RAILWAY DEVELOPMENT AND THE GROWTH OF EXPORT AGRICULTURE IN NIGERIA DURING THE 1900-1950 PERIOD

BY

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A thesis presented to the School of Graduate Studies, University of Ottawa, in partial fulfilment of the requirements of the degree of Master of Arts in Geography.

University of Ottawa
1981

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ABBREVIATIONS

Cm	=	Centimetre/s
Dev.	=	Development
IBRD	=	International Bank for Reconstruction and Development
Km	=	Kilometre/s
Ltd.	=	Limited
Min.	=	Ministry
Nig.	=	Nigeria
North.	=	Northern
Recons.	=	Reconstruction
Sq.	=	Square

ACKNOWLEDGEMENT

I owe a very great debt to my thesis supervisor, Dr. Rolf Wesche, who gave so generously of his time and advice. Special thanks to the many members of the Department of Geography at Ottawa and Carleton Universities, and others who gave me the benefit of their experiences. For opinions expressed in the text and for any errors of fact or interpretation I am responsible.

PREFACE

Without transport and trade a person would have to lead a self- sufficient existence; he would have to produce everything he needed and there would be no market for his surplus production. Therefore, transport and communication are vital to economic and social development. Transport routes are important features of the landscape which merit study in their own right and for the effect which they have on other distributions.

In most of rural Nigeria, until recently, a subsistence economy was the rule. The gradual change to a cash economy began seriously with the arrival of British Colonial rule and the introduction of new and faster means of transportation in the country. Notable among these new forms of transportation was the railway system which had a considerable influence on the development and movement of mineral and agricultural exports.

A research proposal entitled: Railways and the Development of the Space Economy in Pre-Independence Nigeria, was presented to an advisory committee at the University of Ottawa in the summer of 1980. The proposal was accepted as no research on the topic had previously been undertaken. It was suggested, however, that the scope of the study be confined to the railways and agricultural "development". Hence, the present title: Railway Development and the Growth of Export Agriculture in Nigeria During the 1900-1950 Period. The prime reason for this work is to examine one of the innovations introduced into Nigeria by the Colonial Administration and its impact on something "Nigerian": agriculture. A second reason is to make a small contribution to the understanding of the process of agricultural development in Nigeria.

It is hoped that this thesis will be of value to those who wish for a general picture of the rôle of the railways in the expansion of export agriculture in Nigeria, particularly during the pre-independence era. The objective of the thesis will be equally achieved if the criticism of it leads to better research in the field of transport and agricultural development in Nigeria.

ABSTRACT

Guided by the stage model of Taaffe, Morrill and Gould (1963) the thesis examines how the construction and extension of the Nigerian railway network by the Colonial Administration during the 1898-1930 period gave access to pre-existing agricultural production areas and facilitated the development of new production areas by linking them to coastal ports. As the main penetration lines into the hinterland the railways gave rise to the establishment of new export collecting centres. Some of the existing trade centres, now on the railway line, became centres for the buying and bulking of agricultural products for export.

The thesis focuses on the expanded production and movement of groundnuts, cotton, cocoa, and palm produce, representing the bulk of agricultural exports between 1900 and 1950. Structural changes in the hinterlands of export collecting centres on railway lines are analysed, including the role of feeder roads and competing transportation modes. Though a clear temporal relation between extension of railway lines and massive activation of export production along them is demonstrated, indicating that railways were crucial in facilitating export production, further research is required to elucidate the role of railways in relation to other variables.

RESUME

Basée sur le modèle de Taaffe, Morrill et Gould (1963), cette thèse étudie de quelle façon la construction et l'extension des chemins de fer nigériens, par l'Administration coloniale entre 1898 et 1930, donnèrent accès aux régions agricoles déjà existantes et facilitèrent le développement de nouvelles régions de production en les reliant à des ports côtiers. Les chemins de fer, étant les voies de communication principales de l'arrière-pays, créèrent l'établissement de nouveaux centres de dépôts en vue d'exportation. Quelques lieux de commerce déjà établis, maintenant au bord des chemins de fer, devinrent des entrepôts pour l'achat et l'abri des produits agricoles en vue d'exportation.

