Reversed Migration Trends in the Kondoa Eroded Area: Lessons for Future Conservation Activities in the Hado Project Areas, Tanzania

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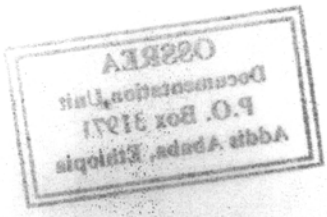

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REVERSED MIGRATION TRENDS IN THE KONDOA ERODED AREA: LESSONS FOR FUTURE CONSERVATION ACTIVITIES IN THE HADO PROJECT AREAS

Abstract: The HADO project was established in 1973 to deal with environmental conservation in Dodoma Region. The main objective of the project was conserving land and water and reclaiming the already depleted areas. During the early years of its existence, the project emphasised land conservation and afforestation programmes. In collaboration with the district administration, the project identified villages that were severely affected by land degradation in the form of gully and sheet erosion. Settlements located in such villages were resettled to other areas. This measure was taken to reduce the impact of population pressure and enable the process of environmental recovery. Similarly, the project destocked the whole Kondoa Irangi Highlands in 1979. Livestock were thought to be a major cause of land degradation and an obstacle to land conservation activities. The removal of human population and the eviction of livestock in the KEA were followed by amendments and enacting of new by-laws to take care of the settlement distribution, land use and environmental conservation issues in the Kondoa district.

Initial demographic studies in the HADO areas indicated strong linkages between migration and the HADO project activities. Migration trends tended to be unidirectional from the highlands to the lowlands. Such migration trends were linked to land scarcity and to the destocking exercise. Many families and individuals remained reluctant to part with their livestock.

The initial phase of people moving out of the HADO project areas is now over. Recent observations and reports demonstrate a reversal of migration pattern of both human and livestock populations from the lowland to the highland. In many cases, the land that was considered to *germinate stones* in the early 1970s is now *coming up*. The germination of stones during that time was actually an indication of severe sheet erosion. The coming up of land can be taken to mean the beginning of the process of environmental recovery in the protected areas.

Recent observations in the areas where the population was removed in the 1970s show a clear evidence of an active resettlement process taking place. New settlements have emerged and livestock are back in the restricted areas. Although there is no official evidence to support the return of people to the protected areas, physical visits to the area show an accelerated pace of return migration. These preliminary observations are contrary to the observations made in the 1980s that migration was from the highlands to the lowlands. These developments have rendered the process of environmental recovery obsolete and almost at a halt. Most of the environmental conservation by-laws that were effective in the 1970s and 1980s have been eased. This laiser-faire-fair type of control upon the district and project administration has created a loophole for people to return. The resettlement process that is occurring in the

protected areas has significant impacts on the environmental recovery achievements attained during the past 25 years. This study aimed at assessing and documenting these impacts.

The study has established that human activities in the new settlements are very detrimental to environmental conservation activities that existed there before. These activities include farming, house building, tree felling for fuel wood and farm expansion, and sporadic grazing of livestock. No close monitoring of how these activities are conducted was made. Similarly, none or just minimal legal measures are being taken on against the offenders of the district by-laws. Generally, the rate of environmental destruction has increased rapidly especially in the areas where reversed migration is a major issue. This generalisation can be extended to other areas located inside the KEA where notable evidences of environmental destruction can be cited. The study concludes that there is need to adopt a partnership management system, which involves all stakeholders in the protection of the environment in rehabilitated areas. This means adoption of a *bottom-up approach.* Environmental conservation activities cannot be successively achieved without community participation. Community participation will, to a larger extent, increase the rights and access of the local communities to the resources available in their surroundings. This encourages villagers to think of long-term effects and develop a sense of pride among the local communities.

1. BACKGROUND TO THE PROBLEM

The relationship between population and environment has drawn the attention of many scholars in recent decades. Often, population has been viewed as a major cause of environmental change and a hindrance to the attainment of sustainable development especially in developing countries. A rapidly growing population can create and accelerate population-resource imbalances, causing serious socio-economic and environmental consequences Most often population growth affects the natural environment and its various resources by increasing the demand for food, water, arable land, wood and other necessities from the natural resource pool (UNFPA 1991). Such linkages have made the topic of population/environment a permanent item on the agenda for various international, regional and national level gatherings as demonstrated by UNFPA (1991).

In 1987, the World Commission on Environment and Development challenged the international community and national governments to work towards a sustainable future*: one that will broaden, not contract, the choices future generations* will have to make. At its 1987 session, the United Nations General Assembly called for a balance between population and environment capacities to make sustainable development possible ... In December 1990, the General Assembly once again emphasised the importance of addressing the relationship between demographic pressures and unsustainable consumption patterns and environmental degradation

> during the preparatory process of the United Nations Conference on Environment and Development (UNFPA 1991, 3)

This global population/environmental concerns have also been reflected in various World Population conferences. For example, the 1974 World Population Conference held in Bucharest recognised the existence of a strong link between population and development and adopted specific resolutions for integrating demographic and development programs (UN 1975). The 1984 International Conference on Population in Mexico recommended that national and international development plans, programs and strategies should be formulated on the basis of an integrated approach that takes into account the interrelations between population, resources, environment and development (UN 1988). Agenda 21 of the 1992 United Nations Conference on Environment and Development (UNCED) presents the consensus of the international community on objectives and strategies for integrating environment and development. The 1994 International Conference on Population and Development (ICPD) held in Cairo builds upon Agenda 21 on the consideration of the linkages between population and environment (UN 1994). The task put forward here is to re-examine the population/resource imbalances; to correct inefficient and wasteful use of resources; and to seek optimal population growth and distribution patterns in an integrated and comprehensive move towards sustainability (UNFPA 1991). This task is difficult to achieve if population issues are ushered to the sidelines. It should be emphasised that population concerns are central to the search for sustainable development.

The HADO project is a regional land conservation project that was started in 1973 (Mbegu and Mulenge 1984). *HADO* is a short form of the Swahili words *"Hifadhi Ardhi Dodoma"*, which literally means, *"Conserve the Land of Dodoma Region"*. The major objective of the project was to conserve land and water and rehabilitate the already depleted areas. This was in response to failure of past land conservation measures implemented by the colonial administration and during the early years of independence.

During the initial years of the HADO project, most efforts were directed towards land conservation and afforestation. Both mechanical and manual methods were employed to construct contour ridges in the most affected areas. Another notable measure was to resettle the population from the severely degraded to less degraded areas. The HADO project, in collaboration with the district administration, identified villages that were seriously affected by land degradation in terms of gully and sheet erosion. All settlements from such areas were moved elsewhere (Mbegu and Mulenge 1984). Such villages included Kidongo Cheusi, Choka, Gubali, Ausia and Mondo (Aya and Elele sub-villages). This measure was taken to reduce the impact of population pressure and enable the process of environmental recovery. Recent observations in these areas show clear evidence of an active resettlement process taking place. New settlements have emerged and livestock are back in the restricted areas. These developments have rendered the process of environmental recovery obsolete and almost at a

halt. Further, most of the environmental conservation by-laws that were very effective in the 1970s and 1980s have been eased.

In 1979, a deliberate decision was made to remove all livestock from the Kondoa Eroded Area (KEA). Livestock were considered detrimental to the environment and a hindrance to the activities of the HADO project (Madulu 1996). The removal of human population and the eviction of livestock in the KEA were followed by amendments and enacting of new by-laws to take care of the settlement distribution, land use and environmental conservation issues in the district. In 1990, a by-law on environmental protection was enacted (HWK. 1990) and it was put into effect on 1st January 1991. Articles 7 (i) and 7 (iii) of the by-law are very relevant to this study. Both articles are quoted and translated in box 1 below. Most of the environmental conservation efforts that were effected by the HADO project were strengthened by these district by-laws. This led to most of the notable environmental recovery processes seen today. To what extent are these measures relevant today, was the question that this study aimed to instigate.

Box 1. Relevant articles from the district by-laws on environmental conservation

Article 7 (i):	Article 7 (iii):
"Hakuna mtu anayeruhusiwa kulima, kufuga, kuchunga, au kukata mti wa aina yoyote ile katika hifadhi na eneo lililozuiliwa bila ya kupata kibali kinachohusika kama ilivyo kifungu cha 5 na jedwali la pili na la tatu la Sheria ndogo hizi kutoka kwa Afisa Mwidhiniwa (HWK 1990, 3)".	"Hakuna ruhusa kwa mwanakijiji yeyote katika wilaya hii ya Kondoa kuhama katika eneo alilopewa na kijiji kuishi na kuhami katika eneo lingine (matongoni) bila kibali cha Afisa Mwidhiniwa (HWK 1990, 4)".
Translation:	***Translation:***
"No person is allowed to cultivate, keep or graze livestock, cut any type of tree or grass from the conserved/protected area without holding a written permit from an authorised Officer as stipulated in Article 5 and in Annex 2 and 3 of this By-laws".	*"No person in Kondoa District is allowed to move from an area allocated to him by the Village Council and live in another area (specifically areas where they lived before villagization) without a written permit from an authorised Officer".*

SOURCE: HWK (1990).

Initial demographic studies in the HADO areas aimed at documenting demographic changes and linkages between demographic characteristics and the environmental degradation (Madulu 1989; Madulu 1996; Madulu and Mung'ong'o 1990). Various observations have been made in relation to fertility, mortality and migration trends. The most notable observation was the existence of linkages between migration and the HADO project activities. Migration trends were found to be unidirectional from the highlands to the lowlands (Madulu and Mung'ong'o 1990; Madulu 1990). One notable consequence of the destocking exercise was an acceleration of migration from the KEA to other areas, especially to the Kondoa Irangi lowland. This population movement happened because many families and individuals remained reluctant to part with their livestock (Madulu 1990). Alternatively, families had to establish two homesteads, one in the highland KEA area (without livestock) and another in the lowlands (with livestock). This strategy was common in villages like Haubi, Hebi and Kolo in the highlands and Pahi, Mnenia, Busi and Bumbuta in the lowland (Madulu and Mung'ong'o 1990).

A much wider research programme named *"The Man-Land Interrelations in Semi-Arid Tanzania (MALISATA)"* was launched in 1991 to collect and analyse empirical data that will increase the understanding of the man-land interrelationships in semi-arid and sub-humid parts of Tanzania. Similarly, the programme aimed to encourage participatory research and assist in making the research findings implementable (Christiansson and Kikula 1996). With regards to demographic studies, the programme emphasized on fertility changes in relation to the activities of the HADO project (Madulu 1995, 1996; Christiansson and Kikula 1996).

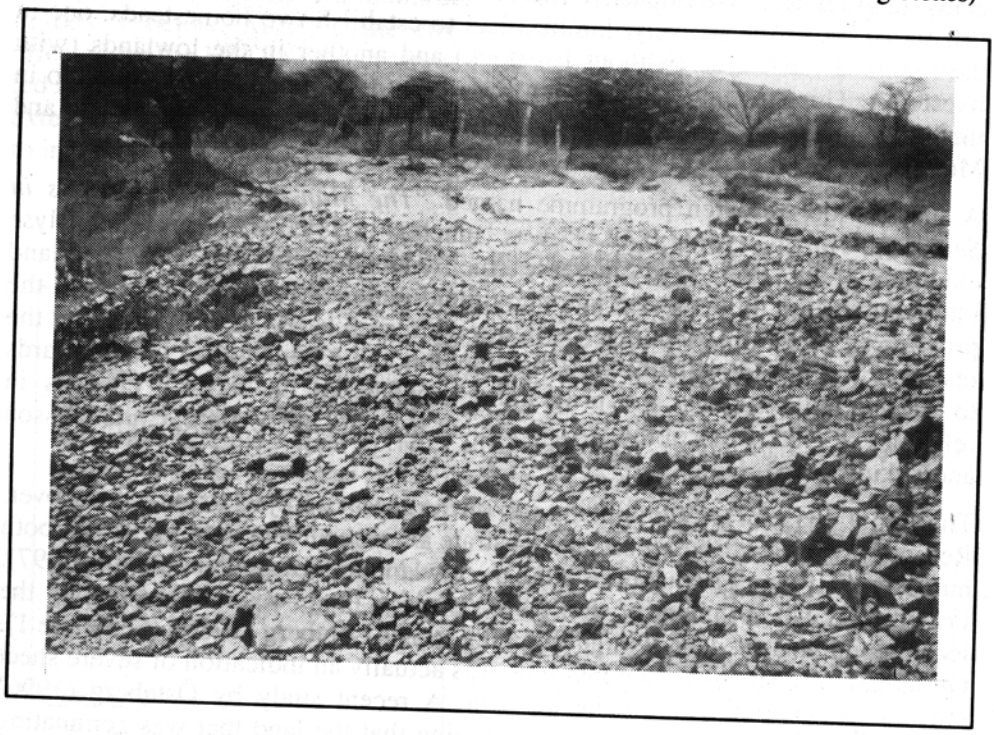
The initial phase of people moving out of the HADO project areas is now over. Recent observations and reports demonstrate a reversed migration pattern of both human and livestock populations from the lowland to the highland (Kikula 1997). Prior to the establishment of the HADO project, there was a belief among the local people that the land was germinating stones Österberg (1986)[i] (See Plate 1). Germination of stones during that time was actually an indication of severe sheet erosion, which removed all the top soil. A recent study by Österberg (1996) reports that the local people are now arguing that the land that was geminating stones in the 1970s has came back.

Although there is no official evidence to support the return of people to the protected areas, physical visits to the areas concerned show an accelerated pace of return migration. These preliminary observations are contrary to the observations made in 1987 that migration was unidirectional from the highlands to the lowlands (Madulu and Mung'ong'o 1990).

One possible cause of the accelerated reversed migration trend is the lack of political push and ineffective implementation strategies for the land conservation by-laws, especially from the district and HADO project administration during the 1990s[ii]. This lesser-fair type of control upon the district and HADO project

administration has created a favourable environment for people to return to the protected areas. This trend has a significant impact on the environmental recovery processes achieved during the past 25 years. Kikula (1997) echoed this concern in his *"back to office report"* after a field visit to Kondoa in early 1997. However, the immediate and long-term implications of this unexpected reversal of population migration to the land conservation activities are not yet documented. This study on *"Reversed Migration Trends in the Kondoa Eroded Area"* aimed at assessing these impacts and documenting them for the benefit of future conservation activities.

