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POVERTY, ENVIRONMENT AND LIVELIHOOD ALONG THE GRADIENTS OF THE USAMBARAS IN TANZANIA

Adolfo Mascarenhas

RESEARCH ON POVERTY ALLEVIATION

Research Report No. 00.2

**POVERTY, ENVIRONMENT AND LIVELIHOOD
ALONG THE GRADIENTS OF THE USAMBARAS IN
TANZANIA**

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ACRONYMS

HDI	Human Development Index
HHs	Households
REPOA	Research on Poverty Alleviation
SECAP	Soil Erosion Conservation Agroforestry Project
SIDA	Swedish International Development Authority
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
WCED	World Commission on Environment and Development
WI	Wealth Index
WRI	World Resource Institute

POVERTY, ENVIRONMENT AND LIVELIHOOD ALONG THE GRADIENTS OF THE USAMBARAS IN TANZANIA

1.0. INTRODUCTION

Two of the most important global issues today are pervasive poverty and problems related to environmental degradation. The causal factors are complex (Leonard et al, 1989, Holmberg, 1991). There is considerable debate on the relationships between poverty and the environment. The "Brundtland Commission" brought to the forefront the links between development and the environment, concluding that "Poverty is a major cause and effect of global environmental problems..." (WCED, 1987). However, despite some cautions there has been a tendency in Tanzania, like in many other developing countries to rush to simplistic relationships and the resulting interventions, be it in macroeconomics, livestock destocking or for that matter afforestation which do not bring appreciable positive changes to the people.

Holmberg (1991) pointed out that the relationship between the environment and poverty is not so straight forward. Insufficient attention had been paid to some intuitive and field experience and that there was even a possibility of conflict between the goals of poverty alleviation and environmental protection. A number of studies have been carried out on how both poverty and wealth have impacted on the environment, resulting in a number of environmental threats such as degradation of the soil, water and marine resources which are essential for life supporting systems, pollution which is becoming health threatening, loss of biodiversity and global climatic changes which jeopardize the very existence of life on the planet (WRI, 1992). The World Bank (1992) emphasises that the links between environmental degradation and poverty are as yet understood, and concludes that it is necessary that improved understanding between poverty and environment remains a priority. The dilemma that most countries have now to face is how to foster development and conserve the environment simultaneously.

In developing countries, the environment-poverty linkages are much less understood and even include myths such as the belief that natural resources alone determine the quality of life, that poverty is a rural phenomenon and is undifferentiated in such areas, that ecology plays an important part. On the latter the highland areas are associated with "richness" and lowlands with poverty, etc. So strong are such beliefs that areas rich in natural resources, such as the Rufiji delta remain as back waters

Tanzania, as one of such developing countries is facing many predicament in matters related to poverty and environment. There are a number of initiatives towards both having a clearer understanding of this complex linkage as well as towards eradicating poverty. The initiatives are both in areas of research and policy making. In the latter for example, in order to underscore the link the second highest office, that of the Vice President, has environment (conservation) and poverty (elimination) as key units.

1.1. Statement of the Problem

Ever since the Brundtland Report (WCED 1987), the central research question has been: "What are the links between the environment and poverty?" More specifically for Tanzania, other questions were raised. For instance are there environmental anomalies and what clues do they provide in our understanding of environment - poverty issues? Are communities living in certain ecological areas more prone to poverty than those in other areas? Is "environment responsible" for this poverty or are there other more fundamental explanations?

1.2. Study Objectives

Broadly this study intends to shed light on the complex environment-poverty linkage in order to understand the processes at work and provide lessons to bring about improvements in the quality of life. The study approaches this task through examining the role played by ecology since this determinant is one of the 'myths' to explain poverty in Tanzania. This analysis will help to establish whether communities living in some ecological areas are more prone to poverty than those living in other areas. The specific objectives include:

- To examine the extent to which natural resource scarcity causes poverty and to break through the conventional notion of direct environmental induced poverty
- To use various measures to identify the nature and distribution of poverty in Lushoto.
- To examine the poverty-environmental links through livelihood pattern.
- To gauge the extent to which steps can be taken to bring sustainable development.
- To take a more integrated perspective of the Usambara by examining the plains which form an integral part of the mountains.

1.3 Study Area

This study will focus on the Usambara mountains in Tanzania for the following reasons. Firstly the Usambaras provide the full range of ecological differences: arid and semi arid plain, valleys and plateaux as well as highlands. Lushoto District is purposefully selected because within a relatively short distance there are great contrast between the plains and the mountains. In the arid and semi arid parts problems of water resources exist especially for agriculture and for domestic use. This has forced people to adjust to both the environment and to social arrangements. In extreme cases environmental constraints, such as paucity of

water have resulted in a distinctive livelihood - pastoralism. In complete contrast, the highlands with almost year round availability of moisture are also faced with problems. High population densities in many parts of the highlands means that natural resources are under great stress. To meet with these threats the people have had to respond differently from the people in the plains.

Secondly because early European settlers were drawn to the highlands, there is a legacy of the richer areas, such as Lushoto, must be highlands. However, the Usambaras exhibit a totally different conventional experience compared with other highlands in Tanzania, such as the highlands of Kilimanjaro and Southern Highlands which also attracted early European settlers and had similar historical record and agricultural background. This preoccupation with the "highlands" has meant that the plains have been neglected and interventions have been to the minimum. The main focus will be to critically examine the nature of poverty in the Usambaras and why it has been so persistent.

1.4. Study Hypothesis

The main guiding hypothesis is that differentially there are enough natural resources in the Usambaras in the various ecological areas. Poverty has many dimensions and therefore the nature of poverty must be understood. For instance shortage of land or its abundance does not determine whether a household is poor or rich respectively. Poverty alleviation measures will be effective if the processes and constraints are understood. Planning interventions by considering the natural resources and social dimensions stands a reasonable chance of poverty alleviation and real development. It may well be that the social environment which human beings create is as significant if not more critical in Lushoto.

1.5. Significance of the Study

This study will provide some insights that will contribute towards bringing about a balance on the views of the relationships between poverty and the environment. But beyond this the juxtaposition of mountains and plains like that found in the Usambara, replicates many times in Tanzania, from Kilimanjaro to Meru, Kilosa to Mbeya. In livelihoods too, there are pastoralists and other self-provisioning groups who have found great difficulties to adjust to social and environmental changes.

An underlying concern is the relationship between population density and natural resources. Invariably there are Malthusian overtones and this means that there is serious need to examine this inter-relationship. For instance at the turn of the century the population density in the Usambara highlands was no greater than it is today in the plains around

Mnazi ward. Yet, historical literature on the Usambara reveal the same preoccupation about "overpopulation" even at the turn of the last century. Therefore, unlikely as it may seem for the plains around the Usambara one is inclined towards what was said by Tiffen, Mortimore and Gichuki (1994) that "more people, less erosion" may not be too far fetched!

Measuring poverty just in monetary terms has been conventional. A-dollar-a-day makes a nice universal slogan but in many rural areas it is unlikely to happen and neither is it really relevant. At this stage in Tanzania, identifying ways to readily measure poverty is very important if we are to come out with meaningful programmes. Further, it will assist policy makers to identify poverty in its various dimensions. This could help in establishing priority interventions both by the communities and the government. Most of the present programmes to alleviate poverty and to conserve the environment are still far from the mark. This comprehensive and focused study on environmental aspects and poverty in the Usambaras will be yet another contribution and also be a source of information.

1.6. Limitations of the Study

The poverty, environment linkages are very complex. It is therefore not possible for a study like this one to deal with all the five aspects mentioned earlier with the same level of detail to cover all geographical areas. There are also the limitations imposed by time and financial resources. Therefore a few and focused issues were selected for this study.

1.7. Organisation of Study

Section one covers the introduction, highlighting the problem and study objectives. A brief setting of the study area is provided in section two, while section three provides a survey of literature, both theoretical and empirical. The fourth section deals with methodological issues while section five reports the results of the analysis. The last section is devoted to concluding remarks.

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II. GENERAL BACKGROUND OF LUSHOTO DISTRICT, TANZANIA

2.0. Preamble

This section gives a brief background of the study area. The discussion covers issues of physical resources as well as conservation efforts and population. A brief survey on social and historical adjustments is also provided.

2.1 The Physical Setting

Lushoto District, in North East Tanzania is part of the Tanga Region. The total land area of Tanga Region is 26,808 square kilometres out of which 3,497 square kilometres is Lushoto District. Within this 13% of the land area (comprising Lushoto District) of Tanga Region, reside some 28% of the Region's population. The highland nature of the district attracted some of the earliest European settlers and the highlands continue to dominate the interest of most people. Yet, the highlands only occupy about 40% of the district.

The Luengera river and its valley divides the Usambara mountains complex into two main blocks - the Western Usambara and the Eastern Usambara (See Fig 1). There are major differences between the Eastern Usambara and Western Usambara - the fundamental one being dense population in the Western Usambara Highlands, and the rich biodiversity of the Eastern Usambara. The latter is part of an older mountain system that has been eroded down considerably. Starting from the low hills near the coast, the East Usambara rises to over 1000 metres above sea level near Amani, rising again steeply up the valley of the Luengera to a plateau over 1500 metres above sea level. Continuing into Western Usambara, within about 20 kilometres, it ascends to a peak over 2000 metres high near Lushoto town. In less than 20 kilometres the Usambara falls precipitously to less than 400 metres in the plains in the west. The great amplitude of relief of the Usambara Mountains and its position less than 100 kilometres from the coast gives the climate of the upland an island character.

The research focus of this study is the Western Usambara. It is much higher than the Eastern Usambara. It is a folded and faulted massif consisting of metamorphosed, volcanic and sedimentary rocks. The upthrust forming the mountain is deeply dissected and faulted and consequently a considerable number of the slopes are steep sided. The valleys and subsided floors by contrast are relatively level. Good land is limited to the narrow valley bottoms or to the blocks which were down-faulted. In contrast are the steep slopes and ridges of many parts of the highlands.

Although the Usambara is treated as a uniform entity, the reality is that there is a great deal of variation brought about not only by its physical fragmentation but also reinforced by the amount of precipitation and the resulting vegetation. It is also profoundly affected by the migration of people and the history of the people. For instance history and the deep valley separates southern Usambara and Vuga, once the main seat of a paramount chief, from northern Usambara with Lushoto as its main focus. Vuga that was a thriving centre before the Germans arrived is now a back water.

2.2. Soil Types

It is important to note that soil types vary considerably even over small distances and are complex because of their catenary nature. Five basic soil types have been identified (Milne 1938). First are the lateritic red soils on the wetter higher slopes which have a thin organic top soil which deteriorates rapidly when the forests are cleared. Second are the fertile red loams, still on the hill tops, which are non lateritic and lose their fertility rapidly. The fourth soil type is the grey loamy mineral soil and fifth is related grey/black soil which is restricted to the escarpment floor. Both are very fertile soils and with care could support permanent cropping. In addition they respond well to irrigation.

2.3. Climate

The different climatic regimes of the Usambaras are mainly determined by the interplay of altitude, position, temperature and rainfall. Spatial and temporal variations of temperatures and rainfall, even over small distances are considerable. Mean annual rainfall is highest on the tops of the mountains. Since most of the rains come from the south-west monsoons, the southern escarpments of the Usambara can get as much as 2000 mm per annum. In the northern parts of the Usambaras, the highlands capture most of their moisture from the north-eastern monsoon which arrive in November or December. Lushoto lying in the rain shadow of the southern escarpment gets over 1,000 mm of rain per annum. Soni township less than 15 kms but which is lower and more sheltered gets less than 800 mm per annum. In the central plateau variations are even greater - Malindi gets only 643 mm per annum while Mlalo, about 8 kms to the south gets about 1,222 mm per annum (Cliffe, et al 1975). In many places in the plains rainfall can be as low as 400mm per annum.