Cette thèse se concentre sur la production et le transport développés des arachides, du coton, du cacao et du palmier, ce qui représente la majorité des exportations agricoles entre 1900 et 1950. Les changements de l'environnement des arrière-pays où il y a des centres de dépôts exportateurs sur les lignes de chemin de fer font l'objet d'une analyse, ainsi que le rôle des voies de raccordement et des moyens de transport concurrentiels. Une relation distincte entre le développement des chemins de fer et l'accroissement des produits exportés soit démontrée le long de ceux-là, indiquant que les chemins de fer étaient de première importance pour facilier l'exportation des produits, une recherche supplémentaire est requise pour tirer au clair le rôle des chemins de fer en relation avec d'autres variables.

Chapter 1

INTRODUCTION

One of the central problems in the study of Nigerian economic geography in the twentieth century is to explain the rapid increase in primary exports which began around the turn of the century. For instance, the volume of palm produce exported rose almost four fold from 1900 to 1950, and the exports of cocoa, cotton, and groundnuts grew enormously from almost negligible initial levels. To many observers, the production of primary products for export has appeared the most dynamic feature of economic life in Nigeria, apparently responsible for most of the growth in per capita income during this period (see Berry, 1970). Since this development coincided in time with the advent of Colonial rule (1900-1960), it has commonly been analyzed as a set of responses to the various external forces introduced in Nigerian society by the colonial regime (Helleiner, 1966; Oluwasanmi, 1966). Crucial among these forces is the introduction of new forms of transportation.

Transportation had been poor and was one of the most serious obstacles to economic development in the country. It was significantly re-organised during the colonial era. The Colonial Administration improved some of the traditional forms of mobility, and in most cases did introduce new forms of transportation. The motives behind the introduction of these new forms of transportation were economic, political and social development. The economic motive for the construction of new transport routes is of particular interest to the thesis because it is the recognition that transportation has a vital role to play in the process of development that prompted the examination of the relationship between railways and the growth of export agriculture in pre-independence Nigeria.

The thesis is confined to quantitative growth of export agriculture vis-a-vis growth of the railways. Agriculture is chosen specifically for examination because until recently it accounted for over 85 percent of the national export revenue, and provided employment for about 80 percent of the Nigerian labour force. In looking at the railways I am concerned with the movement of goods rather than the movement of people. Rail passenger traffic is of relatively small significance in the economic geography of Nigeria. Compared to goods' traffic the passenger traffic is proportionately small. In general people travel less and for short distances by rail, whereas a large proportion of goods are moved long distances. Even when people travel by rail, large numbers of them carry huge loads of produce as luggage (Walker, 1959). The impact of railway development on mining in Nigeria has been purposely excluded. During the study period mining products accounted for only 11.8 percent of principal exports and 8.5 percent of total railway traffic.[1]

Scope And Objectives

It has been suggested that an empirical appraisal of the role of transportation in regional growth can be made by associating the historical development of transport with shifts in geographical distribution and increased output of agricultural export (Lugard, 1922; Chinitz, 1961; Chisholm, 1962). To explain this phenomenon reference is made to (1) Levels of agricultural exports and (2) Shifts in geographical distribution of agricultural production for export. Therefore, the first objective is to trace the historical development of the Nigerian railway network and its hinterland. The second objective is to evaluate the impact of the railway network on the growth of agricultural production for such exports as groundnuts, cotton, cocoa and palm produce, which represent the principal exports for the period 1900 - 1950.