Plate 1. People's perception of severe sheet erosion in Ausia (Land Germinating Stones)



1.1 The Research Problem

The return of human and livestock populations to the severely degraded areas of Kondoa District (i.e. the KEA) is an undesirable situation, especially in relation to the environmental conservation efforts done by the HADO areas in the past two decades. To understand the environmental implications of the reversed migration, four research questions have been raised. First, has the land in the protected areas shown significant recovery to the extent of allowing people and livestock to return? Second, to what extent are the changes in migration trends affect the present and future conservation activities in the protected areas? Third, are there any localised demographic and socio-economic changes that are a

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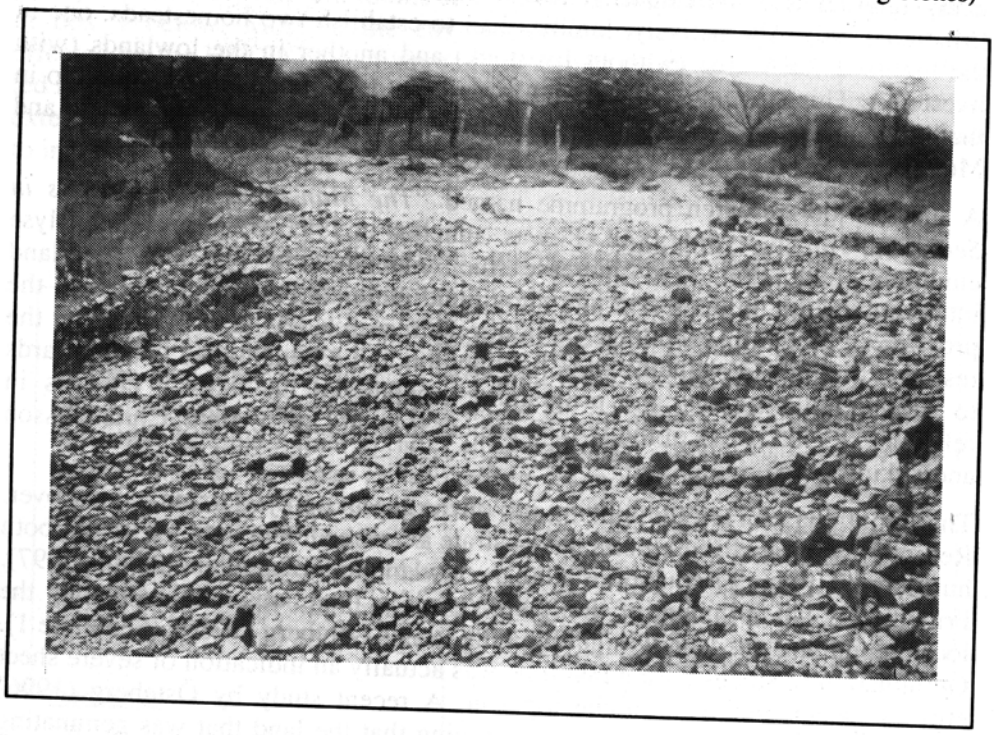

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function of the reversed migration pattern? Fourth, what lessons can be drawn from the recent changes occurring in the KEA? Are these lessons relevant to other environmentally affected areas or other environmental conservation projects in Tanzania? These research questions are vital and need to be answered in order to broaden the understanding of the population-environment linkages.

Plate 2. Deep gulies located in Kidongo Cheusi area in the Kondoa Irangi highlands

1.2 The Hypotheses

The proposed study is based on the assumption that the process of environmental recovery has been progressing well in the KEA and significant changes have occurred in all villages located in the HADO project areas. To examine the effects of the reversed migration trends, four hypotheses are put forward:

a) The return of people and livestock to the protected areas has no significant impacts on the environmental conservation successes attained by the HADO project in the past 25 years of work.

b) There is no change in the farming methods and livestock husbandry practised in the new settlements.

c) There is no linkage between land scarcity on the one hand, and reversed migration trends on the other.

d) Lack of community participation in the HADO project is not a major cause of population resentment to the project policies and activities, and hence, reversed migration.

1.3 Objectives of the Study

The main objective of this study was to assess the extent to which reversed migration trends affect environmental conservation activities in the HADO project areas. The study also aimed at accomplishing the following specific objectives:

a) To assess the rate of return migration during the past five years;

b) To examine the main factors influencing people to return to their old settlements;

c) To document the extent of unofficial reintroduction of livestock in the restricted areas;

d) To identify villages that are seriously affected by reversed migration.

e) To assess the notable demographic, socio-economic and environmental impacts of reversed migration in the affected villages within the HADO project areas;

f) To document lessons from recent changes occurring in the Kondoa Eroded Area for the betterment of future conservation activities.

1.4 Significance of the Study

This study has dwelled into the discussion of the main components of the PDE Model (i.e. Population, Development and Environment). The findings of this study are expected to extend the frontiers of knowledge about the relationship between these variables. The information gathered forms an important planning tools in developmental and environmental conservation projects. Moreover, the findings expose the changing nature of migration in the controlled areas of Kondoa District and highlight the impacts of reintroducing of livestock and settlements in the delicate ecosystems. Such observations provide lessons for future conservation activities both in the KEA and elsewhere in Tanzania. The study has suggested various amelioration measures that, if employed, will definitely reduce the possible consequences in population pressure in the affected areas. Lastly, but not least, this study can be taken as an evaluation exercise to the past and present land conservation approaches. An attempt has been made to examine changes in people's attitudes to environmental conservation in response to different government policies. The outcome of such an evaluation may possibly pave the way towards sustainable environmental conservation approaches.

2. REVIEW OF RELATED LITERATURE

2.1 Population and Natural Resource

The majority of the rural population in Tanzania is smallholder subsistence producers who largely depend on the natural resource exploitation for their survival. They mostly practice extensive farming systems that need sufficient arable land and enough pasture for livestock (Mbegu and Mlenge 1984). This is because; small-scale subsistence farming is largely extensive and labour intensive in nature (Madulu 1996). These qualities are environmental unfriendly because high demand for labour leads to high population growth and agricultural expansion leads to deforestation and land degradation. These impacts to the environment are demonstrated by Myers (1989), who argued that:

> There is hardly any agent more destructive of natural resources - notably soil cover, grasslands, and forests - than the subsistence cultivator who cannot produce enough to eat by cultivating traditional farmlands. ... This marginal person is inclined to seek his livelihood in marginal lands leading to widespread deforestation, soil erosion, and spread of deserts (Myers 1989, 47).

The livestock sector in Kondoa District is important in the peasant's socio-economic development. Livestock are valued as a source of protein, capital, investment, labour, prestige and respect (Madulu 1996). In most rural communities, pasturelands are communally owned and often there exists no formal control on grazing in the rangelands. In many villages, the livestock population exceeds the carrying capacity of the land leading to excessive overgrazing and serious environmental damage (Mbegu and Mlenge 1984). Experiences from the KEA demonstrate that deep gullies often develop along cattle tracks (Mbegu 1988). The increase in livestock populations in the already delicate ecosystems may intensify environmental damage processes (UN 1993).

2.2 Land Degradation and Conservation Initiatives in Kondoa District

Kondoa District, which is located in Dodoma Region in central Tanzania, is probably the most environmentally affected district in the country (Mbegu and Mulenge 1984). Nearly ten percent of the district area (about 1256 sq.km) is categorised as being severely degraded, and hence, is referred to as the "*Kondoa Eroded Area (KEA)*". Land degradation in Kondoa is a major problem that was documented as early as 1920s (Tanganyika 1931, 1936). Recent studies on the history of soil erosion in the Kondoa Irangi highlands indicate that accelerated soil erosion began no later than 900 years ago and are still continuing (Eriksson, 1998). The large scale *"Tsetse Flies Eradication Campaigns"* that started in 1927 marked the onset of population resettlement and extensive deforestation in Kondoa (Darkoh 1987; Madulu and Mung'ong'o 1990). Most of these campaigns were effected through large-scale forest clearing in order to open up new lands to accommodate the excess population from the highlands. The severity of land degradation in Kondoa District is demonstrated by the existence of deep gullies and serious sheet erosion (Plate 2 and 3).

Various efforts to fight land degradation in the Kondoa District have been made. During the 1940s and 1950s, anti-erosion measures consisted of forced reduction of livestock numbers, introduction of ridge cultivation, contour banking of the uncultivated land, rotational grazing, planting of sisal plants in contour ridges and in the gullies, as well as population resettlement (Mbegu and Mulenge 1984). Other efforts included the establishment of a Soil Conservation Committee in 1930 and the Irangi Development Scheme in 1948 to deal with land use and livestock matters. However, most of these measures met limited success, mainly because they were discriminative in nature and coercive in approach (Mbegu 1988, 1996). Legal coercion through the Native Court Ordinance of 1927 and 1928 were widely utilised.

The HADO project is the most recent land conservation measure administered in Dodoma Region in general and Kondoa District in particular. The main objectives of HADO, among others, are to protect land from degradation and to rehabilitate the already depleted soils (Mbegu and Mulenge 1984; Mbegu 1996). In order to meet its objectives, the project started by concentrating its activities on reclamation of land already destroyed by soil and gully erosion, raising and distribution of tree seedlings, and planting of demonstration woodlots and protection. The land reclamation methods used included the removal of livestock and people from non-agricultural areas. Other methods are the introducing zero grazing; construction of contour ridges and planting of vegetation (e.g. *Agave, Eucalyptus spp., Leucaena,* etc.) on these ridges; construction of the stone-check dams to control gully erosion; and planting of vegetation in the gully bottoms (Mbegu and Mlenge 1990). Through out the first twenty years of the project life span, the project staff carried out the protection of the project areas. This included protection of grazing, settlement, establishment of new agricultural farms, illegal tree cutting, bush fires and other activities that are considered not to be environmentally sound. The project staff (foresters and policemen) carried out frequent patrols and labourers under the supervision of the HADO staff did fireline clearing.

The HADO project registered a number of clear achievements. These include significant vegetation recovery, take off of the gully healing processes, rivers now follow more defined water courses, and availability of more arable land. Among the main activities of the project, the destocking of the KEA has drawn the attention of the public. Discussing the importance of destocking, Mbegu (1988) argued that:

> Whereas the recommended carrying capacity of the natural unimproved rangelands under 4,276 LU. (i.e., 43.2 LU. per sq. km). Thus much of the land is left bare and completely at the mercy of both water and wind erosion (Mbegu 1988, 8).

Given this situation, some 46,375 cattle, 28,840 goats and 10,666 sheep were removed in the KEA in 1979 (Mbegu and Mulenge 1984). The environmental consequence of total destocking includes the rapid recovery of vegetation cover

and initial healing processes in the gullies and sand rivers. These outcomes occurred because no livestock were allowed to graze in the destocked areas and tree cutting was prohibited (Madulu and Mung'ong'o, 1990). Economically, destocking allowed agricultural expansion because many of the former grazing areas were now open for cultivation (Mbegu 1988). The move also influenced changes of the basis for household economy from livestock dependence to pure subsistence crop cultivation (Madulu, 1989). Other achievements include the construction of more than 750,000 metres of contour ridges, adoption of tree planting practices, availability of building materials (e.g., poles, timber, thatching grass etc.), and easing of the fuel wood problem.

Plate 3. Severe sheet erosion in old Mondo area in the Kondoa Irangi highlands

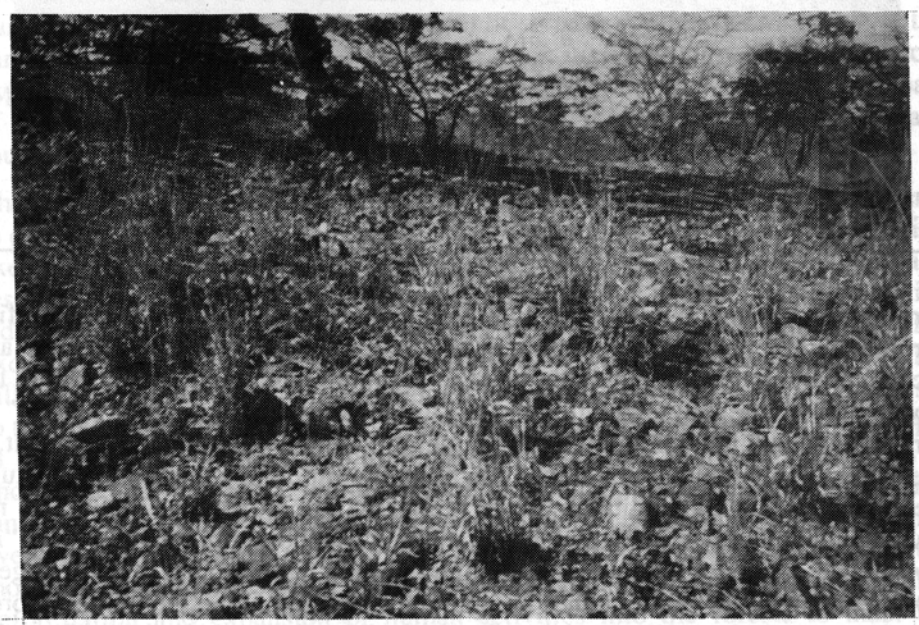

Plate 4. Evidence of past resettlement exercises in old Mondo

From the description and analysis of the project areas, the overall identified problem is related to the restriction of forest-dependent villagers' rights and access to forest products and other natural resources. Due to this restrictions, the local people have been penetrating into the rehabilitated areas as *"thieves"* in order to obtain their needs (such as fuel wood and pasture). As a result, a negative conception has developed among the local community that the natural resources in the rehabilitated areas belong to the government and are not available for people's direct or immediate use. This conception has led to a *"rat and cat relationship"* between the HADO project staff and the local villagers. Once the villagers get a chance to entering the forest, they harvest the forest products unwisely to the maximum level possible. Such a situation reflects the failure to consider the future utilisation of the forest resources and community involvement at the project planning stage. Moreover, little close collaboration between the project and other sectors/departments in the region/districts were established (Mbegu 1996). Generally, the technical approaches that the project followed since its inception in 1973 was of a *"top-down"* nature. This is reflected in the local people's resentments that have led to many court cases and fines. Such a situation brought tension and conflicts between the HADO staff and the local communities that the project is supposed to serve.

2.3 Population Growth and Settlement Patterns

Changes in population size and its characteristics have an important effect on settlement and land use patterns. High population growth triggers more resource depletion and, hence, more degradation. The food needs of a growing population can be met either through *intensification* of agricultural production on the land that is already cultivated or through expansion of cultivation (*extensification*) into new territories (Preston 1994). Both processes have ecological consequences that vary from one setting to another. Until the early 1970s, the principal means of expanding agricultural production in the Kondoa District was the expansion of cultivation into new lands, typically after the destruction of vegetation cover. As a result, soil erosion reduced the amount of land available for human and livestock use to a large extent. The consequence of such reduction is the concentration of human activities in a much reduced land area causing high population pressure on the land leading to high population densities.

The advent of the HADO project in the early 1970s helped to minimise the human impacts on the environment. In addition to the villagization policy of the early 1970s, the HADO project instituted regulations that limited people from expanding to the most delicate and severely devastated environments. The impact of these measures was demonstrated by the spatial distribution of homesteads (huts) especially in the KEA.

The formation of *"ujamaa villages"* concentrated the once scattered settlements in certain selected locations. Many environmental implication of the villagization exercise were observed. On the positive side, villagization helped to remove and resettle people from the severely degraded areas in the KEA. On the negative side, the exercise increased population pressure on land and accelerated excessive deforestation within and around the immediate surroundings of the villages. Moreover, the exercise stimulated spread of land degradation processes to the less affected areas (Madulu 1996). In addition, the concentration of people in villages caused concentration of resource extraction in specific localities in and around the villages. Overgrazing, excessive tree felling, farm expansion, and land use conflicts between livestock keeping and crop farming became common events in most villages. General observations from elsewhere indicate that the more densely parts of the land have less forest cover due to excessive deforestation and expansion of human activities into the forests to meet the increasing demands from population pressure (Preston 1994). The destruction of forests has several adverse consequences on the environment. These consequences include accelerated rates of soil erosion, scarcity of fuel wood, climatic change, and loss of bio-diversity. These effects vary in intensity from place to place depending on the consumption and production patterns of the population.

Before the destocking exercise of 1979, the human population was accompanied by concentration of livestock in most cases. As a result, areas of high population density like the KEA demonstrated the most devastated environments in the

district. It can, therefore, be generalised that the concentration of human and livestock populations into those areas led to extensive cultivation, overgrazing and deforestation, which are thought to be responsible for the existing environmental decay around many villages. This argument is justified by the fact that areas that have high concentration of settlements also show signs of severe degradation.