The highlands experience three rainy periods: short rains ("Vuli"), October-December, long rains ("Masika") March-June, and intermediate rains ("Mluati") July-September. Temperatures are also a significant variable. In the highlands it can range from 0 degrees Centigrade at night to a maximum of about 25 degrees Centigrade during the day.

The short rains account for only 25% of the total annual fall and are less reliable than the long rains. However, they are the most important for growing seasonal and annual crops like maize and beans which require temperatures higher than 20 degrees Centigrade. These temperatures occur in West Usambara from October to March. In areas with altitudes

higher than 1500 metres above sea level the long rains can be used to plant wheat, temperate and sub-tropical fruit trees and many vegetable crops requiring cool temperatures.

2.4. **River System**

There are a few rivers and many small streams in the Usambara. The River Sine (known as Mzimuni in the plains) flows southwards from Mlalo Ward, before turning in a westerly direction past the small township of Soni and eventually joins River Pangani in the plains on the western side of the Usambara, near the junction town of Mombo. It separates south Usambara from the northern components. The Uмба river arising from the highlands at Mtae, past Mlalo and empties in the Uмба plains and its marshes. In the eastern part of the Usambara the Lwengera River which starts in the highlands around Soni flows eastwards before turning southwards and creating the important divide between the Eastern and Western Usambaras.

2.5. **The Forests**

The striking feature about the forests of the Western Usambaras is that they now represent only a fraction of the original forests. Most of the closed rain forests were cleared by settlers from Europe and African migrants into the area. There were efforts subsequently at afforestation with exotic trees. Eight local authority forest reserves, and fourteen central government reserves give a total area of 112,229 acres of protected forests. Many of the forests are affected by encroachment.

Natural forests now cover a very small part of Lushoto District. Officially, they are estimated to cover 28,242 acres. Other forested areas are mostly planted with exotic species, mainly eucalyptus and soft woods like pines as well as hardwoods. All these forests cover another 83,987 acres. However, several of them have been encroached upon. Compared to other parts of Tanzania, the planted areas have received some management and they have been harvested.

The natural forests in the Usambaras are not just other forests. Their great value is related to the protection of the micro-environments and habitats and culminating in their rich biodiversity (Rodgers and Homewood 1982). The forests recycle the nutrients and act as a regulatory body in the hydrology of the area (Lundgren 1978). Basically these two aspects mean that there is a great degree of subtle differences in the various parts of both highland and lowland in Lushoto District.

2.6. Conservation Efforts

Throughout history Lushoto District has at various times gone through different types of vegetation changes and deforestation the agents of change being both indigenous people and outsiders. There are often conflicts arising from the short term needs of people and even the bureaucrats as opposed to long term sustainable goals.

In the highlands, with their relatively concentrated rain, great amplitude of relief and high population density has meant that the impact is both direct and can be dramatic. For instance in the Mlalo basin, deforestation for agricultural land and heavy grazing by cattle greatly increased land erosion. This has meant that the sustainability of such areas has periodically been a matter of great concern to the people and the successive administrations. Deforestation and land degradation are still regarded as serious problems. The Federal Republic of Germany and now the Republic of Germany has for the best part of nearly 30 years embarked on development projects with a conservation bias, in Lushoto. The major current environmental programme is the Soil Erosion Conservation Agroforestry Project (SECAP) (See Box 2.1).

BOX 2.1

Soil Erosion Conservation Agroforestry Project (SECAP)

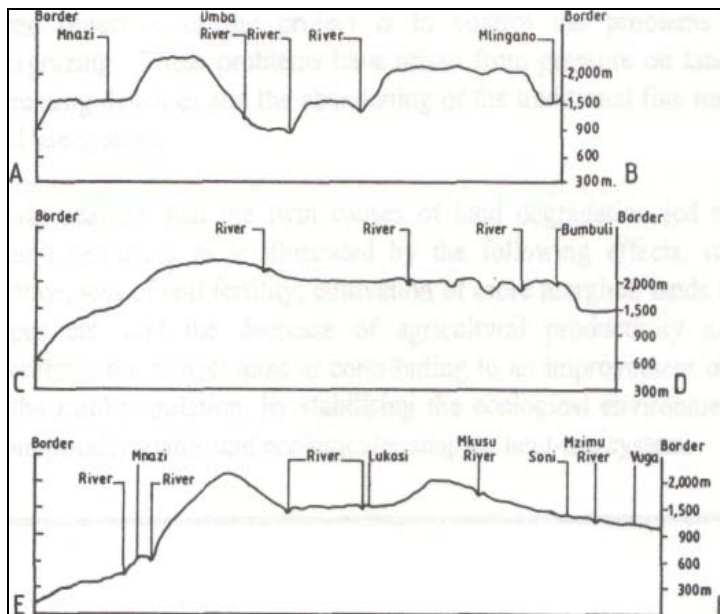
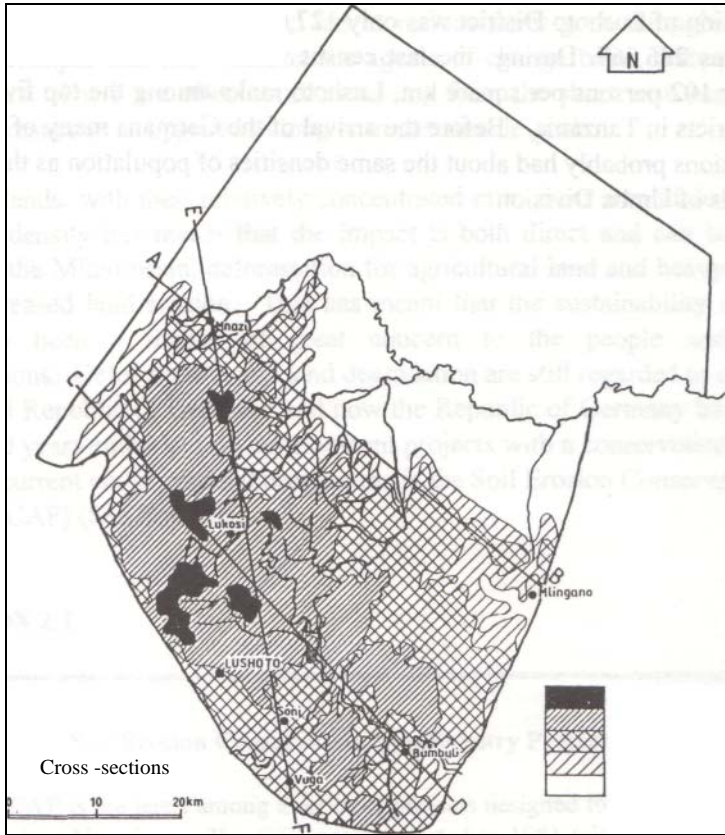
SECAP is the latest among a series of projects designed to halt land degradation in the Western Usambara. The GTZ project started in 1981 with a diary project. This was enlarged in 1984 to include a soil erosion control and agroforestry component. The broad objective of the project is to control the problems of soil erosion and overgrazing. These problems have arisen from pressure on land resources caused by increasing densities and the abandoning of the traditional fine tuned and site orientated land use systems.

It was realised that the twin causes of land degradation led to the deterioration of natural resources as is illustrated by the following effects: reduction of the water balance; loss of soil fertility; cultivation of more marginal lands such as hill tops, steep slopes etc. and the decrease of agricultural productivity and family incomes. Therefore, the project aims at contributing to an improvement of the living conditions of the rural population, by stabilising the ecological environment and introducing an economically viable and ecologically adapted land-use system.

The Land and Population Factor

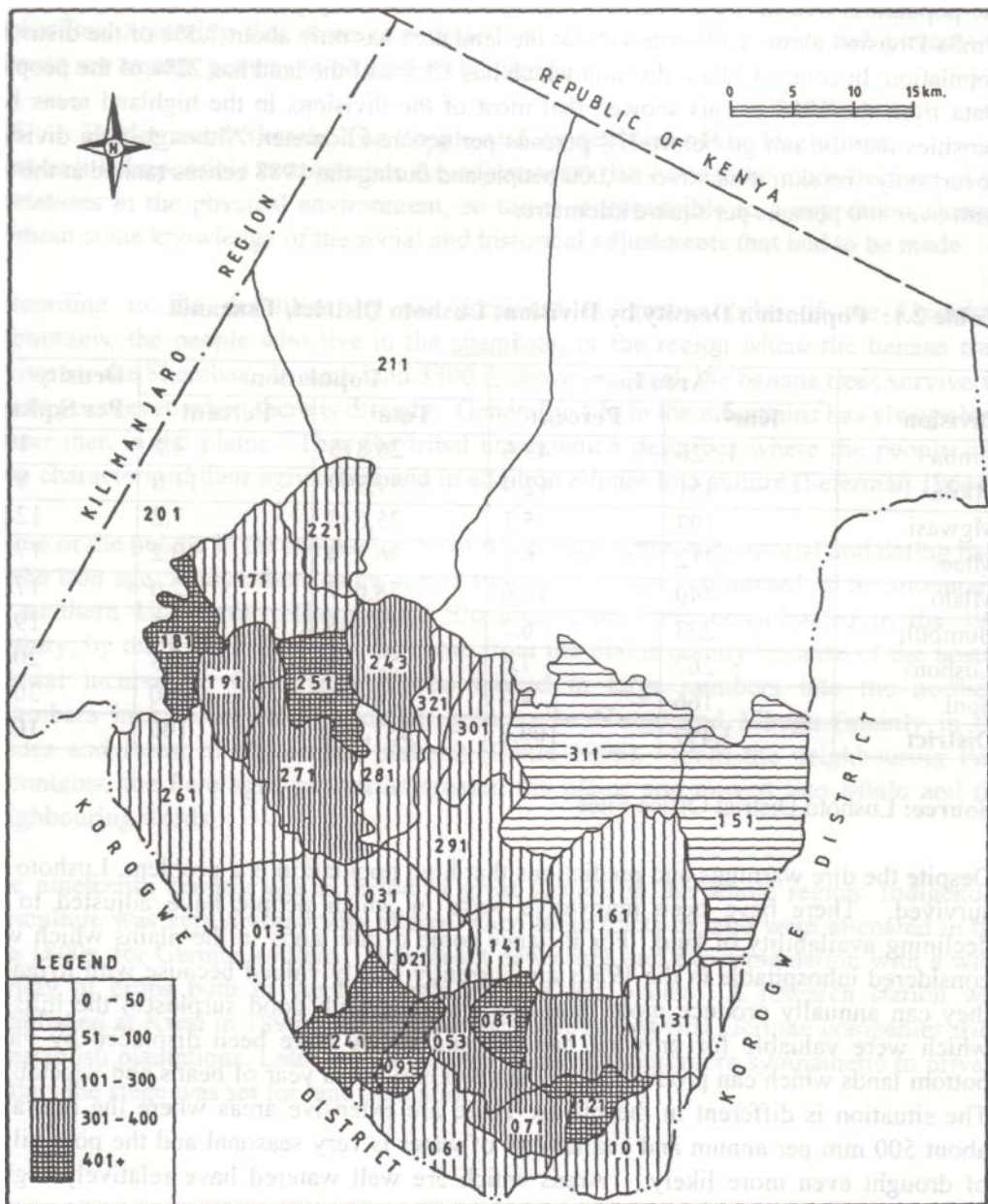
In 1948 the population of Lushoto District was only 127,663. By 1968 it was 210,484 and a decade later it was 286,069. During the last census in 1988, it reached over 375,000 persons. With over 102 persons per square km, Lushoto ranks among the top five densely populated rural districts in Tanzania. Before the arrival of the Germans many of the future administrative divisions probably had about the same densities of population as those found **in** some of the wards of Uмба Division.

