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Uncovering the Implications of Gazetting the Derema Forest Corridor on Livelihoods and Conservation

Nangena Mtango & Adam Kijazi

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Abstract

The study is about the gazzeting a forest and how the process has affected local communities, and conservation outcomes of the same process. Historically in Tanzania, the dominant colonial approach to conservation was the establishment of protected areas (PA) from which people were essentially excluded or resettled, often forcibly. Despite much advocacy for participation and inclusion of communities in conservation, such 'protectionist' views still exist. The PA network in Tanzania is growing and many social conflicts result from conservation initiatives and, negative human impacts continue relatively unabated and local non-compliance is common. Tropical forests like those in the East Usambara Mountains are often marked by poverty and undertaking conservation in such landscapes is not tenable if it further contributes to marginalization, impoverishment and disregards the development needs of local people.

The government is conserving the forests of the East Usambara Mountains because of their high biodiversity values and as catchment forests. The conservation strategy is to link the Derema Forest via the Derema Corridor, to the Nature Reserve. The Derema forest is the economic back yard of 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 forest together with black pepper and clove trees. They are extremely important to household incomes and local livelihoods.

In the mid seventies the government realized that Derema, an unprotected forest corridor contributes to the fragmentation of the continuous forest belt, which covered the mountains. It decided to protect the area and in 2000, communities in five villages adjacent to Derema forest agreed to abandon cultivation of high value crops inside the forest, give up their land for conservation, in return, they would be would be adequately compensated. Compensation payments began in late 2005 but the manner of compensation was far from ideal and led to anxiety and frustration on the part of the farmers.

Conservation cannot be undertaken without the support and participation of local people, and their livelihood concerns and future development goals must at the centre. The Derema Resettlement Action Plan (2006) recommended that the livelihoods and quality of life of the affected communities must not be negatively affected, if anything it should lead to the opposite. The study results show that most of the Resettlement Action Plan's recommendations have not been adequately addressed.

The resettlement and compensation exercise was far from ideal, and there is the danger that it has laid the foundations to both future conservation and livelihoods tribulations. On the positive side, the assets were eventually compensated at replacement value. The poorest were not afforded the opportunities to improve their living standards nor their ability to exceed their productive capacity, or at least to replace them. The compensation mechanism and manner was seriously flawed, with dire consequence to the poorest. On the conservation side regeneration is happening rapidly. Once again, the conservation approach applied leans towards further vulnerability and poverty enhancement rather than poverty reduction.

1. Introduction

Since the mid 1970s, the Tanzanian Government has been conserving the forests of the East Usambara Mountains because of their high biodiversity values, microclimates, as sources of high value agricultural products, and for ecotourism. The conservation strategy includes the linking together of 24 separate forest reserves in the mountains and the adjacent lowlands, covering 32,352 hectares in all. The idea is to link as much continuous forest as possible. The first additional link is the Derema Corridor, the focus of the proposed study.

The Derema Forest corridor is a crucial conservation area situated in the East Usambara Mountains, particularly in Amani Division, Muheza District, with an area of 956 ha. 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 that forms a centerpiece of conservation effort is located. ANR is the largest forest zone under unified management in the Eastern Arc, and its dedication as a nature reserve (the first in the country) gives it a special mission in national conservation efforts.

The corridor connects ANR with the rest of East Usambara forest reserves up to recently formed Nilo Nature Reserve in the Southwest and Longuza in the North. It forms one of the most important biodiversity connecting corridors in the Eastern Arc Mountains. Others include Bunduki gap between Uluguru North and South, and the Matundu-Uzungwa scarp gap in the Udzungwa Mountains.

In the mid seventies conservation organizations and the government of Tanzania realized that Derema being an unprotected forest corridor contributes to the fragmentation of the earlier continuous forest belt which covered the mountains. The continued fragmentation of the forests increased biodiversity loss not just a proportional reduction in numbers of animals or plants from the spaces lost, but a reduction in the biodiversity itself, in the number of different species present in the forest, according to both ecological theory and the observations of long-term scientific observers in these forests. In time, continuing pressure on, and loss of, species could radically disturb the ecological balance in this limited bio-region.

In 2000 communities in five villages surrounding Derema forest corridor agreed to abandon cultivation inside the forest to give up their land to the government for conservation purposes and in turn would be duly and adequately compensated. A participatory boundary demarcation exercise was carried out in 2001 involving community members from each of the five villages of Msasa IBC, Kisiwani, Kwemdimu, Kambai and Kwezitu.

The first compensation was paid for crops that were slashed in the course of demarcating the boundary. 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, because of lack of funding, payments only began three years later, in late 2005. That payment involved only 50% of the total compensation pay that was earlier envisaged.

In 2006, a few farmers were again paid 25% of their crop values. This process of piece meal payments led to frustration on the part of the farmers. To rescue the already increasingly contentious situation, in 2006 the Government through the Ministry of Natural Resources and Tourism approached the World Bank to seek funding for completing the compensation payments.

In 2006 the World Bank came up with a Resettlement Action Plan with the following conditions:

1. That all aspects of the taking, 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 that
5. Accessible and affordable mechanisms for resolution of disputes are put in place.

The government accepted the plan, the communities too accepted it; though some felt this was further bureaucratic delay, the 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 Derema forest corridor.

It is important to note that Derema forest has been termed as an economic "back yard" of 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, sugarcane and fruit trees.

Five villages with 1,547 farm plots were affected by the resettlement. The loss of incomes has impaired some people's ability to pay for health, education, taxes, and their capacity to save. As poverty increases and social security decreases, tensions and vulnerability has inevitably increased: with women and children losing out disproportionately. In the long term this will militate against conservation.

This situation justified carrying out this research whose results would hopefully form a basis of advising decision markers and conservation authorities. The study was carried out in five (5) villages surrounding Derema forest corridor in the Amani Division of Muheza District, Tanga Region. It involved 1,128 affected farmers who received cash compensation payment to establish alternative livelihood options as well as play a leading role in conservation of biological resources in the Derema corridor and thereby adding an additional 956 hectares to the East Usambara Mountain chain of biologically important forests and the Eastern Arc in general.

2.0 The research problem, questions and objectives

2.1 Statement of the research problem

The Forest and Beekeeping Division (FBD) has now gazetted (during 2010) the Derema forest and linked it to the Amani Nature Reserve. A protracted gazettment and compensation process starting from 2002, lasting over a eight years has generated a lot of expectations one the one hand and anger, anxiety and disappointment to local communities, on the other. Over and above the tedious and lengthy compensation process, follows the experience feom elsewhere, that restricting access to land and forests has often failed to achieve its environmental objectives: the resource depletion by the former forest resource users has continued, therefore making the protection measure ineffective and therefore defeating the purpose of the gazzetement and conservation.

The problem is that the practice of declaring some prior resource-use patterns (in this case cultivation of high value crops such as cardamom and black pepper) as suddenly restricted and prohibited has in the past inflicted heavy opportunity costs on local people, subtracting from their livelihoods without compensating adequately. The social outcome has been impoverishment of those affected and generating loathing for conservation. Such a situation is likely to militate against any success in conservation whilst exacerbating poverty through loss of livelihoods. This study sought to assess whether this could be the case with the communities around Derema.