Various factors influence population growth in the KEA. These include land degradation, land scarcity and the removal of livestock from the degraded areas (Madulu and Mung'ong'o 1989). The impact of these factors was reflected through out-migration from the KEA to other areas and through transformation of people's mode of life in the destocked areas (Madulu 1990). Despite the negative effects of both mortality and out-migration, the population of Kondoa has continued to expand at a rate above 2% per annum. Madulu (1996) observed a total fertility rate (TFR) of 7 children per woman in the KEA. Such a high fertility level influences both growth and structure of the population.

Evidences from other areas indicate a close association between peasant agricultural systems and high fertility (Henin 1968, 1969; Simmons 1985). The culture of high fertility in peasant societies is often considered to be a function of high demand for labour generated by stagnant technology and low returns from market exchange (Kamuzora 1980). In many peasant communities, a large family is considered to be an asset that means more hoes (labour) and more grain (Malcom 1953). In other words, high fertility and large families in peasant societies are linked to power, wealth and increased agricultural production. These qualities exist in many areas including Kondoa District in general and the KEA in particular. According to Handwerker (1983), changes in lifestyles, consumption, agricultural technology, land reforms, culture and reduction of poverty may have immediate effects on both demographic and environmental spheres.

Increases in human populations and expansion of farms into grazing areas have stimulated land use conflicts in many areas of Tanzania. The case of the Barbaig in Hanang District (Kjærby 1980) and the Masai in Ngorongoro (Arhem 1981) and Bagamoyo (Mustafa 1988) districts are very illustrative. The influx of agro-pastoral tribes and the opening of large and small scale farms forced the pastoral Barbaig to squeeze themselves into the vastly reduced and drier areas causing overgrazing and severe soil erosion (UN 1993). Similarly, the conversion of large portions of the Masai pasture land into state ranches, wheat farms, bean-seed farms, or putting the land under national parks or military control, stimulated a southwards movements among the pastoral Masai to Coast, Morogoro, Iringa and Mbeya regions (UN 1993). Although migration or relocation of human and livestock seems to be an attractive measure, it has short-term positive effects. In the long run, such actions may initiate or accelerate environmental degradation processes in the new areas of destination (Madulu 1996).

In Tanzania, the National Population Policy (NPP) adopted in 1992, had the principal objective of reinforcing national development through developing

available resources in order to improve the quality of life of the people (URT 1992). Among the other policy goals, the issue of promoting sustainable relationship between population, resources and the environment is given high priority. The adoption of a NPP that recognises the linkages between population, environment and development, is a positive step towards sustainable development.

Various environmental and developmental projects, programs and policies aim at environmental protection and improving the socio-economic and living conditions of the people. Although such programs and projects are designed to stimulate changes in the environment and socio-economic conditions of the people, most of them have had impacts beyond the environment and development spheres to affect the lifestyle of the people and their demographic behaviour as well. Such tendencies have led to an increasing concern on the link between environmental factors and population. Given this complementary relationship between the human and natural resources, any discussion of resource management is incomplete if the demographic behaviours not closely examined. This issue formed the bases for this study.

3. LINKAGES BETWEEN POPULATION, ENVIRONMENT AND DEVELOPMENT

Various models have been developed to describe the linkages between population, environment and development. These include the IPAT and PDE models.

3.1 The IPAT Model

The IPAT model demonstrates the general relationships between (I)mpact on environment, (P)opulation, (A)ffluence and (T)echnology (UN 1993; UNFPA 1991; Ehrlich and Ehrlich, 1990). According to the Model, I = PAT where I is the Impact on the environment; P represents the Population (absolute size, growth rate, distribution); A reflects the Affluence (usually measured as GNP per capita); and T demonstrates the impact of Technology (amount of pollution per unit of GNP). Generally, the I=PAT formula mean that environmental Impact is a joint function of Population x Affluence x Technology (UN 1993). According to this model the people's lifestyle, incomes and social organisations usually determine consumption patterns. The technologies in use determine the extent to which human activities damage or sustain the environment and the amount of waste associated with any level of consumption (UNFPA 1991). Population determines how many persons there are and it acts as a multiplier that fixes the total impact.). These three factors, compound each other's impacts. In other words, for any given change in technology, any given level of consumption patterns, any level of poverty, the more people there are, the greater is the overall impact on the environment (UNFPA 1991). This equation yields insights of the impacts that population growth and distribution can have on the quality and quantity of critical natural resources.

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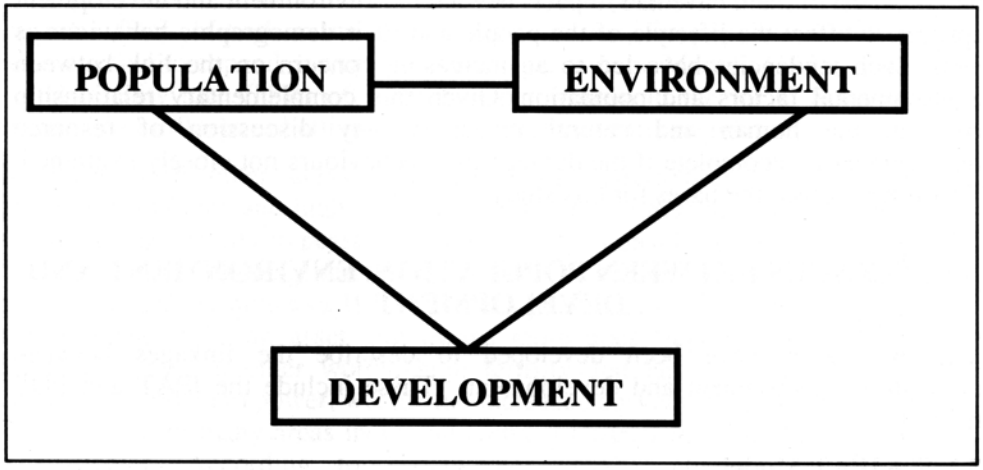
3.1 The PDE Model

This model demonstrates that there are strong linkages between population, development and the environment. Any change in one of these factors may necessarily influence changes in the other two factors. The study on reversed migration patterns in the Kondoa Eroded Areas (KEA) was based on the logic of the PDE Model that examine the linkages between population change (**P**), socio-economic development (**D**) and environmental factors (**E**). Figure 1 demonstrates these linkages.

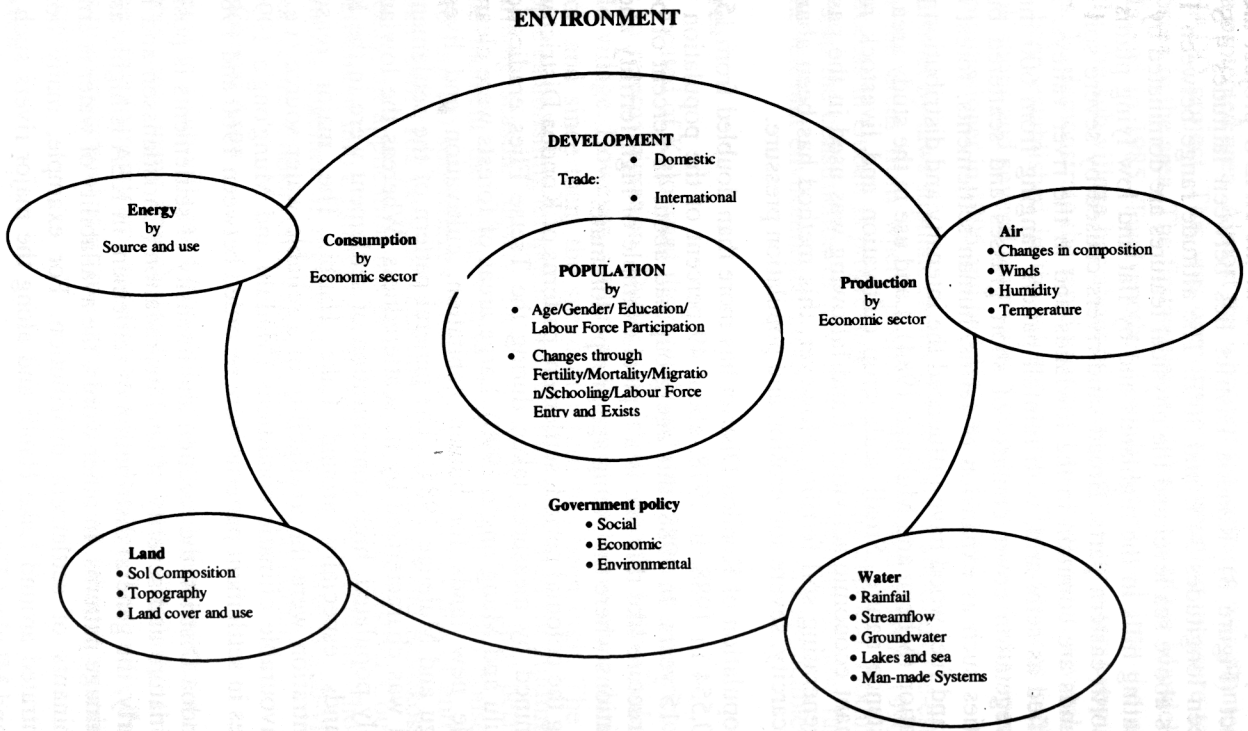
Figure 1. The population, development and environment model



The model aims at enhancing scientific understanding and demonstrating the long-term consequences of alternative policies on demographic, developmental and environmental spheres. It also gives a broad accounting framework that specifies the most important and immediate effects of one sector to another. These linkages are demonstrated in figure 2, which shows that population and development are entirely embedded in the environment.

In this study, (P)opulation was taken as the point of departure and considered to be the basic driving force that, together with other factors, influence (D)evelopment and the (E)nvironment. In this case, the reversed migration component and other demographic factors reflect the P factor. The (D)evelopment factor is reflected by the HADO project, which aims at transforming people's lives, their socio-economic status, and the status of the environment. The (E)nvironment factor reflects all environmental related impacts in the KEA. The linkages between these variables formed the ground for analysing the impacts of reversed migration on the environment and development in Kondoa District.

Figure 2. Basic Structure of the PDE Model



SOURCE: Wolfgang (1995).

4. THE STUDY AREA

The study reported here was conducted in the HADO project areas in Kondoa District (Figure 3). Kondoa District lies between latitudes 4°S and 5°S, and between longitudes 34°E and 36°E. The altitude range between 1000 and 2000 meters above sea level and the physical features are dominated by inselbergs and undulating hills in the highlands and by flat and low lying plains in the eastern and north-eastern parts. Broad sand-rivers caused by severe soil erosion in the highlands are common in the lowlands and in the river valleys. The climate is classified as semi-arid, with rainfall pattern ranging from 600 mm to 800 mm. The vegetation cover consists of short grasses and scattered bushes. Human activities such as expansion of farms, human settlements, forest clearing, bush fires, and fuel wood have influenced the intensity and distribution patterns of the vegetation (Mbegu and Mulenge 1984). Land use in the study area is typically of subsistence nature. Small scale crop cultivation and livestock rearing are the dominant economic activities. Land fallowing was used in the past as a method of regenerating soil fertility. However, this method has been abandoned due to land scarcity, severe soil erosion and population pressure.

The population of Kondoa District has more than doubled from 158,834 in 1957 to 340,554 in 1988. In 1978, about 49 percent of the population were children under 15 years. In 1988, this age group had about 48 percent of population. An age structure like this one is a typical example of high fertility and high growth populations where the young age groups dominate.

During the colonial period, settlement patterns of Kondoa District were primarily determined by measures taken during the Tsetse Flies eradication campaigns (Madulu and Mung'ong'o 1990). Large areas of forests were cleared in order to provide new lands for human habitation, cultivation and livestock grazing (Mbegu and Mulenge 1984). The general pattern of the settlements during that period was characterised by its scatteredness. Whereas the lowland areas were sparsely populated, high concentration of settlement were in the Kondoa Irangi Highlands especially around Lake Haubi. The major reasons for this concentration were the availability of a reliable water source (i.e. Lake Haubi) and favourable climatic conditions (Madulu and Mung'ong'o 1990). No major changes in settlement patterns were recorded between 1960 and 1987.

In Kondoa District, the location and intensity of settlements is positively related to the nature and severity of land degradation (Christiansson and Kikula 1996). Similarly, the general distribution of settlement in KEA is highly associated with the drainage patterns. In other words, the availability of water is among the basic determinants of settlement distribution. For example, many homesteads are concentrated around Lake Haubi and along the major rivers such as Mkondoa, Bubu and Mkuku (Figure 4).

4.1 Gubali Area

This sub-village is also located in Kolo village. It is a very recent settlement that developed in a protected area. Almost the whole of Gubali area was planted with trees by the HADO project. This was one of the conservation measure to fight severe soil erosion in the area. The first settler in Gubali was Mzee Mandela who came from Masawi in 1985. Twelve other households moved into the area in 1992. Currently, the sub-village has about 62 households with a total population of 296 persons. To demonstrate the rapid growth of the settlement, several social services have been established in the village centre. These services include a primary school, shops and several tea rooms. The primary school was opened by the District Commissioner in 1996 and had 100 pupils in 1998.

Although the district by-laws stipulate clearly that nobody is allowed to re-establish settlements in the areas from where people were removed (HWK 1990), the resettlement process in Gubali is progressing without being checked. Nothing has been done to stop the construction of new houses and opening of new farms in Gubali as if the relevant environmental protection by-law is not applicable to the area.

4.2 Choka Area

Choka is also located of Kolo ward. Its growth and expansion in a restricted area has been due to return migration. During the 1970s, people from Choka were moved to Kolo village. However, settlers in this area started to come during the 1988/89 season and since then, the speed of return has been high. The return started by people establishing temporary shelters that were used for guiding crops during the farming season. Slowly, these camps were turned into permanent houses. At the moment the villages have a total number of 186 households, distributed into four (4) sub-villages. These sub-villages are: Choka Centre (222 persons), Choka Asili (162 persons), Lusangi (144 persons) and Korokoso (142 persons). Already, an application has been submitted to the District Council to upgrade the settlement into a full registered village that will combine Choka and Gubali settlements together. If registered, the village will have 5 sub-villages, namely: Choka Centre, Choka Asili, Lusangi, Korokoso and Gubali.

4.3 Kidongo Cheusi Area

Kidongo Cheusi is a sub-village of Loo village. Although settlements were also removed in this area, many households have come back. Similarly, this sub-village has been an expansion area for the, main Loo village. The sub-village has established as primary school of its own and several kiosks (shops) are emerging at the village centre.

4.4 Mondo Area

The Mondo area covers the sub-villages of Old Mondo, Elele and Aya. All these sub-villages belong to Mondo village. The extent of reversed migration in these areas is worth noting because the resettlement process is occurring at the expense

of the past conservation measures. There is clear evidence of recent resettlement in Old Mondo and Aya. New houses are being built and many trees are being cut for building and fuel purposes. Old buildings located at the Old Mondo settlements are being rebuilt to enable new settlers to come (see Plates 4 and 5). The sizes of settlements are rapidly expanding even to the edges of the gullies. Almost everywhere, the expansion of settlements is accompanied by expansion of farms.

