

LIS and Customary Land Tenure: The Tongan approach

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Abstract

Technologies that are being developed according to the needs of a particular society depend largely on the level of skills, available materials, economy, requirements and cultural traits of that society. If such technologies are proved to work successfully within a given society, cultural differences may not allow those technologies to operate effectively in other societies. Therefore, when transferring a new technology cross-culturally, several factors must be considered so that it is beneficial to the receiving societies.

Land Information Systems have been developed to serve the growing needs of developed societies for complete, current and reliable information in a timely fashion. They are also engaged to evaluate long-term policies on land management combining economic, social and environmental issues.

In exploring the ways in which Information and Communication Technology (ICT) tools and techniques can be used to collect, use and preserve information about lands which are held under various customary land tenure systems, this paper presents a brief overview of land tenure, Land Information Systems (LIS) development and proposes an extension to the classical LIS development models in order that information about customary held lands is dealt with effectively. This paper provides background information to an attempt to find a suitable solution for problems raised by Tonga's unique land tenure system.

Keywords: land information systems, land tenure, Tonga

1 Introduction

Land, the *sine qua non* for the continued existence of the human race, is one of the most important objects of proprietorship. As such, property is a universal feature of human culture. This paper explores the strength as well as the applicability of the Land Information Systems (LIS) models which have been developed primarily to handle data pertaining to lands which are held under freehold land tenure system to be used for handling the data about customary held lands. The authors have been asked to

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develop an information system to assist Tonga's Estate Holders (Nobles) in managing the country's land under their care.

The efficacy and the deficiency of the current approaches for providing information about the land *per se*, regardless of the tenure system being employed, are also examined. The paper concludes that the existing parcel based LIS models should be redesigned and extended, not only to reflect the co-existence of the two tenure systems but also to provide the information covering all lands of economic potential in any multi-tenure jurisdiction. It takes the Tongan's approach and experience as a case study to demonstrate the importance to adapt and modify tools which have been enabled by Information and Communication Technology (ICT), LIS in particular, to suit the socio-economics and cultural realities of traditional societies.

2 Land Tenure

Meek (1968) claims that the word *tenure* has been derived from the Latin word *tenere* meaning to hold as in tenure of office. When applied to landed properties, it implies that land is held under various conditions. Land tenure comprises the rules and procedures which govern the rights and responsibilities of both individuals and groups in the use and control of the basic resource of land (Ratcliffe, 1976).

In this paper, land tenure is defined as the practice under which people control and share the bundle of rights in landed property, and the period for which such rights are held. It is the way in which people obtain, use and distribute the rights to land. It embraces the rules and laws for sharing and using land. Ownership of landed property means owning the rights to a particular piece of land. There may be different rights associated with the same piece of land.

In many communities, people often believe that they own the land outright as they own cars and boats but this is not strictly true because:

- land rates and tax must be paid
- zoning restrictions may prohibit the owner from using the land the way he wants

- all minerals and rights to look for and mine them belong to the government or the community
- part or all of the land may be taken by compulsory acquisition for public use (road, school, hospital or parks)

2.1 Types of Land Tenure

This paper broadly categorises land tenure into customary and freehold land tenure systems. The main differences between these tenure systems are:

- under the freehold system, land rights are described explicitly and protected by laws and land is often regarded as an asset which can be sold,
- under the customary land tenure system land rights and obligations are described broadly and protected by customs, and land is often used for subsistence farming.

2.1.1 Freehold Land Tenure System

In ancient times, cultivation of the land was given as *socage tenure* (Barnhart and Barnhart, 1987). Socage tenure is the basis of all modern land tenure systems. This type of tenure eventually developed many varieties commonly called “*fees*”. Etymologically, the word *fee* stems directly from *fief* meaning a piece of land held on condition of giving military and other services to the feudal lord owning it, in return for his protection and the use of the land.