Data Source and Data Quality

The thesis is based entirely on library research, and undertaken in the context of a developing nation. The use of quantitative techniques is rather limited on account of data problems. The lack of hard facts in crucial fields is one of the major aspects that appear to distinguish the problem of understanding development in most developing countries from elsewhere. Most scholars working on developing country topics are aware of the constraints imposed on them by data limitations. As Wesche (1971, p. 117) rightly observes, "data for less developed countries are usually limited in quantity, coverage and quality". These shortcomings are due to a variety of reasons among which are illiteracy, ignorance, a lack of interest, and superstitions (Purves, 1964). With special reference to agricultural data; collecting agricultural statistics is not easy in any country and much more difficult in developing economies. The extensive area covered by agricultural activities and the variations of soil, climate, and topography increase the disparity in any facts collected and may lead to errors unless a large sample is taken. Several personal and social factors also make the collection of statistics difficult. Few farmers have records or accurate measurement of the acres planted or amounts produced. The products are sold in small amounts and in many forms. Many farmers hesitate to report their true output because they are suspicious of the use that will be made of these data.

Where data are available the discrepancy between statistical values and the reality of production is, in most cases, appalling. Nevertheless, available data can be put to effective use for some general conclusions.

Secondary sources have been used for the greater part of the thesis. These are obtained from Annual Reports of the various Nigerian Government Departments and of the Railway Administration. The reliability of statistics quoted varies greatly. Those concerned with rail movements are generally accurate, for detailed records are kept by the railway administration of all traffic handled, and there is no reason to doubt their reliability. Most of the export figures quoted are equally reliable. This is not true of crop acreage figures, which are calculated from estimated yields per acre. Among the statistics used in the thesis these must be regarded as the most suspect.

The time scale being examined in the thesis covers the period from 1900 to 1950, but data from 1932-37 and 1947-50 are the primary focus of the analysis. These are the periods for which adequate and consistant data are conveniently available for the railways. Some available and relevant data on the railways before the 1932-1937 period are referred to when appropriate. Export data exist for the entire 1900-1950 period. Data from the 1951-53 period have been integrated into the analysis because they provide some vital information on agricultural practices that are not available in earlier sources.

The use of groundnut, cocoa, cotton and palm produce data considered aggregately as indicators for agricultural exports stems from the fact that these cash crops on average contributed about 78 percent of the Nigerian cash crops trade between 1900 and 1950.[2] The word <u>export</u> is underscored here because the data for groundnuts, cocoa, cotton and palm produce do not represent total production but rather refer to totals railed and exported. Furthermore, <u>export</u> is limited to purely international export, since railway freight movements of the above products for internal markets are limited.

Spatial observation is primarily focused on the railway lines and on selected stations along the lines. These stations are selected on the basis of their location and the quantity of agricultural exports handled annually at each station.

On account of the time series nature of data, long term historical trends are constructed for exports, quantity of agricultural exports railed, and acreages in use. Multi-year averages are designed to provide coverage of the 50 years which followed the successful introduction of the railways and which included the peak years of railway building. These multi-year averages reduce variations due to short-term weather and price fluctuations and thus serve to isolate basic long-term trends. By using the same time periods for the total export trade and the export railed, it has been relatively simple to examine the relationship between the railway development and the growth of agricultural exports.

Notes

1 See Annual Reports on the Nigerian Railway and Colliery, 1934-35, p. 132; Annual Reports on the Nigerian Railway, 1947-48, p. 16; 1949-50, p. 20; and G.K. Helleiner, 1966.

2 Palm produce accounted for 43.4 percent, cocoa 18 percent, groundnuts 15.4 percent, and cotton 2.1 percent of the total exports (1900-1950).

