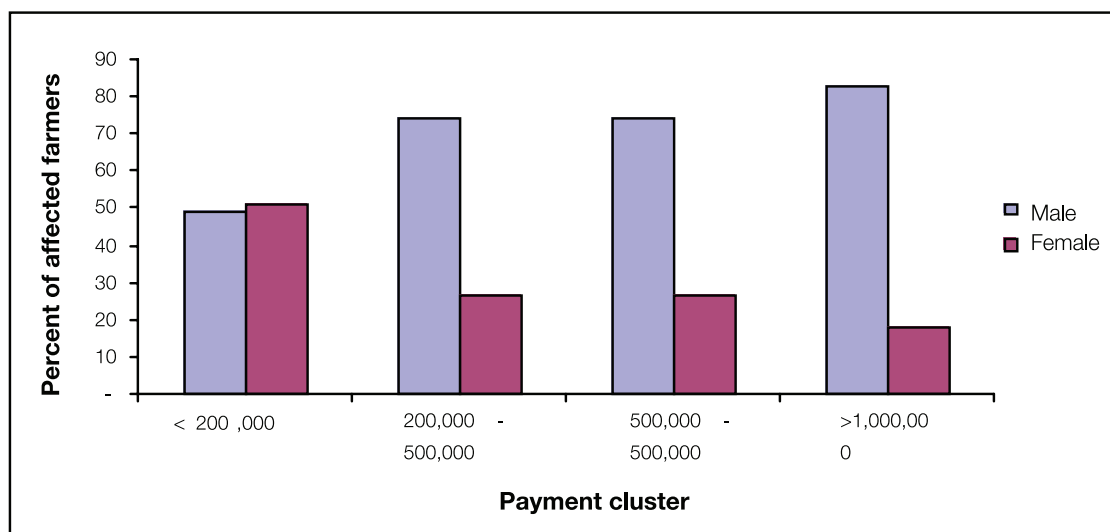
The study found that 72% of affected farmers had applied for alternate land in the lowlands of Muheza district and were ready to go and farm, but not to move their main homesteads. Given the number of protected areas and the process of linking them up, together with the large tea estates and growing population, land has become increasingly scarce. Inevitably, this has dire consequences on the poor, who have very limited livelihood options. The scarcity of land and livelihoods is also likely to lead to more conflicts between conservation authorities in the mountains and the poor who are likely to attempt to access natural resources illegally.

From the focus group discussions, the people who did not apply for land explained that this was because they did not have the resources to purchase and develop the land despite being in need of it. Only 4% of those interviewed were able to obtain alternative land, implying that there is no relief to land pressure and land scarcity in the mountains. Therefore, it may be concluded that the prerequisites for RAP under the World Bank policy were only partially met. Land had been identified and the process of securing the land for interested farmers had commenced, but the land was not yet secured.

5.2 Impact of resettlement by gender

In the five villages, the highest compensation paid per individual was TZS 22,832,172.32 and the lowest was TZS 3,112.45. Based on the information gathered from the farmers interviewed, the majority of women received <TZS 200,000, while most men received a compensation payment ranging from TZS 200,000 to TZS >1,000,000. The main reasons for lower payments to women were that women had smaller land holdings and were engaged in growing food crops like cocoyams, banana and pineapples which are of low value compared with cash crops like cardamom, cinnamon and cloves.

Figure 3: Distribution of compensation payments in five villages of DFC, by gender



The use of compensation money to increase affected farmers' participation in other cash-earning opportunities was also analyzed. The study found that investments differed based on the amount of compensation money received. The majority of farmers who received amounts less than TZS 200,000, mostly women, used the money for household expenditures, i.e., buying food, clothes and cosmetics. This payment cluster could not invest in other income-generating activities, hence, can be regarded as the ones who effectively lost their livelihoods. These findings corroborate the results from an assessment study in 2000, where women specifically expressed concerns about

decreased control over land and monetary compensation as a consequence of the establishment of the Derema Forest Corridor (Jambiya & Sosovele, 2000).

