Scientific Research and Essay Vol.4 (12), pp. 1536-1542, December, 2009
Available online at http://www.academicjournals.org/SRE
ISSN 1992-2248 © 2009 Academic Journals

Full Length Research Paper

Peoples' response to diminishing natural resource base in the Pare-Usambara area, North Eastern Tanzania

Pius Z. Yanda* and Elieho K. Shishira

Institute of Resource Assessment, University of Dar Es Salaam, P. O. Box 35097, Dar Es Salaam, Tanzania.

Accepted 26 June, 2008

In a geographical area consisting of varying potentials, naturally people will tend to exploit areas where they will gain more productivity with minimum investment. However, they will move towards the marginal areas as resources become depleted in the formally high potential areas. This study is aimed at establishing how communities have responded to diminishing resource base in the Pare-Usambara area of northeastern Tanzania. In the Pare-Usambara area, highlands formally highly endowed with natural resources are surrounded by marginally endowed lowlands on the west. The study was conducted through literature review and field data collection using PRA techniques and questionnaire survey. Findings from this study show that resources have been depleted in the highlands mainly due to population pressure, thus forcing people to move out into the marginal areas i.e. the lowlands. In both areas, land is acquired mainly through inheritance, which leads into land fragmentation, decline in land productivity, and freeze of fallow system. Increased migration into the lowlands is inserting pressure on natural resources resulting in cultivation replacing livestock keeping and land shortage as the case for the highlands. In both uplands and lowlands, more than 50% of households own not more than 2 acres of land.

Key words: Natural resources, population, impacts.

INTRODUCTION

The livelihoods of most people in developing countries depend on direct utilization of natural resources surrounding them. Sometimes circumstances arise be it natural or of their own making that impact negatively or positively on the level of the natural resources availability. Under such circumstances, human beings, try to device means of coping with the change. It is important to learn and document how different communities cope with changing environment so that appropriate policies may be formulated.

The underlying hypothesis is that in a geographical area consisting of varying potentials, people would naturally tend to exploit first, areas where they will gain more productivity with minimum investment. Then they would move towards the marginal areas with delicate environmental balance as resources become depleted in the formally high potential areas. This phenomenon is examined in the Pare-Usambara area of northeastern Tanzania where highlands are highly endowed with natural resources and are surrounded by marginally endowed lowlands on the west.

The study area

The Pare-Usambara Mountains are located in northeast Tanzania (Figure 1). The mountains form part of the Eastern Arc Mountains, which are characterized by high rainfall (between 1000 and 2000 mm/year) compared to the surrounding plains which receive much less rains (250 to 600 mm/year). Because of the favourable climate and fertile soil, the mountainous areas have attracted a lot of people. However, an adjacent plain west of the mountains is semi-arid as it is situated on the rainy shadow. The area is crossed by Pangani River, which is characterized by varying human activities such as livestock keeping and irrigated crop production.

Geology of the area is composed of basement complex

*Corresponding author. E-mail: yanda@ira.udsm.ac.tz.