Plate 5. Current settlement process: Rebuilding of houses at Old Mondo

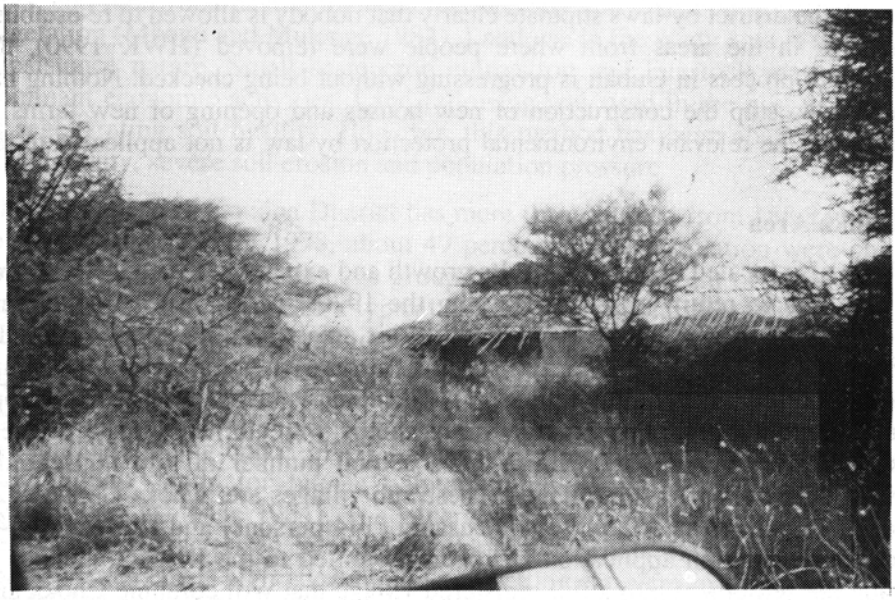


Figure 3. Location of the study area in Kondoa District

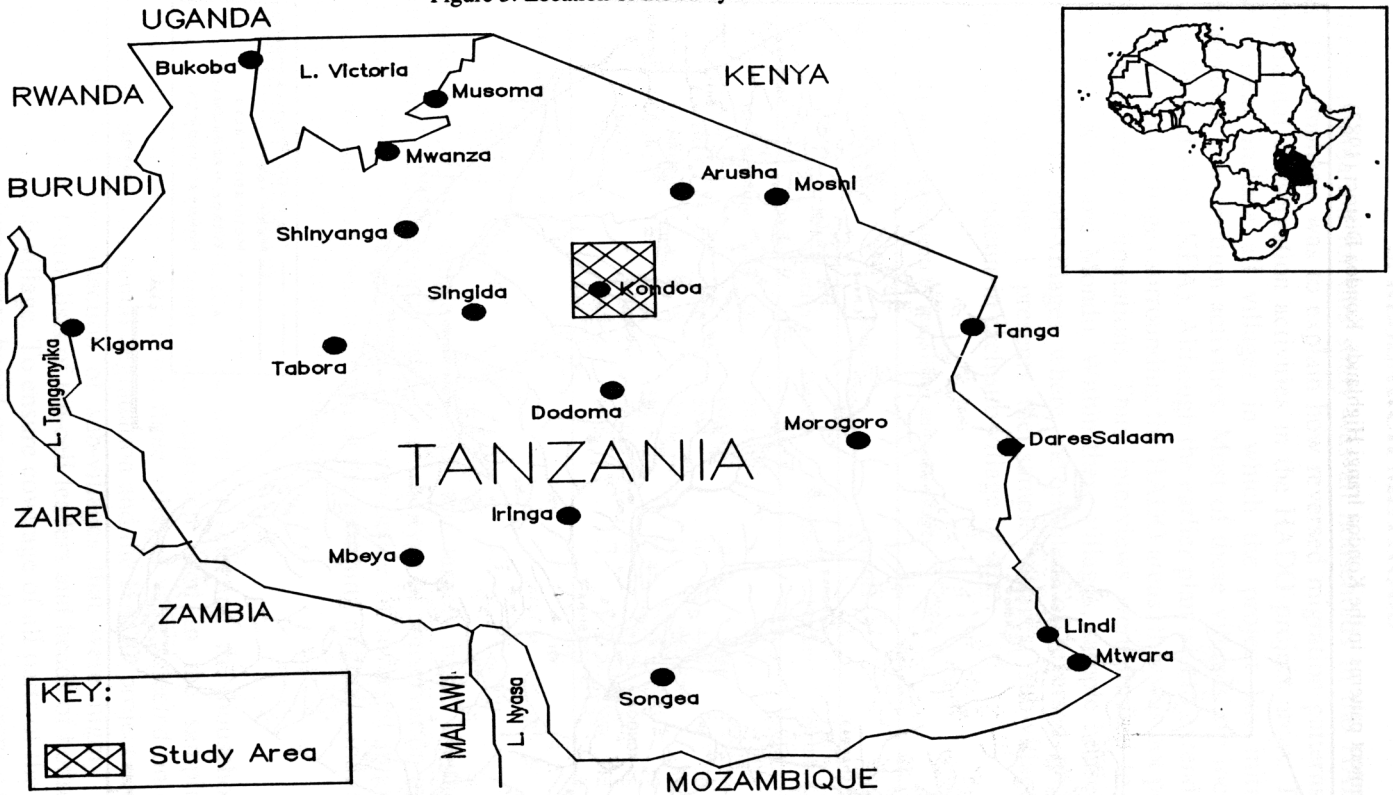
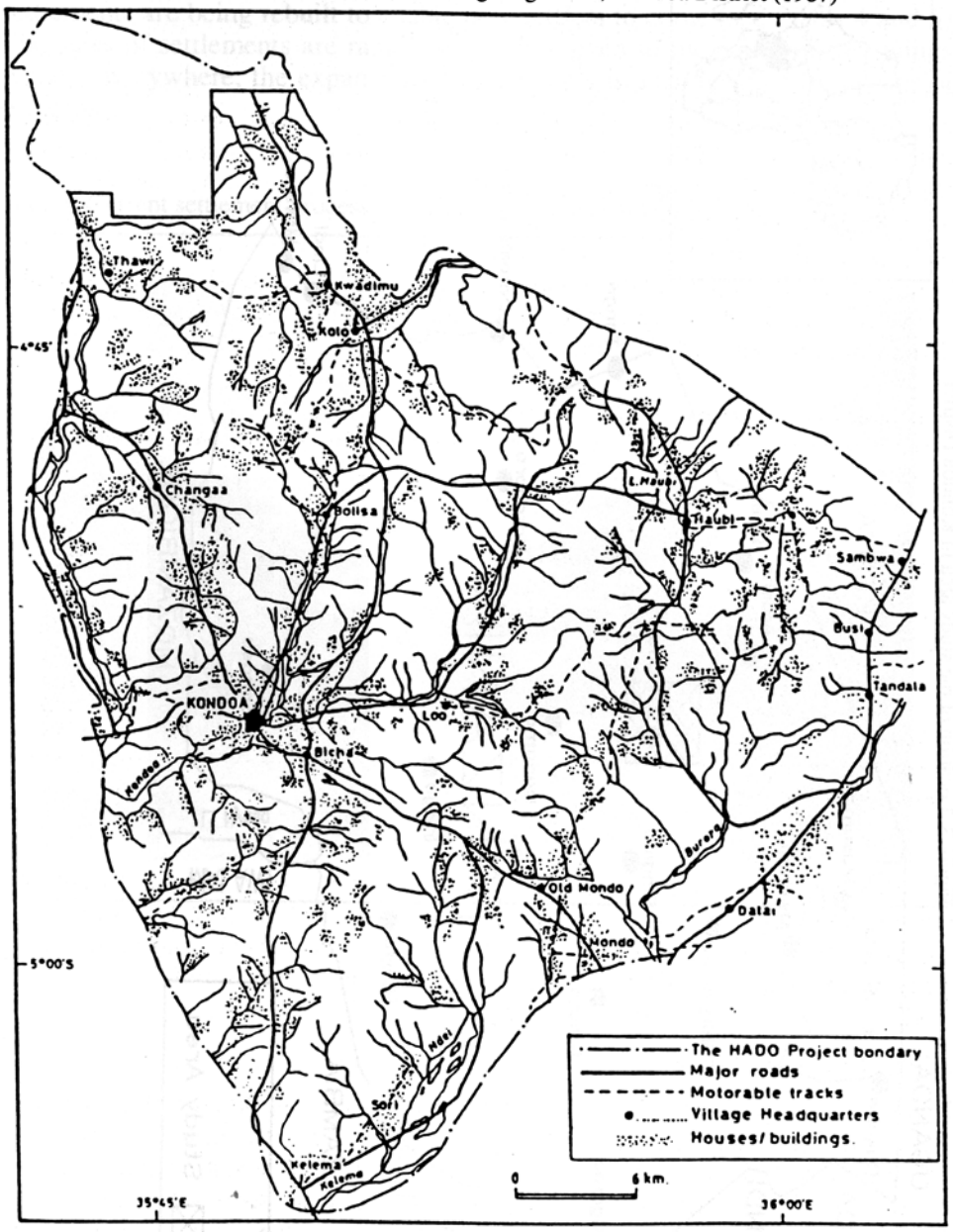


Figure 4. Settlement patterns in the Kondoa Irangi Highlands, Kondoa District (1987)



5. RESEARCH METHODS

The target population for this study was all households in the HADO project areas. The emphasis was to explain how reversed migration patterns affect the environmental conservation activities in the HADO project areas. The HADO project areas include all villages in which the project has initiated some environmental conservation activities. Most of these villages are located in the Kondoa Eroded Area (KEA). Although the earlier plan was to extend interviews to the peripheral villages surrounding the HADO areas, this was not possible due to time and financial limitations. Thus, interviews were limited to 3 villages, namely Loo, Kolo and Mondo. Within these villages, sample households were selected from six sub-villages where the problem of reversed migration had notable effects. Table 1 presents the sample villages, sub-villages and the distribution of respondents in each sub-village by sex.

Table 1. Distribution of respondents by sex, village and sub-villages

Villages	Sub-villages	Males		Females		Total	
		Number	Percent	Number	Percent	Number	Percent
Loo	K/ Chekundu	28	78.4	8	21.6	37	17.5
Mondo	Aya	30	100.0	0	0.0	30	14.2
	Elele	20	55.6	16	44.4	36	17.0
	Old Mondo	8	25.0	24	75.0	32	15.1
Kolo	Choka	24	61.5	15	38.5	39	18.4
	Gubali	30	78.9	8	21.1	38	17.9
Total		141	66.5	71	33.5	212	100.0

SOURCE: Survey Data (1998).

The selection of the sample sub-villages was largely based on the nature of environmental degradation in those areas, the type of conservation measures put into effect made in the past, and the prevalence of reversed migration. This approach was important because most of the returning migrants and livestock are actually concentrated in these sub-villages.

5.1 Sampling Procedures

Different sampling methods were used in selecting the households for the interviews. The multi-dimensional approach used in the sampling process involved the following steps. First, three villages were selected on the basis of the intensity of environmental degradation and the HADO project activities. The second step was the selection of sub-villages that were highly affected by reversed migration. Third, lists of ten-cell leaders and heads of households were compiled for each sub-village. To ensure coverage of all parts of the sub-village, the selection procedures were based on each ten-cell leader from which sample households were randomly selected. This purposeful selection was intended to

minimise bias and allow comparison of observations on the basis of population pressure and environmental stress. In each sample village, at least one tenth of the households were randomly selected for interviews.

5.2 Data Collection Procedures

Data was collected for a period of 3 weeks in August 1998. Emphasis was put on establishing the extent of reversed migration trends and their impacts on environmental conservation activities in the sample villages. Similarly, efforts were made to document the important lessons that can be useful for the future progress of the HADO project and in planning other related projects elsewhere. Quantitative data was gathered through structured questionnaire, which was administered to 212 villagers. This instrument was administered to family members, preferably the heads of the household or wife. It was used to capture general information of the households, socio-economic conditions, demographic characteristics and migratory history of the household members. The age distribution of the respondents in each sub-village is shown in table 2.

Table 2. Distribution of respondents by age and sub-village

Age Groups		Respondents in each Sub-village						Total	
		K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	Number
20-24		5.4	-	20.0	-	2.6	5.3	3.3	7
25-29		-	-	11.1	-	-	-	1.9	4
30-34		5.4	30.0	5.6	25.0	12.8	28.9	17.5	37
35-39		5.4	50.0	-	-	2.6	13.2	9.9	21
40-44		8.1	20.0	19.4	-	15.4	13.2	12.3	26
45-49		5.4	-	5.6	-	12.8	13.2	7.1	15
50-54		18.9	-	19.4	-	2.6	15.8	7.5	16
55-59		16.2	-	5.6	25.0	-	-	8.0	17
60-64		16.2	-	11.1	-	10.3	2.6	7.1	15
65+		35.1	-	16.7	50.0	41.0	7.9	25.5	54
Total	Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
	Number	37	30	36	32	39	38		212
	Mean Age	57.4	36.2	48.5	55.8	57.1	42.0		49.9

SOURCE: Survey Data (1998).

As it is observed from the table, the age of the respondents ranged between 20-24 and 65+ years. The majority of the respondents were, however, concentrated between age 30-34 and 45-49. Variations existed between sub-villages, mainly due to availability of the respondents at home during the interviews.

In addition to the actual structured interviews in the sub-villages, unstructured interviews and discussions were made with the district and ward level leaders. These interviews were vital in establishing and understanding the district position

with regard to reversed migration in the protected areas. A checklist was prepared to ensure collection of uniform information from all the key informants in the study area. Discussions were held with key informants in order to capture historical migration trends and the impact of population pressure on the environment in general and natural resource exploitation in particular. Lastly, qualitative information such as the socio-economic activities and cultural attitudes towards resource use were gathered through direct observations, historical tales and from historical documents.

5.3 Data Analysis

The data were coded, entered in computer, processed and edited by using a SPSS computer software. Frequency tables and cross-tabulation of variables were performed. The observations from quantitative data were supplemented with secondary information and qualitative data. The later was used to provide background information by describing the social, cultural, economic and environmental conditions and the implications of reversed migration in the sub-villages and families.

6. PRESENTATION AND DISCUSSION OF RESEARCH FINDINGS

6.1 The Resettlement Process in the Protected Areas

Between 1974 and 1976, the government in collaboration with the district administration and the HADO project, made a decision to resettle the population from the severely degraded areas to the less degraded ones (Mbegu 1988, 1996). This exercise was commonly referred to as "Operesheni Vijiji (Villagization)". The resettlement exercise affected areas like Aya, Eelele, Old Mondo Choka, Gubali; and Kidongo Cheusi. This exercise was followed by the destocking of the whole KEA in 1979. The first phase of the HADO project put emphasis on rehabilitation of the non-agricultural areas that were already severely degraded with special emphasis put in the areas where people were removed after the villagization exercise. The major activities that were done to reclaim the land included construction of contour ridges, tree planting, planting of elephant grasses in the sand rivers and sisal hedges on the contour ridges (Mbegu and Mlenge 1984). In recent years, a rapid resettlement process has been taking place in many of the areas that were left uninhabited after the villagization and destocking exercises. In most cases, the resettlement process is occuring at the expense of all the environmental conservation efforts that were achieved during the past twenty five years. The demographic characteristics of the new settlements are discussed in the following section.

6.2 Demographic Characteristics

The demographic characteristics of the new settlements indicate a rapidly growing population. The total population of the 212 households visited was 981 people. The age distribution of this population is presented in table 3.