LUSHOTO DISTRICT RELIEF



Estimated Population Density By Wards C. 2000

(Persons Per sqkms)



Importantly, the population of Lushoto district is not evenly distributed (Table 2.1). The two administrative divisions of Lushoto and Soni which between them account for only about 13.3% of the land have nearly one third of the population. In contrast about 15% of the population live in the lowlands which absorb some sixty percent of the land surface. Umba Division alone, with over 43% of the land area has only about 7.5% of the district's population. In contrast Mlalo division which has 12.5% of the land has 22% of the people. Data from the 1988 census showed that most of the divisions in the highland areas had densities that did not go below 128 persons per square kilometer. Although Soni division covers only 166 km² it had over 50,000 people and during the 1988 census ranked at the top with over 300 persons per square kilometre.

Table 2.1: Population Density by Division: Lushoto District, Tanzania

Division	Area In		Population		Density Per Sq.km
	Km ²	Percent	Total	Percent	
Umba	1,526	43.6	26,875	7.5	17.6
Mlola	451	12.9	39,399	11.0	87.4
Mgwasi	199	5.7	25,638	7.2	128.8
Mtae	212	6.1	36,374	10.2	171.6
Mlalo	440	12.6	78,617	22.0	178.2
Bumbuli	233	6.7	45,148	12.6	193.8
Lushoto	267	7.6	55,118	15.4	206.0
Soni	166	4.7	50,086	14.0	301.8
District	3,497	100.0	357,255	100	102.2

Source: Lushoto District Office Files

Despite the dire warnings and predictions that high population is a problem, Lushoto has survived. There have been innovative ways in which people have adjusted to the declining availability of land. For instance some of the lands in the plains which were considered inhospitable in the 1950s are currently highly valued because with irrigation they can annually produce more than one crop and with good surpluses; the hillsides which were valuable for growing bananas and coffee have been displaced by valley bottom lands which can produce more than two harvests a year of beans and vegetables. The situation is different in the plains. There are extensive areas where the rainfall is about 500 mm per annum and availability of water is very seasonal and the possibilities of drought even more likely. Areas which are well watered have relatively high to medium population densities.

In theory, the population of the Usambara would probably be uniformly distributed if the environment and natural resources were uniformly distributed. This fact alone should stress the message that the Usambara is not a homogenous area, its environment and natural resources are diversified and even in small ways these differences can be critical. Therefore, assuming that there is a direct link between environment and poverty we should not expect poverty to be uniformly distributed.

2.8. Background Sketch: The People and Agriculture of the Usambara.

Just as it is impossible to appreciate the adjustments that have to be made because of the variations in the physical environment, so too is it impossible to comprehend changes without some knowledge of the social and historical adjustments that had to be made.

According to the definition by the dominant indigenous tribe of the Usambara Mountains, the people who live in the shambaai, or the region where the banana trees thrive are the Shambaa. In such land 3500 ft above sea level, the banana trees survive for many years even when there is drought. Generally, life in the mountains has always been easier than in the plains. Thus the tribal name which describes where the people live, also characterized their agriculture and in addition alludes to a culture (Feierman 1968).

Some of the people in the mountains have lived since times immemorial and dating back to the iron age. Many others came during times of famines and moved up the mountains in southern Usambara. The various Shambaa clans were consolidated in the 19th century, by the Kilindi dynasty who came from the plains mainly because of the hostile Maasai incursion. Other groups who moved in large numbers into the northern Usambara include the two pastoralist groups, the Nango and Mbugu (mainly in the glades and forest of the central plateau) (Conte 1996). From the neighbouring Pare Mountains, the Pare agro-pastoralist crossed the plains and moved into Mlalo and the neighbouring wards.

The nineteenth century was a period of great turmoil in the whole region. Indigenous agriculture was very dramatically altered when large tracts of land were alienated in the late 1800s, for German settlers. This meant new crops and experimentation with a wide variety of crops both in the highlands and the hot plains. A research station was established at Kwai in 1896 to try out European crops. At first German companies tried to establish plantations. Later with a German administration more sympathetic to private settlers the stage was set for land alienation.

It was envisaged that there was room for dozens of settlers to be granted titles of 100-200 hectares of land. This meant that each settler required land that was approximately needed for an entire village! In addition each settler was assisted by the German administration to get 8 - 12 labourers to open the land and work on the estates. It would seem that by 1899, some 6.5 million coffee trees were planted (Kaponen 1994). The destruction of the forests was so glaring that officials hastily wrote legislations which were enacted to protect the forests and water sources. Administrations that followed would periodically repeat these exercises or try to resolve related issues. In the plains which were hot and dry, (but where great quantities of water were readily available) and had relatively few people, large sisal estates were created and plantations of several thousand hectares or more were not too uncommon.

The period since independence is also marked by peculiarities. There was a major attempt to improve health and education and to some extent progress was made. However, malaria is still a problem in the lowlands and seasonal migration actually means that people in the highlands still suffer from malaria contracted in the plains. For a brief while forested land which was under protection was "allocated" for cultivation. But the biggest problems were related to the economy. The nationalized tea estates and the sisal plantations were so badly managed that workers were not paid, outgrowers of tea and coffee were never certain when or if they were to be paid at all. The extent of the hardships and poverty endured by people was well documented at the height of the state control of the economy in the mid 1980's (Sender and Smith 1990).

For over a 100 years, the people of Lushoto have had to make adjustments to major constraints-including droughts and diseases, alienation of land, shift in food crop patterns and to population growth. This is the social context in which levels of poverty and wealth are determined in Lushoto.

m. LITERATURE REVIEW ON POVERTY-ENVIRONMENT NEXUS AND THE SITUATION IN LUSHOTO DISTRICT, TANZANIA

3.0. Overview

The purpose of this section is to provide a brief review on the complex issues of poverty, the environment and the interlinkages between the two. Both theoretical and empirical literature are covered. Some specific studies on Lushoto are reported as well. Our review will however concentrate on the last part.

3.1. Theoretical Literature Poverty and the Environment

Poverty is a human condition. There have been several theoretical approaches to defining poverty (Cooksey, 1994). One of the most frequent and conventional method of measuring the economic status of people is their incomes. In many developing countries, however, there are difficulties in trying to assess rural incomes (Collier, 1986).

The limitation of GDP and other economic indicators to bring reality to the issue of poverty have prompted individuals and institutions to look for new indicators of poverty which put emphasis on the quality of life. Longhursts (1986), for instance, looks at poverty in a multidimensional perspective which includes such aspects as prevalence of illness, indebtedness, food availability and problems of seasonal hunger. Another major contribution to these ideas is that by Chambers (1985) who argues that the best way to understand poverty is to emphasize "disadvantages". Five clusters are identified: physical weakness, powerlessness, vulnerability, poverty and isolation.

A number of approaches have been suggested to reflect a true picture of the situation. Such approaches include the UNDP Human Development Index (HDI) which goes beyond pure income considerations to include educational achievements and life expectancy (UNDP, 1997). The Wealth Index is another method. In a rural setting the Wealth Index essentially consists of possessions (Fleurent, 1978) and items which people acquire as soon as they could afford them (Sender and Smith 1990). Poverty has thus to be regarded in a comprehensive manner (Chambers, 1985). Using a Wealth Index, populations can be categorized according to "wealth levels" e.g. destitutes, poor group, average and above average. The value of wealth ranking is that it enables one to observe, verify and collect information about social stratification as well as giving the researcher new insights (Ostberg, 1995). There are two important elements incorporated in the Wealth Index: as a pointer to the economic status of the respondents and secondly that

the possession score calculation should shed light on intra-household resource distribution e.g. by gender; between adults and children, etc. (Sender and Smith, 1990).

The construction of the material wealth index could be used in an aggregate way to compare the poverty or wealth of adjoining areas such as between mountains and plains, or between villages or even households. Different livelihood groups in the areas, such as subsistence or commercial agriculturalists, pastoralists, or social groups, such as women-headed households and professionals/traders, can be compared. A common criticism about this approach is that it is biased in favour of spenders of money incomes. This, notwithstanding, however as an indicator of socio-economic status compares favourably well with other measures assessing rural household incomes (Collier, 1986).

3.2 Empirical Literature of Poverty Especially on Tanzania

Empirically the economic approach to the study of poverty has been dominant in Tanzania. The merits and demerits of the various economic approaches have been reviewed in the Tanzanian context (Semboja 1994). Some economists, best exemplified by Sen have argued for a broader approach. In this context poverty is not simply a matter of physical and material deprivation but a much more complex social phenomenon with economic, cultural and socio-political dimensions. Sen's empirical work in India and Ethiopia demonstrates that with rare exceptions famines and poverty are a result of people's basic "entitlements" being violated (Sen 1981, 1999).

In Tanzania, the first comprehensive study on poverty was conducted by the World Bank in 1991. (World Bank 1993). This study was based on a survey of 1,046 households out of a total of about 4.3 million households. The main findings were the following: eight regions (out of twenty), were classified as being above average. Tanga was one of them. About 50% of the people were classified as poor; of which 36% are those who could not afford to meet the basic food requirements. A latter study, conducted through a participatory poverty assessment (PPA) by the World Bank examined poverty more within a perspective of social capital (Narayan 1997). Recent estimates classify about 30% as being poor (URT, various). As a result of an improved institutional base, through the Vice President's Office and research through REPOA (Research on Poverty Alleviation) the literature on poverty is rapidly increasing compared to a decade ago.

Poverty-environment nexus

The possibility of a connection between the environment represented by the forests, vegetation, land and water and poverty in Lushoto was realized long ago. In response, the German administration was quick to enact a legislation in the early 1900s on forest and watershed management, after it was realized that the agricultural potential of Lushoto had been overestimated: the soils were not as rich as it was earlier thought, that drought could not be ruled out, that water management was important, that

environmental destruction through forest clearance was simply not practical for sustainable agriculture. Basically, there was a realization that the natural resources were not as abundant to allow German settlers the extravagant use of them.

During British rule (1918-1960) the sensitive nature of the environment was recognized and ameliorative and conservation measures were taken at various times. These measures began in earnest in the early 1930s to conserve soils, water and vegetation. The tentative and even inconsistent nature of the identification of problems meant there was little agreement about the suitable course of action. Was it population pressure, the presence of cattle, the cultivation of steep slopes? The preamble to the Staples Report stresses on the need for compromise in conservation efforts:

"...an increasing human cattle population is bringing about a serious state of affairs on many of the steep slopes of this mountain block...it **would not be advisable to prohibit the grazing of cattle as it seems that the future welfare of the people lies in the development of mixed farming** (my emphasis)..but the conservation measures need to be unusually and thoroughly well planned ' (**Quoted in Watson 1972p 223**)

Soon after independence in 1961, in an effort to foster egalitarian development, some of the conservation issues including restriction on encroachment into forested areas were not enforced, land holding transactions were severely curtailed and the priorities of development shifted into food-security, nationalization of estate etc.

One of the major works on poverty undertaken by an agricultural economist in the Usambara must be attributed to Attems (1968). According to him, the pauperization of the Usambara Mountains was an anomaly in East Africa. In seeking for an explanation **he** concluded that the poverty of the people in the highlands is anchored on three factors: first, was the unwillingness on the part of the Shambala to break from their traditional agriculture. Second, was the absence of a specially profitable innovation to make them break from the past and third was the poor state of nutrition which led to the stagnation of Shambala agriculture (Attems 1968).

A few years later, against the background of environmental disasters and famines in West Africa and elsewhere, research was started in the mid 1970s in Lushoto on the efficacy of the eco-development approach among peasants in the Usambara Mountains (**Glaeser 1984**). The survey was concentrated among the households of Shashui, near

the town of Soni, Western Usambara. The carefully designed study gives detailed account of cash and food crops productivity and expectations of meeting the basic needs both from a theoretical perspective and from what the peasants considered as priority (Glaeser 1984). The author is among the very few to specifically state that Tanga was economically among the better off regions in Tanzania. The value of the work by Glaeser, Sender and Smith, though their focus was quite different, is that they provide a basis of comparison for some of the changes and the processes at work.