The freehold system has the following advantages over the other systems of land holding:

- more rights are given to individual or group, including usufructuary right, right to transfer land by sale, right to lend or lease the land to others and the right to leave land rights in a will,
- land rights are defined and protected by laws,
- evidence of ownership is provided by issuing of titles to land holders,
- the title to land provides easier access to credit in which the title can be used as a collateral asset pledged as security for loan,
- the government can easily collect money from the land owners and use that money for the benefit of both the land holders and the landless, the aged and the sick people.

The main drawback of the freehold system lies with the fact that individual land holder often expressed interests in capturing individual benefits from private ownership. People often buy and sell land just to make profit. Consequently, a fair distribution of the society’s wealth cannot be effected.

2.2 Customary Land Tenure System

Customary land tenure is defined in Ezigbalike and Benwell (1994) as the system of holding rights to land which derives from the operations of the traditions and customs of the people affected. This paper refers to customary land tenure as a system comprising all the

arrangements by which the land units, land rights and obligations of the individual towards land and towards others are defined and preserved in unwritten customary laws. It is the traditional way by which land rights in a particular region are administered.

Knowledge of the rights, obligations, and the land, to which the rights are related, are recorded in the minds of the people involved. This knowledge is verbally transmitted from one generation to another. The customary land tenure system is characterised by the ownership of land in common by a community which can be a family, an extended family (lineage) group, a clan or a tribal group.

The fundamental principles of customary land tenure are the inalienability of the land rights and the communal owning of the land itself. Any member of an extended family group may acquire and cultivate a portion of the unused land provided he or she has permission from the headman of the land owning group

Indigenous people living under a customary land tenure system restricted the concept of individual ownership to objects which a man either made himself or acquired by trade through his own efforts. These people claimed that land existed before anyone set foot on it and it continues to exist while its users exist merely for the few years of their lifetime. To them, it is obvious that man merely uses the land and the ownership of it belongs to all generations.

3 The Land Information Systems Concept

LIS are information systems that have been developed to provide spatial and aspatial information for some managerial purposes.

Historically, individual organisations have gathered, processed, archived and maintained land-related data to enable them to execute their functions. Nowadays, LIS developments involve a transition from individual organisations collecting and maintaining data for their own use to an environment where data are considered to be corporate resources. Under the concept of corporate data resources, the agencies who are responsible for maintaining the data are not the owners of the data but are data custodians. The data therefore, should be shared among the interested parties.

3.1 Land Information

Land information is information that spatially and qualitatively describes real world phenomena. A parcel *per se* is an object but its spatial location, address, soil type, owner, value and so on, are the pieces of information that are important, to decision makers, regarding that parcel. Furthermore, Chorley (1987) suggests that land or geographic information is information that can be referenced to specific locations on the Earth. It covers a wide range, including the distribution of natural resources, description of infrastructure, pattern of land use, employment, housing, health and voting habits of the people.

As land becomes scarce its value changes from that of social security to that of financial security. As a result, land becomes very important to people in both developed and developing countries and much attention has been devoted to the provision of information upon which proper decisions may be founded. Land information provides knowledge of the character of the soil, the distribution of the natural and the artificial resources, and who has the legal or social rights to use the resources and in what manners. It is also a prerequisite for achieving ecologically sustainable development. If appropriate information can be provided to planners and decision-makers at the right time, expensive errors in land planning can be avoided.

3.2 Computerised Land Information Systems

LIS collect land-related data in whatever formats are appropriate using whatever methods are applicable, available and affordable to local communities. LIS has been in existence for more than five thousand years. Breasted (1905) describes how the Pharaohs of Egypt, who began ruling in 3400 B.C., kept records of those pieces of land which had been granted to their subjects for fiscal purposes. However, it is only during the past three decades that various forms of computerised land information systems have been in operation throughout the world. These systems are not new or unique in nature but resemble the old way of managing land information.

LIS have been broadly classified into parcel-based, natural resources, cultural, infrastructural and environmental LIS (Palmer, 1984; Toms, Williamson and Grant, 1987; Barnes, 1988). Typically, a number of separate organisations, even within a single parliamentary jurisdiction, spent large sums of money and much effort in separately collecting and maintaining information sufficient to fulfil their individual mandates. This has the potential to waste valuable resources through duplication of effort as the information about essentially the same areas of land is repeatedly collected and maintained by different departments of the same organisation - different government ministries (Palmer, 1984).