Table 3. Total population in the sample households by age and sub-villages

Age groups	People in all sample households						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	N0.
0-4	12.2	15.7	10.0	-	11.9	21.6	12.6	124
5-9	12.2	13.0	12.9	-	23.7	25.0	15.3	150
10-14	17.4	13.5	14.4	-	3.7	8.5	11.4	112
15-19	7.6	18.9	13.4	7.7	3.7	4.5	8.4	82
20-24	6.4	11.9	11.4	23.1	8.9	4.5	9.5	95
25-29	4.7	3.8	8.5	23.1	4.4	2.3	6.9	68
30-34	4.1	11.9	5.0	-	5.9	11.4	8.1	79
35-39	4.7	8.1	5.0	-	3.0	5.7	4.8	47
40-44	2.9	3.2	5.5	-	6.7	4.0	4.1	40
45-49	5.2	-	1.0	-	3.7	5.1	2.5	25
50-54	4.7	-	3.5	7.7	3.7	2.8	3.4	33
55-59	5.2	-	1.0	7.7	-	1.7	2.2	22
60-64	3.5	-	3.0	-	3.0	0.6	1.7	17
65+	9.3	-	5.5	30.8	17.8	2.3	8.9	87
Total	Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Population	172	185	201	112	135	176	981
	Households	37	30	36	32	39	38	212

SOURCE: Survey Data (1998).

As it has been demonstrated in the table, people in the young age groups dominate the population in the study area. In almost all sub-villages, over 40% of the populations comprised of children under 15 years of age. A high concentration of the population in the young age groups is a characteristic of high fertility populations.

Given the total population available from the sample households in each sub-village, the average household size for the sample was 4.6 people per household. However, the mean size of households was much higher in Aya (6.2) and Elele (5.6) and the lowest in Old Mondo (3.5) and Choka (3.5). Table 4 shows the distribution of households by sex.

Over half of the households have 4-6 persons. This may reflect both high fertility and a strong extended family culture in the study area. These features reflect a remarkable implication to resource exploitation in the new settlements because of the built-in growth momentum of the population.

Table 4. Household size by sub-villages

Sub-villages	Household Size (Percentage of total households)				Total		Mean size
	1-3	4-6	7-9	10+	Percent	No.	
Kidongo Cheusi	32.4	48.6	13.5	5.4	100.0	37	4.6
Aya	-	56.7	43.3	-	100.0	30	6.2
Elele	19.4	38.9	41.7	-	100.0	36	5.6
Old Mondo	25.0	75.0	-	-	100.0	32	3.5
Choka	51.3	43.0	5.1	-	100.0	39	3.5
Gubali	15.0	76.3	5.3	2.6	100.0	38	4.6
Total (Percent)	25.0	56.1	17.5	1.4	100.0		
Total (Number)	53	119	37	3		212	4.6

SOURCE: Survey Data (1998).

6.3. Migration Patterns

Notable human and livestock population movements occurred during the early 1970s. Most of the movements were initiated by the villagization exercise and, to a certain extent, by the activities of the HADO project. The respondents were asked to indicate the villages where they went after the resettlement in the 1970s. Table 5 summarises the observations from the data on movements of population in the KEA area.

Table 5. Distribution of respondents by previous destination after the 1970's re-settlement.

Sub-villages	Proportion of all people born					Total	
	Not stated	Other sub-villages	Other villages	Other district	Other region	Percent	Number
Kidongo Cheusi	32.4	59.5	2.7	5.4	-	100.0	172
Aya	-	100.0	-	-	-	100.0	185
Elele	-	88.9	11.1	-	-	100.0	201
Old Mondo	-	100.0	-	-	-	100.0	112
Choka	15.4	69.2	15.6	-	-	100.0	135
Gubali	-	15.8	71.1	7.9	5.3	100.0	176
Total (Percent)	8.5	69.2	17.9	2.4	0.9	100.0	
Total (Number)	18	149	38	5	2		212

SOURCE: Survey Data (1998).

Table 4. Household size by sub-villages

Sub-villages	Household Size (Percentage of total households)				Total		Mean size
	1-3	4-6	7-9	10+	Percent	No.	
Kidongo Cheusi	32.4	48.6	13.5	5.4	100.0	37	4.6
Aya	-	56.7	43.3	-	100.0	30	6.2
Elele	19.4	38.9	41.7	-	100.0	36	5.6
Old Mondo	25.0	75.0	-	-	100.0	32	3.5
Choka	51.3	43.0	5.1	-	100.0	39	3.5
Gubali	15.0	76.3	5.3	2.6	100.0	38	4.6
Total (Percent)	25.0	56.1	17.5	1.4	100.0		
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Elele	-	88.9	11.1	-	-	100.0	201
Old Mondo	-	100.0	-	-	-	100.0	112
Choka	15.4	69.2	15.6	-	-	100.0	135
Gubali	-	15.8	71.1	7.9	5.3	100.0	176
Total (Percent)	8.5	69.2	17.9	2.4	0.9	100.0	
Total (Number)	18	149	38	5	2		212

SOURCE: Survey Data (1998).

The data clearly shows that most of the people moved from one sub-village to another within the same villages. This category of movement comprised 69% of the respondents. The next big group moved from one village to another (18%) but within the same district. Negligible proportions of the households moved either to other districts in Dodoma region (2%) or to other region (1%). These observations suggest that the households that are moving back to the protected areas come from within the same villages around these locations. This argument is justified by examining the place of birth of all persons living in the sample households as demonstrated in table 6.

Table 6. Place of birth of all persons living in the sample households

Sub-villages	All people born		All people living in sample households	
	In the village	In other villages	Percent	Number
Kidongo Cheusi	74.4	25.6	100.0	172
Aya	83.8	16.2	100.0	185
Elele	78.6	21.4	100.0	201
Old Mondo	71.4	28.6	100.0	112
Choka	84.4	15.6	100.0	135
Gubali	30.1	69.9	100.0	176
Total Percent	72.3	27.7	100.0	
Number	709	272		981

SOURCE: Survey Data (1998).

The data shows that 72% of all persons living in the sample households were born within the same villages they are currently residing. Only 28% were born in other villages. Similar observations were found at the sub-village level with the exception of Gubali where only 30% were born in the village (same location). This observation may be a reflection of earlier land conservation measures taken during the colonial times and during the early years of independence (Tanganyika, 1931, 1936). The observations on place of birth tally with that of past residence before coming to the present location as described in table 7.

Even in this case, about half of the residents (51%) lived in other sub-villages within the same villages and another 47% lived in other villages within the same district. These observations demonstrate a dominance of short distance migration from one sub-village or one village to another. Population movements from either other districts of Dodoma region or from other regions are negligible in the case of Kondoa District. This observation may be influenced by the problems of land for agriculture and pasture availability for the livestock. These problems existed for a long time.

Table 7. Previous residents before coming to current settlement

Sub-villages	Proportion of all people born				All residents	
	Within village	Other villages	Other district	Other region	Percent	Number
Kidongo Cheusi	77.9	15.7	1.7	4.7	100.0	172
Aya	50.3	49.7	-	-	100.0	185
Elele	41.8	58.2	-	-	100.0	201
Old Mondo	28.6	71.4	-	-	100.0	112
Choka	82.9	14.1	-	3.0	100.0	135
Gubali	22.7	72.7	3.4	1.2	100.0	176
Total (Percent)	50.5	47.2	0.9	1.4	100.0	
Total (Number)	495	463	9	14		981

SOURCE: Survey Data (1998).

The preceding discussions on the place of birth and residence suggest that the problem of reversed migration in the protected areas of Kondoa District has its origins within the district itself. There is no enough evidence to demonstrate notable impacts of migrants from outside the district, especially in the KEA areas, which is centrally located within the district area. Migrants from other district may have notable influences on other areas of the district such as the lower Irangi plateaux bordering the Masai Steppe and on the Western areas bordering Hanang and Babati Districts. The importance of these observations is the demonstration that the problems caused by reversed migration are within the reach of the district authorities, which can effectively effect measures to curb them. Table 8 shows the periods when reversed migration in the study areas started to emerge.

The table shows that around 31% of the settlers moved between 1981 and 1990 and another 30% moved between 1991 and 1998. These observations agree with those made earlier that reversed migration trends are a recent phenomena in many villages. However, exceptions do exist especially in the Kidongo Cheusi and Choka areas. In both locations, migrations occurred much earlier even before the creation of the HADO project. This observation might not reflect the actual situation in those areas. It should be noted that efforts to protect Choka against settlements and other destructive human activities started much earlier during the colonial period (Tanganyika 1931, 1936). Similarly, the history of land conservation in Kidongo Cheusi is much longer. To a certain extent, the observations given by the respondents in these areas may reflect a defence mechanism from the settlers in their efforts to avoid another resettlement exercise. The much earlier return date given, is probably an attempt to justify their presence in the protected areas.

Table 8. Year of moving into the present residence

Year of return	Proportion of respondents by year of returning						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	Number
Up to 1970	89.2	-	-	-	100.0	-	35.8	76
1971-75	2.7	-	-	-	-	-	0.5	1
1976-80	-	-	13.9	-	-	-	2.4	5
1981-85	-	100.0	52.8	25.0	-	5.3	26.9	57
1986-90	-	-	16.7	-	-	73.7	3.8	8
1991-95	2.7	-	16.7	75.0	-	10.4	27.8	59
1996-98	5.4		-	-	-	-	2.8	6
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (No.)	37	30	36	32	39	38		212

Source: Survey Data (1998).

6.4. Reasons for Coming Back

Various reasons that influence the return of people to the protected areas were mentioned. A close observation of these reasons suggests that land is the main factor for the return. These reasons include land availability, whether land has recovered, to live near farms, land availability and search for new farms. Table 9 presents the main reasons given for the return of people into the protected areas.

In Kidongo Cheusi, the main reasons for the return were search for new farms (46%) and to live near farms (27%). Living near farms was dominant in Aya, Elele, Old Mondo and Choka. In Gubali area, the search for new farms (47%) and live near farms (40%) were the prime reasons for the return. These reasons were supplemented by the people's attitudes that the land that was geminating stones, Österberg, (1986) in the past has actually recovered (21%). Other migrations are influenced by land availability in the areas of destination. However, these reasons do not reflect the fact that land is a big problem in most villages in the KEA. The case villages in this study are not an exception because they were the most affected areas in the 1970s to necessitate serious land conservation measures. Table 10 shows the distribution of the reasons for returning to protected areas by year of migrating. This is done to reflect variation of reasons over time. The percentages of the people returning are computed on the basis of number of respondents in the sub-village.

Table 9. Distribution of respondents by reasons for returning to the protected areas

Reasons for returning	Respondents returning for particular reason/s (%)						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	%	No.
Employment	2.7	-	8.3	-	-	-	3.3	7
Land has recovered	-	-	-	-	-	21.1	3.8	8
Land availability	5.4	-	-	-	35.9	2.6	8.0	17
Employment ended	2.7	-	-	-	-	-	0.5	1
Own decision	2.7	-	-	-	-	-	0.5	1
Live near farms	27.0	100.0	91.7	100.0	64.1	39.5	68.4	145
Post-villagization resettlement	-	-	-	50.0	12.8	7.9	19.3	24
Divorce	2.7	-	-	-	-	7.9	1.9	4
Search for new farms	45.9	-	-	25.0	-	47.4	17.9	38
Total (Percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (Number)	37	30	36	32	39	38		212

SOURCE: Survey Data (1998).

The table demonstrates the presence of multiple reasons for the movements. Similarly, it demonstrates that population movements have been occurring for different reasons at different times and locations. In Kidongo Cheusi, for example, most of the movements occurred before 1970 and the main reasons there were search for new farms (38%) and to stay near farms (27%). The response for Choka reflects all movements occurred long time ago before 1970s. The main reasons were to stay near farms (64% and land availability (36%). In Aya, Elele and Old Mondo areas, the return of people occurred in the 1981-85 period and the main reason was to stay near the farms. This observation may have been influenced by the changes made in the policy related to villagization, which allowed resettlement of people to enable them live near their farms. However, Old Mondo received more returnees in the 1991-95 period for the same reason of staying near farms (75%) and due to the post-villagization resettlement policies (50%). The movements to Gubali are more recent. Although there are settlers who claim to have moved to the area before 1970s, the majority came between 1986 and 1998. Reports from the HADO office indicate that the first settler was Mzee Mandela who came at Gubali in 1985 from Masawi village. The main reasons for moving back to Gubali include staying near farms (61%), search for new farms (50%) and recovery of the land from severe degradation (21%).

Table 10. Distribution of respondents by reasons for returning to the protected areas

Year of return	Reason for returning	Respondents returned due to particular reason (Percentage of respondents in sub-village)						Total (all respondents)	
		K/ Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	%	No.
Up to 1970	Land availability	5.4	-	-	-	35.9	-	7.5	16
	Employment	2.7	-	-	-	-	-	0.5	1
	Own decision	2.7	-	-	-	-	-	0.5	1
	Stay near farms	27.0	-	-	-	64.1	2.6	17.0	36
	Search for farms	37.8	-	-	-	12.8	13.1	11.3	24
	Divorce	2.7	-	-	-	-	-	0.5	1
1971-75	Search for land	2.7	-	-	-	-	-	0.5	1
1976-80	Employment	-	-	8.3	-	-	-	1.4	3
	Stay near farms	-	-	5.6	-	-	-	0.9	2
1981-85	Stay near farms	-	100	52.8	25.0	-	-	26.9	57
	Expand economic activities	-	-	-	25.0	-	-	3.8	8
1986-90	Stay near farms	-	-	16.7	-	-	5.3	3.8	8
	Land recovered	-	-	-	-	-	2.6	0.5	1
1991-95	Land availability	-	-	-	-	-	2.6	0.5	1
	Employment	2.7	-	-	-	-	5.3	1.4	3
	Stay near farms	-	-	16.7	75.0	-	31.6	19.8	42
	Post-villagization	-	-	-	50.0	-	5.3	7.5	16
	Land recovered	-	-	-	-	-	18.4	3.3	7
	Search for farms	-	-	-	-	-	36.8	6.6	14
	Divorce	-		-	-	-	7.9	1.4	3
1996-98	Employment	-	-	-	-	-	7.9	1.4	3
	Stay near farms	-	-	-	-	-	5.3	0.9	2
	Post-villagization	5.4	-	-	-	-	-	0.9	2
Total (No. of respondents)		37	30	36	32	39	38		212

Source: Survey Data (1998).

6.5. Socio-economic Characteristics and Their Implications to the Environment

6.5.1. Farming

Various economic activities are being conducted in the new settlement. These include farming, livestock keeping, self-employment and other activities. Table 11 summarised the main categories of the economic activities conducted in these villages. The table shows that farming is the dominant economic activity in almost all sub-villages.

Table 11. Distribution of respondents by main economic activities and sub-village

Sub-villages	Main economic activities				Total	
	Farming	Livestock	Employment	Self-employed	Percent	Number
Kidongo Cheusi	67.6	21.6	2.7	8.1	100.0	37
Aya	100.0	-	-	-	100.0	30
Elele	100.0	-	-	-	100.0	36
Old Mondo	100.0	-	-	-	100.0	32
Choka	97.4	2.6	-	-	100.0	39
Gubali	94.7	-	5.3	-	100.0	38
Total (Percent)	92.9	4.2	1.4	1.4	100.0	
Total (Number)	197	9	3	3		212

Source: Survey Data (1998).

The dominance of farming as an economic activity is justified by the fact that no other significant economic activities prevail except for livestock in Kidongo Cheusi (22%). Food crops are used for both food and cash earning. This is because there exists no other cash crops in Kondoa District apart from finger millet, maize and green peas. Table 12 shows the main agricultural crops that are grown in the new settlements.