Chapter 2

THE GEOGRAPHICAL CONTEXT OF NIGERIA'S EXPORT AGRICULTURE

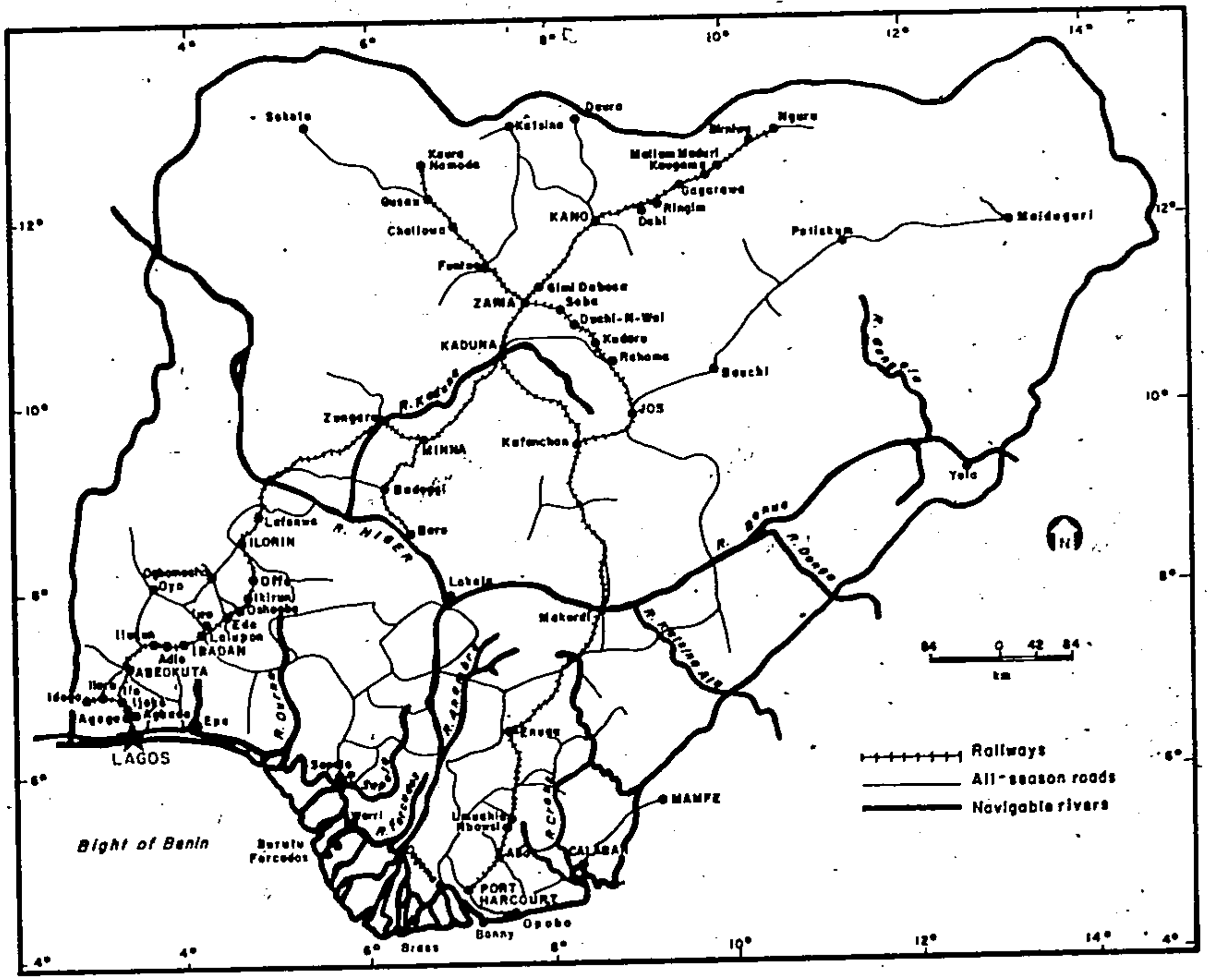
At the Berlin Conference in 1885, the British Governemnt claimed a large territory of about 913,000 square kilometres around the Niger-Benue Rivers. It was not until 1900 that it took over full control of the area from the Royal Niger Company which had formerly been responsible for trade and administration, and proclaimed the Protectorates of Northern and Southern Nigeria. The two Protectorates and the Colony of Lagos were amalgamated into the Colony and Protectorate of Nigeria in 1914. In 1946 the country was divided into three regions: Northern, Western and Eastern Nigeria. It remained so until 1963, three years after Independence, when the Mid-Western Region was created. Nigeria has undergone further divisions since then. In 1967, twelve states were created. In 1975, seven more states were carved out, bringing the total to nineteen states.

