

A Comparative Analysis of Agricultural Land Use in Ikere Ekiti, Nigeria

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Abstract

Agriculture is the mainstay of Nigerians. This is exemplified by the fact that more than 70 percent of Nigerians are involved in this sector (Olayide, 1980). However, a lot of land use problems beset the Nigerian farmers hence the prospects of the sector are better appreciated by a comparative analysis of agricultural pattern in the developing and the developed world. Von Thünen's agricultural land use provided the basis of arguments while distances from the city centre, crops planted, means of transport and number of days spent on farm constitute the data collected on the basis of primary source. The result revealed that there is total departure of what existed in Ikere agricultural region with that of Von Thünen. The major deviation is that food crops and forest woods were grown in distance farms. In conclusion, the paper recommends intensive use of fertilizer for nearby farms with reduction in land left to fallow. This will further create more land for use in nearby farms

Keywords: Land use, farming system, crops planted, agriculture, comparative analysis.

Introduction

Agriculture is the mainstay of people living in the south-western part of Nigeria. According to Olayide (1980), more than 70 percent of the population living in Nigeria practice agriculture as their main occupation. This means that substantive percentage of Nigerians is involved in this primary occupation. Land has always been at the centre of struggles because of the opportunity cost of alternative uses. In spite of the increased significance of oil and gas sector, Nigeria largely remained an agrarian economy since a high percentage of the labour force continues to engage in agricultural production (Adefila, 2014). The sector however remains labour intensive and this explains in part the reason for downward trend in productivity.

Land as a factor of production and as a natural resource is a critical input in agricultural production (Raufu, 2010). The criticality is imposed by its availability, accessibility, quantity and quality. In Nigerian agriculture, the quality factor stands out as a major determinant of land productivity. This is due to the problems associated with sourcing artificial amendments that can improve the productivity of land especially by subsistent farmers that dominate the arable crop production landscape. Reid *et al.* (2006) submitted that although, estimates of the effects of land degradation on food production are rare, it had been realized that the problem often leads to drastic reduction in agricultural production by necessitating the use of higher level of inputs to maintain yields, temporary or permanent abandonment of plots and conversion of land to lower value uses. Rosegrant and Cline (2003) reported that while food production in 1993 had been derived from 748.6 million ha, it has been projected that 795.5 million ha will be needed in 2020 to meet up with world's food requirement.

Nigeria food problem shows both in quantity and quality. Tied to low agricultural production and productivity is the increasing relative and absolute poverty of the farming population in Nigeria. Although, as observed by Swinton *et al.* (2003) the land management pursued by wealthier household may increase some forms of resource degradation (e.g., more soil erosion due to use of mechanical equipment, or more damage to water resources and biodiversity due to greater use of agro-chemicals), while reducing other forms of resources degradation (e.g., less soil nutrient depletion as a result of greater ability to purchase fertilizers or greater ownership of livestock and recycling manure). The need for increased food production call for knowing the socio-economic characteristics in term of physical inputs used as well as highlighting the farmers pattern of land use in the study area.

A study of agricultural systems and practices in the south-western part of Nigeria is useful in appreciating the problems and prospects of agricultural development. In Nigeria, the distance of farmlands and types of crops grown are of importance in the type of pattern of agricultural land use that emerges. However, a lot of problems affect agricultural land use pattern. Important among such problems are farmers searching for virgin land because of high fertility inherent in such soils. This is probably due to the farmers' cultural attitude towards the use of fertilizers and modern methods of practicing agriculture. The fact that they still want to continue to practice the old method of bush burning and shifting cultivation makes the farmer to continue practice farming activities in a zone year-in-year-out. Pressure on nearby farmlands as a result of increasing demand for land by non-professional farmers such as teachers, clerical workers and also the aged farmers had led to small holding and shorter fallow period. Thus Fadare (1987) attributed the reasons for distance farms to the search for greater farm size and greater amount of revenue derivable.

