

Impacts of Population Pressure and Poverty Alleviation Strategies on Common Property Resource Availability in Rural Tanzania

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Abstract: This paper outlines the linkages between population pressure and common property resources availability in Tanzania. It examines on whether population pressure has an influence on diminishing common property resources at the local level and establishes the coping mechanisms of the local communities in response to new circumstances and changing environment. In the course of discussion, an attempt has been made to assess the extent to which population pressure have influenced availability of common property resources at the local level; and identify policy implications and alternatives strategies to cope with diminishing common property resources. Further analysis have been made of the extent to which poverty alleviation strategies at the local level influence non-sustainable use and degradation of common property resources. These issues require a closer examination of the circumstances under which population; development and environment linkages manifest themselves. Whereas the population has shown a continuous increase, there is less information about the rate at which the common property resources are diminishing in response to changing demographic conditions. Similarly, the impacts of various poverty alleviation strategies on diminish common property resources at the local level are not well documented. Small and large-scale mining operations in Mabuki and Maganzo villages has been used as an example to illustrate the transformation in the way local communities use and manage common property resources. The identified long-term implications of the various practices to include increased environmental degradation; accelerated food insecurity, increased poverty, diminishing common property resources, increased land use conflicts, and creation of a landless class at the village level. These implications require policy commitment and support to enable sustainable utilization of common property resources.

Key words: Commons property resources, population pressures, poverty, globalization, community conservation, and partnership management

1. Introduction

The World Commission on Environment and Development in 1987, challenged the international community and national governments to work towards a sustainable future that will broaden, not contract, the choices future generations will have to make. This call was amplified by the United Nations General Assembly which called for a balance between population and environment capacities in order to make sustainable development possible, keeping in mind the links between population levels, consumption patterns, poverty and the natural resource base (UNFPA, 1991). The emphasis was directed towards addressing the relationship between demographic pressures on the one hand, and non-sustainable consumption patterns on the other. These arguments suggest the need to examine the linkages between changes in the demographic conditions and those in the Common Property Resources (CPRs). The task here is to: re-examine the population/resource imbalances; correct inefficient and wasteful use of resources; and seek optimal strategies that can ensure access of the local communities to CPRs.

Garrett Hardin defined the “*commons*” to mean any resource which is shared by a group of people (Hardin, 1968). It is on the basis of this definition that the concept of Common Property Resources has been developed to mean the resources that are shared and jointly managed by the local communities in general. Common Property Resources (CPRs), therefore refer to those resources in which a group of people has co-equal use rights, especially rights that exclude the use of these resources by other people. (Oström 1986). Examples of CPRs include the air we breathe, the water we drink, new land for farming and grazing, fish from the sea, and wood for fuel and housing. Following the logic of the commons, each community member has the right to share the resources from the common resource pool.

The concept of Common Property Resources (CPRs) describes the dynamics in which people establish and respect community-based management rules regarding natural resource use and development (CIEL, 2002). Evidence gathered elsewhere suggests that local communities have for many years being able to protect their common property resources on a sustainable manner by using locally designed and commonly agreed by-laws and procedures that benefit all stakeholders (McNeely and Ness, 1996; Kauzeni and Madulu, 2000). Through adaptation to their

local environments, local communities developed a well understanding of their CPRs and how to sustainably manage them through their own established regulations.

Population growth and the resultant human activities have been viewed as generating pressures to the natural resource base in general and CPRs in particular. This statement is demonstrated by, among others, the rapid decline in vegetation cover, pollution of common water sources, and increased pressure on traditional grazing areas. Although this view dominates, different communities have dealt with the management of their CPRs in different ways. Despite the fact that many local communities has for a long time contributed to the conservation and protection of CPRs, only recently their importance in natural resource management and the need for benefit sharing are been recognized (McNeely and Ness, 1996; URT, 1998a). Analysis of the people's perceptions of the socio-economic pressure on coastal forest resource use and management in Tanzania, for example, show no direct responsibility on the part of the local communities for the maintenance and protection of the coastal forests because the local communities do not consider the resources to belong to them. The denial of access to CPRs perpetuates negative perceptions among the local communities that natural resources are a liability to them rather than an asset. Discussing the importance of local communities in biodiversity and environmental conservation, McNeely and Ness (1996) argued for the need to respect, preserve, and maintain knowledge, innovations, and practices of indigenous and local communities embodying traditional lifestyles. Efforts to put this approach into practice in Tanzania are getting momentum, though still at a very limited level.