2.2 Significance of the research problem

The main concern of the study was to gain an understanding about the consequences of the resettlement exercise and what were the positive and negative effects on forest conservation and livelihoods of the communities. It was assumed that the understanding of consequences of the resettlement and compensation exercise will contribute to suggesting better ways of improving sustainable forest management and at the same time improving livelihoods of rural people living adjacent to forests in Tanzania as well as advise the government on sustainable conservation strategies for the future.

2.3 Research objectives

General Objective

The main objective is to get an understanding of the consequences of resettlement and compensation exercise on the livelihoods of communities adjacent to the Derema corridor and its subsequent impact on forest conservation. It is hoped that the findings of the study will be the basis for establishing sound and better procedures and criteria for implementing future gazzettment of valuable conservation areas while also giving priority to the livelihoods of forest adjacent communities and. This is a way of ensuring that conservation does not become a poverty enhancing process instead it should do the opposite, support critical livelihoods and even wealth creation on a sustainable basis.

The specific objectives were to:

1. Explore the extent to which the resettlement and compensation exercise has affected the livelihoods of the forest adjacent communities.
2. Assess which groups were predominantly affected by the whole compensation and resettlement exercise.
3. Establish the condition of the forest after the resettlement exercise.
4. Advise decision makers and conservation authorities on the impacts of resettlement to community livelihoods and conservation and suggest better ways and means of conducting future resettlement and compensation exercises in natural resources management in Tanzania.

Research Questions:

In order to focus on the main research objective the following research questions were presented:

1. Has the resettlement and compensation exercise been positive or negative to forest adjacent communities and how?
2. Is the condition of the Derema corridor better now than it was before and what are the reasons for this?
3. Was the resettlement and compensation exercise done at Derema the best way it could have been conducted?
4. How and to what extent have women been affected by the compensation and resettlement exercise?
5. What are the attitudes of various groups to the exercise?

Hypotheses

The following research hypotheses were postulated:

1. *The null hypothesis: Derema Resettlement and Compensation exercise has impacted negatively on the livelihoods of forest adjacent communities.*

2. *The alternate hypothsis: The Derema Resettlement and Compensation exercise has impacted positively on the conservation of the Derema corridor.*

3. Literature review

3.1 Conservation and poverty

According to **Sunderland et. al. (2008)** the dominant colonial approach to conservation was the establishment of protected areas (PA) from which people were essentially excluded or resettled, often forcibly **(Adams 2004; Hutton *et al.* 2005),** and there remains many 'protectionist' views in the conservation field **(Terborgh *et al.* 2002).** In Tanzania, and indeed elsewhere, the PA network is extensive and growing. In the process of expansion however, many social conflicts result from conservation initiatives and, despite protection measures, human impacts continue relatively unabated and local non-compliance is customary **(Robbins *et al.* 2006).** Tropical forest landscapes such as in the east Usambaras are often marked by poverty and therefore, undertaking conservation in such landscapes is not tenable if it further contributes to marginalization and impoverishment and disregards the development needs of local people, as has been argued by **Cernea** and **Schmidt-Soltau 2006** and **Campese *et al.* 2007.**

Clearly, in the case of the Derema corridor, there are valid ethical and biological arguments for biodiversity conservation at the regional and global levels, but 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 that involves people **(Pimbert & Pretty 1995; Hulme & Murphree 2001; Barrett *et al.* 2005).** The reality on the ground however, throws doubt on the legitimacy of local peoples involvement in conservation efforts and protected areas (PAs) **(Wilkie *et al.* 2006)** and the impacts of PAs on local communities **(Brockington & Igoe 2006; Cernea & Schmidt-Soltau 2006).**

The silent debate and practical realities are still pitting strict conservation against human well-being, and Sunderland et. al (2008) state 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.

As **Sunderland et. al (2008)** note, it is important now 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, Sunderland et. al. suggest 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 proposed study seeks to achieve using the Sustainable Livelihoods approach.

A study by **Korongo Ltd.** (2003) on the links between environment and poverty in Tanzania also concludes that it is mainly through profitable and sustainable use of natural resources, that Tanzania can achieve significant poverty reduction.

The **National Strategy for Growth and Poverty Reduction (NSGRP 2005)** notes that Tanzania's natural resource base has a huge potential for raising and sustaining rural incomes, however it does recognise 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 and deforestation (GoT, 2005) and in the course of reacting to disasters they can also be part of the process of damaging pristine natural resources e.f. catchment forests.

3.2 Sustainability, Growth and Poverty Reduction

Vosti & Reardon (1997) note that policy makers are faced with the need to pursue three challenging goals simultaneously: Growth, poverty reduction and environmental sustainability. Poverty alleviation, they argue, is essential as it undermines development, growth and the environment. At the same time, natural resources must be made sustainable as an input into sustained growth. They also recognize that the three goals are complementary i.e. sustaining natural resources will help growth. Growth will help reduce poverty and improve environmental management. However, in the short-term there will be trade-offs among the three goals. They argue for example that poverty is unavoidable if the natural resource base is degraded. Still, as they point out, trade-offs are at play: Conservation of natural resources just for the sake of preservation, may hurt farmers living from the natural resource base. The poverty - environment nexus, is part of this overall debate as it sheds light on the connection between poverty reduction and environmental sustainability.

3.3 Poverty - Environment Nexus

The poverty - environment nexus is based on the assumption that the livelihoods of the poor depend crucially on access to natural resources, and this is also echoed by the World Resources Institute (2005).

A report by the **Department of International Development (DFID**, 2002) outlines how agriculture is the major source of income for poor people in the developing world and indeed for many African countries the prospects for growth lies in agriculture, tourism and mining. The main concept behind the debate is the notion that "one problem is a significant determinant of the other": Hence, to the degree that the nature and scope of farming activities of the poor are environmentally unsustainable, the long-term resource base for their livelihoods will be eroded. The poor are therefore, more than other income groups, assumed to be utterly dependent on a sustainable natural resource base, but they may themselves be the prime (direct) reason why the base is depleted. The hypothesis has however proven difficult to test, notably, as pointed out by Dasgupta et al. (2003), because of the lack of valid and reliable data.

Cavendish (1999) 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. According to Dasgupta et al., (2003) similar studies (with similar findings) have been carried out by Ambler (1999 in Dasgupta et al., 2003), Kepe (1999 in Dasgupta et al., 2003), and Reddy & Chakravarty (1999 in Dasgupta et al., 2003).

Brocklesby and Hinshelwood, (2001 in Dasgupta et al., 2003) conducted a broader study to show how the poor at least *perceive* the environment and NR 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, viz. deforestation, fragile soils, indoor air, pollution, unsafe water, and sanitation. The study, which is limited to Southeast Asia (Lao and Cambodia), finds mixed evidence: No clear association can be detected in the case of Cambodia whereas the effects is more pronounced in the case of Lao. Thus one of their main conclusions is that the validity of the nexus varies significantly between countries.

In the case of Tanzania, the **NSGRP** observes that under-employment has led to unsustainable use of natural resources (GoT, 2005). **Korongo** (2003) likewise argues that environmental degradation in Tanzania is caused by local poverty and lack of alternative income opportunities. Still they also point to additional factors such as lack of awareness and inadequate tenure etc., and a more rigid analysis would thus be necessary to assess the relevance of the poverty/ environment nexus for the case of Tanzania

3.4 Recent policy implications of the effects of resettlement due to conservation

Cernea (2006) notes 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, enforced as part of conservation projects. This is exactly what has happened in the study area – Derema.

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 its usual acceptation as geographic relocation, to include also occupational and economic dislocation, and requires commensurate economic reconstruction activities.