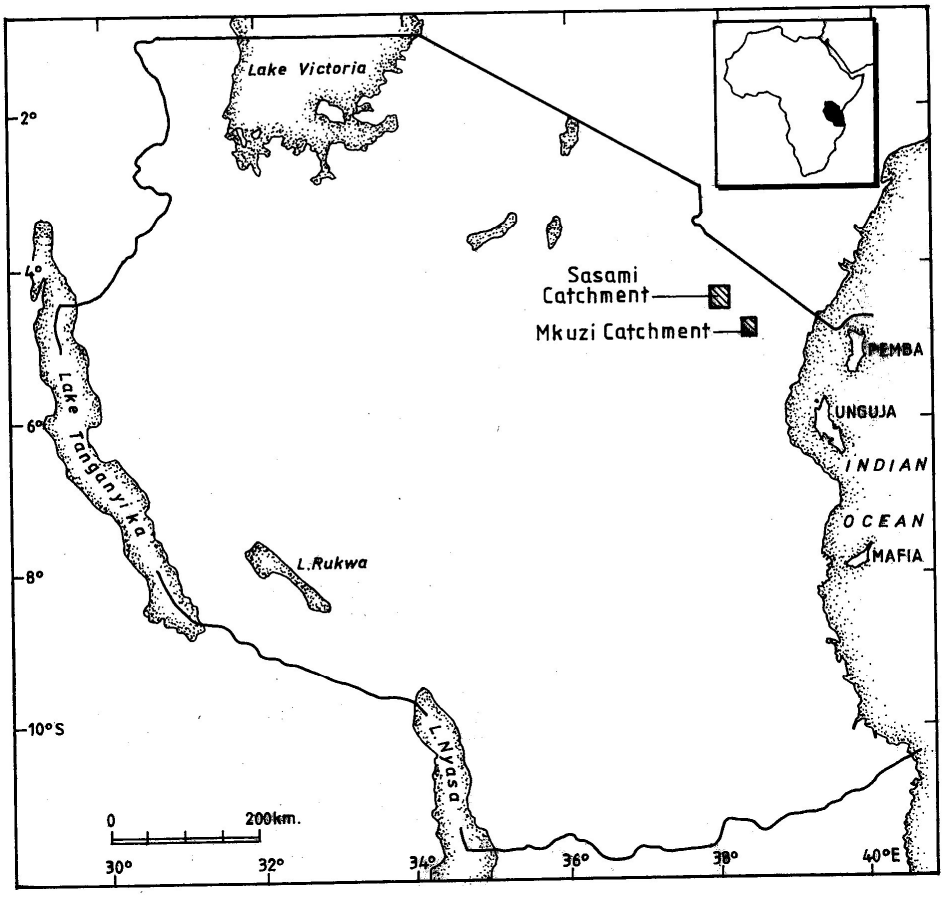

Figure 1. Location of the study areas.

rocks of Archean age which have more recently been subjected to block-faulting thus forming the present chain of Block Mountains.

The mountains were formally covered by moist forest but have since been cleared particularly for cultivation. Kimambo (1991) states that since colonial period, the Pare political system made the ruling group in Upare to be responsible for land distribution to people. The ruling group had power to control land use in the Pare. It was the one to allocate the new land to be cultivated or not. However, during that time there were numerous taboos, norms and rituals that existed for the intention of controling population growth as well as environment. To stress the point Manongi (1978), reports that Wapare had from long time invented the art, which maintained ecological balance. Their rituals and initiation rites helped in the preservation of soil fertility, water and rain. The most outspoken rituals were those involving forests and springs preservation because of belief that God's dwelt in these areas. Similar ecologically sound land use practices were exercised by the Wasambaa people on their side of the mountains (Johansson, 2001). However, with population pressure and incidence of cash economy, human activities have removed most of the forests through clearing and burning. Most of these were done for the purposes of expanding farms and settlements due to the population growth. The only remaining patches of moist forest are protected areas such as catchments forest reserves.

METHODOLOGY

This study was conducted through literature review and field data collection. A literature survey was undertaken and relevant documents were obtained from University libraries, ministries, and district headquarters. The information gathered during literature survey formed basis for planning fieldwork.

It was found during fieldwork planning that the most appropriate approach to gathering field data that would represent both the mountains and the lowlands, was to concentrate on two main catchments running from the mountains into the Pangani River. Therefore, two catchments namely Mkuzi and Sasemi were selected to represent the conditions in the Pare and Usambara Mountains, respectively. In each catchment, two villages were selected to represent the highlands and lowlands conditions, respectively. Therefore, a total of four villages were selected, namely Migambo and Jitengeni for Mkuzi Catchment, and Ivuga Kirongwe and Kankokoro for Sasemi Catchment. Both Migambo and Ivuga are situated in the highlands, while Jitengeni and Kankokoro are situated in the plains west of the mountains.

