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Cartographic Role on Agricultural Land Resources Evaluation and Management

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Abstract: This study examines the relevance of cartography, remote sensing and GIS on accurate evaluation and management of agricultural land resources globally. Its noted that in advance countries of Europe and North America which had a long history of surveying and mapping of agricultural land resources, farmers now have access to abundant data and offer relevant facilities that assists them in decision-making not only about sites and sizes of farm activities but also about the actual agricultural enterprises in which to invest from time to time. By contrast, the countries in the third world including Nigeria have not been able to apply such advanced cartographic materials to facilitate their agricultural activities for several reasons. First, there is need to survey agricultural lands comprehensively in every developing country. Also each country needs to have comprehensive and detailed soil maps. Thirdly,'world countries should place emphasis on acquisition and utilization of these various cartographic devices and facilities to facilitate the evaluation and management of the various agricultural land resources in each developing country. Certainly the availability of basic data on soils and other land resources is fundamental to the promotion of variable agricultural development in every developing country.
Keywords: Cartography, Agricultural land, Evaluation, Management

INTRODUCTION

This study commences with the necessary clarification of the two key concept in the theme cartography' and agricultural land'. The main objective of the study is a critical analysis of agricultural land resources evaluation and management through effective cartographic techniques.

Initially cartography was concerned with map-making and map use. Over the centuries cartography has expanded appreciably its scope functions and complexity of each function. Today, cartography is both the theoretical and applied discipline that is concerned basically with the making, reading, analysis and use of maps for a wide range of activities. These activities span the whole range of human endeavours such as transportation, industry, agriculture, petroleum oil exploration and exploitation, commerce and aviation [2].

On the other hand, the evaluation and management of agricultural land resources are concerned with the comprehensive description and inventory of all agricultural land resources in any designated areas or regions. Evaluation of agricultural land resources involves a careful but detailed assessment of the potentials of each place of agricultural land. The primary objective of the evaluation of agricultural land resources is to be able to allocate each piece of agricultural land to the type of agricultural activity that piece of land can best support economically or socially or both [2].

CARTOGRAPHY AND RELATED FIELDS

Initially, cartography relied on land surveys for data to make maps. But since the 1960's and owing to remarkable advance in aviation in general and in space probe in particular, there has been a tremendous growth in aerial surveys. While land surveys are tardy and laborious aerial surveys are fast, efficient and reliable although expensive. Thus since the 1960's cartography has drawn from the massive data that have been made available through aerial surveys to augment and up-date from land surveys to produce more accurate and more detailed maps than existed before [8].

With the development of the satellite system, power multilens cameras are mounted on aircrafts to undertake aerial surveys of vast expanses of the earth's surface. Such cameras are so powerful that they record clearly and accurately remote and obscure features such as those on ocean floors, ground floors of thick tropical evergreen forests and deep valleys.

These remote sensing gadgets have made available to the advanced countries like U.S.A. vast data

which only such advancement in aerial photography and remote sensing can provide. There are satellites that go round the earth in every eighteen hours. There are satellite gadgets that collect such massive data that the United States of America the greatest power behind the space probe technology now has problem of where to store these data [8].

The invention and utilization of computer cartography has improved and increased tremendously cartographic functions. While traditional cartography is tardy, tedious and characterized with every low output of maps, computer cartography is fast, efficient and produces a large number of maps within a short time. Not this, alone but also computer cartography is capable of uploading and updating old maps. It can store, process and retrieve massive data effortlessly within a short time. With the traditional cartography, storage facilities for relevant data are limited while retrieval of such data is also difficult.

The authenticity of the data acquired through traditional cartography may be in doubt owing to several sources of errors the system cannot correct. On the other hand, computer cartography enjoys a high degree of authenticity as the computer processes involved in data capture, data analysis, storage and retrieval are free from errors [8].

While lettering and typography are difficult with the traditional cartography, both operations are easy and neat with computer cartography.

