THE ROLE OF SOIL AND OTHER LAND RESOURCES INFORMATION IN THE FORMULATION OF LAND USE POLICIES IN TANZANIA[1]

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INTRODUCTION

Land is a resource which is getting scarce every year in Tanzania. Land resources in the context of this paper are those resources of the environment which allow the production of crops and animals. They therefore include terrain elements, soils, climate and biophysical as well as socio-economic aspects.

Tanzania has a total land area of 883,749 km^2. The country is endowed with a wide range of resources offering considerable social and economic potential, including extensive areas of arable land, a coastal and marine zone, wildlife reserves and parks, forests, rivers and lakes (TFAP, 1989). Changing human needs and a growing population result in competition and over-use of resources. According to the last population census, Tanzania has a population of about 26 million people (Bureau of Statistics, 1992), with a population growth rate of 2.8%. Tanzania has a low overall population density, averaging about 19 persons per km^2. However, some areas are more densely populated with over 200 persons per km^2, e.g. Ukerewe Island, Kilimanjaro, Mwanza and Dar es Salaam (Bureau of Statistics, 1988. Urbanisation has been increasing steadily. About 20% of the country's total population lived in the urban areas in 1988 compared to 13.8% in 1978 and 5.7% in 1967 (Bureau of Statistics, 1988).

As pressure on land increases, conflicts between some types of land use arise. In Tanzania the most common example is a growing conflict between arable agriculture and extensive grazing as practised by pastoralists. This has resulted in an alarming migration of pastoralists and conflicts of land ownership between newcomers and indigenous people (IIED/IRA, 1992; WWF, 1992). The result of these conflicts in ownership and land uses is massive tree felling, overgrazing, poor cropping systems, unplanned urbanization and consequent degradation of the environment.

The increased demands on land due to diversity of population needs and requirements for production call for correct land use plans and long-term soil and land use policies.

ENVIRONMENTAL PROFILE

Location and administration

Tanzania is located between approximately 1°00'S and 12°00'S and between 29°00'E and 42°00'E. The country is divided into 25 administrative regions, each of which is divided into a variable number of districts which are subdivided into divisions, wards and villages. At present, there are over 90 districts and over 8,000 villages (Bureau of Statics, 1988).

Landforms

Tanzania includes both the highest and lowest places in Africa - the summit of Mt. Kilimanjaro (5,950 m above sea level) and the floor of Lake Tanganyika (358 m below sea level). Except for the coastal belt, most of the country is part of the Central African plateau, 1000-1500m a.s.l., characterised by gently sloping plains and plateaux broken by scattered hills and low-lying wetlands (Morgan, 1969; Berry and Berry, 1969; Atlas of Tanzania, 1976).

Seven landscape units are recognised at the highest level: mountains, hillands, plateaux, piedmonts, peneplains, plains, valleys. Most mountains in Tanzania are volcanic and tectonic. The volcanic mountains are the highest. Two types of valleys are distinguished, viz river valleys and rift valleys. Most of the important river valleys occur at low elevations in the eastern parts of the country.

The plains occur at all elevations from sea level (marine/coastal plains) to about 2,000 m above sea level (lake plains and erosional plains).

Climate

The country has a great diversity of climatic conditions. Mean annual rainfall varies from below 500 mm to over 2,500 mm per annum, depending on altitude and latitude (Morgan, 1969). Mean annual temperatures range from 24° - 34° C.

Rainfall and its distribution is the most important parameter of climate for agricultural production. Two types of rainfall distribution occur in the country viz: monomodal and bimodal. Monomodal rainfall areas have one growing season. Although rainfall distribution may have two peaks separated by a relatively dry spell (called the in-season dry period) this dry spell is in general short

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[1]Paper presented at the 11th meeting of the *East and Southern Africa Sub-Committee for Soil Correlation and Land Evaluation*, 6 - 10 November, 1995. Morogoro, Tanzania.

enough to be survived by most crops. In areas with bimodal rainfall distribution, the dry period between the two rainfall peaks is too long to be survived by crops and the two rainy seasons are long enough to support appropriate crops.

Generally speaking, areas with a bimodal rainfall distribution are found in the north-east of the country near the coast while the hinterland has mainly a monomodal rainfall distribution. The rainy seasons in the areas with a bimodal rainfall pattern are November to December and March to May while in areas with a monomodal rainfall pattern this period is December to April. Rainfall is erratic, only 21% of the country can expect, with 90% probability, annual rainfall of more than 750 mm (Atlas of Tanzania, 1976); and the central third of the country can expect less than 500 mm, with evapo-transpiration rates exceeding precipitation for most of the year.

Hydrography

Hydrographically, Tanzania can be divided into five hydrological basins depending on where they drain to: areas draining into the Indian Ocean - mainly the Rufiji river and its tributaries (draining one fifth of the land of the country), the Pangani and Ruvu rivers; the Malagarasi basin draining into Lake Tanganyika. The Lake Victoria basin draining via the Nile into the Mediterranean Sea; and two Inland drainage systems - one draining into Lake Eyasi, Manyara and Natron in the north and the other into Lake Rukwa in the south-west.

Soils and agro-ecological zones

Identification, characterization and mapping of the soils and agro-ecological zones in Tanzania has been done at 1:2 million scale (Samki, 1977, 1982; Samki and Harrop, 1984 and De Pauw, 1984) for fertilizer recommendations (Samki *et al*, 1982) and crop-specific growing season analysis.