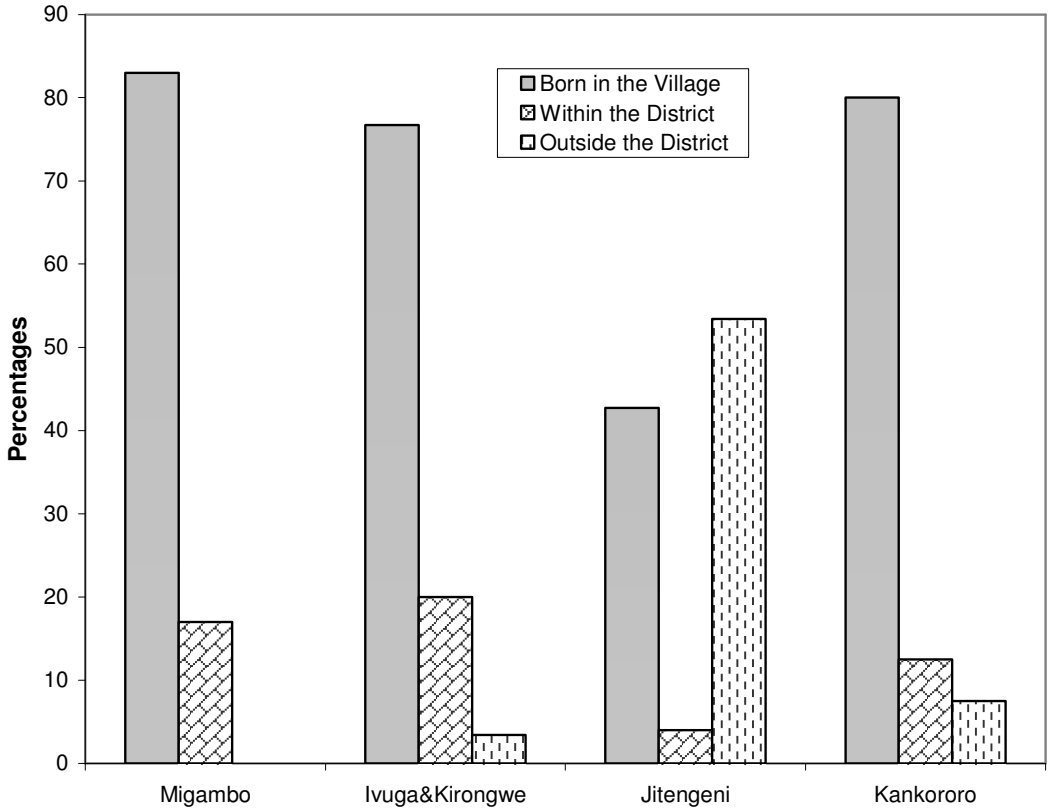

Figure 2. Origin of households interviewed (%).

Both qualitative and quantitative techniques of data collection were used. The use of PRA techniques (transect walks, group discussions) was supplemented by a detailed structured questionnaire administered randomly. The sample size was ten percent of the total households in the village. Application of well thought out and well-constructed instruments of data collection and analysis was imperative to ensure useful results.

RESULTS AND DISCUSSION

The Pare-Usambara Mountains have variety of natural resources upon which people depend for their livelihoods. The resources include land, water, forests, etc. Amongst the variety of resources, land is the most important since the majority of people are agriculturalists whose livelihoods depend on cultivating the land. Thus the issue of land is given priority in this paper.

Diminishing *l*and resources

Land has become a scarce resource in the highlands. Population increase has been pointed out to be the source of the current land shortage in the highlands. The population increase has mainly been through natural growth rate. The few people that have moved into the villages have been through marriages. Because of land shortage there is no pull factor that would encourage them to move into these areas (Figure 2). This phenolmenon is also reported in other highland areas (Yanda, 2002). Results from the questionnaire survey clearly show scarcity of land in the highlands (Figure 3). In these land deficit areas, acquisition of land is mostly through inheritance, purchase, allocation and hiring. However, the most common practices are inheritance and out right purchase (Figure 3). Traditions in the area were against sale of land. Thus the emerging practice of land market is a reflection of the increasing land scarcity in the highland areas where land fragmentation gives rise to land holdings too small to develop gainfully and sustain households. Land fragmentation is a result of the practice of acquisition through inheritance mentioned above.