5.3 Impact of resettlement on forest condition

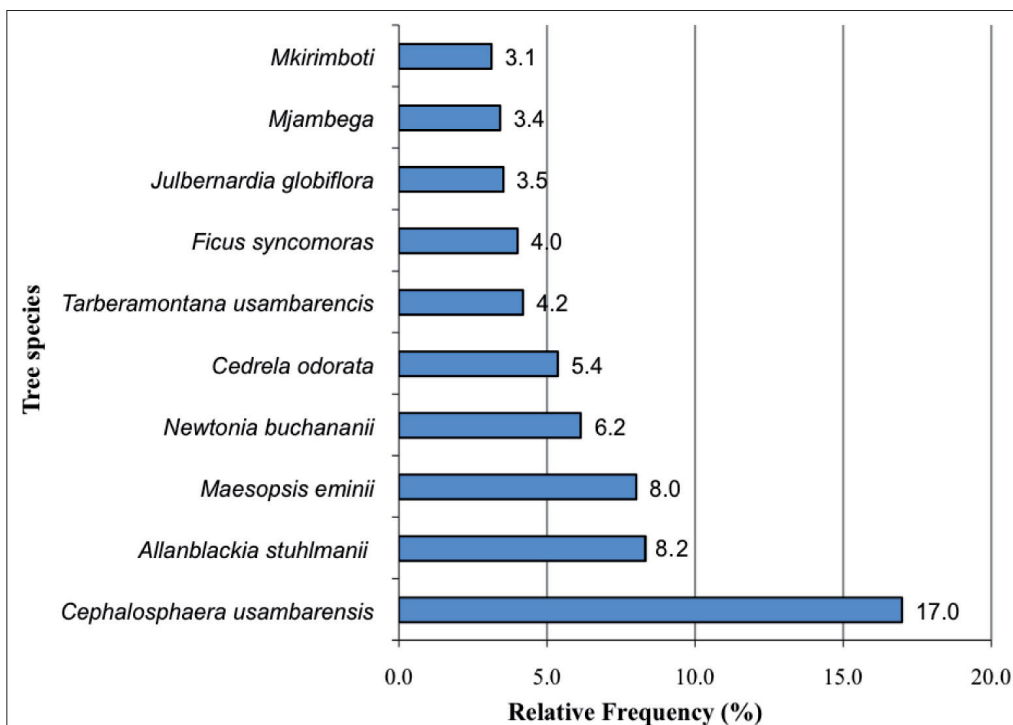
5.3.1 Stocking distribution

The study revealed that Derema Forest Corridor has diverse tree species. A total of 39 tree species were identified. Five tree species of high stocking density include *Cephalosphaera usambarensis*, *Allanblackia stuhlmanii*, *Maesopsis eminii*, *Newtonia buchananii* and *Cedrela odorata*. Figure 4 shows the frequency distribution of ten important tree species in the DFC.

The study revealed that the DFC has a stocking density of 1,061 trees per hectare and an average basal area of 37.59 m²/ha. In a study in Chome Nature Reserve in Same district with similar climatic conditions as the DFC, it was reported that the area of the forest that was undergoing recovery after uncontrolled harvesting had a basal area of 30 m²/ha and stocking density of 3,643 per hectare with 70% being regenerants (Kijazi, 2006).

These results indicate a slow recovery of the forest over the period since the DFC was being used for the cultivation of various agricultural crops. The high basal area recorded can be attributed to the fact that large trees were left during cultivation of shade-demanding crops, like cardamom, which formed about 90% of all agricultural crops of the corridor.