Quite often, the substantial opportunity costs and losses incurred by residents of protected areas are most often 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). This is certainly holds true for the study area.

In light of empirical evidence and of the above policy developments, conservation

organizations need to consider issuing their own self-binding policy prescriptions 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 recognized, preempted, and counteracted.

The new policy of the international banks is all the more relevant 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.

3.5 Conceptual Framework

A livelihood is the set of capabilities, assets, and activities that provides the means for people to meet their basic needs and support their well-being. The building of livelihoods reflects and seeks to fulfill both material and experiential needs. Livelihoods are not simply a localized phenomenon, but 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. Thus the existence of various livelihoods options and their sustainability are 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. Livelihood assets are important in assessing the socio-economic aspects of local communities and how these influence livelihood outcomes. Based on the Sustainable Livelihood Framework the key assets include the Natural, Human, Physical, Social and Financial. As might be expected, those with larger asset portfolios have more livelihood options, as well less vulnerability, than those with fewer assets. The prevention of access say to land or any natural resource that provides livelihood options in the communities under study is likely to have profound and negative livelihood impacts. The application of the Sustainable Livelihoods Approach is likely to help reveal the extent to which communities livelihoods have been affected by the gazettement of the Derema forest and corridor.

3.5.1 The Sustainable Livelihoods Approach (SLA)

Figure 1 presents the main factors that affect people's livelihoods. The conceptual framework is characterized as an improved way of thinking about the objectives, scope and priorities of development, that will better meet the needs of the poor, both at project and policy level (**DFID** 2000a). This section explores the conceptual origins

and pragmatic implementation of this framework. It begins with a consideration of the literature relating to the three levels, characterized by **Farrington** (2001) and links them to broader development debates, in order to examine some of the unanswered questions and assumptions within the current framing of the Sustainable Livelihoods Approach (SLA) discourse.

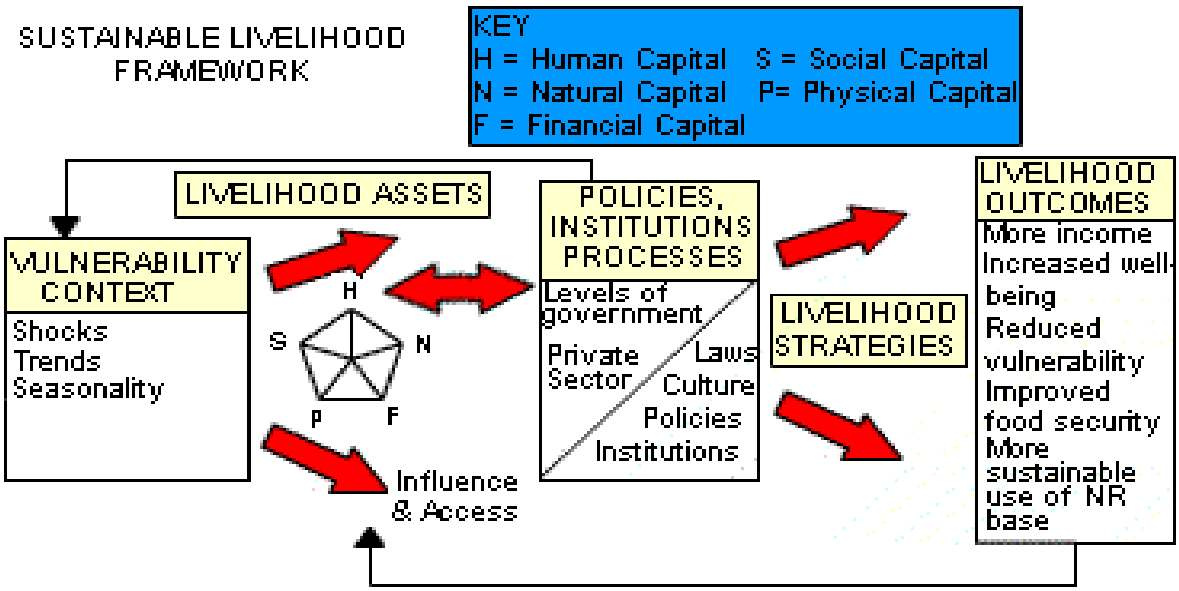

Figure 1: Sustainable Livelihood Framework
Source: DFID (1998)

Much of the SLA literature adapts **Chambers and Conway's** (1992) definition of a sustainable livelihood. A livelihood comprises the capabilities, assets, and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base' (**Ashley and Carney** 1999, **Carney** 1998). This is also where this framework finds its relevance to the proposed study in the five study villages in Derema.

Chambers and Conway (1992), discuss not just 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' (**Chambers and Conway** 1992, p.26).

3.5.2 Sustainable Livelihood Approach Framework and poverty reduction

The definition of livelihoods 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 livelihoods 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 and 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 achieve a better understanding of 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 for good governance to create a facilitating and enabling environment (**Ellis** 1998, 1999a, 1999b, 2000).

Hussein and Nelson (1998) propose that livelihood strategies are constructed in three main ways: agricultural intensification, diversification and migration, and the key to understanding how the three intersect is an understanding of 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, in DFID's words '*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 centered on individuals' rights and responsibilities.

Operationalising 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).

3.5.3 The choice and relevance of the Sustainable Livelihood Approach

The adoption of this approach arises in part from some dissatisfaction with, and the shortcomings of previous development policies, including integrated rural development, basic needs, and others. The sustainable livelihood approach comprises three interrelated components: 1) some combination or portfolio of capabilities, assets (including physical, natural and social resources or capital) and activities; 2) that

enable people to deal with events and trends as well as the development of various strategies to pursue desired livelihood outcomes; and 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 their use of livelihood assets.

The 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 livelihood of people in context. From this starting point, it will attempt to identify the specific constraints, which prevent the realization of people's rights and consequently the improvement of their livelihoods on sustainable base. It will start with an analysis of people's livelihoods and how these have been changing overtime. In this study however, the approach will also analyze to what extent the communities have secured or lost access to, 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 in a manner, which attempt to identify the most pressing constraints and opportunities open to people.

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

3.5.4 Explaining the Sustainable Livelihood Approach Framework

The livelihood framework is used here as a tool to improve our understanding of livelihoods, particularly the livelihoods of the poor who live adjacent to the Derema corridor. In Tanzania's rural setting environmental resources, such as forests are of critical importance for the poor and it is important to identify the linkages between the poor and the utilization and management of natural resources. The SLA presents the main factor that affects people's livelihoods and typical relationship 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 emphasizes 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 framework is depicted in Figure 1.