Findings from this study show that in all the villages studied, more that 50% of households own between 0 and 2 acres and slightly more than 20% of the households own between 2 and 4 acres of farmlands (Figure 4). It is these land parcels that people in the uplands are selling and move into the plains in search for other viable land. These observations are consistent with other observations made elsewhere: In Schonmeier (1977) it is observed that due to the decreasing supply of land in the Pare-Usambara Mountains, a growing number of families now own farms below the critical minimum size. For example, a study undertaken in 1970s established that

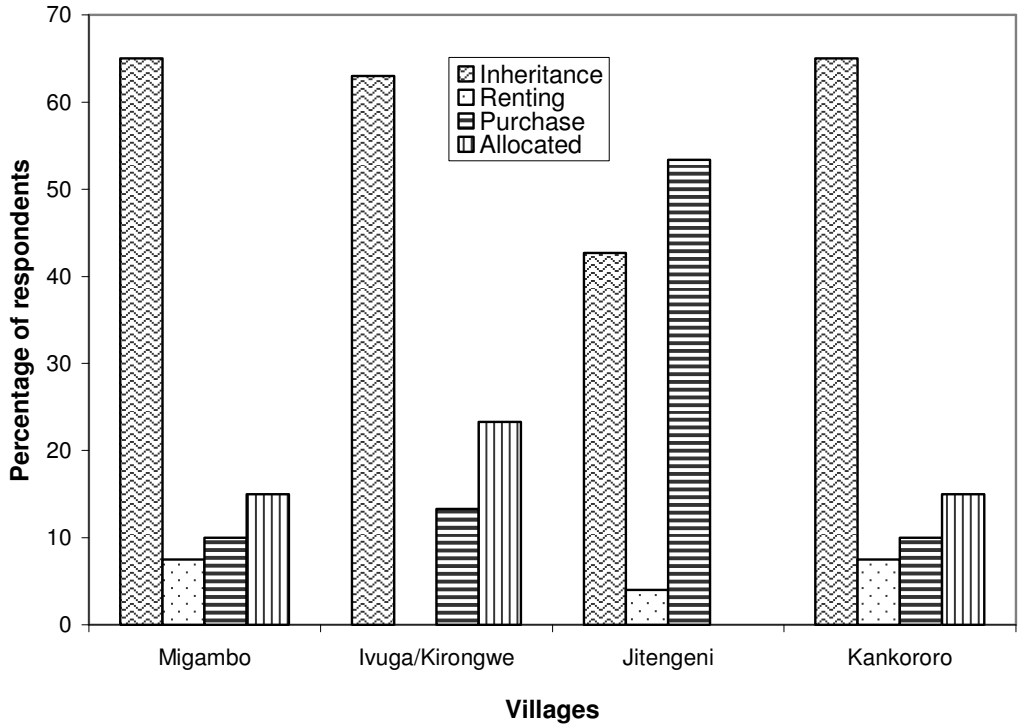

Figure 3. Means of acquiring land (%).