Recent trends have shown diminishing trends in CPRs due to population pressure and the various human actions. Large areas of land, forests, mineral deposits, wildlife, and water resources have been depleted, leading to serious environmental problems. Similarly, various resource use conflicts have emerged and are, to a larger extent, triggered by population pressure, and the neglect of the local communities' interests in the CPR management strategies. This complementary relationship between humans and CPRs necessitates consideration of the end user of the CPRs in any discussion of resource management issues.

For a long time the Tanzanian government has considered itself the sole manager of all natural resources obtainable in the country. This is in total contradiction to policy documents and statements which state that the government holds the natural resources in trust (CIEL, 2002). The concept of trust assumes that the trustee is supposed to manage the said property in the best interests of the beneficiary until such time the beneficiaries are capable of managing their property themselves. However, for the government, this self-evident truth has always been equated to total ownership because the policies and laws of the country do not define what trust means, the functions of the trustee and the obligations of the trustee to the beneficiary.

This paper discusses how population pressure and policy changes have influenced changes in the CPRs in the rural setting, and how local people's lifestyles are being molded by population pressure, changes in the CPR accessibility as influenced by changing land uses and the emergence of new economic opportunities like mining at the local level. Using the case of Mabuki and Maganzo villages in Mwanza and Shinyanga regions, respectively, the paper demonstrates that various demographic and policy changes that have occurred over time have had implications on the nature and extend of CPR accessibility and use patterns. The paper argues that the expansion of agriculture activities and emergence of mining activities that has expended into the traditional grazing and farming areas, has to a larger extent affected accessibility of local communities to their CPRs at the local level.

2. Population pressure and CPR conservation

The link between population pressure and CPRs could be traced back to Malthus¹ in 1798 who argued that there are diminishing returns to additional labour to land (Wilber, 1978). Malthus viewed population increase to cause declines in agricultural output and impoverishment of land resources. Boserup looked at population pressure as a driving force towards intensive land uses and technological change (Boserup, 1965). She viewed population pressure as a force that stimulates adoption of new techniques that enable more frequent cultivation, hence, greater output. In Boserup's views increased population pressure is an impelling force to agricultural

¹ Thomas Malthus launched the population economic growth debate in 1798 with the proposition that population, when unchecked, increases in geometric ratio, and subsistence increase only on arithmetical ratio (Wilber, 1978).

intensification. However, the Boserup hypothesis has been criticized for failing to consider the effects of inadequate public policy on agricultural development. Hardin (1968) argued that as the population grows and resources decline, the commons collapses and ends in "*the tragedy of the commons*".

The increase in population may lead to expansion of farm lands, decline of grazing land, and conflicting resource uses emerge. As a result, the impacts on the common resource poor increases in the form of deforestation, land fragmentation, overgrazing, water scarcity and land degradation. Such features reduce the carrying capacity of the land and the capability of the CPRs to meet the needs of the present and future population.

Different policies affect farming systems and the impact is aggravated by population pressure, leading to degradation of common property resources including land at the local level. Evidence from Machakos (Kenya) seem to suggest that population pressure in an agricultural areas stimulates changes in farming and income generating systems and reverse the degradation process towards sustainable resource management (Tiffen et.al, 1994). Yet the World Bank views population pressure as a major hindrance to economic development and a cause of environmental damage (World Bank, 1989). These contradicting views necessitate a closer look into the linkages between population dynamics and natural resource conservation, including CPRs at the micro-level.

The linkage between population, environment, and natural resources exploitation can, thus, be demonstrated by the association between consumption, technology used, and population. In order to gain some sense of the contribution of population growth to CPR depletion, a review of the ***IPAT Model*** developed by Ehrlich and Ehrlich (1990) is important. The formula for the model is explained as $I = PAT$, Where I is the Impact on the environment, P is the population (absolute size, growth rate, distribution), A stands for affluence (usually measured as GNP per capita), and T refers to the technology in use (amount of pollution per unit of GNP). This model demonstrates that environmental impact (**I**) is a joint function of population (**P**), affluence (**A**), and technology (**T**). For any given type of technology, any given level of consumption, any level of poverty, the more people there are, the greater is the turn, on remaining resources. Although

not enough is known about the complex relationships between population and resources, this model demonstrates that economic development cannot continue if key resources are depleted (UNFPA, 1991).