The authors argue that if the objective of developing LIS is to provide a platform for the sharing of land information in a multi-user environment, then the development should be directed towards making the information available in the right form whenever needed. It should relate the administration of land tenure, economic activities, social and environmental aspects of managing the resources and should not be restricted by the modalities of holding rights to land.

The authors argue that so far LIS developments have been concentrated on *parcelled* lands (parcel-based LIS). Selecting only the features of the customary tenure which the parcel-based LIS can handle demonstrates the relentlessness of the LIS technology to provide planners and decision-makers with the information on all the land resources in a country. In order for a LIS to work effectively and be acceptable to its users, the relationships and the dependencies of its subsystems must be considered during the system development process.

4 The Problem

Most countries in Oceania have a very large proportion of their land held under various customary land tenure systems and only a small part is held under freehold tenure. More than ninety per cent of the land in the twenty-two island states served by the South Pacific Commission is held under customary tenures. This has resulted in the existence of a dual land tenure system within each country. The authors maintain that if LIS is neither to be culturally offensive nor is it to perpetuate the acculturation of the weaker societies, then it has to acknowledge the co-existence of both freehold and customary land tenure in any country. The authors argue that the current parcel-based LIS models are not the appropriate models to be used in countries where freehold and customary land tenure systems co-exist.

Table 1 shows the land area, including lands which are still held under various customary land tenure systems, and the demographic data of some of the small and developing nations of the Pacific:

Table 1: Land area and population data of some of the island nations of the Pacific.

| Country | Total Land Area (km ²) | % of Land held under Customary Land Tenure | Population (est. in 2005) | Population Density /km |
|------------------|------------------------------------|--|---------------------------|------------------------|
| Papua New Guinea | 462,840 | 97 | 4,200,000 | 9 |
| New Zealand | 26,900 | 4.8 | 4,132,335 | 15 |
| Fiji | 18,270 | 58 | 893,354 | 49 |
| Samoa | 2,940 | 80 | 177,287 | 60 |
| Tonga | 750 | 60 | 112,422 | 150 |

Demographic data shown on Table 1 illustrates that the insular nations of the Pacific suffer socially from the fact that the carrying capacity of their lands is limited. While their inhabitants multiply in size, by increasing its population, land cannot be expanded proportionally in such a way that for every child that is born there is corresponding land created for him/her. Economically, the economies of these countries remain unstable because of severely restricted economic resources, lack of technological advancement, dispersal, geographical isolation, and small local markets set against rapid population growth.

4.1 Institutional Issue – The Tongan Case Study.

Economic resources in the Kingdom of Tonga are scarce and are seriously threatened with irreversible depletion. Resources which took nature many years to develop, nurture and preserve are now obliterated in days and those which were regarded by the Tongans in the past as being capable of endless exploitation are now being annihilated at an alarming rate. With a limited land area, a population density of about 150 persons per square kilometre, and a projected rate of population growth of 3.1% annually, Tonga faces such acute problems of land shortage and population pressure as any other territory in the Pacific

(Tonga Government, 1996). However, no study of these matters has been made and their various aspects present a practical and relatively-untouched field for research.

The 171 archipelagic islands that make up the Kingdom of Tonga cover a territorial water area of about 70,000 km² in the southwest Pacific. More than seventy-five percent of the islands are uninhabited. Some of the islands are either very small or inaccessible to be cultivated or inhabited. Others are considered to be economically unsuitable because they are isolated by a wide expanse of rough seas from the main commercial centres.

4.2 Land Management in Tonga

This section looks at the ways in which the Tongans manage their land. This is done in order that the management tools offered by ICT can be used to harness the way in which the Tongans manage their finite and deteriorating land resources in a sustainable fashion.

4.2.1 The Tongan Land Tenure Systems

The Tongan land system prohibits the sale of land, which has prevented indirect or direct eviction of people from their lands, and the loss of real estate to foreign interests. It has also inhibited large differences in material wealth between the rich and the poor and helped to maintain a secure subsistence life-style in the tradition of the Tongan people.