It is in the reality of the above problems that this paper focuses attention on determining the pattern of present agricultural land use and what existed in the concept of Von Thünen. The result of this study will assist

to determine the validity or otherwise of the concept of Von Thünen as applicable to Ikere agricultural region which is a typical agricultural zone.

The major objective of this paper is to compare agricultural pattern of Von Thünen with what exists in Ikere-Ekiti. This exercise will help the research to:

- i. Determine the relationship between distance and land available for farming in Ikere Local Government Area;
- ii. Assess the impact of land use pattern on agricultural production in Ikere Local Government Area.

Theoretical/Conceptual Framework

The theoretical basis for this study is provided by agricultural land use model of Von Thünen which he called "Isolated State". In his book "Der Isolierte Staat in Beziehung auf Landwirtschaft", first published in 1826, Von Thünen set out a model of agricultural land use zones arranged concentrically around a central city (Fig.1 & Table 1). In order to increasing distance from the centre, the zones are of intensive agriculture, forest, extensive agriculture, ranching, and waste. To understand if land use takes this particular spatial arrangement, one must consider two related issues. Firstly, the specific historical circumstances and experiences, which formed the background to Von Thünen's work; and secondly, the specific assumptions on which the model is constructed.

Of more importance than the content of particular zones at different times and in different places are the principles underlying concentric zone formation. In this paper, the crucial issue is the assumptions which underlie Von Thünen's model. These relate both to the environment and to the principles governing land use allocation. Von Thünen (1826) made six major assumptions as follows:

- i. He assumed the existence of an "Isolated State", a discrete entity cut off from the rest of the world and surrounded on all sides by waste.
- ii. The "Isolated State" is dominated by a single city that provides the sole market for agricultural commodities and the sole supply of industrial commodities.
- iii. There is an established system of exchange of agricultural for industrial commodities between rural and urban dwellers.
- iv. The state is located on an isotropic plain; both fertility and transport costs are everywhere equal, so that production costs (other than those of transport) for a given commodity are everywhere equal, while transport costs for a commodity are simply proportional to distance.
- v. Farmers transport their own goods to market on a dense system of routes, which converge on the central city; thus transport costs are seen as a necessary cost of production.
- vi. Farmers act as to maximize profit automatically (and implicitly, instantaneously) adjusting output to demand changes in a market, which is perfectly competitive.

Within the "Isolated State", Von Thünen considered the relationship of three factors viz. distance of farms from the market; prices received by the farmers for their crops; and the land rent. The price received by the farmers was the market price minus the cost of transportation, which increased directly with distance from the market. Thus, any given product was of greater value to the farmer, the closer he was to the market.

Von Thünen's concept and the emerging concentric rings of agricultural land uses have been modified to varying degree from one locality to another as a result of changes in transportation, new technological attainments in production and distribution of agricultural products; and the consideration of non-economic factors (social and psychological) in determining the pattern of agricultural production. The validity or otherwise of the concept is critically reviewed for Ikere agricultural region.