Human beings use the environment in three basic ways: as a *resource bank* – the environment supplies them with raw materials needed to maintain their existence, and their social and technological structures; as a *habitat* – people require more space per individual than any other species; and as a *sink for wastes* – human beings produce more waste than other species. It should be emphasized that population concerns are central to the sustainability of CPRs, because the more people there are on the earth, the greater the impact on the environment and pressures on the CPRs. The increasing population pressure on common property resource at the household and community levels could be demonstrated by the rate of land fragmentation, deforestation, and land use conflicts, especially between agriculture on the one hand, and livestock keeping and mining on the other. These features demonstrate a significant deterioration of the common property resource pool. For example, the rapid technological change in Kwimba District from the hand hoe to an ox-plough and tractors led to increased capacity to cultivate and increased demand for arable land. Consequently, agricultural expansion has been directed to areas that were traditionally used for communal grazing. It can therefore be argued that population pressure is a driving force to diminish CPRs and increased resource use conflicts at the local level.

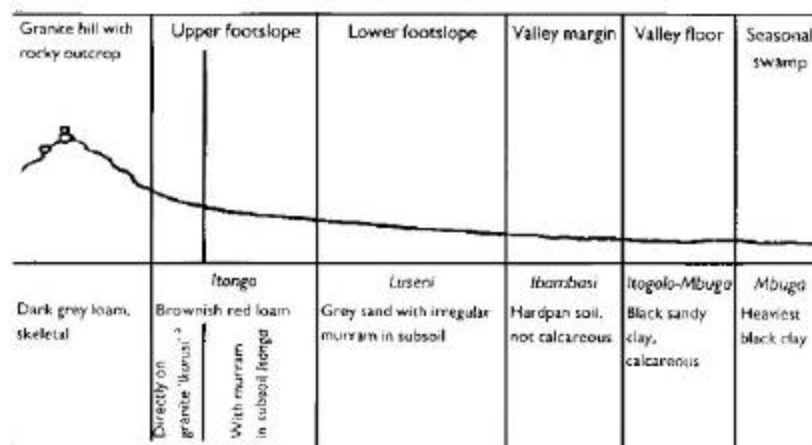
The underlying assumption here is that increases in human population stimulate competing interests resource uses. Expansions of ecological threshold of the human population, for example, often occur at the expense of range management, hence, decreasing the carrying capacity of CPRs in (Meerteens *et al*, 1995). Examining the demographic settings around major conservation areas of Tanzania, It has been argued that the impact of man and his activities on the environment has translated itself into a new emphasis on planning with ecological integration. Shishira and Yanda (1998) observed that almost all Forest Reserves in Tabora Region were encroached in the form of opening up of new farms and settlements, clearing of forests for agricultural and lumbering activities. Similar features were noted in and around the Swagaswaga Game Reserve in Kondoa District (Madulu, 2001). These threats necessitate an

integrated land use management strategy, which take on board the interests of the local population.

3. Population pressure and diminishing CPRs

Small-scale farming constitutes about 60 percent of the district agricultural output. Traditionally, the Sukuma² people practice extensive crop cultivation and livestock keeping. This type of lifestyle necessitates expansive land use patterns, and a large family is associated with a proliferation of hoeing capacity, food security and material prosperity (Malcom, 1953). Traditionally, the Sukuma put emphasis on food availability as a fundamental measure of wealth at the household level. Though this culture still prevails, it is rapidly eroding due to population pressure and the resultant changes in land use patterns. According to Meertens et.al. (1995) and FSRP (1996), the farming systems in Sukumaland could be categorized on the basis of five major areas of the Sukuma soil catena, namely *Luseni-Itogolo*; *Itogolo*, *Mbuga*, *Ibushi/Ibambasi*, and *Kikungu/Nduha*. This classification of the farming systems is largely based on soil types and position of the land along the Sukuma soil catena as illustrated in *Figure 1*.

Figure 1: Sukuma Catena



Source: Meertens, et al., 1995:78

² The Sukuma is the tribe which inhabit the area of northwest Tanzania, south of Lake Victoria.

Meertens et.al (1995) gave the major characteristics of each of the major parts of the Sukuma soil catena. The *Luseni-itogolo* dominated farming system is characterised by poor quality soils dominated by sandy loam. The *Itogolo plain* farming system is dominated Itogolo soils, which is relatively fertile. The *Mbuga plain* dominated farming systems dominated by mbuga soils (*black cotton soils*) which are very fertile in nature but are regularly flooded. The *Ibushi* dominated farming system is dominated by the Ibushi soils which are among the most fertile soils in the lake zone. Such soils are characterised by good chemical fertility, good workability and free of flooding risks. However, these soils are easily eroded. The *Kikungu/Nduha* farming system is characterised by relatively steep sand slopes that make them susceptible to erosion and nutrient losses.