4.2.2 The Tongan Land Law

The main features of the land tenure system that is operating in Tonga today are descended from the 1862 Code and the 1875 Constitution. The present Land Act which was enforced on 23rd August, 1927 with subsequent amendments has the following characteristics:

- All land in Tonga belongs to the Crown
- Sale of land by anyone, even the king, is prohibited.
- The rights or interests that all land holders, estate and small land holders alike, have in their land are declared to be a life interest only
- The Land Act forbids land holders from entering into any agreement for profit or benefit from the use of his holding other than that prescribed by the Act.
- Non-Tongans can only obtain land under leasehold tenure, subject to the approval of the Cabinet. Estate holders are allowed to lease out no more than five percent of the total area of their estate. The other ninety-five percent is to be distributed as hereditary allotments of the indigenous people.
- If there is no male heir, then the unmarried daughter(s) may inherit or jointly inherit their father's land until they all get married. If there is no heir at all, then the land reverts to the estate holder for re-granting.

There are about 119 estates in the country that have been distributed as hereditary estates of the country's 33 nobles and their subjects as well as 6 titular chiefs and their subjects. Twenty-two estates belong to the king as Royal estates and 22 as royal family's hereditary estates. The rest is designated as Crown or Government land and administered by the Minister of Lands, Survey and Natural Resources.

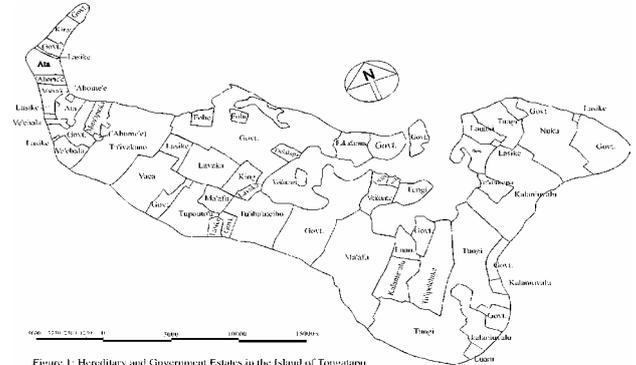


Figure 1: Hereditary and Government Estates in the Island of Tongatapu

Figure 1: Hereditary and Government Estates in the main island of Tonga

Figure 1 illustrates how the main island of the group (Tongatapu) has been divided into estates. Each estate holder is responsible for the management of all the land at his disposal. Although the Constitution obliged the Estate holders to allocate land from their estates as hereditary farm-land to the indigenous people, it did not offer any instruments that might allow compulsory distribution of the land as hereditary holdings of the people. Maude (1965) and Maude and Sevele (1987) state that much of the land has, in fact, been held in large customary plots, often exceeding the legal size, and cultivated by extended family groups rather than individuals.

The most recently-available data on land holdings indicate that in 1999, around 12% of the total land area of Tonga had been allocated as leasehold land. Even if it is assumed that no further leases have been issued since 1999, only 37.7% of the 1996 male population could have been accommodated if they had chosen to exercise their right to a full grant of heritable land as provided by the law, whilst the remaining males would be considered landless.

It is evident that on this basis alone that there exists the potential for extreme social unrest in relation to land availability in Tonga and that a need for change in the traditional land management strategies is imperative. Numerous other examples exist which illustrate that Tonga's growing population and *laissez-faire* land-use controls, allied with outdated traditions, pose a serious threat to the quality of life and economic well-being of this island paradise. People responsible for allocating land do not have easy access to the records kept by various public agencies. As a result, uninformed and irreversible decisions are often made, which are later found to lead to unintentional but irreparable situations.

4.3 Technical Issues

LIS developments in developing countries have often been supply-driven and technique-oriented. They rarely meet the

needs of users because they are not goal-oriented. Goal-oriented LIS developments meet not only technical problems, but also institutional problems and organisational problems (Van Reij, 1994). Figure 2(a) illustrates a widely used LIS framework developed by Williamson (1985) for a state-wide parcel-based LIS based on a legal cadastre. Figure 2(b) is a framework of a multi-purpose cadastre developed by the National Research Council, USA (NRC, 1983).