Maize is the main food crop in the study area. Almost every household (99%) grow maize. Traditionally, millet and sorghum were the main staple food crops in the district. However, maize became the main crop in the area in recent years due to availability of markets (Madulu 1996). In addition to, the cultivation of millet/sorghum and sweet potatoes are widespread in Kidongo Cheusi, Aya, Old Mondo and Elele. Finger millet is dominant in Elele and Gubali. The cultivation of finger millet is often associated with deforestation because the cultivation of this crop is preceded with trees felling and burning of tree leaves. It is not surprising therefore to find this crop being prominent in Gubali and Elele where

notable vegetation regeneration has been observed. These areas had shown a remarkable recovery of the vegetation cover especially in the years after destocking. This means that there is enough vegetation to clear and burn. Finger millet cultivation has increased due to availability of reliable markets in neighbouring regions. It is currently considered to be an important cash-earning crop in most households.

Table 12. Distribution of households by village and type of crops cultivated

Crops grown	Households cultivating a particular crop in each sub-village						Total	
	K/ Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	No.
Maize	100.0	100.0	100.0	100.0	94.9	100.0	99.1	210
Millet & sorghum	100.0	100.0	94.4	75.0	76.9	50.0	78.8	167
Sweet potatoes	67.5	100.0	94.4	100.0	46.2	7.9	67.0	142
Sun flower	59.5	76.7	88.9	75.0	23.1	31.6	57.5	122
Groundnuts	18.9	100.0	38.9	75.0	41.0	18.4	45.3	96
Finger millet	21.6	23.3	66.7	-	12.8	78.9	39.6	84
Green Peas	24.3	-	-	50.0	61.5	89.5	39.2	83
Beans	16.2	-	-	25.0	7.7	76.3	21.7	46
Cassava	43.2	-	11.1	-	69.2	2.6	22.6	48
Others	35.1	-	5.6	-	-	-	7.1	15
Total (Percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (Number)	37	30	36	32	39	38		212

Source: Survey Data (1998).

In Old Mondo, Aya and Elele areas, agriculture is the main activity of the returning migrants. Cultivation started even before the households actually moved in. Evidence of crop residues seen in many parts including the gully bottoms and sand rivers indicate the presence of active farming activities for a much longer period. The return of homesteads is considered to have accelerated farm expansion and tree felling in many locations because the time served from walking long distances to farms is now used in actual farming. In areas like Old Mondo, trees planted by the HADO project have been cut down to give way for farm expansion. Crops grown include maize, sunflower, sweet potatoes and sugar canes.

6.5.2. Livestock keeping

Before the removal of livestock from the protected areas, most villagers in the KEA owned livestock. As stated earlier, some 46,375 cattle, 28,840 goats and 10,666 sheep were removed in 1979 (Mbegu and Mulenge, 1984). Even after the

destocking exercise, the people's attitude towards livestock remained unchanged. Cattle are valued as an economic investment, and as a source of labour and social prestige. In recent years, livestock have started to reappear in the protected areas. During the survey, many herds of livestock grazing freely were seen in almost every location (Plates 6 and 7). Table 13 shows the distribution of respondents by ownership of livestock before the resettlement in the 1970s.

Plate 6. Free range cattle grazing: Evidence of the return of livestock in the KEA

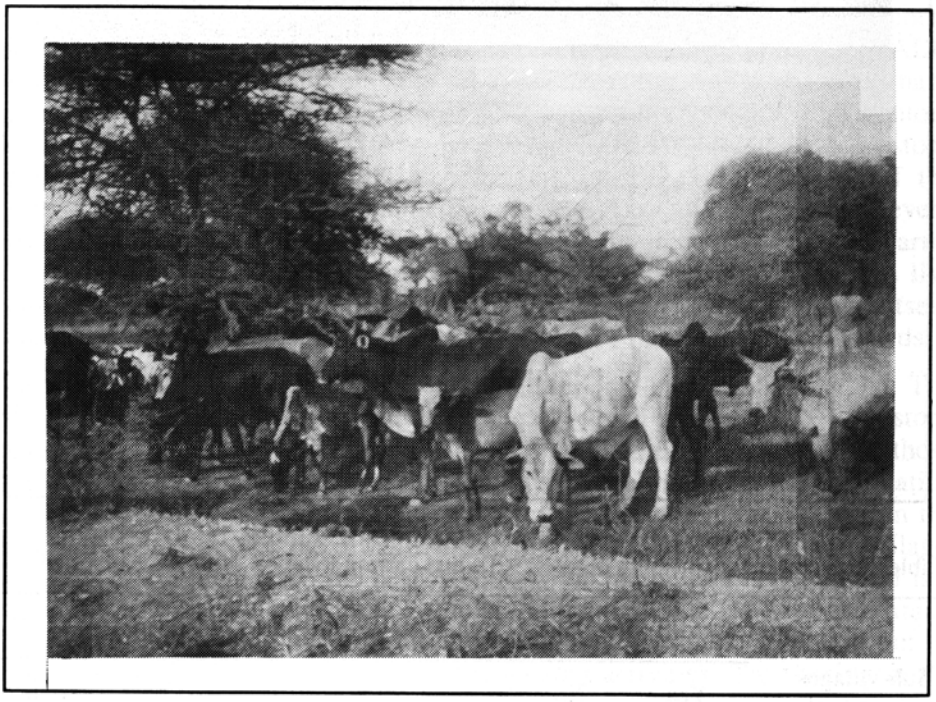

Plate 7. Free range grazing of goats around Lake Bicha, Kondoa

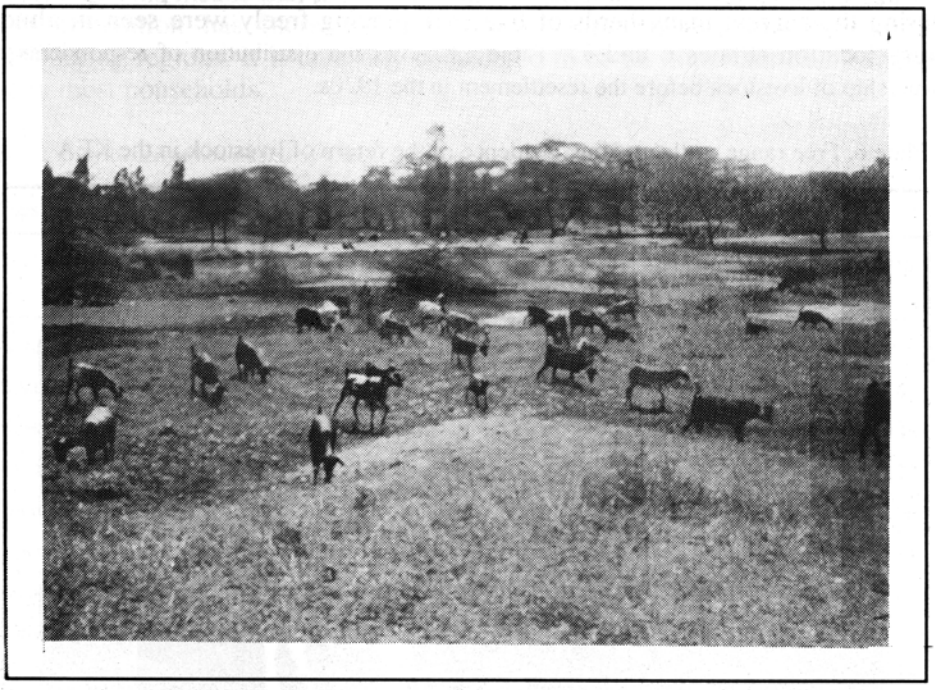

Table 13. Livestock ownership before 1970s and current location of livestock owned

Sub-villages	Before migrating		Current location of livestock			
	Yes	No.	No livestock	In village	Other village	All died
Kidongo Cheusi	37.8	62.2	56.8	2.7	21.6	18.9
Aya	23.3	76.7	76.7	-	-	23.3
Elele	61.1	38.1	38.9	-	16.7	44.4
Old Mondo	50.0	50.0	50.0	50.0	-	-
Choka	76.9	23.1	23.1	-	25.6	51.3
Gubali	31.6	68.4	71.1	-	5.3	23.7
Total (%)	47.6	52.4	51.9	8.0	12.3	27.8
Total (No.)	101	111	110	17	26	59

SOURCE: Survey Data (1998).

It is observed from the table that almost half of the households owned livestock in the past. These livestock were kept in the protected areas before the 1979 destocking exercise. The table also demonstrate that the proportion of households owning livestock has not declined significantly. This observation supports the argument made earlier that the people's attitudes towards livestock have never changed. Although it is stated that most livestock are kept in other villages outside the protected areas, the rate of return of these animals is rapid.

Our physical survey observed clear evidence of the existence of livestock in many homesteads. These evidences include fresh cow dung, free-range grazed goats, calves and physical presence of cattle. In Gubali, livestock have come back and were seen grazing freely in the area including in the gullies and HADO tree plantations. Evidence from this area indicates that cattle trampling have destroyed even the previous environmental conservation efforts like contour ridges. In Choka, livestock grazing is also an issue. Although few livestock keepers have been registered for zero-grazing practices, the majority of the livestock keepers hold no official permits. In Loo village, almost every household have livestock. Large herds of cattle were seen grazing in the farms and new kraals were found in many households. Similarly, small animals like goats and sheep are widely seen in the area including the Kondoa town itself. Table 14 shows the number of livestock owned in the respondent's households.

The table demonstrate that over 80% of the households own no livestock. The true picture of livestock ownership may be concealed by the fact that livestock are kept elsewhere as demonstrated in table 13 above. However, even those livestock kept outside the protected areas often graze in the area. The situation becomes even worse when the owners of the livestock decide to resettle in the protected areas leaving the livestock out like in the case of Mondo village. Livestock trespassing from the nearby Mondo village is very common and is a big problem. Almost all livestock in Mondo village graze in the protected areas. This situation is known even to the HADO Officer stationed at Mondo but no action has been taken to stop this illegal grazing activities. Trespassing in the protected areas has increased due to scarcity of pasture in the lower Irangi plains where a large number of livestock are concentrated.

Table 14. Current number of livestock owned by sub-villages

Sub-villages	Current number of livestock (Cattle)				Total	
	None	1-5	6-10	11+	Percent	Number
Kidongo Cheusi	75.7	10.8	2.7	10.8	100.0	37
Aya	100.0	-	-	-	100.0	30
Elele	83.3	16.7	-	-	100.0	36
Old Mondo	75.0	25.0	-	-	100.0	32
Choka	74.4	10.3	10.3	5.1	100.0	39
Gubali	92.1	5.3	-	2.6	100.0	38
Total (Percent)	83.0	11.3	2.4	3.3	100.0	
Total (Number)	176	24	5	7		212

SOURCE: Survey Data (1998).

Few cattle owners are located in the new settlements like Old Mondo, Aya, Elele and Kidongo Chekundu. This observation is justified by the fact that no single livestock owner in these areas has been registered by the HADO Office to practice zero-grazing as required by the district council regulations (HWK 1990). The environmental consequence of the return of livestock and the free grazing system in the protected areas include destruction of the contour ridges and tree farms, overgrazing and bush fires deliberately set to allow re-germination of fresh green grasses and eliminate tsetse flies in the grazing areas.

6.6. Access and Ownership of Land

Land availability is a big problem that is aggravated by the presence of severe land degradation in many areas including in the farmlands. Land degradation in Kondoa manifest itself in the form of severe soil erosion, gulling, declining soil fertility and deforestation. To illustrate the severity of the land problem, over three quarters of the respondents moved to the current residence due to land related factors (table 9 & 10). Table 15 presents the distribution of respondents by amount of land owned within and outside the village and hired land.

Generally many households own just small pieces of land. About 33% of all households own 1-5 hectares and 46% own 6-10 hectares. These two categories comprise over three-quarters of the households and about one fifth (20%) own more than 10 hectares and these are mainly concentrated in Aya (20%), Choka (41%) and Gubali (40%). Some people reported to be landless in Choka.

Table 14. Current number of livestock owned by sub-villages

Sub-villages	Current number of livestock (Cattle)				Total	
	None	1-5	6-10	11+	Percent	Number
Kidongo Cheusi	75.7	10.8	2.7	10.8	100.0	37
Aya	100.0	-	-	-	100.0	30
Elele	83.3	16.7	-	-	100.0	36
Old Mondo	75.0	25.0	-	-	100.0	32
Choka	74.4	10.3	10.3	5.1	100.0	39
Gubali	92.1	5.3	-	2.6	100.0	38
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Table 15. Amount of land owned within and outside the village and hired from other landlords

	Land owned within the village (ha)					Total	
Sub-villages	No land	1-5 ha	6-10 ha	11-15 ha	16+ ha	Percent	No.
Kidongo Cheusi	-	37.8	51.4	10.8	-	100.0	37
Aya	-	30.0	50.0	-	20.0	100.0	30
Elele	-	50.0	44.4	5.6	-	100.0	36
Old Mondo	-	25.0	75.0	-	-	100.0	32
Choka	5.1	20.5	33.3	7.7	33.3	100.0	39
Gubali	-	31.6	28.9	23.7	15.8	100.0	38
Total (%)	0.9	32.5	46.2	8.5	11.8	100.0	
Total (No.)	2	69	98	18	25		212
Land owned outside the village (ha)							
Kidongo Cheusi	94.6	-	5.4	-	-	100.0	37
Aya	100.0	-	-	-	-	100.0	30
Elele	100.0	-	-	-	-	100.0	36
Old Mondo	100.0	-	-	-	-	100.0	32
Choka	82.1	17.9	-	-	-	100.0	39
Gubali	84.2	15.8	-	-	-	100.0	38
Total (%)	92.9	6.1	0.9	-	-	100.0	
Total (No.)	197	13	2	-	-		212
Land hired from other landlords (ha)							
Kidongo Cheusi	100.0	-	-	-	-	100.0	37
Aya	70.0	30.0	-	-	-	100.0	30
Elele	100.0	-	-	-	-	100.0	36
Old Mondo	100.0	-	-	-	-	100.0	32
Choka	94.9	5.1	-	-	-	100.0	39
Gubali	100.0	-	-	-	-	100.0	38
Total (%)	94.8	5.2	-	-	-	100.0	
Total (No.)	201	11	-	-	-		212

Source: Survey Data (1998).

Land ownership outside the village was not a common characteristic of the households. Only 7% of all households own land outside. These were concentrated in Kidongo Cheusi, Choka and Gubali. Similarly, land hiring was reported only in Aya (30%) and Choka (5%). These observation clearly reflect the severity of the land issue. The main feature to demonstrate this includes ownership of small land plots and lack of land to own outside the village and to hire. There are various strategies that are used to acquire land in the study area. Some of the prominent ones are summarised in table 16.

Table 16. Strategies used to acquire land by sub-villages

Strategies for acquiring land	Proportion of households in each sub-village						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	Number
Inheritance	48.6	100.0	77.8	100.0	92.3	52.6	77.4	164
Buying	48.6	-	11.1	-	2.6	36.8	17.5	37
Hiring	2.7	-	5.6	-	-	5.3	2.4	5
Borrowing	-	-	-	-	-	5.3	0.9	2
Family land	-	-	5.6	-	5.1	-	1.9	4
Total (Percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (Number)	37	30	36	32	39	38		212

SOURCE: Survey Data (1998).

Inheritance (77%) is the most prominent strategy for acquiring land in almost all sub-villages. This strategy was the only one reported in Aya and Old Mondo and was reported by the majority in the other sub-villages. Under conditions of high population growth, inheritance often led to land fragmentation. In Kidongo Cheusi a combination of Inheritance and buying were preferred. Other strategies like hiring, borrowing and use right of family land were negligible in almost all sub-villages. These observations supplement the argument that land is a scarce resource in the study area. This is inferred from the dependence on inheritance as the method of accessing land.