The typology identifies five generic categories of improvement to livelihood capital, which can be seen as the core of local benefits in environmental projects:

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 of ecosystems

deterioration, retained biodiversity values, the regeneration of forests, and improvements to water quality. In Derema this includes access to lowland areas, alterative farming incomes and access to forest resources.

b) Increased **livelihood opportunities, income** and **financial capital**. This includes increases to the productivity of existing and opportunities for new livelihood activities such as farming, and agro-forestry, increases in cash income and improvements to the ability to save or the availability of generating capital. Insofar as the Derema communities are concerned included the compensation and resettlement packages and the manner it was managed and mismanaged with the 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 is part of 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**: the skills, knowledge, work ability and management capabilities of local community members. There is a need for a gender focus in this and it also emphasises issues such as functional literacy and management skills of women **(Carney et. al., 1999**). Compensation invested in human capital is inclusive here and in Derema this is reflected in increased investments in children's' schooling and health.
f) Increases in the **livelihood capitals** 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 to both the absolute level of nutrition and a balanced diet.
g) Strengthened **livelihood capitals** and improved health and food security as well as practicing sustainable natural resource utilization that 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

A multi-disciplinary approach entailing both resource assessment (for forest bio-physical data) and social survey (for socio-economic data) methods was employed in the data collection exercise. Also intensive desk studies were executed for collection of secondary data

Different approaches that necessitated the combination of qualitative and quantitative data were applied and these tools were complementing each other. The quantitative data were used to obtain certain benchmarks and evidence relating to socio-economic variable such as incomes, investments, and livelihoods streams as well as identifying clear winners and losers, while the qualitative data assisted in exploring perceptions, opinion and obtaining clearer insights on specific matters.

Given the complexity of the research topic, the study employed a combination of participatory research techniques that are commonly used in many qualitative studies such a face to face interviews and focus group discussions with various target groups such a men, women, youth and eldedery **(Mikkelsen**, 1995, **Salkind**, 2002, **Feyerabend and Buchan**, 1997).

4.2 Forest resource assessment

A survey of the vegetation type and plant species diversity found in Derema Forest Corridor (DFC) was conducted. Basic quantitative and repeatable methods were employed and the results can be compared with other earlier forest surveys. Human disturbance within the forest was assessed and recorded and compared to a baseline of an earlier survey conducted in 2002.

Sampling design

The sampling unit is the forest area of the Derema Corridor, consisting of approximately 956 ha established after a preliminary survey with assistance of the map of Amani Nature Reserve and consultations with Tanga Catchment staff who were involved in preparation of Draft Management Plan of DFC. The sampling intensity was 0.04% making a sample size of 38 ha with a total of 22 plots. Sampling intensity of 0.01-0.05% is common in natural forests depending of the budget and time constraints (Kijazi, 2006). The sampling plots were circular with maximum radius of 15 meters. Measurements were taken at a radius of 2, 5, 10, & 15 meters (Table 1).

Table 1 Sample plot design framework

Plot radius (m)	Dbh of trees measured (cm)
2	1.0-5.0
5	5.1-10
10	10.1-20
15	>20

Source: Malimbwi and Mugasha (2001)

Data collection

Systematic sampling techniques were employed on transects located at a predetermined interval of 2 km, together covering a total distance of 8.3 km. Plots were laid in transects running in East-West direction located using GPS co-ordinates at an interval of 300meters, ensuring coverage of all effects of altitude and humans on the vegetation composition, abundance and quality. Data recorded for each tree was entered into a field inventory form at diameter at breast height (dbh), species names (local and botanical), number of stems and plot location. In all plots and along the transects, human disturbances was assessed: counting stumps, evidence of fodder collection and presence of agricultural crops.

Data analysis

Species diversity is the most dominant method for ecological and conservation techniques (Kent and Coker, 1992). Shannon index of diversity or Shannon-Wiener index of diversity was used as it 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 abundances 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 diversity index was then calculated as a proportion of species *i* relative to the total number of species (p_i) and multiplied by the natural logarithm of this proportion ($\ln p_i$). The resulting products were summed across species, and multiplied by -1: The Shannon-Wiener function was summarized in the following formula (Kent and Coker, 1992):

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

Where: H' = Shannon's Wienner diversity index;

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

'*pi*' = 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 doses 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):

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

Where: ID =Index of Dominance,
n_i = Importance Value Index of individual species, and
N = Total Importance Value Index of all species

Values of Shannon's diversity index (H') and Index of Dominance (ID) describe the impact of resettlement on conservation. The impact on regeneration potential was analyzed from tree species with dbh≤5 cm measured in the 2 meters radius of the sample plots.

4.3 Review of secondary sources

Prior to the application of field participatory research tools, 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 (RAP) with a focus on the five affected villages. The information gathered through the review of secondary sources was used to provide a general overview of the existing and other social, economic, institutional and ecological settings of the study area. Such information collected was used to complement and supplement the primary data methods, which was collected through other data collection techniques as described below.

4.4 In-depth interviewing

This is the major instrument, which was used to obtain specific, in-depth qualitative and quantitative information on specific questions related to compensation and resettlement. In-depth semi structured interviews are normally used to obtain a wide variety of information across large number of issues related to the exercise. This involved use of a checklist of open-ended questions to key informants of relevant knowledge, experience and interests to compensation and resettlement. Further probing of more detailed questions as raised by the respondents followed general themes of the study raised through semi-structured questions.

4.5 Focus group discussions (FGDs)

FGDs involved interviews with homogeneous groups of people to obtain in-depth information on the effects of the RAP to different stakeholder groups. The issues focused on the benefits or losses and opportunity costs incurred as a result of the resettlement exercise and compare the situation before and after. This provided better information about knowledge, attitudes and practice of the RAP in relatively less time than individual interviews. The main stakeholders were men, women and the youth affected by the RAP.

4.6 Sampling

Purposeful and stratified sampling was applied in selecting respondents. This research design is important so as to cover the various strata within the affected communities as well gaining a representative enough group as possible in terms of gender and other socio-economic categories in the study area. 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 the 1,128 affected farmers was obtained and divided between men and women. Thereafter a 10% a sample population of 113 households

were randomly selected. The importance of adequate representation among men and women is important due to the fact that they have different access and use of forest and land resources e.g. timber, poles, firewood, medicines, food and so on.

4.7 Data analysis and presentation

Qualitative data such as people's perceptions about the RAP and its implications to their livelihoods and conservation are presented in a descriptive and analytical form, whereas data obtained from the questionnaire are presented in the form of charts, tables and graphs. In addition, maps from transect walks constituted yet another form of data presentation.

5. Research findings

The following are the main findings of the research and the results are used to verify or negate the hypotheses and fulfill the research objectives and answer the research questions.

5.1 Reasons for and year of moving into the area

Of those who migrated into the five villages, most came between 1961 and 1980 (Table 2). This coincides 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, and subsequently a large number of the Wasambaa and Pare people from the West Usambara Mountains migrated to the East.

Table 2: Reasons and time when migrated to village (number)

	Reasons for moving into the area					Total
Year moved into the village	Agricultural land	Marriage	Employment	Family	Business opportunities	
<1950	1	0	2	0	0	3
1950-1960	0	0	7	0	0	7
1961-1970	12	2	7	3	0	24
1971-1980	7	1	3	2	0	13
1981-1990	3	0	2	0	0	5
1991-2000	4	1	0	1	3	9
Total	**27**	**4**	**21**	**6**	**3**	**61**

Source: 2010 field study

The main driver for migrating is the need for land for cultivation and full and part time employment in the nearby tea estates and factories. An important push factor was also the Arusha Declaration of 1967 that made land available to people in land scarce areas. This explains why just over a fifth of the respondents (22.6%) moved to their respective villages due to land scarcity in their respective areas of origin – and most came from the West Usambara and Pare Mountains.

Table 3 shows that the dominant reasons for coming into this area/village include the need for agricultural land (22.6%) and seeking employment (18.5%).