Rivers

Nigeria has several rivers and lagoons. Notable among the rivers are the Niger, the Benue, and Cross. These rivers are navigable to certain points all through the year (Map 1). In addition the extensive lagoons of the southern coastal area play an important role in transportation and economic activity. Many of the coastal areas are easily accessible through the rivers and creeks. The Northern towns with limited access to the Niger

MAP I

NIGERIA'S TRANSPORTATION NETWORK



Note: This map shows the main transportation arteries developed between 1898 and 1950.

Sources: Adapted from Annual Reports on the Nigerian Railway and Colliery, 1933-34.

and Benue rivers were served by caravan and camel routes before the railways and modern road network.

Climate, Soil Conditions and Agriculture

The climate of Nigeria is dominated by two seasons: wet and dry, which are well marked throughout most of the country. The wet (rainy) season extends from April to October. The annual rainfall varies from 380 cm on the eastern coast to 63 cm or less in the extreme north. The dry season is from October to April in the North, and in the South it extends from November to April. The annual temperatures range from 21°C to 32°C in the South, and from 10°C to 43°C in the North. The Nigerian climate is generally favourable for quick plant growth. Planting starts as soon as the rain arrives, much earlier in the South than in the North. Day length varies from 11.5 to 12.5 hours in the North and from 11.75 to 12.25 hours in the South (IBRD, 1955). The prevailing conditions of cloudiness, continuously high temperature, high humidity and reasonably sustained rainfall are ideal for the south's oil palm, cocoa tree and a host of indigenous food crops. The oil palm, which is very sensitive to drought, does not flourish in regions experiencing a pronounced dry season, even if the total annual rainfall may be abundant. Given a well-distributed rainfall, as found in most of the southern rainforest zone, it thrives with totals as low as 130 cm or as high as 640 cm. Most of the cocoa is grown with an annual rainfall of 110-150 cm, spread over eight to nine months. Mean annual rainfall of between 90-150 cm, with abundant sunshine during the growing period and a relatively dry period for harvest provide ideal conditions for cotton growing. Groundnuts, on the other hand, require a mean annual rainfall of between 60 and 100 cm, concentrated into the summer months. The conditions in the Savannah zone are well suited to the crop.

H. Vine (1953) has identified at least ten top soil types in Nigeria, ranging from the loose sands and plastic clay with sands in the extreme North to the matted alluvial muds in the extreme South (IBRD, 1955, Map 4). The soils of the principal groundnut producing areas are derived from the desert sand, and the presence of granite fairly close to the surface, as in the Kano and Zaria areas, makes available plant minerals lacking in the desert sand itself. They are rich in plant food. Cotton, which requires loam to clay-loam soils of deep and high fertility, is grown in this ideal condition which is largely found in Zaria, Katsina and Sokoto provinces, stretching from the vicinity of Gusau to Zaria, and also in the eastern part of Bauchi province. Both cocoa and oil palm grow in areas where the soils are broadly classified as porous sands to sandy clays, but each has adapted to some local variations of these soils. The oil palm is well adapted to the deep reddish sand and the yellowish-brown soils of the South, especially in the heavily leached soils of Eastern Nigeria (Buchanan & Pugh, 1955). But in the main cocoa growing areas, soils tend to be less acid and have reduced leaching, better fertility, a high content of clay but good drainage and greater retention of moisture over a three to four month period of low rainfall (IBRD, 1955).