Special mention must be made of the path-breaking study by Sender and Smith undertaken about a decade ago. Although the analytical findings are a historical interpretation, they reveal the processes at work. The survey was heavily biased towards women and gender relations were considered crucial in the understanding of class formation. The section on material well being is probably among the best available for Lushoto and indeed for the country for that period. Many of the social processes critical then are still relevant now. For instance, transactions in land, exploitation of labour particularly of women are still rampant. While the volume produced is still good on issues pertaining to labour and wages, accumulation and related themes, it did not discuss much either the environment, the livelihood patterns nor the extensive arid and semi arid parts of Lushoto. Sender and Smith saw the biggest obstacles to the development of the Usambara as basically too great an interference by the State, the exploitation of women and the preoccupation with subsistence farming rather than production of high value crops. They conclude by stating that'

"A constitutional and legal framework for the development of rural trade unions is the only basis for the alleviation of the misery of the rural poor " (Sender and Smith p 139)

Most of the major recent works on poverty in Lushoto confine themselves to the Highlands (Attems, 1968; Glaeser 1984 and Sender and Smith, (1990). Until recently there was little information of an empirical nature about poverty in the lowlands. As part of this study there is now much more perspective on this neglected area (Mascarenhas 2000)

IV. METHODOLOGY FOR ASSESSING LINKAGES BETWEEN THE ENVIRONMENT AND POVERTY IN THE USAMBARA, TANZANIA.

4.0 Overview

The methodology developed for this study is rooted in the conceptual framework that recognizes the competition between social and environmental factors in ensuring that development takes place in a sustainable manner. This study recognizes five different facets which have to be considered. First it must be recognized that the livelihood systems which in the past were so tied to the environment and especially natural resources are rapidly weakening. Secondly, the quality of human life is jointly determined by the interplay of two very complex systems: the socio-economic system and the ecological system. Thirdly, there is a need to have some realistic perspectives about the links between environment as represented by the use of natural resources and development. Indeed too many of the conservation projects in Africa are biased against the full participation of the indigenous people. Few appreciate that with such low incomes, solar cookers or for that matter electricity are out of the question.

Fourthly, to take cognisance of the fact that rural communities and different groups do not live in isolation but are increasingly being linked to the local, national and global scene. This facet has both pros and cons. For instance, exposure to the outside world can open up new options -be it in the form of a new vegetable seed, irrigation system, market prices etc. On the negative side is migration in the form of abandonment of local responsibilities. The fifth aspect is to pay more attention to the perspectives of the local people and their views on environment and poverty. For these various facets to be considered new data had to be generated and old information revisited.

4.1 Data Sources

As pointed out in section 1, there were a number of reasons for choosing the Usambaras. The environment of Tanzania is so diversified that it is important to identify a microcosm like the Usambara which replicates the complexities of the real world around us. The inter-connectivity between the different components along the various gradients of the Usambara do not separate people but gives new options. Conventionally, there has been a tendency to look at *environments* and the people around them as if they were isolated islands.

Both secondary and primary sources were used to collect information. The main instrument for collecting primary data was a household questionnaire administered by the research team with the help of primary school teachers and ward officials. The questionnaire was designed to collect the following information: household characteristics, membership to various associations, livelihood and income, agriculture and cultivation, indicators of wealth, nature of poverty (non economic indicators), environmental issues, food security aspects, labour and wages. The field work was carried out in three phases. In addition, the main supervisor of the field work kept a field diary. The questionnaire was supplemented with discussions with relevant officials at the levels of village, ward and division.

4.2. Sampling Procedure

The first level of selecting respondents was purposeful to reflect the ecological differences between respondents from the arid and semi arid plains, from the valley and plateau and from the Highlands. For each category poor and rich wards (according to District officials classification) were selected, two wards for each status. Then households were selected randomly, about thirty for each of the sampled villages. In some cases it was not possible to reach this number. The result of the sampling led to some interesting features e.g. twenty-nine woman-headed households; seventeen pastoralist households one of which was woman headed.

4.3. Method of Analysis

Our analysis falls broadly into two categories, statistical tabulations including cross tabulations using the SPSS programme and construction of a Wealth Index (WI) for all the households interviewed. A considerable part of the analysis of this study is based on the WI framework. With this background some of the empirical results are presented in the following section.

V. EMPIRICAL RESULTS OF THE LINKAGES BETWEEN POVERTY, ENVIRONMENT AND LIVELIHOOD IN THE USAMBARA

5.0 Overview

This part of the report presents the measurements and analysis on the levels of poverty in four of the major ecological areas identified in Lushoto. It also examines the probable interlinkages between poverty, environment and livelihood along the gradients of the Usambara. The first part of this section briefly provides characteristics of the study sample area and the age and gender of the head of the households.

The second sub-section identifies the main types of livelihood of the households and the extent to which the group is vulnerable. It will be appreciated that many of the livelihoods are critically dependent on natural resources for their continued survival.

The third sub-section covers a substantial proportion of this analysis. It starts by measuring poverty and essentially involves the following:

1. Construction of a Wealth Index (WI) and its application in the major environmental gradients of the Usambara. The WI which is based on observed items and possessions depicts level of affordability and past investments. The greater the number of possessions, the higher the scores and less poor is the household;
2. Determining poverty and its distribution by using two critical variables which are based on - land and livestock ownership of the household along the main ecological zones;
3. Combining the two measures of poverty to give a consolidated picture of poverty in the various environmental gradients of the Usambara;
4. Analysis of the perspectives of the households on the non material factors which lead to poverty.

The fourth subsection looks at the environment but more from the perspectives of the people and into the future. It analyses the household main perception about the environmental and poverty problems and what remedial measures would likely help them. This gives a better picture of poverty - environment interlinkages, but above all it

is a good indicator of what interventions would be most helpful and what are the lik constraints.

5.1. Characteristics of the study sample

5.1.1. Representation by ecological location and livelihood groups The sampling procedure resulted in household representation as shown in Table 5. Overall, the sample from the Plains and Highlands were not too dissimilar at 46.5% a 53.5% respectively. The survey sample had 37.3 percent of the households from semiarid areas, the valleys, 36.7 percent, Upland and ridges 16.8 percent and from a areas 9.2 percent.

The sample from the semiarid areas and the valleys was almost the same in size, sample in the semi-arid areas was by comparison very low but it was representative of important livelihood group - the pastoralists. Many of the heads of the households in i mountains were former labourers in the tea and coffee estates and while this group s exists many have now resorted to subsistence farming. In the valleys, the domin; group are involved in commercial horticulture. In the plains subsistence farming is a pronounced.

Table 5.1: Study Sample by Ecological Location Lushoto

Major Ecological Areas		Number of Households	Percent of Total
Highlands (53.5% of hhs)	Upland & Ridges	31	16.8
	Valleys	68	36.7
Plains (46.5% of hhs)	Semi arid	69	37.3
	Arid	17	9.2
Total		185	100.0

Source: Field Data

5.1.2. Representation by gender and age

Males constituted a larger part of the respondents while in terms of age group, those ag between 36 to 55 years formed the largest proportion of respondents. This was true 1 all the areas. Table 5.2 reflects the age and gender distribution in the plains.

Table 5.2: Respondents by Gender and Age Group in the Plains

Gender	Aged 18-35 N (%)	Aged 36-55 N (%)	Aged + 55 N (%)	Total	Percent
Women	6 (37.5)	8 (50.0)	2 (12.5)	16	23.2
Men	14 (26.4)	23 (43.4)	16 (30.2)	53	76.8
Total	20 (29.0)	31 (44.9)	18 (26.1)	69	100.0

Source: Field Data

5.2 Livelihood Along the Gradients of the Usambara

5.2.1 Livelihoods to Reflect the Links Between Poverty and Environment To survive physically and socially, households have to be involved in activities. These activities are strongly influenced by environmental factors and the natural resources base, but to a large extent are also determined by a host of socio-economic factors including the culture and value systems, technology, the knowledge base, institutions etc. The livelihood systems that exist in an area reflects three important components: natural resources/environment assets, historical/cultural integrity and knowledge base which has to be dynamic. In Lushoto seven major livelihood groups have been identified. Six of them are dependent in varying degrees on the environment/natural resources assets.

The seventh represents a very broad transition group found in the urban and peri-urban areas. It consists of a cluster of heads of households involved in activities that are generally indirectly or very much less dependent on natural resources. For instance, it consists of administrators and professionals, like doctors, teachers, magistrates etc who purchase most of their food and their major income is from activities which are not directly related to the environment or natural resources. This is true even if the professional happens to be a forester!

BOX 5.1

LIVELIHOOD & VULNERABILITY LINKS

LIVELIHOOD GROUPS (& Distribution)	DEGREE OF VULNERABILITY
<p>* 1 Hunters and Gatherers (L/AA) Suspect the existence of such groups in the Umba Division.</p>	Risky - hostile social environment. Mostly poor
<p>*2 Pastoralists (L/AA) Mainly found in the drier parts of Mnazi, Umba and Mlingano</p>	Greatly depend on natural resources. In the absence of infrastructure are very vulnerable because of cyclical drought and loss of livestock. Only a few can get out of poverty.
<p>* 3 Subsistence Cultivators (L/SAA +) Mainly located in the plains and the less endowed highlands.</p>	Very vulnerable, environmental constrains, including shortage of productive land in uplands etc. Most are poor.
<p>*4 Partial Subsistence Cultivators (LAA + Up - v) Subsistence mixed with commercial cropping: mainly in the valleys and better endowed highlands and plains.</p>	Generally can be sustainable if they have cash crops (beans, coffee, vegetables). Most are average in the Wealth Index
<p>* 5 Commercial farmers: (V +up - saa) Mainly in the valleys and better endowed parts of the highlands.</p>	Several harvests possible with irrigation & the opportunities for accumulation are good. Above average in WI and it is sustainable.
<p>* 6 Agro-pastoralists: (Lsaa - up) Cultivate crops but also keep livestock - Mainly in Mnazi,</p>	Potentially good, with oxen could open larger areas & grow cotton, castor etc.
<p>* 7 "Urban/Pre-urban livelihoods": Varies from full formal employ-ment to begging - Agriculture (with few exceptions e.g dairying) and direct food production are less important compared to the rural areas. Apart from Lushoto town, there are other centres like Soni, Bumbuli</p>	Non Farming Activities (NFA) are becoming more common. In Bumbuli & Soni more than 20% are engaged in NFAs, including being agents, transporters, traders, owner of dairy cattle, etc. Some of the richest households are in this category.

(Key:L=lowlands; H=highlands; Up=Uplands; AA=Arid Areas; V=valley SAA=Semi Arid Area. Lowercase implies less significant)

Source: Based on Mascarenhas (1998)

Box 5.1 above, summarizes the main features of the livelihood groups found in Lushoto.

Box 5.1 above, summarizes the main features of the livelihood groups found in Lushoto. The first column indicates the main livelihood groups and their dominance and current distribution in the various ecological areas. The importance of the lowlands for the hunters and gatherers, pastoralists and the subsistence farmers is well elaborated. Commercial smallholders implying that a substantial part of a food crop or specific groups are dominant in the valley. It is appropriate to note here that the majority of people in the urban areas are in a stage of transition away from natural resource dependence.

The second column gives the degree of vulnerability and levels of poverty of the different livelihood groups. The pastoralists are the most vulnerable not only because of the annual variations in water and pasture for their livestock but also because they have invested less in social development i.e. education, improved housing. This is coupled with very little intervention on the part of the government either in building the infrastructure or for taking a more conducive land management approach.