In addition, soil and land resources surveys for several regions and districts have been done at scales between 1:100,000 and 1:500,000 for regional and district land use planning. About half of the country has been covered by these studies. Also many detailed and semi-detailed soil surveys have been undertaken for village planning and project implementation.

There are no exact figures on the areal distribution of the soil types in Tanzania due to scanty information at national level and the small scale nature of the existing national soil resources inventories (Msanya and Magoggo, 1993).

A rough estimation of the areal distribution of the soil types (according to the FAO-Unesco, 1974 classification) can be obtained from the soil, physiography and agro-ecological zones maps of De Pauw, (1984). Table 1 gives an estimated distribution of the various soils found in Tanzania.

Table 1: Aerial extent of different soil types in Tanzania

Soil type	Area mill. ha	%ge	Soil type	Area mill. ha	%ge
Cambisols	23.3	28.3	Fluvisols	2.9	3.5
Ferralsols	12.5	15.1	Planosols	2.4	2.9
Vertisols	7.2	8.7	Phaeozems	1.7	2.1
Xerosols	5.9	7.1	Solonchaks	1.3	1.6
Lithosols	5.6	6.8	Andosols	1.3	1.6
Nitosols	4.8	5.8	Chernozems	0.9	1.1
Gleysols	4.7	5.7	Histosols	0.5	0.6
Arenosols	4.0	4.8	Solonetz	0.4	0.5
Luvisols	3.2	3.9	Regosols	0.06	0.07

Source: De Pauw (1984)

LAND USE PLANNING

The process of land use planning in Tanzania begins with identification and characterization of resources and attaching a spatial relationship to them. Thereafter, the process of land use planning follows the steps outlined below.

Biophysical land evaluation

In Tanzania land evaluation follows the FAO (1976) framework for land evaluation whereby the qualities of the land are matched against the ecological requirements of the land utilization types. At this stage possible land use alternatives are identified within the context of the biophysical environment. For each land use alternative identified the ability of the various tracts of land to support the use on a

sustainable basis is rated in relative terms.

The qualitative biophysical land suitability serves to indicate possible adverse effects of a particular land use

Socio-economic land evaluation

Although in Tanzania the two-stage approach to land evaluation is followed, social factors are implicitly considered right at the outset. The choice of land use alternatives is usually based on an informal survey carried out before or during land resources inventory.

Environmental impact evaluation

Land evaluation reporting in Tanzania almost always includes a set of recommendations. These recommendations and conclusions contain information for guiding the selection of land uses and include possible off-site effects of some uses, interactions between land use types and similar issues.

Decisions and implementation of land use plans

Decisions on land uses are carried out at various levels starting from village to the national level. There are two planning organs at the village level: i.e. the Village Council and the Village Assembly. The latter is responsible for initiating plans.

At the district level the main planning bodies are the District Planning Committee, the District Council and the District Executive Committee. In addition, there is a District Land Use Planning Team (DLUPT) and District Land Use Planning Advisory Committee (DLUPAC). The District Land Use Planning Team comprises district-based representative from the various departments of the different ministries. It reports on a day-to-day basis to the District Lands Officer and Planning Officer, but is directly answerable to the District Land Use Planning Advisory Committee. The team leader is supposed be a physical planner from the Ministry of Lands. The role of the DLUPT is to liaise with their respective sectors so as to ensure the integration of plans and other sectoral activities.

The terms of reference of the District Land Use Planning Advisory Committee (DLUPAC) include formulation of the District Council Policy on land use matters and directing the district land use programmes. The committee is responsible for approving the selection of villages to be included in the planning programme and for the final approval of plans prepared by the planning teams.

The Regional Land Use Planning Team (RLUPT), led by the Regional Planning Officer, is also a multi-disciplinary team with a composition similar to the DLUPT.

The (national) Planning Commission is the highest organ which has the responsibility to compile and scrutinize all ministerial sectoral plans to ensure complementarity with national development plans and policies. A National Land Use Planning Commission (NLUPC) coordinates activities and interests between different sectors. The NLUPC has also a mandate to formulate land use policies and to prepare physical plans at all levels. Such plans are submitted to the Planning Commission, the cabinet and the National Executive Committee of the ruling party for approval.

CONCLUDING REMARKS

If there was a time when well-advised land use planning was needed it was during the villagization era. A political decision was made to create nucleated settlements so as to facilitate the provisions of services. Very little attention was paid to the quality of land and environmental impact issues. However, even on the best advice the country would have been hard put to formulate sound land use plans at the village level. Tanzania lacks a comprehensive national soil policy to guide land use planning.

The lessons to be learned from the failure of many of the villages is that land use planning should address the impact of land use changes on the biophysical and socio-economic environment. In Tanzania, quasi-urban settlements are mushrooming at a fast rate, especially along the main highways. This increasing urbanization places an increased demand on the rural areas to supports the population. The need to develop orderly urban development and rural land use strategies is obvious. Yet, policy on soil is non-existent.

A national soil policy should be developed side by side with a national land use policy and the national agricultural policy that will guide needs for land allocation at various times and levels. The national soil policy will also allocate authorities and responsibilities within the planning machinery to avoid waste and duplication of services. The policy should be structured and implemented on three horizontally-linked levels namely technical, institutional and legal.

For proper and adequate land use planning, advisory purposes and soil policy formulation at a national level, soil mapping and agro-ecological zoning at scales of 1:1 million or larger are desired. These maps could be compiled from existing regional and district maps covering various parts of the country. All efforts should be made to complete land resources inventory of the remaining half of the

country at regional and/or district scale.

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