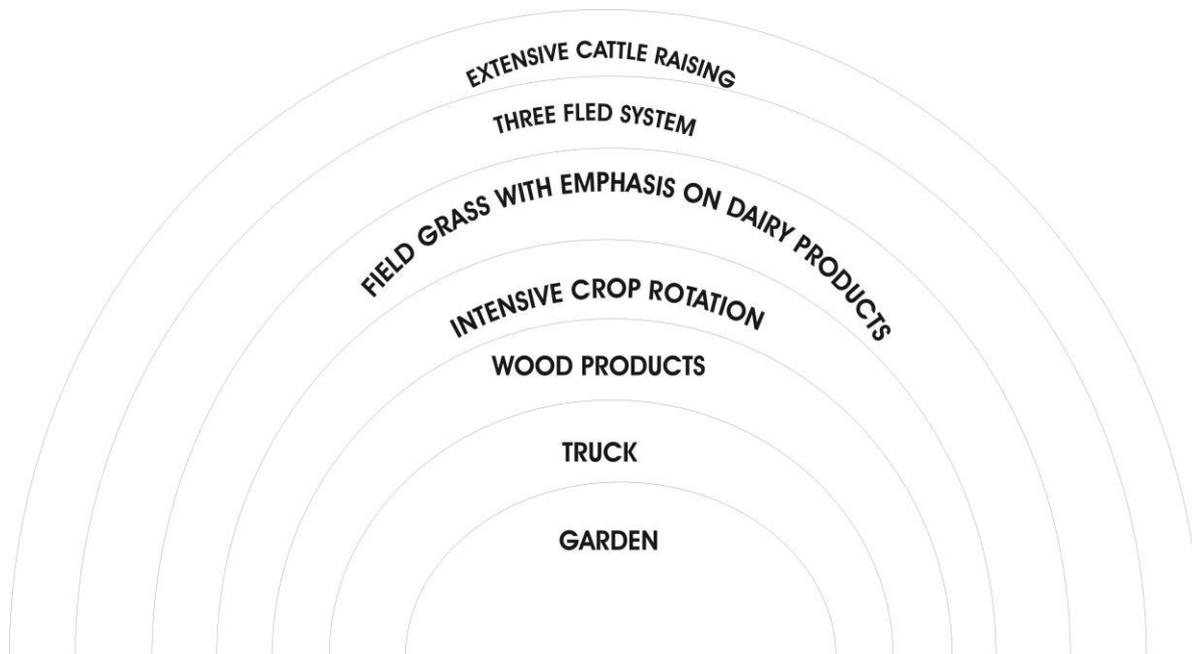


FIG 1: Von Thunen's Isolated State
Source: Rhind And Hudson , 1980

Table 1: Von Thünen's Land Use Rings: The Isolated State.

Zone	% of State	Relative Distance from Centre	Land Use Type	Major Product	Production System
0	< 0.1	< 0.1	Urban Industrial	Manufactured goods	Urban trade centre of state, near iron and coal mines
1	1	0.1 – 0.6	Intensive Agriculture	Milk, Vegetables	Intensive dairying and trucking, heavy manuring, no fallow
2	3	0.6 – 3.5	Forest	Firewood, Timber	Sustained yield forestry
3a	3	3.5 – 4.6	Extensive Agriculture	Rye, Potatoes	6-year rotation: rye (2), potatoes, clover, barley, vetch, no fallow; cattle stall-fed in winter
3b	30	4.6 – 34.0	Extensive Agriculture	Rye	7-year rotation: pasture (3), rye, barley, oats, fallow
3c	25	34.0 – 44.0	Ranching	Rye, animal products	3-field system: rye, pasture, fallow
4	38	44.0 – 100.0	Ranching	Animal products	Mainly stock raising, some rye for on-farm consumption
5	-	> 100.0	Waste	None	None