Table 3: Reasons for coming into village (%)

	Frequency	Percent
Need for agricultural land	28	22.6
Marriage	5	4.0
Employment	23	18.5
Family attachments	8	6.5
Business opportunities	3	2.4
Missing System	57	46.0
Total	124	100

Source: 2010 field study

5.2 Household Size

The average household size of the villages is 7.6 persons per household, which is slightly larger than that derived from a social impact assessment study done in 2006 by Misana (2009) which showed it to be 6.5 persons per household, and the range is between 1 and 20 persons per household. Table 4, shows the highest frequency of households are those with between 6-7 persons per household. The average for this study is much larger which is slightly larger than the district average of 5.2 persons per household (GoT 1997) and the regional average of 4.6 persons per household. This has implications on the dependency on and highlights the importance of cash crops and especially cardamom, black pepper and cloves as cash crops for household economies.

Table 4: Household size

Number of persons/household	Frequency	Percent
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**	**100.00**

Source: 2010 field study

5.3 Main Employment

As expected, agriculture is the dominant economic activity in the five villages and for most it's a full time activity with a small proportion of people engaged in non-farm activities. Many households coping mechanisms involved doing more than one type of work, with agriculture clearly being the most dominant source of employment/work (Table 5). The first choice of employment or work consists of agriculture for food production (48.4%), agriculture for cash crop production (37.1%) and commerce/business (5.6%). Others included casual labour (3.2%) and livestock keeping (2.4%).

Table 5: First choice of work

	Frequency	%		Frequency	%
Agricultural (Food)	60	48.39	Agricultural (Food)	53	42.74
Agricultural (Cash crop)	46	37.10	Agricultural (Cash crop)	61	49.19
Wage employment	1	0.81	Wage employment	3	2.42
Commerce/Business/Petty trading	7	5.65	Commerce/Business	3	1.61
Carpentry	1	0.81	Carpentry	1	0.81
Casual labourer	4	3.23	Petty trading	1	0.81
Butterfly farming	1	0.81	No answer	3	2.42
Livestock keeping	3	2.42	Total	124	100
N/A	1	0.81	Agricultural (Food)	53	42.74
Total	**124**	**100**	Agricultural (Cash crop)	61	49.19

Source: 2010 field study

The second choice of work is not too different from the first (Table 6), with cash crop production being dominant (27.4%), followed by agriculture for food (20.2%) and casual labour (6.5%), petty trading/business and livestock keeping (3.2% each). Other activities include formal wage employment, carpentry, butterfly and fish farming.

Table 6 The second choice of work/employment

	Frequency	Percent
Agricultural (Food)	25	20.16
Agricultural (Cash crop)	34	27.42
Wage employment	3	2.42
Commerce/Business/Petty trading	4	3.23
Carpentry	2	1.61
Casual labourer	8	6.45
Butterfly farming	1	0.81
Fishing farming	1	0.81
Livestock keeping	4	3.23
N/A	42	33.87
Total	124	100.00

Source: 2010 field study

5.4 Duration of engagement in economic activity and location of activity

As for the main or principal employment, for 68.5% of the households this is a full time – all year activity, and for 18.5% it's a seasonal activity (Table 7).

Table 7: Duration of principal employment/work

	Frequency	Percent
Full time/all year	85	68.55
Part time/Seasonal	23	18.55
No answer	16	12.90
Total	124	100

Source: 2010 field study

Most of the economic/farm/income generating activities (Table 8) took place within the respective village areas (81.5%), indicating the geographic difficulty of going further afield to generate incomes or obtain livelihoods, short of migrating.

Table 8: Location of main economic activities before gazetting Derema

Location		
	Frequency	Percent
In this village	101	81.45
Out of this village	2	1.61
In and outside the village	1	0.81
No answer	20	16.13
Total	124	100

Source: 2010 field study

5.5 Main uses of household incomes

The main uses of household income from main economic activities were predominantly for normal household consumption (51.6%) and those that used money and crops for household consumption and development were 15.3% (Table 9), suggesting that, generally incomes are low such that only about 15.0% of respondents have sufficient amounts to make development expenditures.

Table 9 Main uses of incomes before gazetting

	Frequency	Percent
For household consumption and development	19	15.32
For household consumption only	64	51.61
For sale only	14	11.29
No answer	27	21.77
Total	124	100

Source: 2010 field study

5.6 Farm sizes before and after gazettement

It is evident and was expected that as a result of giving up their farm plots, the majority of farmers have experienced a decline in land holding, and this has implications of cash incomes from the sale of cash crops but also reduced food security. This is likely to increase their vulnerability to food insecurity but also their incapacity to combat food shortages. Table 10 shows that the mean land holdings declined from 8.84 acres to 4.07 acres between 2002 and 2010. The range of land sizes has also narrowed considerably during this time.

Table 10: Land/farm sizes before and after gazetting

Size of land/farm plots	N	Range	Minimum	Maximum	Mean	Std Deviation
Land size before gazetting (2002)	122	47	1	47	8.84	6.981
Current land size (2010)	123	19	0	19	4.07	3.588

Source: 2010 field study

Subsequent interviews in all the focus group discussion clearly spelled this out with statements such as "most of us have lost a lot of land with good potential" and "most of us are now much poorer and have to seek other less paying alternatives, such as selling of labour, or have to do without some things that we enjoyed in the past", and the fact that they also showed anger and disappointment in the process.

5.7 Housing quality

After all the payments were made by 2009 there have occurred some interesting developments with respect to housing conditions, especially the type of housing, suggesting that a good number of respondents have invested in house building or improvements. Table 11, for example, shows that the proportion of cement walled houses has almost doubled between 2002-2010 (12% - 22%), while the purely pole and mud houses have declined from 77% to 44%. Houses made from burnt mud brick have increased from 10% to 32% during the same period.[1]

Table 11. Changes in type and quality of housing 2002 – 2010

	Before gazetting		After gazetting	
	Frequency	Percent	Frequency	Percent
Cement bricks/concrete bricks	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

Source: 2010 field study

The focus group discussions explain this factor, that after having undergone some very difficult times and procedures, one of the unplanned or unintended benefits is that the communities had ample time to reflect and plan how they would spend their compensation payments.

There has also been an increase in the number of rooms per household and as Table 12 shows, the average number of 1 and 2 roomed houses have decreased, 3 roomed houses have remained the same and 4 -5 roomed houses have increased, further supporting the proposition that there have been investments and improvements in housing. These houses are not just within the respective villages, since some of the well-compensated respondents have built or purchased houses in towns such as Muheza.

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

Table 12: Number of rooms in the house 2002 -2010

	Before gazetting		After gazetting	
Number of rooms	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	0	0.00
Missing System	5	4.03	0	0.00
Total	124	100	124	100

Source: 2010 field study

In line with the improvements to the materials used in the walls of the houses, Table 12 also shows a decline from mud floors from 78% to 61%, while there is an increase in cement floors from 20% to 38% between 2002 -2010. It is likely that this will change further in the near future, for the better of course, given that the way houses are built in the area, floor improvements often come much later.

There are similar results with the types of flooring materials with changes occurring between 2002 and 2009 (Table 13).

Table 13: Type of floor material 2002 - 2010

	Before gazzeting		After gazzeting	
	Frequency	Percent	Frequency	Percent
Mud	97	78.23	76	61.29
Cement	25	20.16	47	37.90
Timber floor	2	1.61	1	0.81
Total	124	100	124	100

Source: 2010 field study

Table 14 also supports these observations with an almost 50% decline in grass/thatched houses and a corresponding increase in corrugated iron and metal sheets roofed houses.