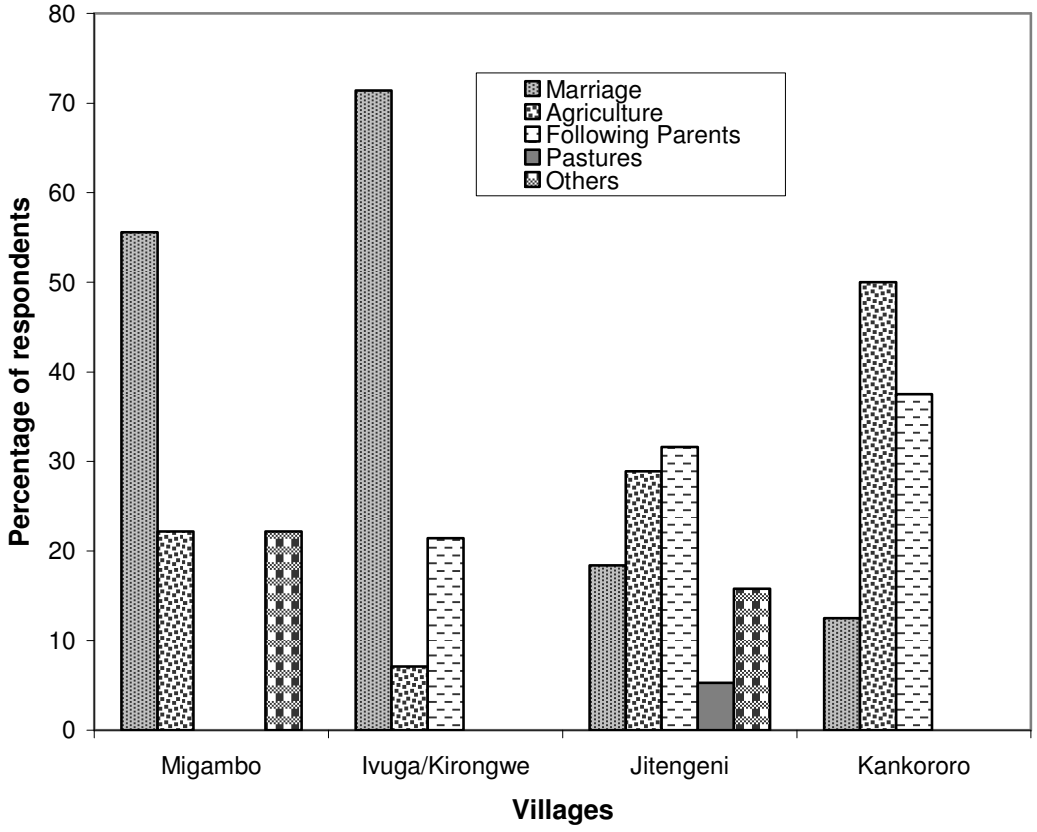

Figure 4. Reasons for moving into the village (% of those who moved into the village).

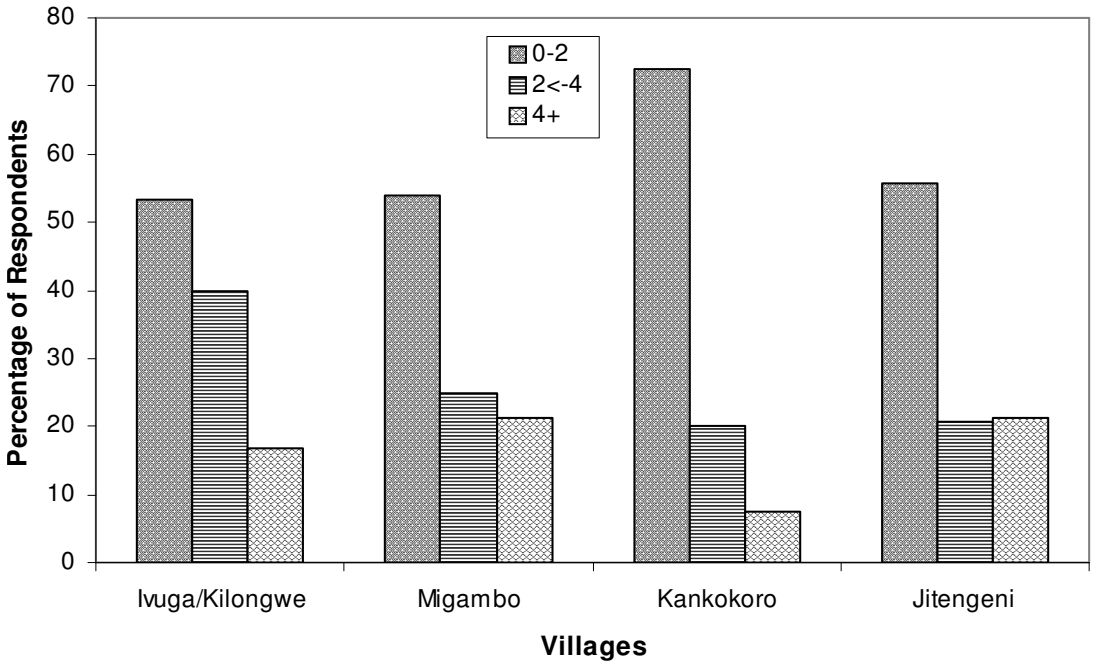

Figure 5. Size of land holdings (acres).

25.8% of 595 families had not more than 2 acres of farmland. This data illustrates that the number of households with no more than 2 acres has doubled. Johanson (2001) observed similar pattern in neighbouring Longai Village. He observed that if holdings were too small to be divided among many heirs, young people would take any opportunity to move elsewhere including lowland areas. The further subdivision of farmland within the families has worsened the situation.