These characteristics were very fundamental is determining the land use patterns and the location of various crops grown by the local population. The rapid increase of the population was consequently accompanied by a significant departure from the traditional practices, hence abandoning the indigenous knowledge that was used to determine land use and land management systems over time.

Subsistence farming which is the dominant farming system in Sukumaland is labour intensive and time consuming. Malcom (1953) described the wealthiest man in Sukumaland as the man with the largest family because a large family means more hoes which spell grain and other material wealth. He viewed food production to the fundamental measure of riches in Sukumaland where agriculture is considered to be an occupational identity and source of social prestige (Madulu, 1998). Similar observations were noted in Bunda District (Kauzeni and Madulu, 2000) and Urambo District (Melamari et.al, 2003) where the number of wives and children are considered to be important source of labour and an indicator of family wealth. According to the 1978, 1988 and 2002 population censuses, Mwanza and Shinyanga Regions were the most populous regions in Tanzania (Table 1).

Table 1: Population Trend for Mwanza and Shinyanga Regions (1967-2002)

Regions	Years	Population	Percent ³	Rank
Mwanza	1967	1,055,883	8.6	1
	1978	1,443,379	8.2	1
	1988	1,876,635	8.1	1
	2002	2,929,644	8.5	1
Shinyanga	1967	899,468	7.3	4
	1978	1,323,535	7.6	2
	1988	1,763,800	7.6	2
	2002	2,796,630	8.1	2

Source: Egerö and Henin (1973), URT (1981, 1994, 2003).

The rapid population increases in these regions has been a function of high natural increase and in recent years due to migration. The rapid increase of the population in Mwanza and Shinyanga Regions has stimulated population out-migration into Kagera, Tabora, Mbeya and Rukwa regions (Charnley, 1994; Melamari et.al., 2003). While out-migration from congested areas could be considered as a strategy to reduce population pressure, its long-term implication is to transfer population pressure and environmental degradation problems to the areas of destination. Observations made in Kwimba District indicated that as the population increases and migrate to new areas the pace of deforestation and other forms of degradation also increases. Until now, a larger part of Kwimba District is considered to be prone to frequent droughts and food insecurity. These features are reflections of the environmental destructions that were made in the past years (Madulu, 1998).

Changes in the farming systems in Sukumaland are reflected by the use of ox-ploughs and tractors that started around 1934, and significantly increased in 1945 when cotton production became an important cash crop (Fuggles-Couchman 1964). After independence the 1960s, the Arusha Declaration in 1967 introduced the *ujamaa and self-reliance policy*, which led to the resettlement of the rural population and change in the land use patterns and tenure system. Such

³ This refers to the percent contribution to the national population.

changes necessitated expansions of farmlands into the communal grazing areas as most of the high lands were distributed to new villagers for residential plots.

4. Availability and use of CPRs in Ng'wakilyambiti Village

Ng'wakilyambiti village is located about 42 km on the South-west of Ngudu town, in Kwimba District. The village originated from Nera chiefdom, which was headed by Chiefs, and assisted by sub-village headsmen (*Wanangwa*). Each sub-chiefdom had a *Mwanangwa* who was responsible for the day to day management and administration of development issues. This administrative or institutional structure of the village was changed during the villagization period of 1974. Although no major boundaries changes were effected after villagization, people from scattered hamlets and settlements were pulled into the concentrated administrative units, *the village*. Every household was given a plot to build a house for residence, disregarding the traditional land tenure systems on the basis of the *Sukumaland soil catena* (FSRP, 1996; Meertens et.al., 1995). Currently, the total land area of the village is 3980 hectares. Table 2 shows the population trends and growth rates in Ng'wakilyambiti village.

Table 2: Population Size and Growth Rates for Ng'wakilyambiti Village (1978-2002)

Years	Population			Growth Rates	Sex Ratios
	Males	Females	Total		
1978	1,020	1,175	2,195	-	87
1988	1,153	1,214	2,367	0.8	95
2002	1,437	1,594	3,031 ⁴	1.8	90

Sources: URT (1981, 1992).

The village population increased from 2,195 in 1978 to 2,267 people in 1988 and and 3,031 in 2002. These population figures indicate that the village had a growth rate of 0.8 percent between 1978 and 1988, 1.8 percent between 1988 and 2002. The relaxation of the villagization

⁴ Draft Village Statistics for the 2002 Population and Housing Census as given by the Central Census Office, National Bureau of Statistics, 2004.

regulations in the mid-1980s enabled people to move back to their former settlements (*mahame*), hence, creating new sub-villages headed by sub-village chairmen (*Kitongoji*).