5.3. Measuring Poverty

To assess poverty levels it was first necessary to get the larger and more measurable picture. As a first step observations were made about the design, inner layout and construction material used for the house. Clearly a house built with purchased inputs could cost more than a simple structure built with natural resources. Heads of households were then asked about possession of various furniture items, clothes, and possession of agricultural tools. For each of the 22 items found in a household a score was given. The greater the score the richer the household - conversely those who scored 0 - 4 points were classified as destitute. "Poor" consisted of households scoring 5-9 points; average 10-16 points and above average +17 points.

Table 5.3 has been designed to give three levels of information. First it gives an overall picture of poverty levels for the whole district by combining the various ecological zones. Next it gives information about poverty levels in each of the four identified gradients of the Usambara and thirdly gives information which is specific to each village. Results from each of the two component villages gives more details about poverty at the household level.

In order to capture the poverty levels of female headed households and among the pastoralists, the last two rows of the Table 5.3 provide data which reveals the standing of

the two groups compared to the households of the whole district as well as specifically to the four main ecological areas.

5.3.1 The main findings using the Wealth Index (WI)

It can be observed from Table 5.3 that the single largest group constituting slightly over a third (34.5% of the hhs) are in the "average" category, followed by the "poor" who form about a third (31%) of the households. If we combine the "destitute" with the "poor" households the 51.1% form the majority of the sample. The "average" and "above average" group with a combined total of 48 percent are only slightly fewer than the poorer section of the households. On their own the "destitute" comprise about a fifth of the total households and the above average households constitute about a seventh of the total.

5.3.1.1 Comparison Between Highlands and Lowlands Using the WI The single largest group or the core group in all the ecological areas were the households classified as average in the Wealth Index (WI). The deviation from the standard of 34 percent for the whole sample was fairly well maintained in the uplands (36.1%) and even among the agriculturists in the plains (31.0%). However, if we take the commercial farmers in the valleys and the subsistence farmers and pastoralist found in Milingano there are substantial differences from the sample or district average. In the valley the group identified as average nearly amount to half of the sample (45.6%) but in the arid parts they make up for only 25% of the households. In this case the larger or core group are those categorized as poor.

The major deviation took place at the extremes. For instance if the households in all the highland villages (upland + valley) were compared with their counterparts in the lowlands, there were proportionally twice as many households which were regarded as "above average" in the mountains (15.7%) than in the plains (8.3%). When it came to the destitute households the proportions were reversed, compared to the 11.5% in the highlands the equivalent figure at 17.5% was larger in the lowlands.

5.3.1.2 Using the WI for Comparing Villages

For an improved analysis the data was also aggregated at the village level. At this level the data reveals major variations between villages even in the same as well as between other ecological areas

Table 5.3: Poverty Measured by the Wealth Index in Lushoto, 1996

Name of Village/ Ecological Area	Destitute 0 - 4 pts	Poor 5 - 9 pts	Average 10- 16pt	Above Average 17-23 pts	Total
All Villages	20.3	31.1	34.0	14.6	100
Bumbuli	11.1	33.3	39.0	16.6	100
Mbelei	20.0	26.6	33.4	20.0	100
Uplands	15.6	30.0	36.1	18.3	100
Lukozi	3.0	29.4	47.1	20.6	100
Mtae	11.8	38.2	44.1	5.9	100
Valley	7.4	33.8	45.6	13.2	100
Milingano Agri	25.0	45.8	25.0	4.2	100
Mnazi Agri	21.7	23.7	36.9	17.4	100
SemiArid Agric	23.2	35.0	31.0	10.8	100
Pastoralists	11.7	41.2	41.2	5.9	100
Female HHs	28.0	28.0	32.0	12.0	100

Source: Field Survey

The greatest contrast is provided by Milingano village where the "destitute" comprise 25% and the poor over 45% of the households. This extreme case is striking - when the two groups are combined they account for over 70% of the households in Milingano. In comparison none of the other villages attains a figure exceeding more than 47% for the two groups combined. Significantly the two villages are the counterpart village of Mnazi and Bumbuli in the highlands, where the poorer households constitute 45.4%, 46.6% respectively.

Even within the same ecological zone differences between villages can also be striking. For instance in the highlands there were almost twice as many "destitutes" in Mbelei as there were in Bumbuli; yet the proportion of the category "poor" was relatively larger in the latter compared to the former. Similarly in the lowlands the variations were there but taking a different pattern. In Mnazi nearly a fifth of the households were in the category "above average". Only 4.2 percent of the households were in this category in Milingano. (Table 5.3)

5.3.1.3 *Explanation of poverty beyond the environmental links*

It would appear that households in the mountains are generally better off than those in the lowlands. Indeed "Destitution" was more widespread in the plains than in the highlands. It is only at the disaggregated level that one is forced to conclude that poverty is not the only link with environment. The proof of this is that even in the same major ecological zone major differences can occur. This is best exemplified by Bumbuli and Mbelei in the uplands. With a destitution rate of nearly a fifth of the households in the latter, poverty here is comparable to the lowland areas. For instance, destitute households make up nearly a quarter of the households and Mnazi has slightly above a fifth. Bumbuli in contrast has 11 percent or about half as many destitutes.

To assist in the analysis two further disaggregation were made - one was based on female headed households and the other was based on one of the major livelihood groups - the pastoralists (last two rows of Table 5.3). Female-headed households have the largest proportion of destitute (28%) and in this case even exceed the ratio found in Milingano. If the poor are added to the destitute then more than 56% or the majority of the households can be regarded as being poor. Interestingly too there is a fairly large group of female headed households that are above average in the wealth ranking. Details of these various aspects are elaborated in a recent publications (Mascarenhas 2000)

Similarly, pastoralist - headed households are divided equally between "destitute" and "poor" on the one hand and "average" and "above" on the other. When compared to female headed households the figures for the poorer category are almost similar.

5.3.1.4 *Comparison with Sender and Smith*

In comparison to the Sender and Smith (1990) study where the highest score was 14, this study has included more items for analysis such as wheelbarrow, sewing machine, stove, hammer, table and mosquito net. This made the highest score in this study to be 23 points. While 39% of the households in the Sender and Smith study were considered as destitutes, in this study, even after making allowances for a larger score and making 4 the cut-off point for the very poor, it was found that destitutes formed only 19.5 percent of the sample.

5.3.2 *Explaining poverty differences in Lushoto District*

In this sub-section an attempt is made to explain the differences in poverty levels in Lushoto, based on additional empirical findings. Two group factors are analyzed: material factors with a critical focus on land and livestock and non material or five socially related variables.

5.3.2.1 *Material factors causing poverty differentials*

(a). **Land ownership by number of plots and size**

The land issues featured significantly among the respondents. This analysis covers issues of both ownership in terms of number of plots and the acreage of farms. Table 5.4a and Table 54b summarizes the results.

i) **Number of plots**

In a rural area land is everything - it gives one a larger identity of a clan or a tribe, a history; it gives one natural resources and specifically a secure place to grow food. Land is a critical factor because most of the people have for very long time depended on agriculture or livestock for their livelihood. Agriculture is a dominant activity and ownership of land is therefore a critical factor. In the highland good arable land is scarce not only because of subdivision of property between sons but also because of the nature of the terrain - steep slopes, outcrops, orientation of slope etc. Our concern is both the number of plots and the total acreage.

Out of 185 heads of households that were interviewed only 4% did not own any farming land. However almost an equal number of respondents (13%) of the sample owned between 4 and 5 plots and some even as many as 9 pieces of land.

Table 5.4a: Land Ownership by Number of Farms and Ecological Areas Lushoto

Respondents from	Plains	Arid and semi-arid	Highlands	Valley
No of Farms Owned	% of hhs	% of hhs	% of hhs	% of hhs
- 0	4.4	6.3	2.0	1.5
1	43.5	43.7	7.8	7.4
2-3	47.7	31.3	49.1	36.7
4-5	4.4	18.7	33.3	35.3
6-9	0	0.0	7.8	19.1
TOTAL	100	100	100	100

Source: Field Survey

In the highlands and valleys very few of the respondents could do with only one piece of land. The largest number 49.1% and 36.7% respectively owned two or three plots and about a third of them owned four to five plots ((See Table 5.4a). In complete contrast in the lowlands, six times as many or 43% own only one plot. There are several ecological and social reasons for this pattern. In the upland areas the high population density means the sub division of land into smaller plots through inheritance. The amplitude of relief is great and each gradient "niche" is suitable for a particular crop. For instance bananas can tolerate steep slopes but not vegetables which prefer flatter ground where water can be more easily controlled.

In both the lowland areas the situation is reversed - there is not a single household that owns more than 5 plots. Even though this is an anomaly it can be explained. A fifth of those in the semi arid areas own up to 5 plots because many of these heads of households are migrants from the uplands! It is partly custom but however small the plot of land in the uplands may be, it is too precious to simply abandon it.

ii) Plot Ownership by Ecological Areas and Size

An examination of overall ownership of land in terms of acreage, show two major anomalies which require a comment. First, given the pressure of population in the highlands one would have expected a much higher proportion to have no land. On the contrary only 2% were found to have no land. About 10.7% of the households mostly in the plains, and arid and semiarid areas did not own land (Table 5.4a). On the surface, land is relatively more abundant in the lowlands than in the highlands. A possible explanation why a relatively large number seem landless is that land is not always owned - it could be let or be jointly owned by the head of the household and his adult offsprings.

With regard to land acquisition, the process differed across the ecological areas. As has already been elaborated elsewhere there are more than a dozen ways of acquiring land (Mascarenhas and Madulu 1997). In the Highlands and Valley the acquisition was mainly through inheritance (39.2% and 33.8% respectively) while in the Plains inheritance and buying were dominant (34.8% for each process). In the arid and semi-arid areas free acquisition (and clearing) was dominant at 62.5% (Source: field survey).

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Table 5.4b: Size of Farms by Ecological Areas: Lushoto

Respondents from	Plains	Arid and semi-arid	Highlands	Valley
Size of fields in acres	%	%	%	%
0	5.8	6.2	2.0	1.5
<2	15.9	6.2	11.8	11.8
2-5	45.0	25.0	60.8	42.7
6-9	18.9	31.2	9.8	29.4
10-15	10.1	18.7	15.6	8.8
16+	4.3	12.7	00.0	5.8
TOTAL	100	100	100	100

Source: Field Work

Total Size of Holdings

The second anomaly is simply that from the perspective of total size of land ownership, there is little to separate the people from the highlands, the plains and valley. Most of the respondents were households were in the 2-5 acres category except in the arid and semiarid areas. However, along the columns the pattern is different. In the plains and arid areas there is a conspicuous absence of households owning more than six acres. This depicts that there is simply no easy way to acquire large tracts of land. On the other hand, in the Valley and in the Highlands, this category of land owners forms a greater percentage than those without land. In the Highlands it is more than three times, while in the Valley there are more than ten times as many households owning more than six acres than those without land.

There is a sharp contrast in the acreage of land owned in the Plains and the Highlands. The largest group, in the plains, highlands and valleys, are Households owning 2-5 acres. The respective figures are 45%, 60.8, and 42.7%. On the whole there is propensity for those in

the valleys and highlands to own a greater number of small farms. In the arid and semi-arid areas the plots could be very large.

(b) Livestock ownership by ecological areas

Livestock ownership is one of the critical factors of appreciating poverty. They are also major indicators of the different livelihood systems, reflect a method of coping with environments which are not too conducive for agriculture, represent a sign of "wealth" and also is a form of investment. The survey on poverty and environment focused on three dominant livestock types: dairy cattle^ traditional cattle and sheep and goats. The ownership patterns are shown in Table 5.5. The concentration of livestock also shows a distinct pattern.