The main land uses in the study area is farming. Table 17 demonstrates that over three quarters of the respondents (77%) reported farming as the main land use and 17% reported HADO activities as the main land use. The later's land use include tree plantations, areas protected for natural regeneration of the vegetation cover and catchments areas.

Farming was the primary land use in Aya, Elele, Old Mondo and Kidongo Cheusi. Although HADO activities were mentioned in Gubali (74%), current events in the area have already negatively influenced this situation. Previously, no human habitation was allowed in the Gubali area. This measure contributed to the dominance of HADO activities. However, recent trends have changed the situation to the extent that no more HADO activities are carried out in Gubali. Large parts of the tree plantations have been cleared to allow expansion of farms. This type of conflict of interest will continue for a long time if no strategies to involve the local community in environmental protection are sought.

Table 17. Distribution of land by current land uses and sub-villages

Current land uses	Proportion of respondents in each sub-village						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	Number
Farming	13.2	91.9	100.0	100.0	100.0	66.7	76.9	163
Hado activities	73.7	5.4	-	-	-	12.8	16.5	35
Not used	13.2	2.7	-	-	-	20.5	6.6	14
Total (Percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (Number)	37	30	36	32	39	38		212

SOURCE: Survey Data (1998).

The increase in ox-ploughs use increases the demand for land over time. About 85% of the respondents reported to use ox-ploughs. In almost all sub-villages, over 80% of the respondents use ox-ploughs. This also reflects the presence of livestock in the study area. The implication of this observation is that the land that in put under cultivation will continue to increases if more sophisticated technologies like tractors and ox-ploughs are used. The re-introduction of settlements and agricultural activities will definitely lead to more deforestation to clear more farms for ox ploughing.

6.7 Assessment of socio-economic development

In order to examine the people's attitudes with regards to reversed migration, the respondents were asked to make a self-assessment of their family, agricultural and livestock development since they returned in the new settlements. The observations for these assessments are summarised in table 18.

The general assessment of the agricultural performance in the new settlements was favourable. About 47% of the respondents reported good performance and 22% very good. Only 29% said the performance of the sector was satisfactory and 1% observed no change. The positive attitude towards agricultural performance may be one of the factors that encourage the return of the households. The examination of the reasons for the return puts more emphasis on the land factor. The positive agricultural development supports the importance of land as the main reason for the return.

Concerning livestock development, only 7% reported good or satisfactory performance. While 37% reported no change at all, 53% reported a deteriorating situation in the livestock sector. Again this poor performance of the livestock sector may be an impetus for the return of people and their livestock in the protected areas. Livestock were expelled from the protected areas in 1979. It has been repeatedly reported that most of the livestock died when they arrived in a new environment in the lower Irangi areas.

Table 18. Self-assessment of family, agricultural and livestock development levels since return

	Assessment of agricultural development					All respondents	
Sub-villages	Very good	Good	Satisfactory	No change	Deteriorated	Percent	No.
Kidongo Cheusi	-	5.4	86.5	8.1	-	100.0	37
Aya	-	100.0	-	-	-	100.0	30
Elele	-	66.7	33.3	-	-	100.0	36
Old Mondo	-	50.0	50.0	-	-	100.0	32
Choka	59.0	35.9	5.1	-	-	100.0	39
Gubali	63.2	36.8	-	-	-	100.0	38
Total (Percent)	22.2	47.2	29.2	1.4	-	100.0	-
Total (Number)	47	100	62	3	-	-	212

Assessment of livestock development

Sub-villages	Good	Satisfactory	Poor	No change	Deteriorated	Percent	No.
Kidongo Cheusi	-	2.7	18.9	73.0	5.4	100.0	37
Aya	-	-	-	23.3	76.7	100.0	30
Elele	-	-	-	38.9	61.1	100.0	36
Old Mondo	-	-	-	-	100.0	100.0	32
Choka	5.1	-	-	48.7	46.2	100.0	39
Gubali	28.9	-	-	31.6	39.5	100.0	38
Total (Percent)	6.1	0.5	3.3	37.3	52.8	100.0	-
Total (Number)	13	1	7	79	112	-	212

Assessment of family development

Sub-villages	Very good	Good	Satisfactory	No change	Deteriorated	Percent	No.
Kidongo Cheusi	-	5.4	83.8	10.8	-	100.0	37
Aya	-	100.0	-	-	-	100.0	30
Elele	-	66.7	33.3	-	-	100.0	36
Old Mondo	-	50.0	50.0	-	-	100.0	32
Choka	61.5	33.3	5.1	-	-	100.0	39
Gubali	65.8	34.2	-	-	-	100.0	38
Total (Percent)	23.1	46.2	28.8	1.9		100.0	-
Total (Number)	49	98	61	4	-	-	212

SOURCE: Survey Data (1998).

Throughout the past 20 years, the local communities has been trying tirelessly to return their livestock in the protected areas. In some cases, the propagators of this idea have attracted sympathy of some politician and administrators (Mbegu 1996). The loosening of the implementation of the district by-laws on environmental protection (HWK 1990) has given the opportunity that has been lacking for the past 19 years. Now the livestock are back and more are still coming at a high speed.

On the family development, the respondents reported positive assessment. About 23% reported very good development, 46% good and 29% satisfactory. The very good responses were recorded in Choka and Gubali. Even in the Aya, Elele and Old Mondo sub-villages good development was reported prominently. Family development was reported to be largely satisfactory in Kidongo Cheusi and Old Mondo. Again these assessment of the family lives suggest a favourable environment for the settlers to stay. In a way it is an attraction for new settlers to come in the near future.

7. IMPACTS OF REVERSED MIGRATION ON THE ENVIRONMENT

7.1 Environmental Conservation Activities in the New Settlements

Table 19 shows the various environmental conservation strategies that were used by the local communities in the past. These strategies included ridge cultivation, use of fertilisers, and use of animal manure, land fallowing, crop rotation and use of fire.

Table 19. Past land conservation strategies used by respondents by sub-villages

Land conservation strategies	Proportion of respondents in each sub-village						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	Percent	No.
Ridge cultivation	24.3	46.7	5.6	-	66.7	63.2	35.4	75
Use of fertilisers	35.1	-	-	-	-	-	6.1	13
Use animal manure	16.2	-	-	50.0	5.1	5.3	12.3	26
Land fallowing	8.1	-	-	-	5.1	-	2.4	5
Crop rotation	8.1	-	-	-	-	-	1.4	3
Use of fire	-	-	-	-	5.1	-	0.9	2
None	8.1	53.3	94.4	50.0	12.8	26.3	39.6	84
Not stated	-	-	-	-	5.1	5.3	1.9	4
Total (Percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (Number)	37	30	36	32	39	38		212

SOURCE: Survey Data (1998).

The data indicate that the use of ridge cultivation was very prominent in Aya (47%), Choka (67%) and Gubali (63%). In other areas like Old Mondo and Kidongo Cheusi, the use of animal manure (50%) and fertilisers (35%), respectively, were considered important strategies to conserve the environment. In Elele, Aya and Old Mondo sub-villages, a significant proportion of the households did not affect any strategies for environmental conservation. However, some of these measures have ceased to operate in some localities. A summary of the strategies used at the moment is presented in table 20.

The table demonstrates that the use of various strategies like ridge cultivation have declined significantly in Kidongo Cheusi, Choka and Gubali areas. New

strategies that were not widely used in the past have emerged. These include tree planting and construction of contour ridges. The use of tree planting was significant in Old Mondo (50%) and Gubali (50%). Other new strategies include construction of contour ridges and restrictions to use fire in preparing farms.

Table 20. Current land conservation strategies used by respondents by sub-villages

Land conservation strategies	Proportion of respondents in each sub-village						Total	
	K/Cheusi	Aya	Elele	Old Mondo	Choka	Gubali	%	No.
Ridge cultivation	8.1	46.7	-	-	5.1	50.0	9.0	19
Tree planting	2.7	-	-	50.0	35.9	-	19.3	41
Use compost manure	21.6	-	-	-	15.4	36.8	6.6	14
Use fertilisers	8.1	-	-	-	17.9	-	11.3	24
Use animal manure	5.4	-	-	-	-	78.9	0.9	2
Contour ridges	13.5	-	5.6	50.0	30	-	39.2	83
Land fallowing	5.4	-	-	-	5.1	-	1.9	4
Crop rotation	13.5	-	-	-	5.1	-	3.3	7
No burning farms	10.8	-	-	-	-		1.9	4
Total (Percent)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total (number)	37	30	36	32	39	38		212

SOURCE: Survey Data (1998).

7.2 Reversed Migration and Environmental Conservation

A rapid assessment of the environmental situation in the study area demonstrates an increase in tree felling activities. Areas around Lake Bicha, Gubali and Old Mondo villages have been affected severely by this practise. Trees are cut for expansion of farms, brick burning, charcoal making and collection of firewood. Evidence of brick making and burning activities were almost everywhere in the study area especially around lake Bicha and in Mondo and Gubali villages (Plates 8 and 9).

7.2.1 Gubali

In Gubali, many land conservation activities that were affected by the HADO project have ceased to exist. These included contour ridge construction, tree planting and construction of check dams in the gullies. A tree demonstration farm of about 400 hectares was established in the area but has been severely damaged. In addition, a natural regeneration of the indigenous trees accelerated after the area was completely destocked and settlement prohibited. The impact of resettlement in this area includes the destruction of the tree plantation by the returning people. Neither the HADO project nor the new settlers carry out any further conservation activities. The main activities that are not environmentally friendly in Gubali include brick making, tree felling for fuel wood and building purposes, livestock grazing and agricultural expansion. Brick making is done in a gully that has a reliable water pond. The impact of this practice is the expansion of the size of the gully. Similarly, brick making is associated with tree felling for the purpose of obtaining wood for burning the bricks. Like in other villages, there

is a total dependence on wood fuel for the burning of the bricks. Even with this understanding, no proper land conservation measures are affected. Thus, the major environmental impacts of the resettlement process in Gubali include:

- Destruction of the HADO demonstration tree farm. About 100 hectares of exotic trees have already been destroyed.
- Many indigenous trees that regenerated after the removal of people and livestock have been cleared to provide wood for brick burning, charcoal making and allow farm expansion. At the moment, Gubali is famous for charcoal production to feed the Kondoa market. This business has a very negative environmental implication especially in relation to vegetation cover in the area.
- Large parts of the main contour ridges have been destroyed due to farm expansion and house construction. No rehabilitation has been done on the remaining contour ridges.
- The return of livestock has led to sporadic grazing and cattle trampling both in the gullies and across the contour ridges.
- Re-activated and accelerated soil erosion processes due to increased human activities and livestock grazing.

Plate 8. Tree felling and brick-making for house construction in Kidongo Cheusi

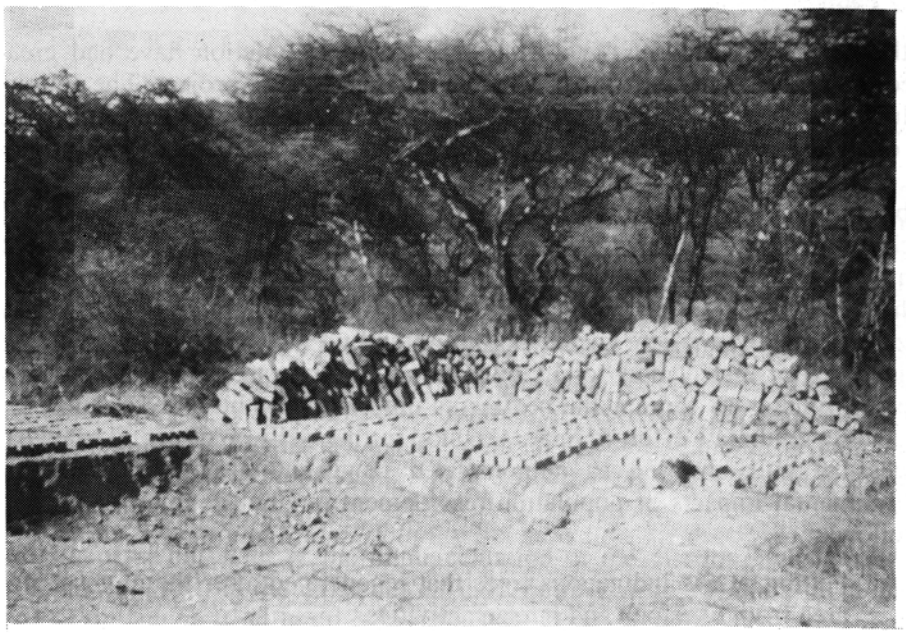


Plate 9. Preparations for burning activities at Bicha

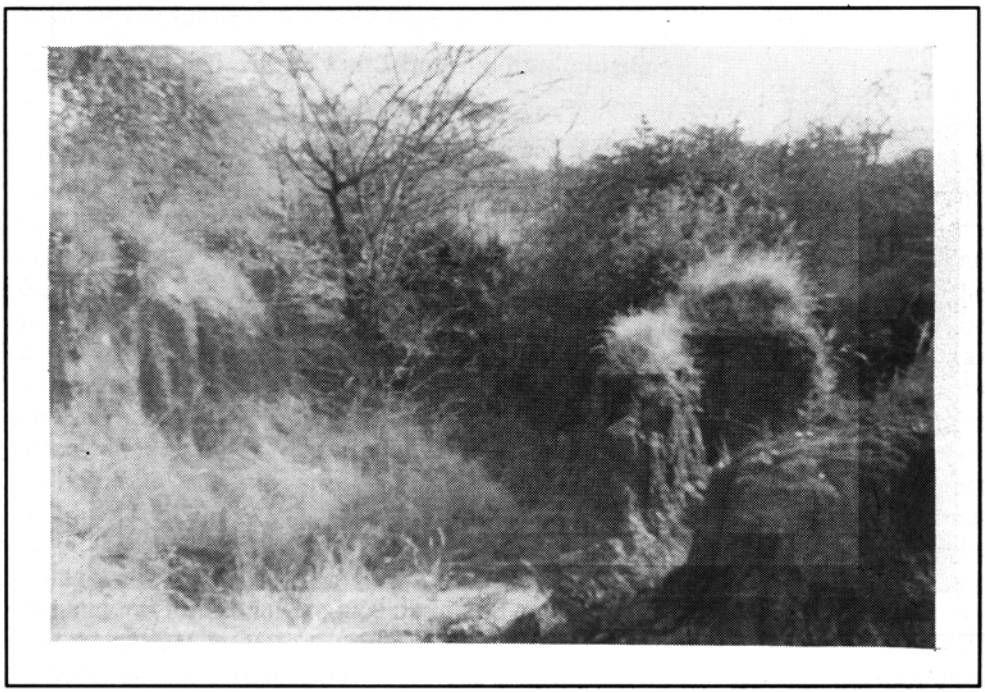
7.2.2 Choka

In the Choka, the return of human and livestock population have had greatly affected on the conservation activities done by the HADO project. The activities include tree farms planted by the project, natural regeneration of the vegetation, the contour ridges, the "trash-wood check dams" constructed in the gullies, and the elephant grasses planted in the sand rivers and gully bottoms. Like in the Gubali area, many of the regenerated trees have been cut to provide wood for brick burning, firewood for home use, and to provide room for the expansion of farms. Agricultural activities have already expanded into areas that were planted with trees in the past and to delicate locations near the gullies. Livestock are grazed almost everywhere including in and around the steep gullies where the project have invested much of its resources to construct check dams and plant elephant grasses to capture the sediments eroded in the highlands and gullies. This was a deliberate effort to initiate to stop further gully erosion and initiate the process of gully healing as demonstrated in plate 10 and 11. The major environmental impacts of population resettlement in Choka can be summarised as follows:

- Felling of the indigenous trees that regenerated after the closing of the area from livestock and human activities.