There is a clear divide of the highland areas that are dominated by *luseni* soils, and the low-lying areas dominated by the *mbuga* soils. There are few areas that are reserved for forestry, though they are dominated by scattered bushes and thorny thickets. A large part of the village is *mbuga* (considered to be fertile) and *luseni* soils (comparatively sandy and less fertile). The *mbuga* areas were mostly used for grazing purposes in the past, but they have been transformed into major maize, sorghum, paddy, and cotton cultivation. Paddy is increasingly replacing cotton as a cash crop mainly due to unreliable marketing systems and low prices for cotton. Due to increasing population pressure, and the importance of rice as a source of household income, most of the traditional communal grazing areas in the village are been transformed into farmland leading to more land use conflicts.

Observations from Ng'wakilyambiti village in Kwimba District indicate that livestock keepers have been squeezed by agricultural expansion to the extent of causing cultural change and significant land use conflicts in the village. Most livestock keepers in the Ng'wakilyambiti village do spare grazing areas within their own farms for their livestock, as no one would allow some one's livestock to graze in his/her farm without a prior agreement or consent of the landlord. This situation has been reached because of the disappearance of the communal grazing

areas, most of which have been transformed into farms at the expense of extensive free range grazing practises as illustrated in Figure 2. Such changes in the land use have been instigated by population pressure at the local level hence demand for more land for agricultural purposes (Madulu 1998).

Figure 2: Expansion of Farming into Communal Grazing Areas in Ng'wakilyambiti Village



Historical tales demonstrate the presence of dense forest cover in the village in the past. The village name itself originated from a story of two women who were attacked, killed, and eaten by hyenas during day time in 1980s. This is an indication that the area was forested and inhabited by wildlife.

None of these features exist today because a large part of the village land has been cleared and cultivated. The village has recorded a significant transformation in the agricultural technology. Changes in farming system and technology in Ng'wakilyambiti village have occurred in three different phases: Phase One was marked by the dominance of the hand hoe where farms were small and located around homes. Phase Two was characterized by the introduction of tractors and use of inorganic fertilizers⁵. Phase Three was dominated by the use of ox-ploughs which replaced tractors and the hand hoe. Many farmers who were using hand hoes (*igembe*), machetes (*ipanga*) and the axe (*mbasa*) to clear the land before ploughing, are currently using ox-ploughs and ox-weeders. The village administration reported to have 350 ox-ploughs and 334 oxen in 2000 alone. Such a big number of ox-ploughs necessitate expansive farming especially in the flat *mbuga* areas, which were the common grazing areas in the past. This situation has caused remarkable shortage of pasture, and stimulating out-migration of livestock keepers. Given the various changes described above (i.e. technological, demographic, economic, ecological, and climatic), changes in land use patterns and availability of CPRs in the village are inevitable.

Another indicator of degradation of the common property resources in the village is the recurrent food shortages, which are mainly caused by repeated drought and poor farming practices. The repeated drought in the village could probably be a continuation of impacts of past excessive deforestation practices 1920s when tsetse eradication campaigns were implemented by the colonial administration (Tanganyika, 1958). Since 1997, the village has experienced significant out-migration of residents to Kahama and Urambo Districts in Shinyanga and Tabora regions, respectively. The main causes of out-migrations include scarcity of grazing areas, scarcity of arable land, and recurrent food shortages (Madulu, 1998; Melamari et.al., 2003). These reasons signify the diminishing common property resources in the village leading to landlessness, land use conflicts, and out-migrations.

⁵ This phase didn't last long because it was expensive to maintain the tractors.

Traditionally, land was distributed and utilised according to customary inheritance rules and procedures based on family and community solidarity (Wilemski 1994). In most cases communities spared communal land for grazing purposes. Under the Sukuma culture homesteads are normally located on the upper side of the Sukuma catena which is characterized by rock outcrops (Meertens *et al.* 1995). Crop farming was largely done in the *Luseni, Ikungu and Nduha* parts of the catena, leaving the water-logged *mbuga* areas (characterized by alluvial black soils) for seasonal grazing. This system is no longer viable as most of the *mbugas* have been transformed into cotton, maize, and rice farms. These areas are been considered to be the only remaining frontiers for agricultural expansion purposes.