Table 14: Type of roofing materials

	Before gazzeting		After gazzeting	
	Frequency	Percent	Frequency	Percent
Grass	34	27.4	18	14.5
Corrugated iron sheet	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

Source: 2010 field study

5.8 Sources of drinking water

There are virtually no changes in sources of drinking water before and after gazetting, and this is expected since most of the respondents continue to reside in the same area and the houses that some have build or purchased in towns are mainly used for renting out so as to get a monthly, quarterly or half year incomes. Besides, the study was unable to include those who migrated to other areas. The sources of water are usually streams, wells and taps, often the same ones that were there since before gazettement in 2002. The most common sources of drinking water was and continues to be rivers, streams and open wells (Table 15).

Table 15 Sources of drinking water

Sources of drinking water	Before gazetting		After gazetting	
	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

Source: 2010 field study

5.9 Lighting sources

As in the case of water, here again there are hardly any changes as to the sources of lighting energy. The situation is basically the same as in 2002. All villages, with the exception of Kisiwani, do not have electricity. The principal types of lighting energy is the kerosene lamp that is used by 95% of households (Table 16).

Table 16: Sources of lighting

	Before gazetting		After gazetting	
Sources of lighting	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**

Source: 2010 field study

5.10 Sources of cooking energy

The main source of cooking energy is firewood. As in most of rural Tanzania the communities here continue to rely on firewood for cooking, warmth and food processing, and the proportions of respondents using these form of energy are the same in 2010 as they were in 2002 (Table 17).

Table 17. Sources of cooking energy

	Before gazzeting		After gazzeting	
	Frequency	Percent	Frequency	Percent
Fire wood	122	98.4	122	98.4
Charcoal	1	0.8	2	1.6
Kerosene	1	0.8	0	0.0
Total	**124**	**100**	**124**	**100**

Source: 2010 field study

One implication of the gazettement of the forests is not only loss of land but also reduced access to firewood. This issue is likely to manifest itself into longer walking distances to obtain firewood and, therefore, impacting more on womenfolk in the affected villages. The focus group discussions showed that some households have already suffered from this aspect, but are still able to collect firewood from the permitted areas (utilization zones) of protected forests.

5.11 Expenditure of compensation money

The most common major expenditures that were made using compensation money, and these were often those who received larger sums of money (in excess of 5 million Tsh) were in order of ranking: expenditures 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 18).

Table 18: How was the compensation money spent? (Multiple response)

MAJOR EXPENDITURE OF THE MONEY COMPENSATED -MULTIPLE RESPONSE

	Frequency	% Responses	% Cases
Acquire land in the village	17	6.9	13.7
Acquire land outside the village	14	5.6	11.3
Invested on children education	38	15.4	30.6
Made house improvements	34	13.7	27.4
Alternative incomes/Non farm activities	25	10	20.2
Buying/building house	22	8.9	17.7
Spent on health	1	0.4	0.8
No answer	97	39.1	78.2
Total	248	100	199.9

Source: 2010 field study

The major expenditures in Table 18 tally with the improvements/investments in housing, that we have seen earlier in section 4.7.

5.12 Ownership of assets

There has not been any substantial increase in assets other than housing, though the ownership of mobile phones has more than doubled, and it is difficult to say this is a result of compensation money alone, given the fact that several mobile phone operators are now covering the area compared to 2002 (Table 19). However, in the focus group discussions, it emerged that expenditures of mobile phones are slowly taking an important share in household incomes.

Table 19: Ownership of Assets 2002 -2010

	Before gazetting		**After gazetting**	
Asset type	YES	No	YES	No
Flash light	103	21	108	16
Radio	102	22	107	17
Iron	66	58	67	57
Bicycle	39	85	39	85
Wheel barrow	8	116	12	112
Mobile phone	36	88	78	46
Television	1	123	4	120
Motor cycle	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/Chain saw	21	103	26	98
Sofa coach	28	96	38	86
Farm animals	60	64	69	55

Source: 2010 field study

There is a slight increase in wooden furniture, and insignificant increase in farm implements and farm animals, suggesting that the reduction in land holdings can explain to lack of increase in demand for implements and farm animals.

15.13 Was the transparency in compensation process satisfactory?

Almost 70% of the respondents expressed dissatisfaction with the degree of transparency in the compensation process and 30% were satisfied (table 20). The explanation for this is that the provision of information and transparency was not managed well, and it further emerged during the focus group discussion, that women and poorer groups often were 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, and especially the weaker and

poor, tend to be excluded from active participation and obtaining information than would help them take part in decision making.

Table 20. Satisfaction in transparency of compensation process

	Frequency	Percent
Yes	41	33.06
No	83	66.94
Total	124	100

Source: 2010 field study

5.14 Understanding of the compensation formula

Most respondents (89%) did not clearly understand the formula that was used for paying the compensation, i.e. how the amounts that were due to them, were calculated (table 21). The implications of this have led to suspicions of being underpaid. This situation was made even more complicated due to the fact that most respondents expected a flat payment of 28,500/= per cardamom plant, regardless of its condition. There is nowhere in any of the documentation that is available, where this figure is mentioned.

Table 21. Understanding of compensation calculations

	Frequency	Percent
Yes	14	11.3
No	110	88.7
Total	**124**	**100**

Source: 2010 field study

From the focus group discussion, it emerged that when the forest boundary payments were made in 2002, this figure 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. This figure led to raising farmers' expectations that the gazzetting compensations would be the same, and also led to farmers not (or not wanting to) understanding how and why the gazzetting payments should be lower.

5.15 Dissatisfaction with compensation payments

It comes as no surprise that most respondents (94%) are not happy with the compensation payments (table 22), and most still believe that they have been wrongfully denied 'proper' payments, and proper being the 28,500/= per plant, regardless of its condition. This had led to suspicion and resentment, a situation in which the farmers cannot be viable partners of conservation, instead they are more likely to be adversaries.

The reasons for being dissatisfied are somehow interrelated, as at the end of the day they all converge to farmers believing that calculation mechanism were not clear and therefore unfair (table 23).

Table 22. Dissatisfied with compensation amounts

	Frequency	Percent
Yes	7	5.6
No	117	94.4
Total	124	100

Source: 2010 field study

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 (12%). Others include being excluded in the valuation and calculation process and therefore not understanding how values were arrived at (16%), poor calculation and payments procedures; and confusion as to why different values were used between the boundary crops and the gazzetting payments (11%).

Table 23. Reasons for not being satisfied with compensation

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

Source: 2010 field study

5.16 Impact of gazettment and compensation on livelihoods and quality of life

Most respondents said that their livelihoods and by implication quality of life had become worse as a result of losing the are that they used to cultivate their crops and that the compensation payments did not sufficiently recompense them. In the focus group discussion it emerged that the farm gate process for cardamom, black pepper and cloves is much higher now compared to 2005. Most respondents (78%) said that they were now worse off compared to 2005 (table 24). About 10% reported to be in the same condition as they were before, while 5% said they were now better off.

Table 24. 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

Source: 2010 field study

Fewer livelihoods options (40%) and loss of main livelihoods (40%) as a result of gazetting and compensation are jointly responsible for lower quality of life and insecurity among the farmers (table 25). During the focus group discussion what was explained is that because the payments were made in installments over a long time

most farmers could not make any meaningful payments. Also the amount were lower than expected and no longer being able to access land under the forest canopy meant that cultivating the high value cash crops were no longer a viable option, leaving them worse off than before.