**Note: Distance to the edge of the Isolated State is assumed to be 100 units.*

Source: Rhind and Hudson, 1980

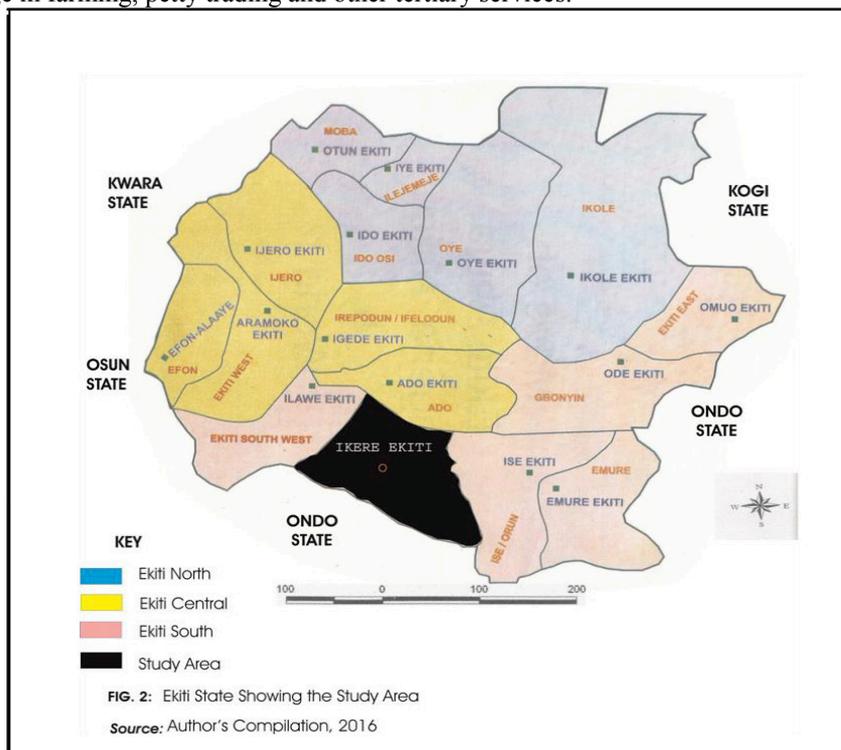
The Study Area

The study area covers Ikere agricultural region. This is an area with a vast agricultural hinterland surrounding it, and occupies a section of an undulation arising from Ekiti hills and dominated by a series of inselbergs. Ikere - Ekiti, the setting for the study is a traditional Nigeria town and like other traditional Yoruba towns in the country, it existed long before the advent of British Colonial rule in Nigeria. The town is located within Ekiti State in the South-western part of Nigeria (Fig. 2). It lies approximately on latitude 7° 30' North of the Equator and longitude 5°14' East of Greenwich Meridian. Ikere is bounded in the north by Ado-Ekiti, in the south by Akure North local government, and in the east and west by Ise/Orun and Ekiti South-west local governments respectively. The last National Population Census puts the total population of Ikere local government at 147,355 (NPC, 2007). Routes from Igbara-odo, Ijare, Ilawe, Akure, and Ise/Emure converge in Ikere town.

Ikere Ekiti experiences a tropical climate with distinct wet and dry seasons which can be better described as Koppen's 'A' Climate (Adebayo, 1993). The wet and dry seasons are associated with the prevalence of the most maritime south westerly monsoon winds from the Atlantic Ocean and the dry continental

north easterly harmattan winds from the Sahara deserts respectively. The rainy season span from April – October while the dry season (November – March). Temperature is almost uniform throughout the year with very little deviation from the mean annual of 27°C. February and March are the hottest months with mean temperature of 28°C and 27°C respectively while June with temperature of 25°C is the coolest (Adebayo,1993). The mean annual total rainfall is 1367mm with a low coefficient of variation of about 10%. Rainfall is highly seasonal with well-marked wet and dry seasons and double maxima as a result of the ‘little dry season’ experienced in August (Ogundare, 2016).

Agriculture is the major economic pursuit of the people of Ikere-Ekiti cultivating both cash and food crops. Food crops like yam, maize, cassava, cocoyam, rice, and plantain are planted while cash crops include cocoa, kolanut, and oil palm. The cash crops are mainly for export while food crops are cultivated on subsistence level. Women engage in farming, petty trading and other tertiary services.



Research Methodology

Von Thünen’s agricultural land use was used as basic information guiding the principles of this research work. Three basic distances based on distance decay-effect were used to divide farmsteads in the study area. The distances are 0 – 3kms for nearby farms, 4 – 7kms for mid-farms, and 8kms above for distance farms. Based on this division farms were identified and numbered. The numbers were subjected to random sampling to enable the research make a sample for close study without any bias. Questions relating to acres of land devoted to different agricultural crops produced were asked. Similarly, other questions such as year of fallow, type of crops, labour required, sources of labour, etc. were asked to know the various crops that were being produced in respect of the distances from the centre of the town.