Thus modern cartography depends upon land surveys, aerial surveys and remote sensing techniques as the main sources of data that are needed in producing diverse maps. As stated earlier, land surveys are characterized with tardiness, tediousness, inaccuracy and low final outputs. Thus land surveys can no longer cope with huge data needs of modern day cartography. In other words aerial surveys, remote sensing techniques and GIS are the current major sources of reliable data for most of the cartographic processes. Although the modern sources of data and other cartographic items are very expensive yet they are reliable and accurate [8]. At present the developed countries of the West-Europe and North America are advanced in the use of the remote sensing techniques in collecting and analyzing massive data on agricultural land resources evaluation. On the other hand, the poor countries of the Third World are still too poor to take full advantage of these remote-sensing techniques through the satellite system to evaluate the agricultural land resources in their respective territories [6].

EVALUATION OF AGRICULTURAL LAND RESOURCES

Land use has been defined as the solid part of the surface of the earth, which comprises essential components such as soils, minerals, vegetations, streams, rivers, ponds, mountains and valleys as well as the air space (atmosphere) immediately above the land.

Thus the land is the physical basis of human existence. Land is not only a source of man's wealth but also impacts positively and effectively on the character and quality of human beings who utilize the land for diverse socio-economic purposes Fasina [5].

Land is definitely of great significance in agriculture. A man must be sure of access to a sizeable piece of land before he can plan to embark on any farming activity- crop production forestry or even livestock production. The demand for agricultural land is not a demand for the land per se but a demand for the products the land can be used to produce. Such products can be crops, livestock, fish, fibers or forest products. Thus the demand for agricultural land is derived demand. In other words the demand for agricultural land is influenced substantially by a number of important factors such as the prices of the products the land can be used to produce. If such prices are low the demand for the land will be low too. The reverse is also true.

Thus, it is imperative to undertake a thorough land evaluation in all agricultural areas in order to allocate land to competing uses on purely rational economic basis. Land evaluation can be undertaken in three stages: land description and inventory, land appraisal and land development. Given a piece of land, it must be surveyed and the inventory of the resources or potentials in it determined. Secondly, an attempt must be made to determine the capability of the land to support alternative functions such as industry, agriculture, recreation and tourism. If the land is found to be best for agriculture, such a piece of land is designated agricultural land Akinbode and Balogun [1].

Thus, agricultural land is defined as a piece of land that is devoted to agricultural activities such as crop production, livestock production, fishery or forestry or agricultural services such as processing, storage and marketing of agricultural products especially when they are undertaken in rural areas Bongfen [3].

Agricultural land evaluation is the process of estimating the potentials of an agricultural land with a view to determining its suitability for an agricultural use. The value of an agricultural land is almost equal to the value of the soil that has developed on the land. Soils are products of many factors including climatic factors such as rainfall and temperature as well as other factors like organic matter, moisture and aeration.

Land evaluation involves land classification. There are many types of land classification. Land use at

any place and at any time is profoundly influence by the following five groups of factors – environmental, technological, economic, political and social factors. Potent among environmental factors which influence soil development are geology, topography, climate, vegetation and fauna. The level of technological development is significant to agricultural land use and management. Here the peasant cultivation is West Africa, for instance, contrasts sharply with the mechanized agriculture of the Western World in terms of farm sizes, quantity and quality of farm outputs and sizes of farmers' revenues per annum.

Socio-economic factors include product prices, factors costs and land tenure systems all of which play important roles in the allocation and management of agricultural land in any community or economy. Political consideration is tied up with the enforcement of planning regulations that facilitate the efficient administration, management and utilization of agricultural lands and agricultural land resources in an area Olomo [7].

According to Dawson and Doornkamp [4] land evaluation facilitates the assessment of the physical evaluation in terms of its resource potentials. These resource potentials can be tapped beneficially through farming activities that are based upon carefully laid out physical planning coupled with the investment in productive inputs in agriculture.

There are four types of planning that are really relevant to the evaluation of agricultural land resources. These are plans that are appropriate for the development of: (a) Under-developed areas that are also sparsely populated. (b) Under-developed areas but densely populated. (c) Less densely populated but developed areas and (d) densely populated and developed areas. The overriding objective of land evaluation is to succeed in allocating every piece of land to that socio-economic activity or function that will yield the best net returns per unit of land.

In general, industry, commerce and even tourism and recreation yield higher returns per unit of land than agriculture. Thus, the expanding urban centers continue to force agriculture to retreat further to the hinterland Akinbode and Balogun [1].