Table 25. Reasons for lower livelihoods

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

Source: 2010 field study

5.17 Accessing farm land

The 2006 World Bank Resettlement Action Plan (RAP) recommended that as part of the compensation process and also as part of the process of reducing population pressure on land, the government should make available alternative land in the lowlands. Two areas were selected, these being Misozwe and Mkwajuni. However since more than 800 farmers registered for farms, the two areas were inadequate to fulfill such a demand and until now there is a request to the President to make available the disused Kibaranga sisal estate. So far tis land has not been made available and some farmers, often those reveieing better compensation payments have obtained land in the Kwa Tango, Misozwe and Mkwajuni areas.

Most respondents (72%) applied for alternate land in the lowlands and were ready to go and farm there, but not move their main homesteads (table 26). 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 and this inevitably has dire consequences on the poor, who have very limited options. This is also likely to lead to more conflicts between conservation authorities and the poor who are likely to attempt to access natural resources illegally.

Table 26.Applied for alternate land in lowland areas

	Frequency	Percent
Yes	89	71.8
No	35	28.2
Total	124	100

Source: 2010 field study

As table 26 shows the large majority of farmers applied for land. From the focus group discussions, some of those who did not apply (28%), said this was because they did not have the resources to purchase and develop the land, and so did not bother to apply, despite the fact that they too are in great need of more land. Other preferred to obtain land in areas that they preferred (i.e. outside the areas sought through the RAP).

The recommendations of the RAP were only partially met, in that land was identified and the process of securing the land for interested farmers had commenced, but not secured. This situation explains why most respondents (96%) did not get any alternate land (table 27).

Table 27. Was alternate land obtained?

	Frequency	Percent
Yes	5	4.0
No	119	96.0
Total	124	100

Source: 2010 field study

Eventually only 4% of those interviewed were actually able to obtain alternate land, and the implications of this is that there is clearly no relief to land pressure and the continuation of land scarcity in the mountains. In the longer term, such a situation doesn't fare well for either local livelihoods or conservation.

5.13 Forest assessment

5.13.1 Stocking distribution

The study revealed that Derema Forest Corridor has diverse tree species. A total of 39 tree species were identified during the study indicated in annex 2 Five tree species of high stocking density include *Cephalosphaera usambarensis, Allanblackia stuhlmanii, Maesopsis eminii, Newtonia buchananii* and *Cedrela odorata*. Figure 2 shows frequency distribution of ten important tree species in Derema Forest Corridor

The study revealed that Derema Forest Corridor has a stocking density of 1061 tree per hectare and an average basal area of 37.59 M^2 /ha. In a study in Chome Catchment forest reserve, Same district with similar climatic conditions as the Derema Forest Corridor, it was reported that the forest part that was undergoing recovery after uncontrolled harvesting had basal area of 30 m^2/ha and stocking density of 3643 with 70% being regenerants (Kijazi, 2006).

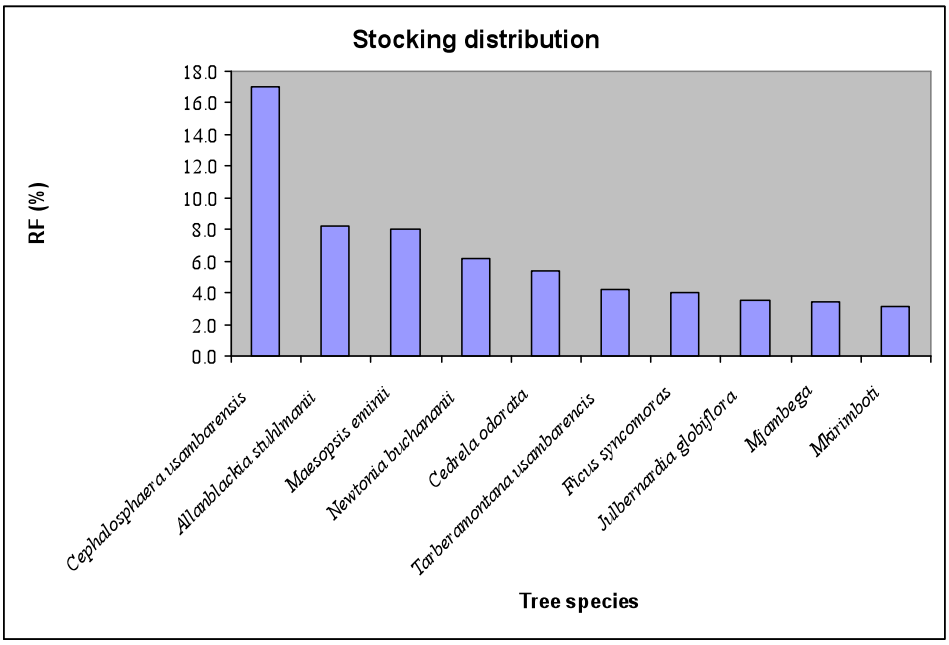

Figure 1: Stocking distribution of ten important species in Derema Forest Corridor

Since the Derema Forest Corridor has been under cultivation with various agricultural crops, the results of this study indicate a slow recovery of the forest. Contrary the high basal area could be attributed by the fact that large trees have been left over during the cultivation of hade demanding crops like cardamom, which formed 90% of all agricultural crops of the Derema Forest Corridor.

5.13.2 Forest regeneration

The regenerants of Derema forest were based on tree species of less 5 cm Dbh. The total number of regenerants recorded in this study was 478 tree species 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*. Figure 3 shows the distribution of the regenerants.

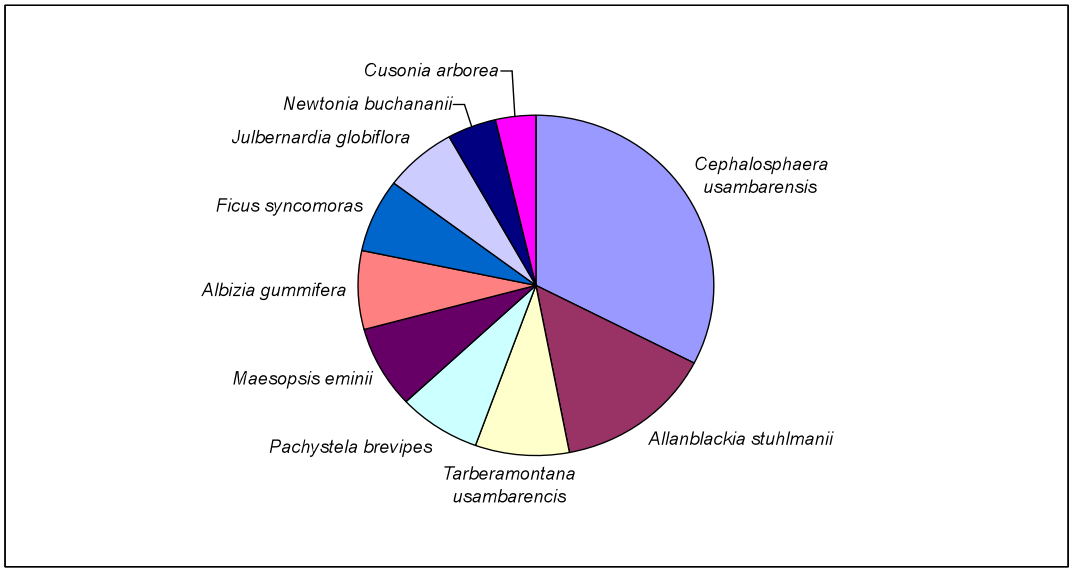

Figure 2: Distribution of regenerants in Derema Forest

5.13.3 Tree diversity indices

The Shannon's diversity index of tree species in Derema Forest Corridor was found to be 3.2. This value is closely similar to that found in recovering degraded forest part of Chome that was 3.12. Diversity indices provide information about rarity and commonness of species in a community .The higher the value, the higher the diversity. Shannon's Index value of > 2 has been assigned as medium to high diversity (Barbour *et al*., 1987), with a maximum value of 5. The value of 3.2 in Derema forest signified that the forest species are recovering after abandoning of cultivation.