Findings on Resemblance and Deviations from Von Thünen’s Concept

Von Thünen’s “Isolated State” of 1826 which state in his concentric model that intensive agriculture will be practiced close to the city centre is a total departure from what exists in Ikere agricultural region. Intensive crop rotational system now existed in the middle distance farms of about four to seven kilometres away to the city centre. Crops grown on these farms are mainly food crops among which are maize, cassava, yam, plantain, sweet potatoes and cocoyam. The fallow period is usually less than three years and each farmer has many plots with an average of 4.5 plots.

Market gardening are still closer to the city centre. This is a resemblance of the Von Thünen’s model. The gardens are found at a distance of less than three kilometres from the city centre. The presence of the flood plains, deposition of loess materials and alluvial soils encouraged the practice of market gardening products along the main coast of the river channel in Ikere agricultural area. The waterlogged areas within or very close to the city centre are also used to produce market gardening crops such as tomatoes, okro, pepper, vegetables, and

garden eggs. These are perishable goods which are cultivated on the flood plains or on the alluvial soils along the channels of Rivers Osun and Ogbese in Ikere-Ekiti. The waterlogged areas are also seasonally used especially during the dry seasons for the cultivation of vegetables, okro, maize, millet and of late water melon.

There are no marked truck zones in Ikere agricultural area. This zone is being intermixed with either the cultivation of food crops at a distance of four to seven kilometres away from the city centre or found mainly on distance farms of eight kilometres and above. In essence, fruits are cultivated with other cash crops such as cocoa, rice, kolanut and oil palm. At times, they are planted to serve as demarcation of land or boundaries between two cash crops owned by separate individual. Oranges and mangoes are the dominant fruits found in Ikere agricultural zone.

The zone earmarked for wood products in Von Thünen's model before intensive crop rotation has been totally taken over by intensive crop cultivation in Ikere agricultural region. Because of the pressure for acquisition of land for cultivation of crops, the rate of deforestation is high and so valuable wood products are being cut down to pave way for agriculture. The use of wood for domestic purposes due to population increase as well as the need for buildings and furniture without real afforestation has increased the rate of loss of wood products. The zone has however been occupied with intensive food crops rotation and increased technology advancement of using electricity, gas, and kerosene as substitute for wood products has reduce the rate of tree felling and so the zone is found at a far distance from the city centre.

Another way of relaxing the assumption of Von Thünen is that dairy products are found after market gardening zones. In fact, livestock are reared in the city and very close to the centre of the town when reared on large scale. They are located at very short distances of less than three kilometres to the town probably because of nearness to market.

There is an extensive land for the cultivation of cash crops after the intensive crop rotation zone. This is usually found at a distance of eight kilometres and above from the city centre. Tree plantation of permanent crop plantation such as cocoa, oil palm, kolanut, and rice thrive in this zone. There are presence of farmsteads in this zone and are much more occupied by native farmers. Food crops such as rice, cassava, plantain, and yam are also extensively cultivated in this zone and mainly for sale by the farmers.

The zone of wood products takes after the extensive land for cultivation of cash crops. This zone is gradually being depleted by the search for fertile land for agricultural purposes and the cutting of valuable woods without replanting or afforestation. Where such woods are being cut, the land is left opened which is latter used for cultivation of crops.

There is no marked wasteland in Ikere agricultural region. The people are always looking for fertile soil for cultivation and boundary disputes and adjustment with other neighbouring villages and towns that surrounds Ikere has given no room for wasted land.

The ring pattern, however, could not be possible in Ikere agricultural area for the mere fact that there are more than forty farmsteads which are scattered along the major routes that converge in the town. These farmsteads serve as temporary abode for farmers and daily commuting to Ikere town is no more of importance. The influence of distance in determining the particular location of some crops is not significant too. Cocoa farms are located closer to the farmsteads while the more perishable and least costly bulky crops such as tomatoes and vegetables are located at shorter distances.