In Mwanga District land scarcity has been characterized by land fragmentation, declining in land productivity, freeze of fallow system, long distance working in search for alternative extra cultivable land outside village boundaries and reduction in the number of livestock because of limited animal forage (Kimolo, 1994). In Barker (1989) it is argued that individuals and farming families do abandon farming when it is impossible to continue or when the balance of opportunity clearly favours change. It is further stressed that key elements in peasants farming unit are land, inputs, people as labour, people as reproducers, and people as consumers. For peasant-farming communities to survive, these elements must be combined in such a way that production takes place and needs are met.

Response to the diminishing land resource

Responses to the question of diminishing land resources availability in the Usambara-Pare Mountains show that this is happening through out-migration into the lowlands, land use changes, intensification, encroachment into protected areas, and dependence on forestry products.

Out-migration from highland areas into lowlands is clearly indicated in Figure 4. The figure shows that majority of those who moved into the lowland villages were searching for agricultural land and following parents who moved searching for land. Most of these people came from the highland villages. Estimates of out-migration in the neighbouring village (Longoi) were estimated to be in the order of about 74 villagers per year (Jonhanson, 2001). To the contrary, most of those who moved into the highland villages were through marriages (Figure 4). Mbonile (2002) found that Pangani basin started to experience population mobility in 19th century, and that it was due to rapid population growth, migration and modernization of rural economy. The main direction of rural to rural migration in this area is from highlands to lowlands.

Although the immediate lowland areas along the Pangani River were seen to be recipients of people in-migrating from the highlands, today the resources, which used to attract them to the area that is, irrigable land, water for irrigation etc. are becoming scarce and land is also being fragmented through inheritance. Data from this study shows no much difference in sizes of land holdings between highlands and lowlands (Figure 5). It should be noted that in the plains, land as such is not scarce but cultivation is largely through irrigation in swamps along the river. Such areas are limited in extent and presently heavily over-utilized. It is also clear in Figure 3 that the process of acquiring land through inheritance and consequent subdivision of land parcels has also taken root in the plains. Because land holdings are small and do not differ much from those in the highlands show that the