The Pattern of Nigerian Agriculture

Over 80 percent of the Nigerian labour force are engaged in agriculture. The majority are independent farmers, and farming is concentrated around the numerous towns and villages. Peasant production consisting of subsistence output in combination with commercial agriculture on millions of individual small holdings, relying on traditional methods with the use of simple implements, contributes a larger proportion of the country's agricultural production. Virtually all the food crops and almost all the export crops are produced in this sector. It should be stressed that, except in the case of cocoa, there is no hard-and-fast division between production for export and production for subsistence or local trade. For example, when grain products are low in the North, groundnuts which would normally have entered the export trade are diverted to local consumption, while the amount of cotton sold for export depends on the relative price levels of the export and local markets. Groundnuts and cotton are important subsidiary crops in the North, and oil palm is a subsidiary crop in the South. Plantation agriculture, which exists on a limited scale in both the public and private agricultural establishments, accounts for a relatively small amount of total Nigerian agricultural output (less than 5 percent in 1948).

A variety of crops is grown on individual farms, but there is usually a main crop of yam, cassava, groundnuts, guinea corn or millet. Despite the variety of production in the country as a whole most crops and types of livestock are identified with a specific climatic and soil environment. The groundnut, cotton, and cattle export economy of the North contrasts with the cocoa and palm kernel export economy of the West and the palm oil/kernel and root crop economy of the East.

Shifting cultivation (land rotation) is a common feature. Where persistent cropping led to soil exhaustion, productivity is maintained by fallowing. Inter-cropping is practised throughout the South, where yams and cassava are planted with crops like maize, melon or beans. Double-cropping is possible where the rains occur through most of the year, or where the land can be irrigated in the dry season in the North.

Land Utilisation

Land utilisation is to some extent affected by the Nigerian land tenure system which is complex. Essentially, it is communal in character. Individual ownership is rare and rights to land are usually held by a small family group or large village or ethnic group. In the South, control over land is invested in clans, villages, communities and families. The private ownership customary in capitalist Western society is not applicable to Nigeria's agrarian land tenure system. Individual occupants of land are identified by the right they hold rather than by actual possession of land. Under this system, individuals do not have complete control over the land in use and the sale of land is hardly possible. In such a situation the farmer is confined to the family land, and the practise of dividing and sub-dividing the farm land among sons is wide-spread. This arrangement limits the productivity of the agricultural farmland since fragmentation and excessive division of land results in uneconomic units. Farm tenancy is also widely practised in the country particularly in the West. Under this system sub-leasing of farmland is not permitted and the tenants are not allowed to plant permanent crops on the land leased to them (Adegboye, 1967). The limitations imposed on the tenant do not permit him to invest in land improvements since his tenancy cannot be guaranteed. The overall result is that agricultural production and productivity remain at a very low level. Even in the North, where ~~the~~ ownership and control of land belong to State Government, the methods of agricultural organisation and production are similar to the system prevailing in the South.

In general, the land tenure system in Nigeria made it very difficult to acquire land for large scale farming or plantation agriculture. The situation in the cocoa areas is an exception rather than the rule. Even at that, before the communal land is put into permanent use by an individual, special arrangements are made with local heads or tribal chiefs.

Land Use Classification

The system of land classification in the country does not permit a clear cut distinction between fallow and uncultivated land, nor between the area alotted to each of the principal crops. the area cultivated varies greatly according to climatic and soil conditions, from about 1 acre in the humid forest belt of the

Table 1

Pattern of Land Utilisation 1950

Use	North	West[1]	East	Nigeria
Non-Tree Crops	6.8	9.3	20.5	12.2
Under Tree Crops[2]	-	7.0	2.7	3.2
Bush Fallow	9.3	22.2	42.5	24.7
Forest Reserves	6.1[3]	15.6	8.1	9.9
Other Forests	31.2[3]	0.7	2.3[4]	11.4
Built-on Areas	0.8	1.0	1.7	1.2
Uncultivated/Wasteland	45.8	44.2	22.2	37.4
	100.0	100.0	100.0	100.0

1 Part estimate; data on Oyo Province not available.

2 Includes plantations under crop; 88 square km in the West and East.

3 95 percent represented by Savannah forest producing firewood only.