It can be argued that due to rapid population increase, the traditional land tenure and management systems have been eroded. This situation is further exacerbated by the expanding market economy and emergence of non-farm activities like mining, which compete with agriculture for land. The emergence of diamond mining in Mabuki and Maganzo villages in Kwimba and Shinyanga District, respectively, have intensified the degradation of common property resources at the village level, and has increased the problem of landlessness and land use conflicts, especially between livestock-keepers, cultivators and miners (Madulu, 1998; 2004). Though the Villagisation Act (URT, 1975) accorded the village governments the responsibility of distributing land, the principles of traditional tenure systems still remained strong.

4. Emerging mining activities and diminishing CPRs

A number of sectoral policy reforms have been initiated in Tanzania in recent years. These include policy changes in the mining, agriculture, investment, health, education, local government reforms, and changes in the political arenas. The purpose of these reforms is to encourage local communities' involvement and to increase efforts towards sustainable development through facilitation of small-scale economic activities including mining.

Mabuki and Maganzo villages are an old traditional village that occupies a strategic position along the Mwanza-Shinyanga trunk road. Maganzo is also strategically located adjacent to the Williamson Diamond Mine at Mwadui. Although the majority of the population in these villages

identify themselves as farmers, there is a significant increase of population involved in small-scale diamond mining. Over 90 per cent of households in Mabuki village identify land scarcity as a major obstacle to agriculture expansion. Increasing utilization of land for diamond mining has facilitated this problem. Table 3 shows the Mabuki and Maganzo population and growth rates between 1978 and 2002.

Table 3: Population Size and Growth Rates for Mabuki Village (1978-2002)

Villages	Years	Population			Growth Rates	Sex Ratios
		Males	Females	Total		
Mabuki	1978	1,842	1,825	3,667	-	101
	1988	2,761	2,387	5,148	3.4	116
	2002	4,281	4,293	8,574	3.6	100
Maganzo	1978	1,312	1,401	2,713	-	94
	1988	1,884	1,958	3,842	3.5	96
	2002	3,846	2,803	6,649	5.5	137

Sources: URT (1981, 1992, 2004).

The population data for both settlements show significantly high growth rates during the 1978/88 and 1988/02 inter-censal periods. In Mabuki village, the population increased from 3,667 in 1978 to 5148 in 1988, and 8,574 in 2002. In Maganzo, the increase was from 2,713 people in 1978 to over 6,000 people in 2002. The observed population increases and growth rates were largely contributed by the mushrooming mining industry which attracted many migrants into the villages. This is demonstrated by the high sex ratio of 116 for Mabuki in 1988 and 137 for Maganzo in 2002, suggesting a sex selective migration in favor of men. Diamond mining at Mabuki started as far as 1922 before the opening of the famous Williamson Diamond Mines at Mwadui in 1940s. It was observed in Mabuki that over 60 percent of the small-scale miners in 1992 were migrants (Madulu, 1998).

There are three main types of mining operations, namely: small, medium and large-scale mining. The first type is the *small-scale mining* which is largely dominated by a large number of poor, livelihood-seeking migrants. The second type is the *medium-scale mining* which is dominated by

outsiders, often regional government officials who have gained access to mining land through their positions, and hire small-scale miners to pan for them. Most medium-scale miners are absentee miners who employ small-scale migrant miners to work for them. The third type is the *large-scale mining* which is mostly dominated by foreign investors using mechanised mining techniques. In most cases the negotiations for mining rights done by the medium and large scale miners are done at without involving the local people. They bypass the local community in their efforts to obtain mining permits.

Large scale diamond mining has been operating in Mwadui near Maganzo since 1940s. However, this type of mining was abandoned in Mabuki after establishing the Mwadui Mine. In both settlements, however, small-scale mining have been flourishing in recent decades. The coming of large-scale mining in Mabuki increased the risk of both farmers and small-scale miners losing their land and mining sites (Madulu 1998). These groups are not consulted when their land is been allocated to a large-scale miner. In many cases, peasants are required to accept nominal compensation to their properties, which exclude land anyway. This implies that, the local communities have no say in determining the fate of their properties and the level of compensation to their common property resources. In other words, the introduction of large and small-scale mining operations in these villages have accelerated the diminishing and degradation pace for the CPRs. The linkage between small-scale mining and degradation of CPRs is largely reflected in the utilization of grazing and farming lands for mining purposes.