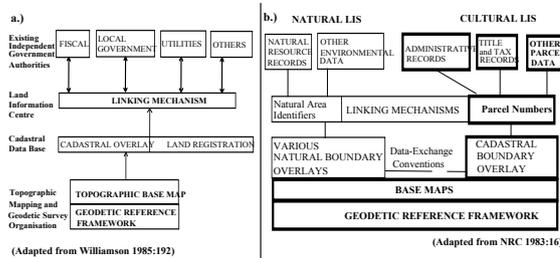


Figure 2: Conceptual Models of a Parcel-Based LIS Based on a Legal Cadastre

These models have been accepted worldwide and are considered as the appropriate models for the development of LIS for land resource management in areas where land has been subdivided into parcels. Bullock (1984) claims that the philosophy of LIS development can be broadly defined as an attempt to improve the availability, quality and utility of property-based data through the use of computer technology.

The NRC regards the model of Figure 2(b) as a foundation for the development of a Natural and a Cultural Land Information System (NRC, 1983). The NRC refers to Cultural LIS as those that are concerned with man's division of the Earth into parcels for purposes of ownership, use and creating a land market. However, parcellation is only one of the ways by which land may be owned and used. Furthermore, dividing land into parcels is only a characteristic of the culture of the Western Societies since they are more individualised and their economy is more capitalised.

It appears that the concept of parcel-based LIS has been specifically developed to provide an information resource-base which can only be used by those societies: a) where legal rights are defined and protected by written law; b) where the smallest administrative units (land parcels) are explicitly marked on the ground and graphically or numerically delineated and recorded on maps and registers; and c) where the economy has its foundation on the individualistic freehold land tenure system. Taylor (1991) states that LIS developments have been driven by technological innovations of the industrialised nations. Such trends have limited relevance or may not be applicable to the problems of development in less developed countries.

4.3.1 Limitations of the Classical Approach to LIS Development

The parcel-based LIS concept does not allow for smooth introduction of LIS technology into places where land is characterised by customary ownership and in which the cadastral parcel and legal boundary concepts are applied

to only a fraction of the total land area. Figure 3 illustrates a case where land in a jurisdiction is held under the freehold tenure (parcel based) and the customary (non-parcel based) tenure systems.

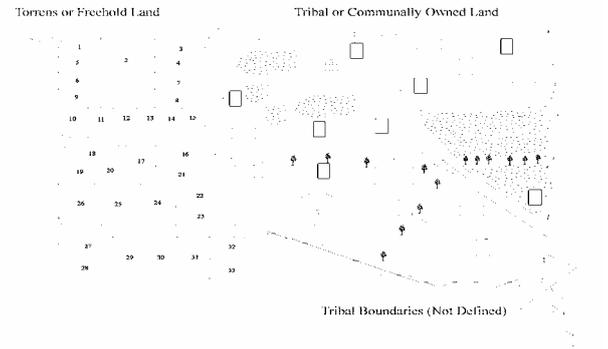


Figure 3: Freehold (parcelled) and Customary Owned (non-parcelled) Land

The classical LIS models of Figure 2 apply only to lands which have been subdivided into parcels, which in some cases are only a small part of the total land area of most countries in the Pacific. Managing the land resources of the country from a national point of view requires adequate information about all the lands in that country. It is therefore necessary that the parcel-based and multi-purpose models should be re-designed so that information about both parcelled and non-parcelled lands could be accommodated in the anticipated LIS to serve all kinds of land information users. It is important also, that the development of a model of a multi-tenure LIS, for countries where lands are held under different tenure systems, should reflect the co-existence of all the land tenure systems practised in those countries.