Table 5.5: Livestock Ownership by Ecological Areas in Lushoto

Ecological Areas	Type of Livestock (Percentage of households owning)		
	Dairy Cattle	Traditional Cattle	Sheep/Goats
Mountain Areas	15.0	3.4	6.7
Valleys	85.0	7.5	16.8
Entire Highland	100	10.9	23.5
Semiarid plain	0.0	31.6	34.9
Arid Area	0.0	57.5	76.5
Entire Plains	0	89.1	100
TOTAL	100	100	100

Dairy cattle are exotic breeds which are about four times more expensive to purchase compared to traditional cattle. Households with dairy cattle are exclusively confined in the upland and none exist in the lowlands. Most dairy cattle owners reside in the valley - 85% of entire dairy stock, leaving the remaining 15% for the highlands. The presence of dairy cattle ownership has several implication. Only the relatively well off can afford to invest in exotic cattle and sustain the necessary inputs. One of the conditions of keeping dairy cattle is that they will be stall-fed. The labour demands are heavy. This also means that one has to ensure a steady supply of pasture and water. The exotic breed of dairy cattle produce

more milk than is required by a household and the surplus must be disposed within a day or so and this means that there must be clients who have the purchasing power. Keeping dairy cattle is a form of commercial investment.

In contrast to the dairy cattle which are exclusively found in the uplands - the distribution of traditional or range cattle are dominant in the lowlands which account for nearly 90% of the stock. The arid areas alone account for more than half of the traditional cattle. The entire highland area has only 10% of the traditional herd. The explanation for the low number of traditional livestock in the highlands is to be found not in ecology but due to the conservation efforts and restrictions imposed by the administrators. Measures taken by administrators included fines, confiscations and systematic destocking exercises especially during the British colonial period and irregularly since independence. One way of ensuring the safety of the traditional stock was to take them to the lowlands where they also met r pastoralists evicted from the Mkomazi Game Reserves and other places.

Traditional cattle form more of a social investment but even the pastoralists have started to get involved in commercial transaction especially during periods of stress. Their counterparts from the mountains who were forced for a much longer time to modify their livestock rearing practices are much more ready to have a more pragmatic attitude to cattle.

Ownership of sheep and goats is widespread. While most or nearly three quarters of the stock was in the lowland the largest concentration was in the arid areas where land was abundant. The uplands had almost one in four of the total number of sheep and goats.

5.3.3 Poverty-environment interactions

This section is divided into three parts and involves the separation of the rich from the poor and finding out how they are distributed in the gross environmental gradient. Both ownership of land and keeping of livestock are used as proxies for further examining the poverty environment interactions.

a) Separating the rich and the poor

In this subsection the interlinkages between poverty and the physical environment are explored. The environmental gradient is most dramatically obvious in the break between the highlands and the lowlands and only the two gross gradients will be considered. The two zones are - the Highlands (consisting of the uplands, ridges and valleys) and the Plains (lowlands but subdivided by the level of aridity). It will be noted that while the highland gradient is further divided by the physical aspects the lowland gradient is controlled by the climate and specifically rainfall. The various parameters of poverty

are similarly collapsed so that instead of four subdivisions of poverty/wealth, these are also reduced to the basic two: poor or rich.

The results are consolidated in Table 5.6 where the poor made up for 58.3% of the Households in the Plains while in the Highlands they formed only 45.6%. Another ratio is that in the highlands there are 8.8% more rich households than poor ones. In the plain: there are 12.3% more poor households than there are rich ones. These figures show that the poverty differentials between the highland and the plains is much more similar than has been assumed.

b) Livestock

In addition to the poverty differentials, there are two other contrasting attributes pertaining to ownership of livestock and to the size of land holdings which need comment. Concerning livestock in the Highlands more of the "Poor" (54.5%) keep livestock than the rich (44.2%). In the plains the situation is reversed, a much larger proportion of the rich households (55.8%) keep livestock than do the poor (44.2%). If a comparison is made of the rich households in the highlands and in the plains there are 10.3 percent more poor households in the highlands compared to the plains. Coincidentally, the same figure is arrived at but reversed when the rich are compared to the poor.

The whole issue of livestock has many complex aspects. Therefore in a separate exercise using data derived from the survey the information on livestock was elaborated (Mascarenhas 2000). Briefly it was found that dairy cattle were exclusively kept by the rich but the poorer people in the highlands kept only traditional cattle. On the other hand in the plains those who exclusively kept traditional cattle were among the poorest. Those who kept both traditional cattle and sheep and goats were among the richer households. The one important conclusion is that livestock rearing is becoming a specialized activity more influenced by economic and investment options rather than environmental issues. For instance, the rich diversify and keep dairy cattle in the mountains and the rich in the plains keep goats for sale. In both cases they represent good returns for investment.

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Table 5.6: The Relationship Between Environment and Poverty in Lushoto

Attributes	MAJOR ECOLOGICAL ZONES			
	Highlands		Plains	
1. Poverty level by Wealth Index				
Poor(%)	45.6		58.3	
Rich (%)	54.4		41.7	
Total %«	100		100	
2. Ownership of Livestock				
Poor	54.5		44.2	
Rich	45.5		55.8	
Total %«	100		100	
3. Size of plots	Poor	Rich	Poor	Rich
(In acres) Small	Percentage 24.3		Percentage 30.0	
<2	5		10.5	
Average 2 - 5	61.4	8.3	43.3	47.9
Large + 6	14.3	46.7	26.7	33.0
Total % »	100		100	
	•			

Source: Field Survey

Pastoralist keep cattle for many reasons - cultural, social and economic. It could also be argued that they too invest. Unfortunately however, pastoralists tend to take for granted that environment and natural resources are common good and the results can be tragic. Furthermore, economic investments dictates that investments must be disposed to derive the maximum rather simply accumulate and dispose them only under duress.

c) Size of Plots

The various sizes of land holdings have been collapsed into three categories, small, medium and large. In the highlands, where land is scarce, over 46% of the rich are owners of large holdings and the poor are concentrated (+80% of responses) on average or small holdings. The poor are almost five times more likely than the rich to own small plots. Even the 14.2 percent of the poor who own large tracts of land probably own the plots in the plains.

In the plains where in most places land is not scarce an altogether different pattern occurs. Both the rich and the poor are concentrated on average sized holdings - 46% and 43% respectively. In all three categories the rich have proportionately more land. In each class however, the differences are not large when compared to the highlands. For instance the poor in the lowlands are only three times more likely to own a small plot compared to the rich.

The issue of size of land holdings is somewhat distorted because both the poor and the rich can have access to land in the plains. However, in the highlands where land is scarce the rich have managed to accumulate land. In the plains, where for the present land is not scarce, mere ownership will not get one out of poverty, unless investments have been made in relation to its maximum use. There is reason to be optimistic in the plains - even using ploughs would open up more land and the surpluses could substantially increase returns of the average and the poor households. For the destitute purposeful interventions will have to be made.

5.3.4 Social or non-material factors causing poverty differentials

As pointed out in section 3.1 an important contribution to the assessment of poverty recognizes social or non material aspects (Chambers, 1985; Longhursts, 1986). This study attempted to test these poverty dimensions in Lushoto. Five different indicators were used: powerlessness, isolation, lack of opportunities, vulnerability and physical weakness. The results are depicted in Table 5.7.

If we tried to find the order of importance of the non material aspects which households perceive to be responsible for generally causing poverty in the Usambara, by giving the lowest score to the first problem, the following would be the objective result: powerlessness (6), physical weakness (8), and vulnerability (10) and "isolation" (16) and "lack of opportunities" (18). The figures in bracket are the scores with the first rank for the most important and five for the least significant. Factors which repeatedly got five points would be least important and score high. Generally the "lack of opportunities" closely followed by isolation hardly appeared as a problem and compared to other indicators were less conspicuous everywhere.

More than any of the other causes, powerlessness as a cause of poverty is pronounced in the valley (40%). In the plains, powerlessness (29%) is closely followed by "vulnerability"(28%). Households in the highlands ranked vulnerability (31.8%) followed by physical weakness (27.3%) as far greater problems than isolation (6.8%). Physical weakness is more linked with age in the highlands and more prevalent with disease and age in the lowlands.

Contrary to expectations compared to the highlands, "isolation" levels were more than twice as high in all the other ecological areas. The deviation can partly be explained by a sampling weakness (Bumbuli and Mbelei, although both the settlements are in the mountains they are well served by transport.). More important, with the exception of parts of the plains, Lushoto probably has the best road network of any district in the country. "Isolation" in the Usambara, barring a few areas, is an exception.

A combination of factors makes powerlessness most acute in the valley. For instance people are powerless to increase the amount of land that they can bring into cultivation, or to purchase. Again in the valley, male migration is so common that agricultural employment in the heavily populated areas becomes so competitive and low paying and yet there is very little that households can do about this problem.

Table 5.7: Social/Non-material Aspects of Poverty in Lushoto

	Disadvantages Experienced by Households (Percentage of households Stating)				
Ecological Areas	Power- lessness	Isolation	Lack of Opportunities	Vulnerability	Physical Weakness
Plains	29.0	18.0	9.2	28.3	21.7
Arid& Semi Arid	24.1	17.2	13.8	13.8	31.1
Valleys	40.0	15.0	0.0	20.0	25.0
Highlands	22.7	6.8	11.4	31.8	27.3

Source Field Work

Generally in the arid and semi-arid areas household problems are aggravated more by social disadvantages than simply by environmental factors. The social disadvantages have their origins in the lack of education, inability to seek for solutions, isolation and disease or a combination of these factors and this is responsible for poverty. The feeling of "powerlessness" among the pastoralist is increasing, probably due to their history and experience of fines, destocking and evictions. Their reliance on knowledge and experience to obtain resources (pasture and water) needed by their cattle increases their level of uncertainty. Furthermore, they are powerless not because of the environment but because of the difficulties to adjust to changing circumstances.

5.4 The *Environment per se* as a cause of poverty differentials

The influence of environment can be both positive and negative. The physical environment *per se* has different effects between places. For instance, reliability of rainfall and availability of irrigation water increases the number of days in which people can work, prevalence of diseases in particular areas e.g. malaria in lowlands, could drastically reduce working days and create major differences in activity levels. Periodic ill health especially at the onset of rains, when land preparation and planting and weeding have to be undertaken on a strict schedule increases the chances of poverty. An assessment of the influence of the major physical component of the environment or its proxy (eg agriculture) was obtained by analyzing responses from the four major ecological zones.

Four environmentally related parameters were analyzed: Land in terms of both quality and quantity (possibilities of expansion); climate included four aspects: temperature, predictability of rains, drought, floods and mud slides; "agriculture" was used as a proxy and referred mostly to the possibilities of growing both food and cash crops and affordability of agricultural inputs. The category of "others" included questions related to time it took to fetch water, or collect fire wood. The results of the analysis are summarized in a simple abridged form (Table 5.8). For those who responded to the question, the land aspect was critical in the highlands; climate displaced land in the arid and semi arid areas; agricultural concerns were dominant in the valley while "other" aspects also took prominence in the arid and semiarid areas.

Table 5.8: Physical Environment Factors Explaining Poverty Differentials in Lushoto

Ecological Areas	Disadvantages Experienced by Households (Percentage of hhs stating)				
	Land	Climate	Agriculture	Other	Not Stated
Plains	12.8	28.6	4.3	14.2	40.1*
Arid	25.0	43.8	6.2	12.5	12.5
Valleys	48.2	26.5	17.7	0.0	17.6
Highlands	47.1	29.5	8.8	0.0	14.6

Key: * Most respondents did not properly prioritize their responses and were relegated to the NS group.

Source: Field Work.

Relative to Table 5.7, in which "powerlessness" was the dominant factor in two out of the four ecological zones, in Table 5.8 it is interesting to note how most of the constraining "environmental factors" are area specific in their importance. For instance in the uplands "land" was regarded as a major constraint in both the highlands and the valley but in the lowlands climate was substituted as a major constraint.

5.4.1 Can anything be done About the Environment?

Following these results respondents were asked in the various zones whether the environmental problem in their area can be managed? In three zones, the Arid and the Semi arid plains and the Highlands, the responses were that something could be done to lessen the constraint imposed by the physical environment. The positive response rates in the above three zones were 62.5 %; 68.6% and 67.6 %, respectively (Table 5.9).