4 Mangrove forests.

Sources: Derived from Department of Agriculture: Sample Census of Agriculture, 1950-51; Annual Report of the Forest Administration: Nigeria, 1952-53.

south to 10-15 acres in the subhumid north. To get a broad indication of the actual area cultivated over a period of years, the croppedarea must be multiplied by a factor varying from 2 to 20, depending on the duration of the fallow period. However, it has been estimated that about 15 percent of the total area of Nigeria was under cultivation for tree and non-tree crops in 1950. Over 21 percent was under forests while 62 percent was uncultivated or kept fallow in 1950 (Table 1).

According to the 1950-51 census of agriculture some 20 million acres of land were under farm crops, of which 62.5 percent were in the North, 16 percent in the West, and 21.5 percent in the East. Three quarters of the acreage were devoted to the cultivation of non-export oriented crops. Table 2 displays the relative proportion of acreages occupied by the various field crops.

Population Characteristics

The Nigerian population is made up of about 250 ethnic groups, who are dominantly rural. The population grew from an estimated 16.25 million in 1920 to 19.1 million in 1931 (census) and to about 23.2 million in 1948-49. (Buchanan & Pugh, 1955; Colonial Report, 1935; See Table 3).

The distribution of population by divisions, the smallest statistical unit, indicates that there are three major nuclei of population: those of Yorubaland, Iboland and the Kano area, and these contain an aggregate population of some ten million (1948).

Table 2

Area Under Principal Field Crops, 1950-51

Crops	North	West[1]	East	Nigeria
Guinea Corn	33.5	-	-	20.0
Millet	25.4	-	-	14.4
Maize	3.0	28.8	5.0	9.4
Paddy	2.4	0.4	0.9	2.0
Yams	4.1	26.0	35.5	14.3
Cassava	2.8	20.2	34.5	11.6
Cocoyams	0.1	6.0	9.6	3.2
Cowpeas	8.5	8.8	1.0	6.2
Groundnuts	8.3	-	0.2	4.8
Other Farm Crops[2]	11.9	9.8	13.3	14.1
	100.0	100.0	100.0	100.0

[1] Partly estimated; data for Oyo Province are lacking.

[2] In order of area planted: cotton, melonseeds, sweet potatoes, benniseed, peppers, okra, tobacco, sugarcane, onions, etc.

Source: <u>Department of Agriculture: Sample Census of Agriculture, 1950-51.</u>

Table 3

Population of Nigeria, 1948-49[1]

Unit	Estimated Population	Estimated Density per Square Km
Northern Region	13,500,000	50
Western Region	4,000,000	90
Eastern Region	5,200,000	110
Colony of Lagos	430,000	310
Total Nigeria	23,130,000	60

Source: Buchanan and Pugh, 1955 , p. 58.

Each of these concentrations coincides with a "key area" in the country's cultural and economic geography. The South-Western concentration coincides with the highly developed Cocoa Belt of the western dry forest zone and with the heart of the Yoruba territory. The south-eastern concentration coincides with the most intensive sector of the Palm Belt and the Ibo home zone, while the Kano nucleus contains the main groundnut and cotton producing area of the Northern Provinces and represents the heart of Hausaland. The population density per square kilometre shows wide contrasts. In the Northern Provinces the density ranges from 80 per square km in Katsina Province to an average of 130 per square km in Zaria Province. The density for Kano city alone is about 650 per square km. The high density found around Kano City has been attributed to a favourable physical environment: the advantageous position in relation to the trading routes of the Sahara and its fringe, the fly-free grasslands and open Savannahs of the Sudan zone, the presence of readily accessible ground-water supplies, and the easily worked drift soils which, as transport improved, showed themselves ideal cotton and groundnut soils (Buchanan & Pugh, 1955).