4.3.2 The Location-Based Concept

Blackburn (1993) argues that LIS have been designed specifically for dealing with "location", therefore the technology should be called LIS, that is, *Location Information System*. Every geographic feature has a fixed location (spatial characteristic) on the Earth's surface and together with its aspatial characteristics (name, quality, extent, etc.) the feature becomes meaningful and distinguishable from other features, be it a land parcel, a house, a historical mound, a cave, a river and so on. Dekker (1984) rightly points out that "one very important aspect of geographic units is the location of each unit on the earth's surface. This, in fact, is the only common factor for all different geographic units. Therefore, the location is the "key" between the different land information systems for the exchange of information collected in each of them separately."

In its simplest form, a real world entity may be spatially represented in a LIS database as either a point, a line or a polygon using its geographical referencing coordinates.

Recent research activities, relating to cultural resource or cultural heritage, have gone their own way and developed various dedicated LIS for their own specific needs. In New Zealand, Cranwell and Benwell (1994) explain how the Maori's historical and cultural place names are

recorded and presented in a spatial information system. Furthermore, Ogleby (1994) describes how Geomatic technology is used in Australia for the documentation and conservation of cultural monuments. These and others, such as the Canadian Heritage Recording Service and the International Council on Monuments and Sites are using some kind of geo-referencing system to locate and identify features of interest in a database and portray the same on a soft or hardcopy map for management purposes.

Similar to the above approach, information about lands held under customary tenure systems can be accommodated in a LIS by adding another component to the models in Figure 2. The additional component would comprise coordinates of points, taken from the topographic base or base map layer, which identify the location of each feature of interest in customary held lands on the base map. The attributes of each feature can then be attached to their respective point identifier. For example, a house situated on customary land is owned by someone or a family and may have electricity, telephone and water connected to it. For planning purposes, knowledge of the number of people living in that house and what facilities connected to it may be necessary. Because the house is not situated in a parcel, other methods of identifying and tagging data in a database, from which the required information is to be generated, have to be used.

On a topographic base map, where the feature of interest is graphically shown, a point can be digitised as an identifier to which all the attributes and textual information about the feature are attached. Moyer and Fisher (1974) maintain that the full locational description of a single point serves quite well as the point's identifier because it involves a relatively small amount of information: three coordinates (x, y and z) are sufficient to locate a single point anywhere on, above or below the earth's surface. The point's identifier can also be used to answer spatial queries such as how many people live in a certain area or what is the actual land use of a particular area and so on.

Using the location, as depicted on the topographic map base by a point, as the basic unit of data collection and communication, is one of the possible solutions to handling information about land held under customary tenure systems. For countries where both freehold and customary tenures are practised, a parcel (polygon) and a location (point) based LIS has to be developed, to avoid imposing of one tenure system on the other. This is illustrated in Figure 4.

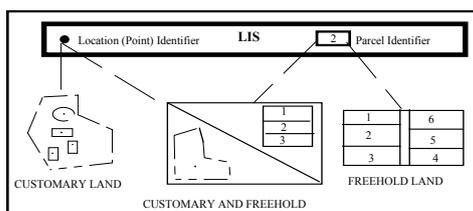


Figure 4: Referencing Mechanisms of a LIS for parcelled and non-parcelled land.

Such a LIS should use the cadastral parcels of the freehold land tenure system and the location, designated by a point, of the features of interest in a customary tenure system as the basic units of data collection and the linking mechanism to other information systems.

5 Proposed Multi-Tenure LIS Conceptual Model

A practical solution is to design a system comprising two inter-related sub-systems. One sub-system collects the data on land held under a freehold land tenure system at the parcel level and the other sub-system collects data about land held under a customary land tenure system based on their spatial location.

In such a system, the parcel-based (Freehold land) sub-system will continue to use the parcel identifier as its referencing mechanism. The non-parcelled (customary land) sub-system shall use a point identifier (defined by coordinates of a selected point representing an area or features of interest as specified by local people) as the spatial and the aspatial referencing mechanism. This will undoubtedly require involvement of the local people during field data collection. Figure 5 illustrates how the current parcel-based model may be re-engineered and extended so that the emphasis is on the land and not on the various rights attaching to the land.