Within agriculture itself land evaluation is useful in the allocation of specific areas to different types of agricultural activities. For instance, while arable farming requires the wetter and fertile land, irrigation agriculture can be shifted to relatively drier areas while grazing can be confined to the unimproved pasture lands. Hence detail soil maps of the areas or the region under consideration are necessary. For a judicious allocation of the agricultural land to the different competing agricultural activities on the basis of the highest net returns per unit of agricultural land.

THE SIGNIFICANCE OF CARTOGRAPHY IN THE EVALUATION OF AGRICULTURAL LAND RESOURCES

Maps are not only valuable but are also inevitable in the process of evaluation and management of agricultural land resource. This is particularly true in the advanced countries of Europe and North America where agricultural land has been comprehensively surveyed and mapped the inventories of all agricultural land resources undertaken. In particular, the soils have been surveyed and mapped in detail. Thus farmers have the soil maps of their farm lands to refer to as needs arise. Also, additional information can be obtained from appropriate offices on any aspects of the environment on which farmers may require assistance Dawson and Doornkmap [4].

Agricultural land evaluation involves detailed surveys of all agricultural lands as well as detailed, mapping of all the agricultural land resources-such as soils, water, and minerals of economic value. The comprehensive mapping of all agricultural lands in various countries today requires that relevant and detailed up-to-date data be available so that the maps based on these data can also be current, meaningful and useful for both, the farmers, agricultural planners and researchers as well as the policy-makers or the government.

There is need to restate here that land surveying provides some of the data cartographers needs as imputs into map-making. Much of the cartographers' data requirements however derived from the satellite remote sensing techniques which are used for collecting data on soils, vegetation, forests, and water resources among others.

Nigeria has just taken a bold plunge into the space exploration by launching her first satellite Sat 1.which weighs 94 kilograms and which is stationed at 686km above the land surface. This space investment has started to yield inestimable dividends as the nation can now use the Sat 1 to monitor closely and undertake in depth research into her soil characteristics, vegetation analysis, water resources, to determine the limits of desert encroachment, to identify and locate bushfire and to delimit precisely the extent of land erosion and land degradation in various parts of the country.

All lands in general and agricultural lands in particular have been comprehensively surveyed and mapped in terms of their distinguishing characteristic features such as soils, vegetation, topography and water resources in the advanced countries of Europe and North America. In developing countries of the Third world, Tropical Africa, Latin America and South-East

Asia, Land surveying in general and agricultural land surveying in particular is of recent origin. Thus in many of these countries including Nigeria, not all the agricultural land have been surveyed and mapped in detail Dawson and Doornkamp [4]. But with the recent launching of the nation's Sat 1 and Sat 2 and the others that will follow shortly, Nigeria seems to be prepared to have a full information and full control over her major natural resources including agricultural land resources. This augurs well for rational national development, planning and effective implementation of such plans.

Basically, according to Akinbode [2] there are four major types of maps. The first type of maps contain of general purpose or reference maps. Such maps contain a variety of information. Examples of such maps includes all topographic maps. Secondly, there are thematic maps each of which deals with a particular theme such as vegetation map or soil map. Thirdly, there are route or itinerary maps. Such maps serve as aid to travelers and examples include road maps and aeron-atitical charts.

Lastly, there are cadastral maps, which are used for property and boundary delineation. Maps perform different functions such as travel guides, certain maps such as the topographical maps facilitate detailed study and analysis of the characteristics features of the land surface in particular areas. Topographical maps are particularly useful for this purpose. Furthermore, maps perform analytical functions such as the determination or calculation of distances, directions, heights and areas. Not this alone but also, maps are used for testing hypothesis that have been formulated on the relationship between two or more phenomena such as vegetation and rainfall. Indeed, maps are a universal means of communication between the mapmakers and the map users. Maps are used by a wide range of disciplines. For the spatial sciences such as geography, geology and meteorology, maps serve as data store houses or sources of information which is a basis for inferring additional data, a means of displaying the result of data analysis.

Defence, law, administration, planning, emergency services and agriculture all need maps for their various purposes. The more accurate and the more up-to-date the maps are the more efficient will the various purposes of these disciplines be served.

Adequate map coverage of an agricultural region implies that there are detailed and accurate maps which provide necessary information on the agricultural land resources of the region, the nature of the terrain, soil characteristics and vegetation characteristics among others.