Comparative studies elsewhere with similar ecological conditions in the Eastern Arc Mountains blocks reported diversity Index of 2.93 in the Usambaras and 3.31 in the Ulugurus (Munishi *et al*., 2004). These figures compare well with those found in Derema forest.

5.13.4 Index of dominance

The index of dominance is 0.060 in the Derema forest. The index of dominance reflects species dominance in a plant community. The lower the index the lower the dominance of a single species (Edwards, 1996; Ambasht, 1988). This low value shows that each species contributes to the community relatively evenly. The findings in Derema forest compare well with values of 0.05 and 0.04 in the Usambaras and Ulugurus respectively (Munishi *et al*., 2004). These forests have been subjected to some kind of disturbances in the past through logging and encroachment (Bjøndalein, 1992; Lovett and Pocs, 1993; Newmark, 1998).

5.13.5 Conclusion

The findings of this study indicate that there has been a positive impact of conservation of biological diversity due to the implementation of compensation process in the Derema forest corridor.

5.14 The Hypothesis

Together with meeting the research objectives and answering the research questions, qualitatively and quantitatively, and despite the few positive aspects that cannot be denied, on the whole the study supports the null hypothesis that was postulated at the beginning i.e. that ***the Derema Resettlement and Compensation(RAP) and gazetting exercise has impacted negatively on the livelihoods of the majority of forest adjacent communities***.

The fact that the Derema RAP and gazzetting process has impacted negatively on the local livelihoods of local communities is likely also to have negative consequences on the conservation of the protected areas. Little wonder then, that there continuing illegal felling of trees, and also illegal gold mining, almost with impunity and with little reaction by local communities in the reporting and prevention of such crimes.

6. Discussions

As per the general objectives set out at the outset, the study has managed to a considerable extent to generate a better understanding of the consequences of resettlement and compensation exercise on the livelihoods of communities adjacent to the Derema corridor and its subsequent impact on forest conservation. The findings of the study clearly suggest that the manner in which the compensation and resettlement exercise was conducted left much to be desired. Once again it has became a classical case of neglecting the poor and consequently the whole process was essentially anti- and not pro-poor.

The main findings of the study are as follows:

a) The resettlement and compensation exercise been positive to a few and negative to many of the forest adjacent communities. Those who were already poor and had crops of low quality and productivity, and small areas of cultivation, naturally got the lowest of the compensation and resettlement packages, and these were the vast majority (78%). For them even the little that they had has been taken away and they are thus worse off. They are now not getting any of the former benefits, little as it was.

b) In contrast those that were already better off and in fact very much better off since they have either been enabled to diversify into other farm and non-farm activities e.g. renting out properties, offering services e.g. food processing, transport and so on. Some have also been able to relocate to lowland areas and purchased larger areas of land/farms.

c) The condition of the Derema corridor better now than it was before and the forest resource assessment exercise combined with transect walks have clearly showed that there has been a positive impact of conservation of biological diversity due to the implementation of compensation process in the Derema forest corridor. Basically the abandoned areas since 2002 have shown remarkable regeneration and reconnection, thus meeting the major objective of the conservation agenda. This has occurred largely because of the belief of the local communities that they would be adequately and promptly compensated and therefore they agreed to completely stop cultivating in the corridor and boundary areas.

d) Most unfortunately the resettlement and compensation exercise done at Derema was not done in best way it could have been conducted despite the fact that the Resettlement and Compensation document insisting on this. There are several reasons for this failure. To begin with the conservation interests failed to come up with the resources required to conduct and complete the RAP exercise, thus making it take several years instead of a few months.

e) Communication with local communities were inadequate and too one sided (i.e. between payers of compensation and receivers), and this fact was also compounded by so-called representatives of the local population who more often than not became purveyors of rumours and half-truths, thus falsely

raising expectations of the affected farmers. The continuous and extended delays with poor communications led to frustrations and conflict.

f) Also when the resources eventually became available payments were made piecemeal and at times inhumanely.

g) Many women have been negatively affected by the compensation and resettlement exercise, through not being adequately informed, especially by partners/husband and lack of transparency. Widows and single mothers who are often the most vulnerable were also negatively affected through loss of land and livelihoods.

h) Most of the farmers have severe negative attitudes of the whole RAP, especially with lack of transparency at the outset, inefficiencies, and lack of respect by some of those who implemented the RAP. Generally, the attitudes of various groups to the exercise have been of resentment and disappointment. Although the few (22%) who received good payments also faulted the payment process because of delays and part payments, they were largely satisfied with the sums paid to them.

At this point it seems that the only "winners" in this context were the conservation communities and interests and, with the exception of a handful of already well-to-do farmers who were handsomely compensated, the "losers" were the majority of the affected farmers. The RAP aimed at making sure no one was poorer, and in fact it idealized a situation in which farmers were actually better-off than before. Unfortunately, the findings from this study show the contrary. Although the study also shows that the RAP had immense potential for poverty eradication, if and only if, it was implemented properly, for the majority, who are the poor, the process has become a poverty enhancing one.

7. Emerging policy conclusions

We hope that the findings and recommendations of this study can be the basis for establishing sound and appropriate procedures and criteria for implementing future gazettement processes, in Tanzania, and indeed elsewhere. There has been and continues to be an urgent need for change in mindset and practice and especially in forestry and natural resources management in general, where compensation and resettlement of valuable conservation areas are concerned, while also giving priority to the livelihoods of forest adjacent communities. 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 one.

Such change is urgently needed and also addressing the resource governance issues related to resettlement and compensation exercises as a whole. Failure to do so will inevitably also imply difficulties and even failure in sustainable resource utilization. Developing appropriate policy and strategies to reverse this appalling practice is also a way of ensuring that conservation does not become a poverty deepening process. Instead it should do the opposite, support critical livelihoods and even wealth creation on a sustainable basis.

8. Suggested further work

There are three areas that this study identifies as areas for further research. First, it is important that studies be conducted to gain a better understanding of the importance of local livelihood opportunities and options in any area where new protected areas are to be established or existing ones expanded. This would also include the need to obtain insights on the costs and benefits of conservation that communities often bear, as well as the opportunity costs that they forgo and this will inform resource managers both local and governmental on the viability of any such initiative as well as the nature of their contribution to both conservation, development and poverty reduction.

Second, the procedures and processes for converting open and village land into conservation areas must take into account their immediate and longer-term impact on local communities and especially in providing viable alternatives and opportunities. Failure to do so, is just delaying the existing contradictions between conservation and resource users.

Lastly, a more open study and clearer understanding of the relationships between nature, as in natural resources, wealth, in terms of who has access to nature's products and services, and enjoys the benefits of nature and the power relations, in terms of who governs and has authority and how this power is used in the management of natural resources.

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