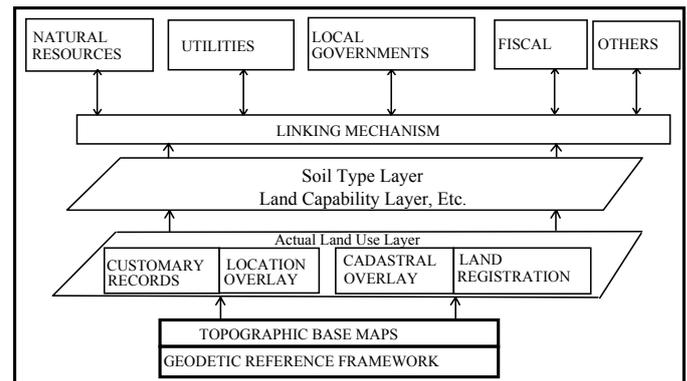


Figure 5: LIS Model for Multi-Land Tenure Jurisdictions

The above model is a variation of the models in Figure 2 to include both the lands which are held under freehold and those that are held under customary land tenure systems, in LIS development. The additional components are those that deal with the information about customary held lands. The model is expected to be used for the development of LIS in countries where the influence of western culture has caused the existence of a dual land tenure system.

In many developing countries there is a lack of awareness among planners, developers and land managers of the problems they are going to face from conflicting land uses. This is partly due to the fact that they lack access to information about the actual use and the potential use of the land resources. The intention of the approach presented here is to let people, especially land managers (chiefs and tribal elders), know what land is being used for, and what activities that a particular piece of land

should be used for in relation to its social, economic and ecological characteristics.

5.1 Rationale for this Approach

Using a point instead of lines or polygons to identify features of interest in customary held lands minimises the risk of being suspected by the chiefs or the elders that LIS tries to do what they do not want to do (i.e. to subdivide the land into parcels). There are many reasons why people living under a customary tenure system are reluctant to see their land subdivided, alienated and held under the Freehold tenure system. Among these are:

- since land is power in many societies, chiefs or tribal leaders fear that they might lose their power over the people;
- in densely populated areas, if subdivided, a lot of people will lose their homes and it will be very difficult to say who stays and who will have to be dispossessed of their rights to their ancestor's land;
- people may only buy land just to sell it for profit;
- Strong kinship relations which assure social security and support will deteriorate and disappear in the future.

It is also important to note that drawing lines on maps, whether hardcopy or softcopy format, to delineate say vegetation cover or actual land uses implies ownership boundaries to people living under customary tenure system.

Maps or layers showing soil polygons or land use capability maps should be shown to the people with great care. If a soil polygon, indicating soil which is good for growing banana, cuts across an area which is used by a customary land holder for growing yams, land the holder may think that LIS is taking away from him part of what has been given by the chief. Customary land holders should be advised that it would better for them, and the communal owning group, to use the affected area for growing banana instead of yam.

6 Conclusion

Any LIS must be capable of: a) acquiring and integrating spatial data as well as the associated aspatial data from different sources; b) processing data into a useable format; c) storing and making data accessible to multiple users; d) retrieving, analysing and transforming data into meaningful information and; e) disseminating information. The general approach to LIS development in both developed and developing countries has changed from centralised to distributed and integrated subsystems.

So far, LIS developments are using the polygon (parcel) component of the LIS primitives (the others being points and lines) as the basic referencing mechanism for gathering, storing and disseminating land information. The simple example stated earlier about the house or improvements made to the land which has not yet been subdivided into parcels, shows that social scientists, physical planners and environmentalists are interested more in the information about the land *per se* and the

improvements made to it than the subdivision of the land into parcels.

The introduction of the location-based sub-system need not, however, involve any change in the practice of customary land holding. All that is needed is to devise a tool which will help the people, living under various land tenure systems, to judge for themselves whether what they do with the land now will not deprive the future generations of their share of the land. The inclusion of a location-based sub-system into the parcel-based LIS model, to handle data on customary held lands is an attempt to avoid the problems which usually arise when trying to replace traditional practices with new technologies.

The next step for this project is to identify all potential stakeholders. The authors intend to explore the capability of SoDIS in addressing the risks associated with introducing unfamiliar technology to indigenous communities.

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