PROBLEMS AND PROSPECTS

The Nigerian farmers partly owing to their low level of literacy and partly because of their limited financial resources can hardly take full advantage of cartographic facilities that are designed to assist them evaluate their agricultural land resources soil surveys are hardly comprehensive and agricultural land that have been surveyed are covered with detailed and up to date soil maps. Thus the farmers have little or no befit to derive from the use of soil maps in deciding their farm sites or in deciding which agricultural activities to embark upon at any point in time.

Surveying of all lands in general and the agricultural lands in particular needs to be undertaken by the governments (both State and Federal). There is need for a comprehensive survey of the soils throughout the country. Not this alone, but also thematic maps showing the distribution of the soil types should be produced on a large scale in large quantities. Such maps will be invaluable in guiding farmers to know the types and characteristics of the soils in their areas. None of these basic facilities are available to our farmers today.

The availability of these facilities implies that farmers would know the capabilities of the soils in their areas and thus be in a position to decide and undertake agricultural activities which the soils can best support. The advantage of this is immense as the farmers can plan realistically their agricultural enterprises and proceed to invest meaningfully in enterprises that are known to be viable.

No doubt the various levels of government in the country, local, state and federal need to take seriously the issue of surveys of all types of land in general and agricultural land surveys in particular. Not this alone but also preparation of soil maps ought to be given the priority it deserves. The availability of basic information about major soil characteristics will assist farmers a lot in planning and enhancing agricultural production and productivity throughout the country.

Coupled with the above, the provision of increased financial assistance to farmers through the National Agricultural and Rural Development Bank will enhance both the production of food and raw materials. While the enhanced food production solves the problem of food shortage and food insecurity, increased production of raw materials will promote the growth of domestic industry particular in sub-sector of processing of agricultural raw materials such tubers, fruits and livestock.

An important component of land resources that are essential for improving agriculture generally in the country is the provision of adequate water for both crop and livestock production. Where arable production is not feasible owing to deficient rainfall, irrigation becomes inevitable to enable agriculture to thrive well.

A close look at the various irrigation schemes suggests that the different government have tried to some extent. Yet much more needs to be done. Thus, individuals, government, corporate bodies should rise to the occasion and contribute meaningfully to solving the palpable problem of water shortage in certain parts of the country.

CONCLUSION

This study has examined agricultural land resources evaluation and management through effective cartographic techniques. The study revealed that advanced countries of Europe and North America have a long history of surveying and mapping of agricultural land resources, which have aided farmers in actual agricultural enterprises to invest on from time to time. While this is in sharp contrast with the third world countries including Nigeria which have not been able to apply such advanced cartographic materials to facilitate their agricultural activities for several reasons.

Certainly the availability of basic data on soils and other land resources from cartographic materials will provide a veritable base for agricultural development in developing countries. Therefore there is need for government both at federal and state level to provide farmers with a comprehensive survey of the soil maps throughout the country. Not this alone, but also thematic maps, financial assistance and provision of adequate water for crops and livestock production, are necessary to foster agricultural development in Nigeria.

REFRENCES

1. Akinbode AA, Balogun OY; Towards An Effective MapInterpretation in Nigerian High Schools. Abraka Quarterly.1980; 1(3):131-137.
2. Akinbode AA; Introductory Environmental Resources Management. 10A Akinola Maja Avenue, Jericho, Ibadan, Dabis Publishers Ltd, Nigeria, 2002; 45-52
3. Bongfen GS; The Characteristics of Soils under Permanent Shifting Cultivation in Kinshasha area of Zaire. Soil Science 2002;134: 259-267.
4. Dawson JA and Doornkamp JC ; Evaluating The Human Environment, Edward Arnold (Publishers) Ltd. London,1973; 89-91
5. Fasina AS; Influence of Soil and Management on Maize (Zeemays) field in some selected farms in Lagos State, Nigeria. Soil Science 2005; 15: 68-74.
6. Food and Agricultural Organization of United Nations ; State of the World Forest. Rome: FAO, 2007.
7. Olomo RO; Modern Comprehensive Practical Geography. Pon Publishers Limited Agbor, Delta State, Nigeria,1996; 22-28.
8. Paterson JH; Land, Work and Resources, Edward Arnold (Publishers) Ltd. London, 1973; 68-74.