The paper also reveals that farming operations are almost limited to the family land among the native farmers in Ikere agricultural region. The family lands, thus, have distinct boundaries that separate them and within such a land parcel are food and cash crops being cultivated. With this kind of situation, it is very difficult to recognize a ring pattern of land use.

Finally, change in transportation means and modes have modified the expected concentric pattern of land use. This is because rise in transport cost as distance increase does not hold today. Transport cost is more related to weight, nature of road and supply of public transport rather than distance. Moreover, it is now much easier for farmers to make as many trips as possible between the farmers and the town daily as a result of the ease of reaching the farms either through bicycle, motorcycles, private or public transport.

The nature of the agricultural concentric ring model as existed in Ikere agricultural region are shown below in comparative analysis with Von Thünen's model.

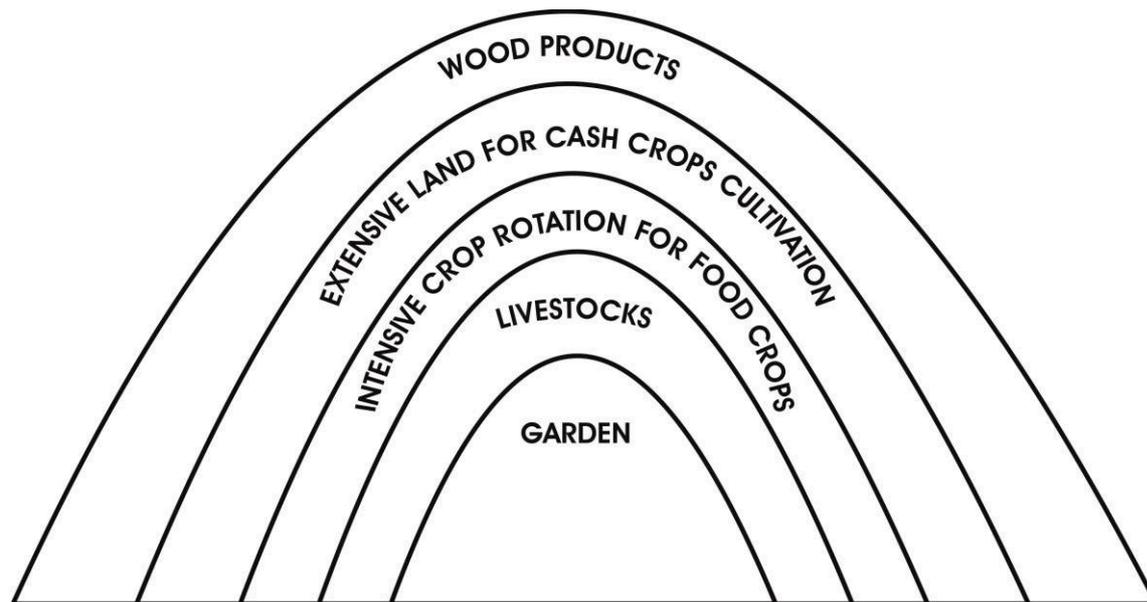


FIG.3:Ikere Agriculture Land use

Source: Field Survey, 2016.

Results and Conclusion

This study reveals that the concentric pattern of agricultural land use in Ikere agricultural region is different from what it used to be during Von Thünen's era. The search for fertile and alluvial land has extended the zone of the wood products to a more distant location. Farming activities are much concerned in the cultivation of food and cash crops. This is due to soil and economic reasons. Less emphasis is given to the production of dairy and livestock. This kind of farming is much more left in the hands of the educational institutions and few individuals on a small scale. Livestock farming is however, not on a large scale because of the high risk involved.

Agricultural land use is as important as other land use types. Both Richardo and Von Thünen were concerned mainly with questions of recent and location in the context of agricultural land use, a reflection of the fact that the economic and social basis of the early 19th century societies in which they lived were primarily agricultural. Till today, agricultural land use remains a vital issue in a large part of the contemporary world.

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