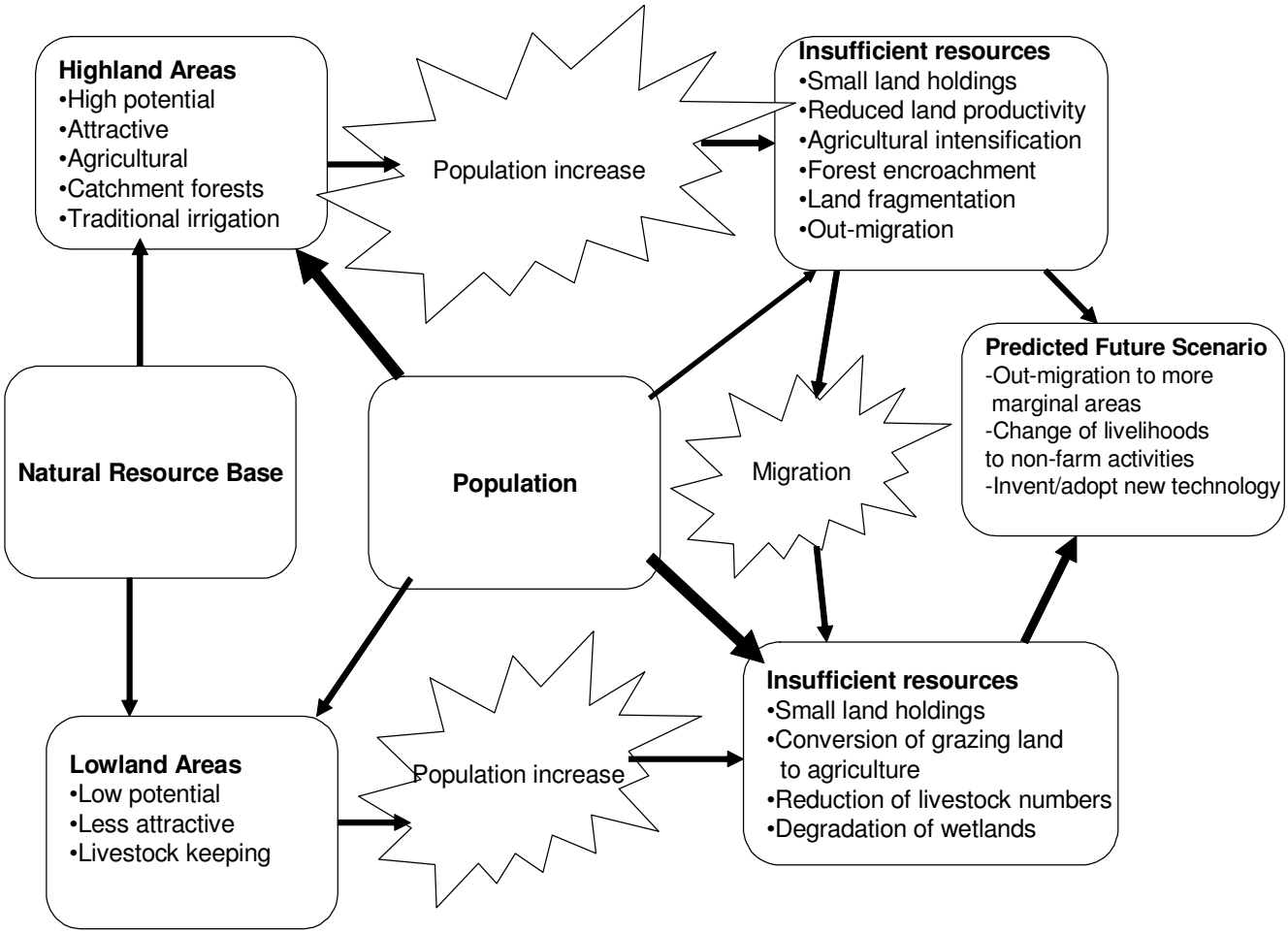

Figure 6. Model illustrating patterns of resources distribution and use in the highland and lowland areas.

available land which was the pull factor in the lowlands is no longer there.

Implications on the *e*nvironment

Out-migration into the lowlands areas may not have significant effect on land availability in the highlands since some people may continue to own the land even if it is idle. Also, in cases where they out-migrate permanently, they may pass it over to members of the clan, and not to the landless people.

Moreover, out-migration from highland areas assumes that moving into lowland areas will solve problems encountered at source. One needs to understand how the lowland can optimally be utilized without compromising its ecological integrity. According to Lein (2002), expansion of agriculture down to the dry lowland has created a number of land and water management problems. For example, irrigation that was formerly concentrated in the highlands has also spread to the dry lowlands area (Lein, 2002). As a result, wetlands, which for many years have been managed sustainably by the local communities in the area, have been opened up by most of these in-migrants, thus leading to the degradation of biodiversity. Also introduction of irrigation system has led to increasing competition over water resources among the users in lowlands. Migration of people into lowlands has also led to the development of agriculture in areas with unsuitable soils hence creating problems of water logging, alkalization and salinization. Likewise, areas that were once forests or grazing land have been settled in and converted into cultivated land. A study conducted in Pare District established that cultivation was replacing livestock keeping in the lowlands, and that led to the decline in livestock numbers (Manongi, 1978).

Water *r*esources *a*vailability

Results from the PRA in all the villages revealed that water is increasingly becoming scarce and vulnerable to pollution. The villagers see deforestation in the catchment areas as the cause of water scarcity which is linked to the expansion of agriculture to meet demands of the

increasing population. For example, in 1962 the government decided that 13,000 ha of the Shume /Magamba Forest Reserve in Mlalo Division, Usambara Mountains should be given out for farming in accordance with the plan to allocate 10 acre farms to more or less landless people from the Mlalo Basin (Johanson, 2001). Such deforestation activities have altered hydrological regime of the rivers and now the discharge has decreased considerably.

As land could not be expanded further, agricultural intensification was chosen to be the alternative means of increasing productivity per unit area. Intensification involved the introduction of irrigated farming, thus leading to the extraction of water, which would have been diverted to the drier plains for irrigation. Agricultural inputs such as chemical fertilizers and pesticides have contributed considerably to the lowering of water quality.