Large and medium-scale miners neither pay equitable compensation to the villagers for the loss of their land taken for mining activities, nor to the village administration for the destruction of the village environment. Small and medium-scale diamond miners dig large holes and leave moonlike appearances covered with piles of sand and rocks and pits which are rarely rehabilitated after the mining operations (Figure 3).

Similar and even more dangerous features are found where small-scale gold mining activities are conducted in Geita, Bukombe and Kahama Districts (Yanda *et.al.* 2000). The presence of large-scale miners in the village has sparked a number of conflicts over land use, water and grazing areas (Madulu, 2004). The dominance of migrants within the mining community raises a

Figure 3: Impact of Small Scale Diamond Mining in Maganzo Village



question of access and ownership of land. The miners access to land is highly variable, ranging from official permission from the national ministry responsible for mining or regional government office, to unofficial purchases from local farmers, villagers mining on their own land, and villagers assigning plots

to migrant miners with agreement of sharing the proceeds (Madulu, 1998). All these strategies have implications on the sustainability of CPRs at local levels as no resources are re-invested in the village to improve their status and rehabilitate the destructed environment.

Small-scale miners' diamond sales are usually very arbitrary. There is no centralized marketing system in the village. Diamonds originating in the two villages are sold without any form of taxation or loyalty to the village. The lack of diamond tax revenues means that almost nothing from the diamond is re-invested in the village social service and productive infrastructure. This implies that instead of contributing to the social and economic wellbeing of the local communities, small-scale mining is seriously undermining the villages' development through widespread degradation of the village CPRs and environments. First, mining is resulting in poor and old villagers being pushed off their land through private sale of mining plots and government allocation of mining blocks. Second, mining pulls the youth labor out of agriculture and livestock keeping through involvement in mining activities as independent miners or hired laborers. The absence of youth in agriculture deprives the sector a vital source of labour. Thirdly, mining activities destroy the environment and accelerates land use diversification at the expense of agriculture and livestock keeping. Lastly, mining activities increases the risks of food insecurity through increased population pressure and reduced arable land and agricultural production.

These adverse effects require immediate policy interventions for the benefit of the future generations and their environments.

5. Institutional and legal frameworks for the management of CPRs

One way of ensuring sustainable use of CPRs is to have legal recognition of the CPR and community based property rights (CIEL, 2002). This will provide assurance that local communities will benefit better from the investment they make in terms of time and labor to protect the CPRs. It will also provide authority to the local people to prevent non-sustainable utilization of the CPRs through local enforcement of management regulations. The formal recognition of the community based CPRs and property rights by is desirable and can help to ensure that CPRs are respected, and sustainably managed and utilized in pursuit of the public interest.

Although there are many laws and regulations that aim at protecting the use of various natural resources, little efforts have been made to ensure that CPRs are recognized and sustainably managed. For example, the Wildlife Conservation Act No. 12 of 1974 (URT, 1974) which is the major guiding document in relation to wildlife conservation have many loopholes that deprived local communities access to their traditional CPRs. In most cases villagers are not given alternative sources of CPRs whenever a new wildlife conservation area is created. Moreover, the various institutions established to manage natural resources have deliberately excluded local communities in the planning and management of the resources including CPRs from which they drive their day to day needs.

Though it is commonly agreed that local communities are indispensable managers of the common property resources, their exclusion in the resource management could better explain the observed dwindling of CPRs in many parts of Tanzania. Through their indigenous knowledge, experience and management systems, the Sandawe⁶ people of Kondoa District who are hunters and bee keepers provide us lessons to demonstrate that local communities could, on their own initiatives, sustainably manage and maintain their ecosystems by ensuring a dynamic ecological

⁶ Traditionally, the Sandawe people are hunters and beekeepers; hence, they needed the forests for their own survival.

equilibrium and the continuous availability of essential common CPRs to the stakeholders (Madulu, 2001). For the Sandawe people who largely depend on availability of forests and wildlife for their livelihood both as hunters and bee-keepers, the issue of sustainable use and management of natural resources including CPRs is a matter of survival.

The Sukuma of north-west Tanzania also use their local management systems (*Ngitiri*)⁷ to protect their CPRs and the environment in general (Meertens, *et. al.*, 1995). Through the *Ngitiri* system, pockets of natural forests are observed even in areas where deforestation has had the

Figure 4: Traditionally managed woodlands/bush land known as Ngitiri



biggest impacts as demonstrated in Figure 4. The *Ngitiris* which are managed by allowing undisturbed regeneration of indigenous forests, are normally used by the local communities to provide wood, medicinal plants, thatches, pasture, and more important, to a protection of catchment areas.