- Destruction of traditional forest sites conserved for generations for various reasons, including rituals and circumcision ceremonies.
- Overgrazing and trampling of the delicate ecosystems such as gullies, sand rivers and contour ridges due to increased number of livestock.

Plate 10. Gully healing processes in Kidongo Cheusi area

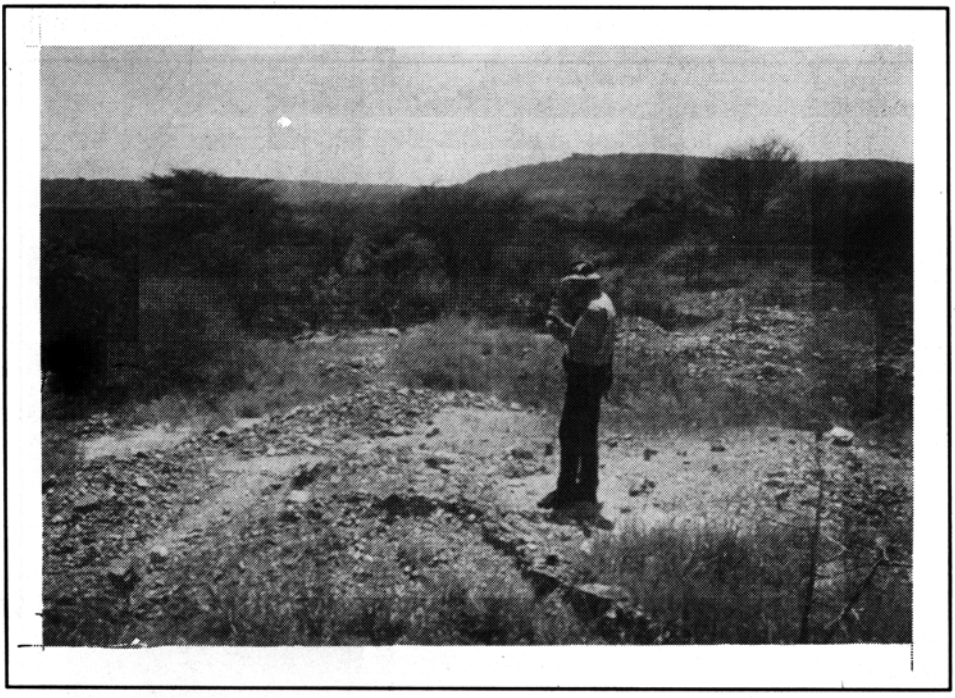


According to the Kolo Ward Executive Officer (WEO), Mr. Iddi Issa Mabele, there are established rules and procedures for allowing people to cut trees for the purpose of burning bricks. A person is required to lodge an application to the sub-village leader. After being certified, the application is sent to the village government for consideration. If permission is given, the person is required to pay a nominal fee of Tsh. 1,500 per cubic meter of wood. Normally, an extension worker (i.e. the HADO Station Officer) is required to supervise the actual tree felling. Although this procedure seems impressive, very few people follow it. Occasionally, ad-hock patrols are made by the WEO in collaboration with the village leaders to curb the offenders. About 16 offenders were sent to court in 1997 and 6 more in 1998.

One of the major obstacles to the implementation of the district environmental by-laws (HWK 1990) is the existence of unfaithful (corrupt) leaders including the HADO project staff. Often these responsible personnel give fake grazing or

tree felling permits to the villagers. Annex 4 presents samples of these unofficial permits). Such practices discourage those individuals who decided to follow the established procedures in order to protect the environment.

Plate 11. The healing process in areas affected by severe sheet erosion



7.2.3 Old Mondo

In the Old Mondo area, various impacts of reversed migration have been noted. These include tree felling for building and fuel wood purposes, encroachment of farms to the edges of gullies, and regular bush fires. Cultivation in the area started even before the households actually moved in. However, the return of homesteads has to a certain extent accelerated farm expansion and tree felling processes. For example, the trees that were planted by the HADO project in Old Mondo have either been burnt or cut down. The HADO Station Officer in Mondo reported an increase of land productivity in the protected areas. This information is a sufficient motivation to encourage people to move back to the areas that seem to ensure their food security and economic growth.

7.2.4 Aya and Elele

Key informants from these sub-villages reported that resettlement started around 1986. About 80 households have already established permanent settlements. The main activities in the new settlements in these sub-villages are agriculture and

livestock keeping. Settlers practice agriculture in areas that were protected without following proper land conservation practices recommended by the HADO project. Such practices endanger environmental protection activities that are already in existence. Similarly, increased livestock population may lead to overgrazing and destruction of the contour ridges in the rangelands. Bush fire destroy the organic matter, which is supposed to increase nutrients in the soil, hence, accelerate the recovery process. All these are negative impacts of resettlement in the two sub-villages.

7.3 Reversed Migration and Resource Exploitation

7.3.1 House Building

Apart from the growing size of settlements in the protected areas, there is a rapid increase of tree felling for house building purposes. This include brick burning, building poles and grass thatches. In Mondo village, for example, almost every household had bricks to burn. Brick making is a seasonal activity that is done during the dry season only. All households depend on fuel wood from the protected area. Although brick burning is a progressive activity, its impact to the delicate environment in the protected areas is significantly big. In many areas numerous tree stems that were recently cut demonstrate that this impact is recent and is accelerating rapidly. The indiscriminate tree cutting practices have affected even those trees located in the just recovering gullies. The estimated number of bricks, made during the 1998 season were two million. Given the fact that about 7 cubic meters of wood is just enough to burn 10,000 bricks[iii], about 1,400 cubic meters would be required to burn the two million bricks in the village. Based on Mitchell (1984) and Kihiyo (1991) estimates that one-hectare of a natural forest can produce up to 480 cubic meters of wood, the estimates for wood required in Mondo (1998) would have been around 3 hectares of natural forests. All the wood required for this purpose are obtained from the protected areas. This example can be extrapolated to other areas to get a feeling of the environmental implication of brick burning with total dependence on natural forests for wood.

In addition to wood for brick burning, there is an increasing demand for building poles and thatch grass from the protected areas. Several villagers were spotted carrying thatch grass from the protected areas. This activity is contrary to the 1990 Kondoa District Council By-law on Environmental Protection (HWK 1990). Generally, most houses are built using building poles or burnt bricks and grass thatches.

The economic benefit of the brick-making activity is the creation of employment opportunity to some of the villagers. People are hired to cut wood at a cost of Tsh. 3,000 for enough logs to burn one kiln of about 10,000 bricks. Similarly, people with ox-carts are hired to transport logs from the HADO areas to the villages the rate in Mondo was Tsh. 1,000 per trip. Moreover, bundles of thatch grass are sometimes sold at Tsh. 200 each. To complete an averaged size house (3 bedroom house), one needs at least 60 bundles, meaning about Tsh. 12,000.

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All these evidences demonstrate the importance of the protected areas to the local communities. Because of the total dependence exerted by the local communities, any increase in the population may have notable implications to resource exploitation. In other words, population pressure causes over-exploitation of natural resources through unofficial resource and non-sustainable exploitation methods. Mondo village is just one example, but there are many other villages with similar characteristics.

7.3.2. Fuel Wood

Fuel wood for domestic purposes is another important impact of the population resettlements in the protected areas. As the number of households increase, the demand for fuel wood also increases. In almost every household visited, a pile of firewood was seen. This is because firewood collection is mostly done during the dry season for use in the wet season. This implies that the impact of this activity to environmental resources is severe during the dry season. Generally, the relaxation of the district and project by-laws has created loopholes for people to cut down trees indiscriminately. This practice threatens the environmental recovery process especially in the gullies and other delicate ecosystems. To demonstrate the impact of firewood collection on the environment, the example of Mondo village is used again. The village has 1,300 households. Based on the estimate that an average household (5-8 persons) would require around 7 cubic meters of firewood per year (Mitchell 1984; Kihiyo 1991), the total annual wood requirement for the village is 9,100 cubic meters. This implies that the about 19 hectares of the open woodlands would be destroyed annually just to meet the village firewood requirements.

7.3.3. Charcoal

Charcoal making is another important use of forest resources from the protected areas. Although few rural people depend on charcoal as a source of energy, there is an increasing demand for this commodity in Kondoa town. In many nearby settlements like Bicha, Gubali, Choka, Kidongo Cheusi and Aya charcoal making has become an economic earning activity. The new settlements that are developing due to reversed migration are becoming the most potential sources of charcoal for the urban market. Even at village level, charcoal consumption rate has been increasing. Several restaurants and tearooms are using charcoal as the main source of energy. In Mondo village, each tearoom requires 5-6 bags of charcoal per month. Rough estimates indicate that 1 cubic metre of wood is adequate to produce just one bag of charcoal. If all charcoal requirements for the urban and rural requirements are put together, the harm to the delicate environment of Kondoa will be even greater.

7.3.4 Bush Fire

Bush fire is very common in the KEA area especially during the dry season. Large areas of indigenous and exotic trees in and around the new settlements have been burnt. Fire is often used to cleanup farms, deter wild animals and to enable regeneration of new green grass for pasture. Tree farms near Aya in Mondo village

have experienced regular annual burning for several years. In old Mondo, the tree plantations there have also been burnt. In the Gubali and Choka areas regular bush fires have generated remarkable implications to the vegetation cover.

8. SUMMARY AND CONCLUSION

8.1 Summary

This study has established that human activities in the new settlements are detrimental to environmental conservation activities that existed there before. In many dimensions, the activities done in these settlements are almost similar. These activities include farming, house building (brick making and burning, building poles, thatch grass, ropes etc.), tree felling for fuel wood and farm expansion, and sporadic grazing of livestock. No close monitoring of how these activities are conducted was made. Similarly, no or just minimal legal measures are being taken on the offenders of the various issues mentioned in the district environmental protection by-laws (HWK 1990). Moreover, the study observed that the current resettlement process is rapid and its impact on the environment is significant. Generally, the rate of environmental destruction has increased rapidly especially in the areas where reversed migration has occurred.

This generalisation can be extended to other areas located inside the KEA, where notable evidences of environmental destruction can be cited. In Kondoa town, for example, brick making and burning is rampant and free livestock grazing is widely practised against the district regulations. In Mondo village, the HADO project area is the only source of wood and building materials and pasture for the livestock population. Actually, the local communities view more benefits for trespassing to the protected areas than the fines paid for trespassing. Such views encourage people to continue with the environmentally unsound practices in the KEA.

One of the biggest obstacles to environmental conservation in Kondoa District is the existence of many contradicting policies and regulations. Different donor agencies and even the Government and District Council often come up with different policies and interests, especially in the fields of livestock keeping and community forestry. Often, there have been forces that push for relaxation of the environmental protection by-laws. It should be noted that any attempts to relax the existing by-laws (HWK 1990) or allow free movement of livestock would instigate serious damage to the environment. Such attempts contradict the purpose of establishing the HADO project (Mbegu and Mlenge 1984; Mbegu 1996). There is urgent need, therefore, to harmonise the different contradicting interests and policies for the benefit of the whole environment in general and the current and future population in particular.

8.2 Lessons for Future Conservation.

Due to changes in environmental conservation policies, the HADO project cannot manage to be the sole institution responsible for the protection of the

rehabilitated areas. Through community participation, this responsibility has to be transferred to the villagers themselves through their village governments and environmental management committees. The idea of involving the local community into the project activities is good and is a positive step for future conservation activities. However, it needs proper arrangements and preparations before the local communities are left to operate on their own.

Given the fact that there are various misconceptions among the local communities on the status of the HADO project, awareness creation becomes very vital. There are individuals who believe that the restricted areas are now free for grazing, farming, resettlement and tree cutting. The policy changes should not be taken to mean failure of the project, hence, end of its existence. The reversed migration discussed in this study signals these type of understanding among the local communities. In other words, the misconception of the policy changes have led to rapid resettlement processes. To a certain extent this response may be a function of poor communication between the HADO office, the District Council and the local communities.

Among the major lessons learnt from this study is the fact that environmental conservation activities cannot be successively achieved without community participation. In the past, the HADO project was able to make forest patrols as a major way of protecting the natural resources. However, the local communities did not support such patrols and resistance was demonstrated in the form of trespassing, tree felling and bush fires. This means that the project has to explore new approaches in order to attract people's attention and interests so that the rehabilitated areas become *"productively utilised"* and *"sustainably managed"*. To achieve productive utilisation and sustainable management of the rehabilitated areas, there is need to adopt partnership management systems that call for a *"bottom-up approach"*. The local people and other stakeholders have to participate in the planning and implementation of the project activities. This means that transformation of people's attitudes, skills and conservation approaches to allow involvement of many stakeholders through *Participatory Rural Appraisal* methods.

Already the project has started to implement this approach in pilot villages where village councils have been empowered to plan on how the project activities will be carried out by the villagers themselves[iv]. Under the new arrangements, village councils will be empowered to make forest management plans that will describe the role of villagers, foresters, and other related stakeholders. Plans from villagers will be discussed at the district level where amendments will be suggested and sent back to the villagers for further transparent discussion and negotiations. Finally the village plans will be sent back to the respective district councils for approval. Contract will be signed between the village councils, district councils (DED) and the Ministry (Forestry and Beekeeping Division[v]). At this juncture, the Partnership Forest Management (PFM) approach will be achieved. In the PFM, each forest user group needs are considered and each

stakeholder has a specific role to perform in the management of the natural resources.

8.3 Conclusion

Policy and administrative support will ensure environmental sustainability in the areas concerned. In all cases, the community has to be an active partner in the planning and decision making processes at all levels. The villagers, the Village Environmental Committees, the Village Executive Officers, the Ward Executive Officers, and field experts from different departments have to work together towards a common goal. Otherwise, individuals will continue to destroy the environment and jeopardise the ability of the environment to sustain the needs of the future population. This is non-sustainable development that contradicts with the long-term objective of the NPP of improving the living conditions of all people.

Generally, the FMP approach will increase the rights and access of the local communities to the resources available in their surroundings. This approach encourages villagers to think of long-term effects and use natural resources in a sustainable manner. This will develop among the local communities a sense of ownership of the natural resources because they benefit from them and they have legal rights to access. The guiding principle should be *"Go to the people, live among them, learn from them, start with what they know and build on what they have"*.

8.4 Policy Recommendations

In order to eradicate the current deforestation and environmental degradation practices, the following strategies are suggested:

- Efforts should be made to change the people's attitudes that land conservation activities in Kondoa district are the responsibility of the HADO project or government sectors only. The process of change can succeed if various sectors at the regional and district levels work together to meet a common goal. Each actor needs to see that he/she is directly responsible to environmental protection and that their operations have impacts of the environment. In other words, awareness creation should not end with the villagers, but also consider administrators and politicians at all levels.
- Deliberate policy strategies should be initiated to allows people to return to their traditional farms on condition that environmental conservation activities are not victimised. Discouraging environmentally unfriendly consumption and production practices at the local community levels can do this. This means that communities should participate fully in all environmental conservation activities.
- The ministry responsible for natural resources, regional governments and district councils have to sort out responsibilities for each sector and

level administration. The HADO project cannot be left to do all the environmental conservation activities alone.

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