Forestry *r*esources *a*vailability

As mentioned in the previous paragraph, extensive areas of natural forests were cleared to give way for cultivation. The consequences have been increased soil erosion, decline of soil fertility, reduced water discharge, and loss of biodiversity. Similar forestry degradation processes are reported elsewhere. For example, Yanda and Shishira (2001) illustrate that there have been changes in land cover on the slopes of Mt. Kilimanjaro since 1950s. Natural forest on the southern slopes of Mt. Kilimanjaro has decreased by about 41.04 km square. Some areas, which were under natural forest in 1952, were already under cultivation or degraded types of vegetation in 1982.

Several measures were taken during the British Colonial period to arrest land degradation on the mountains. But these largely failed because of the coercive approaches employed under colonial authorities. However, the same techniques with different approaches, particularly which involved participatory approaches such as SECAP and TIPP have changed the landscape positively. Other causes of deforestation include illegal timber harvesting, collection of firewood and building poles, and wild fires.

Natural resources use patterns and responses to the diminishing resources in the Pare-Usambara Mountains, can be summarized in the model presented in Figure 6. The model shows patterns of resources distribution, use and consequences and responses in the upper and lower areas of the ecosystems.

Conclusion and policy implications

Response to landlessness has been migration. But this strategy appears not to have solved the problem because the plains have limited resources, particularly arable land and water. As a result, the same process of land fragmentation is evident in the plains. It seems that the driving force is population growth under a situation where technology is not developing fast enough to overcome demands resulting from population increase. Policy should aim at checking population growth both in the highlands and lowlands. Policy should also aim at introducing alternative livelihoods that would draw people away from complete dependence on working on land.

Conservation methods should be inbuilt in natural resources utilization in order to ensure sustainability. Such methods and approaches employed by various conservation programs such as SECAP and TIPP, which have been widely accepted and adopted by the people, should be encouraged and sustained.

REFERENCES

Barker J (1989). Rural Communities under Stress: Peasant Farmers and the State in Africa. Cambridge University Press, Cambridge.

Johanson L (2001). Ten Million trees Later. Land Use Change in the West Usambara Mountains. The soil erosion control and agroforestry project in Lushoto District 1981-2000. GTZ, Eschborn, Germany.

Kimambo IN (1991). Penetration and Protest in Tanzania. The Impact of the World Economy on the Pare 1860-1960. Tanzania Publishing House Ltd. DSM.

Kimolo MAA (1994). Population, Natural Resources and Agriculture Poduction: A Case of Mountainous Zone of Mwanga District, Kilimanjaro Region, Tanzania. (Diss.), University of Dar es Salaam, Dar es Salaam.

Lein H (2002). Migration, Irrigation and Land use Changes in the Lowlands of Kilimanjaro of Kilimanjaro, Tanzania. In: Water Resources Management. The Case of Pangani River Basin: Issues and Approaches. (Ed) Ngana, J.O. IRA, Dar es Salaam University Press.

Manongi SE (1978). The effect of population on Agricultural land use since 1950s: The Case of Mamba/Vunta Division, Pare District. (Diss.), University of Dar es Salaa, Dar es salaam.

Mbonile MJ (2002). Rural Population Mobility in the Pangani Basin, Tanzania. In: Water Resources Management. The Case of Pangani River Basin: Issues and Approaches. (Ed) Ngana, J.O. IRA, Dar es Salaam University Press.

Schonmeier HW (1977). Agriculture in conflict-The Shambaa Case. Kubel Foundation gGmbH, Bensheim.

Yanda PZ, Shishira EK (2001). Forestry Conservation and Resources Utilization on Southern Slopes of Mount Kilimanjaro: Trends, Conflicts and Resolutions. In: Water Resources Management in The Pangani River Basin: Challenges and Opportunities. (Ed) Ngana JO (2001) Dar es Salaam University Press.

Yanda PZ (2002). Land Use Pressure on the Upper Slopes of Mount Kilimanjaro and Progressive Colonization of Marginal Areas on Footslopes. *In:* Water Management in Pangani River Basin (Chapter 7), Research Monograph Volume 2.

Yanda PZ, Madulu NF (2003). Natural Resources Use Patterns and Poverty Alleviation Strategies in the Highlands and Lowlands of Karatu and Monduli Districts: A Study on Linkages and Environmental Implications. REPOA Research Report.