Table 5.9: Can Anything be Done About the Environmental Problems?

Response	Plains		Mountains	
	Pastoral	Agric.	Poor	Rich Valley
Whether they can do anything about the "environmental" problems				
Yes	62.5	68.6	67.6	23.5
No	31.3	27.1	29.4	61.8
NS	6.2	4.3	2.9	14.7

Source: Field Survey

The response from the Valley differed significantly. More than 61 percent thought that nothing could be done (Table 5.9). The probable explanation is that for the people in the valley nothing can be done because the dominant environmental element is availability of land and many do not perceive that anything can be done to increase land. It is worth examining how these challenges would be specifically met.

5.4.2 Identifying the Environmental Problems

To meet the environmental challenges the people must be able to identify the problems. To people in the rural areas environment is clearly perceived in relation to the quality of life, "production" and well being. Concern with the environment was also within the context of major societal changes that have occurred. The main environmental issues were clustered around five aspects: Land, climate, agriculture, population and "Others". Land had both a qualitative and quantitative aspect. Climate included four main aspects, drought (the predictability of rains), floods, mud slides and temperature. The agriculturally based issues were confined to whether it was possible to grow food crops, cash crops and the affordability of agricultural inputs. The category "others" had questions related to the time it took to collect water and fuelwood, forest fires, and in the "temperate nights of Usambara", concern about heat and warmth were included. Finally given the pressure of people on land, human population numbers was included as a factor to be considered.

Table 5.10: Environmental Issues Identified in the Ecological Zones

(Figures % of households)

Name of Village	Environmental Issues Pertaining To					
	Land	Climate	Agric.	Pop	Other	NS
Milingano Agricul'tist	12.5	50.0	8.3	-	-	
Mnazi Agricu'list	15.2	17.4	8.7	6.5	19.6	
All Plains Agricul'tists	12.8	28.6	4.3	4.3	14.2	35.8
Milingano Pastoralist		60.0	20.0			20.0
Mnazi Pastoralist	36.4	36.4	-	9.1	18.1	
All Pastoralists	25.0	43.8	6.2	-	12.5	6.2
Valley Bottom	38.2	26.5	17.7	2.9	-	-
Hill Tops	47.1	29.4	8.8	2.9	-	11.7

Source: Field Survey

Respondents were asked to rank the five clusters in the order in which they considered to be important. Table 5.10 indicates that overall in the plains, irrespective of the livelihood, climate was perceived as the most important environmental issue. Depending on their physical location there were differences between villages and at times these were major. For instance, the agriculturalists in Milingano regarded climate as the most important factor (50%) but in Mnazi it was not "climate" (= 17.6%), but the "other" cluster which was more important. Specifically it was fire and wild animals which were regarded as being critical. In this particular case people's response was strongly influenced by a major fire which threatened the very existence of the village, during the survey.

Pastoralists on the whole also regarded climate as a critical factor. In Mnazi, however, there is growing competition for land between the agriculturalists and the pastoralists and a sizable number regard the "land" issue rather than "climate" as a significant problem. Neither, the agriculturists nor the pastoralists regard population as a major problem.

In the mountain areas the land factor and agriculture dominated. Availability of arable land is a serious issue. Plots are tiny, very few have large holdings but wealthier individuals can buy small plots from less fortunate neighbours or business colleagues. Movement to the less attractive plains is one way to acquire property. This is increasingly happening around the foothills in the Uмба plains and elsewhere.

5.4.3 Meeting "Environmental" Challenges

A few people have begun or intend to meet the challenges imposed by environment and livelihood. The reactions are based on lessons from their own experience and expectation. (Table 5.11). Most people view solving the environmental problems in the context of improving their livelihood and consequently the quality of their life. Therefore few people gave tree-planting in itself top priority unless it led directly to raising their incomes or productivity of their land. Only then was there is better chance of this activity being successfully adopted.

Most responses except the pastoralist stated that agriculture had to be modernized and afforestation carried out. Among the pastoralist the most effective way to solve the environmental was the control of water, by building dams and protecting water sources. The widest range of responses was by the agriculturalist in the plains.

It would seem that in all categories in the highlands, hhs had few options to directly solve environmental problems. The anomaly of the very large numbers of the well to do in the valleys who felt that little could be done deserves a comment. It makes one wonder if the better off care less about the environment or do they realistically visualize their problems in a broader perspective? The latter position naturally reflects a group that is less dependent directly on natural resources use.

The responses tell us something else. There is no one specific "environmental problem" in Lushoto. The problems become specific only along the gradient. The environmental problems in the highlands have socio-economic solutions. Thus since the lack of land was the major environmental problem among many, the solution was to buy land. The more plots the better - but there was a limit to this approach. In practice other off-the-farm activities were pursued or people, mainly young men, simply migrated

5.4.4 Poverty Linkages Along the Main Environmental and Social Spheres

To get to a more manageable process of looking at poverty linkages the environmental parameters or spheres were reduced to the two basic ones: highland and lowlands. In addition four social groups were used as proxy social groups: the "commercial farmers" in the valley and "the self provisioning households" in the plains, the pastoralists who are tied

more to the environment and the female hhs who are found in all the physical environments.

Table 5.11: Solving Environmental Problems

Solving Environmental Problems Through (first priority)	Plains	Highland Poor	Highland Average	Valley	Pastoralist
1. Modern Farming	24.3	38.2	12.1	11.8	-
2. Afforestation	12.9	19.6	21.2	5.9	12.5
3. Construct Dam/ Protect Water Sources	11.4	-	6.0	.	18.8
4. Work Hard Together	5.7	2.9	-	2.9	-
5. Family Planning	4.3	-	-		-
6. Better Land Use	2.9	-	-		-
7. Grow Food & Cash Crops	1.4	-	-		-
8. Decrease Livestock	1.4	-	-		-
9. Hunt and Kill Vermin	1.4	-	15.2	-	6.3
10. Improve Social Services	2.8				6.3
11. Stop Cutting Trees	-	-	9.1	-	
12. Reduce Price of Animal Drugs	-	-	-	-	12.5
13. More pasture from MGR	-	-	-	-	12J
14. Others	-	5.8	-	2.9	-
15. None	31.4	29.4	36.4	76.0	37.3

Table 5.12: Poverty Along the Main Environmental and Social Sphere
(%ofHhs)

Main Social & Environmental Divide	Destitute 0-4	Poor 5-9	Average 10-16	Rich + 17
Highlands: Mainly commercial Farming	15.5*	30.0	36.2	18.3
Plains: Self Provisioning	23.4	34.8	33.1	8.7
Female HH	28.0	28.0*	32.0*	12.0
Pa stora lists	18.7	31.3	50.0	<i>m</i>
All Villagers	20.3	31.1	34.0	14.6

Source: Field Data, 1996

From Table 5.12 the following salient features emerge:

- **Destitutes:** More common in the plains than in the highland. The Female hhs form the single largest proportion of destitutes and this figure is almost twice as many as those for the commercial growers in the highland area.
- **Poor:** In nearly all the groups, except in the highlands, this category provides the largest number. The self provisioning group in the plains have the highest portion of the poor (34.0%) and this group is followed by the pastoralist.
- **Average:** With the exception of the pastoralist, most HHs are in this category account for about one third of the hhs.
- **Rich:** They are a minority everywhere. However, the largest share is to be found in the highlands (18.3%). The district norm is 14.6% and the negative deviation is the highest in the plains among the self provisioning

The overall situation for most of the households of Lushoto is disheartening and it is worth examining what can be expected in the future.

5.5 Why Delve in the Future?

Poverty, environmental degradation and livelihood are interlinked and have dynamic consequences. The analysis of these was done by separating the semi-arid plains from the arid where pastoralists prevailed. The highlands were subdivided into the "poor", "average" and "rich". The ambitions of each of the heads of the households to get out of poverty were enumerated and grouped into aspirations. (Table 5.13).

5.5.1 Future Ambitions of Heads of Households(HHs)

There were six main ambitions and aspirations expressed by heads of households. In order of importance the six main ambitions were: i) to own a modern house; ii) to have a business; iii) to practice modern agriculture; iv) to have a good life and income; v) to own more land and practice modern agriculture; and vi) to own dairy cattle or traditional cattle.

It will be noted that ownership of a modern house is only an indicator of wealth while the rest are mainly a means or strategies to get out of poverty. Table 5.13 summarizes these findings among the agriculturalists and pastoralists in the plains, and between households in rich, average and poor settlements in the highlands.

The dominance of agriculture and the importance of increasing incomes is clearly shown as a strategy of households to get out of poverty. Improving or modernizing agriculture is not regarded as increasing the land area or simply using tractors - note for instance how few people listed ownership of vehicles or tractors as their first priority. The linking of increased incomes and "good life" may well indicate a realization that out-of-farm employment is preferable to the drudgery of agricultural work. Involvement in "business" is also found across all environmental divides. A major strategy to get out of poverty is still ownership of livestock and dairy cattle. Both rank above "education" as an aspiration of heads of households. The very large number in the category "others" is a clear indication that there is no single way of getting out of poverty.

Table 5.13: Main Ambitions of Heads of Households (In Percentage)

Location/Area	Pins Agri N=70	Arid N=16	Hlds Poor N=34	Hlds Aver N=33	Rich Vale N=34	Aggregated N=187	
Ambitions							
1 Modem Hse	28.6	31.2	6.3	11.8	27.3	8.8	21.9
2 Income+GLF	21.4	-	-	-	-	26.5	14.9
3 Modern Agri	8.6	18.6	29.4	18.2	-	17.6	13.3
4 Business			20.6			17.6	8.5
5 Addland+MoA	7.1	6.3	11.8	-	-	8.8	8.2
6 Education							6.4
		-	-			14.7	
7 Dairy Cattle	4.3	25.0	11.8	-	12.1	-	3.7
8 Cattle					9.1		
9 Work Hard	-	-	-	-	-	-	1.6
10 Vehicle/Tract	4.3		-				
11 Educ. Children	2.9	„			-	3.0	1.6
12 Grinding Mill	2.9	-	8.8	5.2	-	-	1.6
13 Perm Husband	2.9						5
						3.0	
14 GoodHlth	1.4	6.3					
		6.3			12.1		57.4
16 Not Stated	8.5				3.0		5.3
TOTAL	100	100	100	100	100	100	100

5.5.1.1 The Low Ranking of Education

The low rank of "education" as a strategy for getting themselves out of poverty is a matter of concern and deserves deeper analysis. One can postulate that education is low among the priorities for the adult themselves, simply because it is too late for them to go to "school" and benefit from such a strategic approach. This explains why education becomes such a dominant aspiration for their children's future.

5.5.2 Poverty and the Future

In order to better understand the situational analysis and the position of poverty in future the first three priority ambitions of heads of households for each specific area were arranged in the order of importance. (Table 5.14).

There are two striking features; first is the persuasiveness of "agriculture" (in all its forms including raising of livestock, dairy cattle). In the entire spectrum of ambitions of the households heads it appears no less than 18 times. Secondly, is the distinct but similar pattern found in the semi arid areas and in the valleys (see column A and E. In both cases "increased incomes and a good life" are the main ambitions.

The priorities expressed by the households in the plains (Column A & B) and in the highlands (C, D & E) in addition to the social dimension, of a better life, also have an environmental link. This means that the altitudinal gradient is a very relevant parameter for analysis. Furthermore, it would appear that one environmental factor - drought/precipitation; delimits two distinct communities in the plains. In a social context, this is expressed by two differing livelihoods, pastoralists and mainly self - provisioning agriculturalists. Each system has its own respective pattern of bringing change in the future.