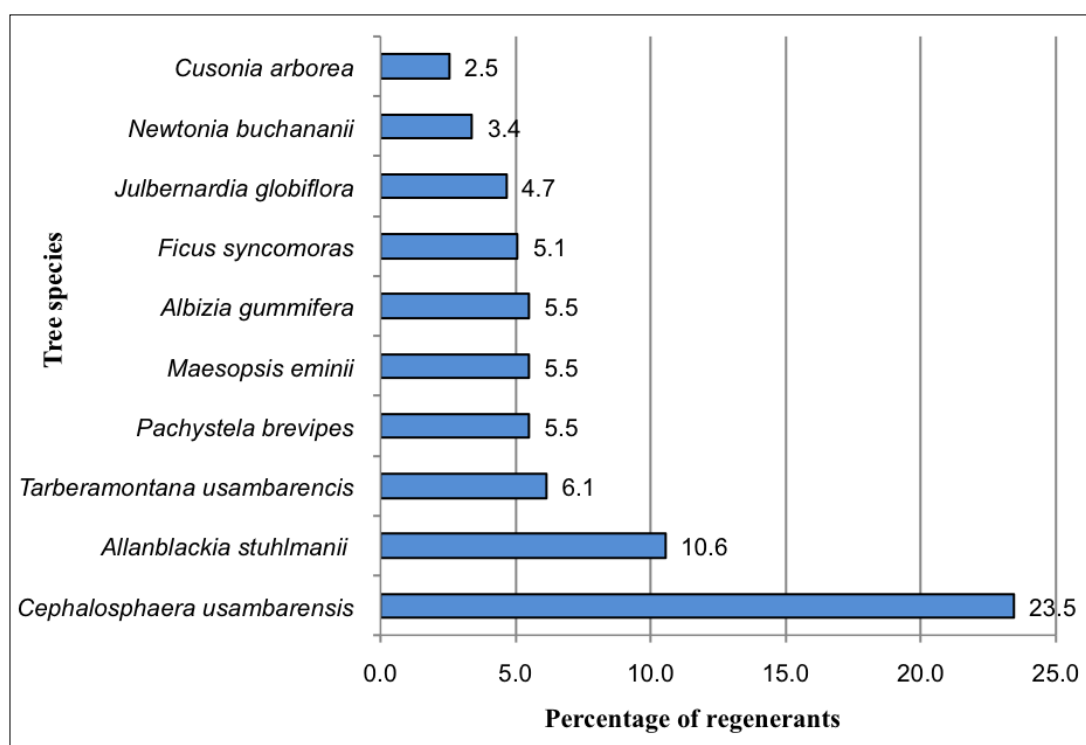
Figure 4: Stocking distribution of ten important tree species in DFC



5.3.2 Forest regeneration

The regeneration of Derema Forest was based on tree species of less than 5 cm dbh. The total number of regenerants recorded by this study was 478 tree per hectare, dominated by *Cephalosphaera usambarensis*, *Allanblackia stuhlmanii*, *Tarberamontana usambarencis*, *Pachystela brevipes*, *Maesopsis eminii*, *Albizia gummifera*, *Ficus syncomoras*, *Julbernardia globiflora*, *Newtonia buchananii* and *Cusonia arborea* (Fig. 5)

Figure 5: Distribution of regenerants in DFC



5.3.3 Shannon-Wiener diversity index of tree species

The Shannon-Wiener diversity index of tree species in DFC was 3.2, which is more or less the same as that found in a recovering area of degraded forest in Chome Nature Reserve (3.12). Comparative studies of areas in the Eastern Arc Mountains with similar ecological conditions reported diversity index values of 2.93 in the Usambaras and 3.31 in the Ulugurus (Munishi et al., 2004). Diversity indices provide information about the rarity or commonness of species in a plant community. The higher the value of index, the higher the diversity. Values for the Shannon-Wiener index of > 2 have been assigned as indicating medium to high diversity (Barbour et al., 1987) with a maximum value of 5. The value of 3.2 in Derema forest signifies that forest species are recovering after cultivation in the corridor was abandoned.

5.3.4 Index of dominance

In Derema Forest Corridor, an index of dominance value of 0.06 was recorded. The index of dominance reflects the dominance of species within a plant community and the highest value is 1. The lower the index value, the lower the dominance of a single species (Ambasht, 1988; Edwards, 1996). The low value calculated by this study reflects that each species contributes to the community relatively evenly. The findings in Derema Forest compare well with values calculated for the Usambaras (0.05) and Ulugurus (0.04) (Munishi et al., 2004). Both of these forests have been subjected to human disturbances in the past through logging and encroachment (Bjøndalein, 1992; Lovett and Pocs, 1993; Newmark, 1998).