According to the Sukuma traditions, land allocation was largely determined by family size and its availability. Although every household had the right to hold land for both cultivation and habitation, neither the chiefs nor the subjects had the right to sell land because it was considered to be a CPR which belonged to the community under the custodian of the chiefs (Wilemski, 1994). Such arrangements ensured availability of land to the villagers and future population without pressures from outside. Access to land was through clearing of forest land in uncultivated areas; allocation of a relinquished land holding; inheritance; allocation by the land control authorities. Such customs played a substantial role in the management of CPRs both at the family and community levels. In Kondoa District, the Irangi people had a tradition of

⁷ Individuals and local communities established their own protected areas that were managed through local rules and regulations

conserving ritual areas where circumcision ceremonies and other rituals were conducted. However, this tradition has increasingly been degrading largely due to lack of political and institutional support and population pressure. Lindberg, (1996) equated this type of destruction to erosion of both the environment and people's culture.

There are conflicting interests in the management of CPRs at various levels. While the national government on the one hand considered CPRs to belong to the nation, local communities and villagers consider CPRs to be theirs. Significant attempts have been made to ensure participatory and demand-driven management of CPRs. Through the new Water Policy (URT, 2002), for example, the emphasis has been put on ensuring community and private sector involvement in the operation and maintenance of water schemes through the Water User Groups (WUG) approach. Moreover, the National Forest Policy (URT, 1998a) and the National Wildlife Policy (URT, 1998b) both emphasize on local community and stakeholder participation in forest and wildlife conservation through joint management agreements between all stakeholders.

These examples suggest that a productive partnership that ensures direct benefits to all stakeholders need to be put in place in order to alleviate poverty and minimize CPR use conflicts and harmonization of stakeholders' interests.. This is true, especially when the value of the local communities' *indigenous knowledge* is recognised. The suggested approaches could flourish if local communities are considered to be protection managers/partners as well as beneficiaries of their own environments and resources (Kauzeni and Madulu, 2000). This means instituting community-based approaches to CPRs conservation. This calls for partnership management to ensure communal benefit, and sustainable utilization and management of resources especially in areas where the management of CPRs have been significantly affected by population pressure.

6. Conclusion

This paper has discussed the impacts of population pressure and policy changes on CPRs availability and sustainable management. It has illustrated that conflicting interests and changing management systems has in many cases led to diminishing CPRs base. Examples from mining, agricultural and pastoral communities have been cited to demonstrate the influence the changing policies, and the implications on the welfare of the local communities. The degradation of CPRs

especially arable land and pasture is accelerated by rapid population increase which stimulates agricultural expansion to meet the population needs.

In many areas local communities have adopted various poverty alleviation strategies, some of which have also facilitated the erosion of CPRs at the local levels. The expansion of agricultural practices into the traditional grazing areas, the involvement in mining activities, the diversification of cropping patterns, and migration, all are considered to be poverty alleviation strategies. In many cases, however, these strategies are implemented without proper environmental protection approaches. It has been argued that various activities that are taking place in the name of poverty alleviation actually deplete the CPRs at the local level. Such experiences stimulate resource use conflicts and competition, which occur at the expense of the local communities' welfare and sustainable development.

Expansion of mining activities in farmlands and communal grazing areas, for example, increases environmental degradation and fear of losing land among local communities. Due to such fears, prospective land sales and non-sustainable mining operations among the small-scale farmers have increased. The long-term implications of these practices include accelerated food insecurity, development of a landless class among rural communities, accelerated poverty, and rapid degradation of the environment. The examples cited in this paper illustrate that local communities are capable of established institutional and legal frameworks that could facilitate sustainable use and management of CPRs. These traditional legal and institutional frameworks were very effective in the past, but have largely been affected by population pressure and lack of political will and support. As a result, many of the traditional resource management systems have been rendered ineffective, hence, are non-functional.

The paper concludes that while population pressure increases the risk of disappearance of most CPRs, involving local communities in the planning and management of such resources is of prime importance, and could trigger sustainable conservation and development at the grassroots level. In all respects, local communities need to be considered as *equal partners* and their interest be given due importance. The paper calls for an integrated approach that could reconcile the interests of all stakeholders, including local communities in managing and benefiting from the

CPRs through. This means that community participation is a precondition for successful and sustainable CPRs use and management. The paper also calls for political and legal support in the efforts to manage common property resources at all levels. Such support could facilitate the harmonization of stakeholders' interests and minimize resource use conflicts and the impacts emanating from rapid population increase.

8. References

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