If in each of the five ecological areas, a maximum of three most selected responses were considered it is possible to construct a matrix (Table 5.14). Some of the "ambitions" had the same score and so both were selected in the same priority. The "ambitions" from the plains were distinct from the highlands and from each other. A closer scrutiny reveals that if the agricultural ambitions were left intact there are some common trends and some priorities are shared. The overall frequencies of ambitions is as follows:

* Involvement in Business	5
Poor Own more livestock	3
* Own dairy cattle	2
* Own more land + Modern Agriculture	2
* Modern Agriculture	2
* Increased Incomes + Good life	2

The ability of what the communities can do for themselves to implement these changes requires added research especially at a time of reforms in the economy which have an urban

5.5.2.1 Getting Out Of Poverty - The Business Dimensions

The answers to the follow-up question on how households could survive in an environment that could be hostile and where the emergence of dire poverty was always present was of particular interest. Most respondents, in five out of the six villages, singled out involvement in "business" as being one of the main options. It is found in all

localities and communities including among the pastoralists. On the surface this is a good sign. However, since the term does not generally mean the same thing in the five environmental areas that have been defined, it is worth noting the practical limitations of this term (see Box 5.1)

Table 5.14: Getting Out of Poverty in the Usambara

Plains		Highlands		
Semi Arid A	Arid B	Poor C	Average D	Rich E
1 More Income & Good Life	1 Own More Livestock	1 Modern Agriculture	1A Modern Agric. 1B Involve In Business	1 More Income & Good Life
2 Involve In Business	2 Involve In Business	2 Involve In Business	2 Own Dairy Cattle	2A Involve In Business 2B More Land + Modern Agric.
3A More Land & Modern Agric.	3 Others	3A Own More Land & Modern	3 Own More Livestock	3 Own More Dairy Cattle
3B Others		Agri 3B Own More Livestock		

Source: Field Survey

Business is both a simple and yet a complex activity. Involvement in business and its characteristics are governed by the aggregate economic and social situation of the local

localities and communities including among the pastoralists. On the surface this is a good sign. However, since the term does not generally mean the same thing in the five environmental areas that have been defined, it is worth noting the practical limitations of this term (see Box 5.1)

Table 5.14: Getting Out of Poverty in the Usambara

Plains		Highlands		
Semi Arid	Arid	Poor	Average	Rich
1 More Income & Good Life	1 Own More Livestock	1 Modern Agriculture	1A Modern Agric. IB Involve In Business	1 More Income & Good Life
2 Involve In Business	2 Involve In Business	2 Involve In Business	2 Own Dairy Cattle	2A Involve In Business 2B More Land + Modern Agric.
3A More Land & Modern Agric.	3 Others	3A Own More Land & Modern Agri	3 Own More Livestock	3 Own More Dairy Cattle
3B Others		3B Own More Livestock		

Source: Field Survey

Business is both a simple and yet a complex activity. Involvement in business and its characteristics are governed by the aggregate economic and social situation of the local

community. Business for instance can be very much an extension of the subsistence activity as is so well revealed during the weefctymarket days in the villages covered by the sample.

In the highlands this means, dozens of individual selling the same products in small quantities: 20 or so buns, a pan full of cooked cassava or sweet potatoes, 5 kgs or more of beans, tomatoes, a few bunches of traditional vegetables or fruits. The hundreds who are involved in this weekly business are there also for social and economic reasons, including the exchange of little surplus to get such essentials like oil, soap, salt, spices and even second hand clothes, but also to obtain seed and to exchange information.

The caution about the "business" route is that even if business so defined is a "duka" (a general store) the difference in the scale and dimension between the various communities is gigantic and is very unlikely to get households out of poverty. Not much attention has been paid to the pre-conditions for small businesses to succeed in rural areas. Real meaningful intervention will require more research.

BOX 5.1**The "Duka" Business**

MLINGANO: Part of a room of a homestead was converted to serve as a duka. The entire stock in the biggest shop was estimated to be worth less than 30,000 T Shs—a case of soft drinks, about 15 litres of kerosene, a few exercise books, pencils, sugar, salt, maize flour, cooking oil, about a kilo of sweets, twine, local knives, some trinkets. The full range of goods consists of about 20 items! Since the nearest bus stop is more than 30 kms away, every item has to be head-carried or bicycled or "lifted" by chance! The business is run essentially on a part-time basis. Around noon when the shop was visited a pre-teenager managed it.

MTAE: The owner who was in his late 30s, had tightly dedicated that part of the small plot adjacent to the road to construct a room 5m x 4m. There were something in the range of 150 items. It was dominated by consumer goods from Kenya, China, some items from Tanzania and even Lushoto itself. There were tubs of fats, tablets of bath soaps, packets and bars of local and imported washing soaps, pharmaceuticals—cough mixtures, common tablets, toothpaste, confectionery, strings of shop-packed groundnuts, and spices. For the children there were pens, pencils, erasers and exercise books. For the women, there were braids, lotions and spices. The owner went either to Mombasa, at least a couple of times a year, or to Tanga to purchase in bulk. The infrastructure consisted of several tall shelves, weighing scales, dip measures, plucking stick for items out of reach. The shop's entire stock of all commodities was worth nearly 500,000 Tshs. The value of the displayed fats—blue Band/Tanbond/Kimbo—was worth about 20,000 Tshs. The turnover per hour was probably equal to a whole week's worth of clients of his counterpart in Mlingano. Having a shop opposite the bus stop close to a primary school is an advantage large enough to have a bank account worth several hundred thousand shillings. From his duka, the owner could not only generate a surplus, he was already thinking in terms of investing in a pump—to have an irrigated field to grow ginger and groundnuts.

Source: Field Survey Data

VI. SUMMARY AND CONCLUSION

6.1. Summary

6.1.1 The Context

Two of the most important global issues today are pervasive poverty and problems related to environmental degradation, the causal factors of which are complex. In many ways poverty is both a major cause and effect of environmental problems. The linkages are not well understood especially in developing countries and in resolving these issues there might even be contradictions in policy.

This study tries to get a better picture of the environment-poverty linkages in one specific part of Tanzania. In the north east of the country, the Usambara Mountains close to the coast and the very large plains that surround it was an ideal site. The main environmental gradients - the highlands and the plains are well defined and also allow themselves to be subdivided. Within a relative short distance there are wide differences in terms of the physical setting, soil types, climate, river systems and forest cover. The highland/lowland interaction replicates itself many times in Tanzania. Lushoto also has a long and rich history in conservation efforts. In addition there have been past research efforts which focussed on poverty in the highlands but ignored the plains which form an integral part of the highland.

6.4 The Main Findings

6.2.1 The Status of Poverty in the Usambara

This research is a multi-dimensional approach on poverty. By using a wealth index it was possible to first of all have a good idea about the nature and distribution of poverty. As is conventionally assumed poverty in the highlands is not homogeneously distributed. The main findings of the research is that poverty is found in all the environmental gradients including in the plains, but its intensity varies greatly.

Across the sample of 185 households, the status of poverty was: the destitute (20.3%); poor (31.1%); average (34.0%) and rich (14.6%). In areas where commercial farming was practiced the rich were almost a fifth (18%) in contrast to the self provisioning where they were less than half the number (8 %). The extent of women headed households who are destitute (28 %) or who are poor (28 %) is unambiguously high. The proportion of the poor (34 %) in the self provisioning villages is also comparatively high.

6.2.2 Poverty & Natural Resources

Poverty was also defined in terms of access to natural resources, either through availability of land for agriculture or indirectly through the use of livestock. Both of these parameters have environmental implications. In many areas in the highlands there was an acute shortage of arable land and as a result of population densities in excess of 300 per skm households had to rely on several very small plots and more than a third owned 4-5 and nearly a fifth had 6-9 plots. Land was generally not a problem in the lowlands and more than 40% owned one plot and if those owning 2-3 plots were included it would account for over 90% of the households. In the arid areas, there are severe constraints to get well watered arable land and this is the domain of the pastoralist.

6.2.3 Poverty and the Non Material Factors

The third measure of poverty was the non material aspects - isolation, vulnerability, powerlessness, vulnerability, lack of options and physical weakness. The feeling of "powerlessness", but for different reasons was widespread. "Isolation" was less of a factor everywhere and yet the poverty of Milingano could be mainly traced to this factor.

6.2.4 Poverty and the Environment

The impact of the environment was generally indirect. Based on the perception of the hh heads, there was no single environmental factor that could explain their poverty. In the plains climate was the major constraint, in the highlands to name a few it was mainly land shortage, steep slopes and cold. Disease and their occurrence and spread was one of the major ways in which productivity and well being were affected. In the highlands where temperatures dropped below 18 C degrees malaria cases were only imported but in the plains it was endemic.

The majority, about two thirds of people, except for those in the valleys, believe that something can be done about the environmental constraints. Environment is not regarded in the abstract but have a whole range of physical and societal dimensions

6.2.5 Poverty and Livelihood

Poverty was also considered in the context of livelihoods mainly because while most people in the rural areas are dependent on natural resources, among the self provisioning communities their very survival critically depends on the unhampered availability of specific resources. Livelihoods therefore provide a good linkage between environment and poverty.

Within the context of livelihood, Lushoto is in a major transition. At the one extreme are the pastoralist and hunter gatherers at the other extreme are the commercial farmers in the valley and those residing in towns and other settlements who can be professionals or whose main activities are non farm based. The increasing pace of the commercialization

of agriculture in many parts of the highlands, but most concentrated in the valleys and the replacement in many places of traditional cattle with dairy cattle, has had a positive and multiplier impact. The prospects for the self provisioning is not very good - irrespective of whether it is in agriculture or pastoralism it is literally characterized by poverty in its widest sense.

6.2.6 The Societal Dimension

The societal dimension include all processes, actions and structures that are put in place to promote change. Poverty is fundamentally a societal phenomenon and environment can only influence but not determine its distribution nor its intensity. More than anything else, where communities continue to be heavily dependent on natural resources and to a large extent are self provisioning their vulnerability to be trapped in poverty is very much increased.

In a social sense where communities have invested in structures and processes that allow greater and more efficient use of natural resources it is more likely that poverty can be more readily checked. The fact that societal influence is great is well brought about by the very large numbers, proportionately, of female headed households who are in the destitute category.

6.3 The Future

Poverty in Lushoto district is caused by an interaction of social processes, physical/material aspects and the ecology. The people have adopted several survival techniques mainly based on some form of agriculture or natural resources use. Given the scarcity of resources, especially of arable land in the highlands there is now growing competition for land in the plains.

But change of strategies: expanding the types of crops grown, greater emphasis on crops for sale, paying attention to yields and returns and above all greater investments in education, housing, technology and exploiting opportunities have in places brought visible improvements. There is much more room for improvement through increased processing, diversification, credit, marketing etc

The pastoralists who fall outside the main stream of the administrative and social processes will be the main losers unless they formalize use of natural resources. Prospects for the agropastoralists in the plains are good even if for the moment they are deceptive. This will depend on infrastructure, better land use etc.

Many believe that to get out of poverty there will have to be an element of continuity. This is expressed in terms of their priorities: pastoralist wanting more cattle, people in the valley wanting more land etc. But there is a strong element that agriculture must be "modernized", that there is a "good life" outside agriculture. Across the gradient is the ambition to be involved in business. The caution is that unless these businesses (including "duka" (stalls or general stores)) are really viable, they will be substituting subsistence agriculture for subsistence business.

6.4. Conclusion / Policy Implication

The protection of the environment has received much attention in the highland of the Usambara but to reduce poverty they must be more directed towards the needs of the communities. Poverty could be remarkably reduced if change would be accelerated, if the links between people from the mountains and the plains; likewise provided that the connections between the Usambara and the outside world, become stronger

Since each ecological area had area-specific problems it is important to design area specific interventions in collaboration with the inhabitants of such areas. Such programmes must in spirit and substance be seen to be improving the livelihood of the people and making them less dependent on the vagaries of nature. Positive changes will increase if government intervention stresses on social spending in education, health and infrastructure.

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