Conclusions, policy implications and recommendations

6.1 Conclusions

The study has generated a better understanding of the consequences of the resettlement and compensation exercise on the livelihoods of communities adjacent to Derema Forest Corridor and the impact of gazetting on forest conservation. The findings suggest that the process of compensation and resettlement did not meet the expectations of the affected communities and consequently cannot be perceived as pro-poor.

The main conclusions are as follows:

- a) The resettlement and compensation exercise was favourable to only a few farmers in the affected communities. Those who were already poor and had crops of low quality and productivity, and/or who had small areas of cultivation received the lowest compensation and resettlement packages and thus became poorer.
- b) The resettlement and compensation process has impacted positively on the forest condition of the Derema corridor as evidenced by the high value calculated for the Shannon-Wiener diversity index and regeneration rate of key tree species. Hence, it can be concluded that the conservation agenda has been met.
- c) Communications with local communities were inadequate and one-sided, i.e., between payers of compensation and the receivers, thereby raising the expectations of affected farmers.
- d) When resources for compensation eventually became available, payments were made on piecemeal basis, thereby creating more frustration among the affected farmers.
- e) In terms of gender, most women farmers or land owners were negatively affected by the compensation and resettlement exercise as they received very small payments and hence could not recover their lost livelihoods.
- f) The study concludes that the main “winners” in the gazetting of the DFC were the government, conservationists and their interests, and a handful of already well-to-do farmers who were handsomely compensated. The “losers” were the majority of farmers. Overall, the whole gazetting and compensation exercise impacted negatively on the livelihoods of the majority of residents in the five villages adjacent to the DFC.

6.2 Policy implications

The study results indicate that, even though the World Bank policy on resettlement explicitly focused on the livelihoods of affected people, the government of Tanzania failed to internalize the policy. There is an urgent need for a change in mindset and practice in forestry and natural resources management. With respect to valuable conservation areas, resettlement and compensation exercises must give priority to the livelihoods of communities adjacent to the forest areas identified for conservation. Time and again those tasked with taking land and other resources from local communities or limiting their access to such resources, fail to consider the importance of natural resources to people’s livelihoods and resilience, thus often making conservation a poverty-deepening process.

Resource governance related to resettlement and compensation exercises needs to be strengthened. Failure to do so will inevitably cause more difficulties for affected communities and potential failure in the sustainable management and utilisation of natural resources. Developing appropriate policy and strategies to reverse the current detrimental practices is also a way of ensuring that conservation does not become a poverty-deepening process but rather supports livelihoods and even achieves wealth creation on a sustainable basis.

6.3 Recommendations

- a) Procedures and processes for converting open and village land into conservation areas must take into account the immediate and longer-term impacts on local communities and provide viable alternatives and opportunities. Failure to do so will simply delay the existing conflicts between conservation and resource users.
- b) Relevant national policies, laws and regulations that internalize international policies on resettlement for conservation of biodiversity or other development initiatives need to be in place to safeguard the interests of affected communities.
- c) In light of empirical evidence and the policy developments above, conservation organizations need to consider developing their own self-binding policies to prevent impoverishment in protected areas, and, specifically, ruinous displacements. The impoverishment risks and effects of access-restriction and displacement are severe and must be properly anticipated and prevented by all parties involved.



Further research

The study identifies two areas for further research.

- a) Comprehensive studies need to be conducted to examine livelihood opportunities and options in areas where new protected areas are to be established or existing ones expanded. Such research would valuably investigate the direct costs and benefits of conservation on affected households and communities, as well as the opportunity costs incurred in the course of attaining conservation, development and poverty reduction.
- b) Further study is recommended to gain a better understanding of the relationships between natural resources, wealth in terms of who has access to enjoys the benefits of natural resources, the power relations in terms of who governs and has authority over natural resources, and how this power is exercised in the management of those resources.



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