Densities in Yorubaland range from 66 in Ijebu Province to 140 in Ibadan Division. The break in the continuity of the rain-forest, and the relative richness in plant foods and the good water relations of the local soils, favoured the growth of a dense peasant population around Ibadan. The mean density for the South-eastern nucleus is 165 per square km, although it has been estimated that the density in some of the critical and over-crowded zones of this region is as high as 625 persons per square km. Some of these critical zones are found in Owerri and parts of Calabar provinces. With its poor soils highly leached and extremely acid, the Iboland is one of the most critical areas in Nigeria. If it were not for the fortunate circumstances that the oil palm will tolerate these soil conditions the economic situation of the Ibos would be dire indeed. The population pressure on the land was felt even in the early 1920s and it was not a surprise that many Ibos migrated to other parts of the country when the opportunity came. As observed by Mabogunje (1972) the dispersion of the Ibos to all parts of Nigeria, among other reasons, is closely related to the expansion of the railway from Port Harcourt through the Ibo country to link up with the Lagos-Kano line in 1927. Their arrival in significant numbers was noted at most of the main centres along the railway, especially in Lagos, Ibadan, Kano, Zaria, Kaduna and Jos (pressure-free areas at the time). Those who dispersed into the rural areas took up jobs as migrant tenant farmers (Udo, 1964).

The population density of much of the Middle Belt,[2] and of the north-eastern province of Bornu and of parts of the dense rain forest zone of Southern Benin and Calabar is well below the average (40 per square km). The low densities of these zones are due to a variety of reasons: wide spread absence of a permanent and dependable water supply, poverty of soil, and above all the ruthless slave-trade which decimated the population of much of the Middle Belt, in the late nineteenth century (Buchanan & Pugh, 1955).

Trading and Retail Activities

To understand the relationship between the railways and agriculture one has to have a knowledge of the relationship between retail trade and other economic activities in Nigeria.

Retail activity ranks second to agriculture in the employment of the Nigerian labour force. It is difficult to take the statistics of traders in the country as nearly everyone is engaged in the business. Traditionally, women dominated the market scene because most of the goods offered for sale were connected with the domestic side of the household. But because trade and commerce have expanded greatly in volume and value, men are participating more and more in the business, particularly in long distance trades. The buying and bulking of export goods, which are more demanding, are dominated by men.

Apart from the business done by the stores and canteens for expatriate companies, all commerce takes place in town and village markets. All towns and most villages have market days at least once a week. Most markets lie within a 1 to 16 kilometres radius from the communities they serve and can be reached on foot in a day. Depending on the area and the distance they must travel, goods are head-loaded or carried by donkeys, canoe or bicycle. As a process, the upward flow of agricultural exports begins when the farmer sells his produce to the dealer or middleman at the local market or near the point of production. The middleman was normally an agent (buying agent), of oversea companies stationed in Nigeria. He purchased in small quantities in distant as well as local markets and sold in bulk to produce buying companies who were responsible for marketing Nigerian products outside the country.

A situation existed in Nigeria before the 1940s where so little of the final sale value of the farm products got back to the farmers that they had little incentive to try to increase their production or the quality of their output. A sound system of pricing was necessary to insure that producers received enough return to encourage them to produce. An important economic development took place with the establishment of Marketing Boards in the 1940s. These were public bodies set up by governmental action and delegated legal powers of compulsion over producers and handlers of primary or processed agricultural products (Abbott & Crenpelandt, 1967). These Boards were established to ensure the orderly marketing of export crops and stable prices for the producers, besides contributing funds for research from their large accumulated reserves. The Cocoa Marketing Board was established in 1947 and three other Boards followed in 1949, the Oil-Palm Produce Marketing Board, the Cotton Marketing Board, the Groundnut Marketing Board. They maintained offices in all the regional and zonal centres. Although they fixed producer prices paid to farmers, these prices were much lower than the actual world prices for these products. The reason for under-paying the farmer was to accumulate surpluses which could be used for stabilising prices in periods of low world prices. But they were used later more as instruments for mobilising savings for economic development, than to stabilise the prices paid to producers (Bauer, 1954).

With the establishment of the Marketing Boards, many of the middlemen and newly formed co-operatives were commissioned as buying agents of the Marketing Boards. The middlemen made their money either by the commission paid by the Marketing Boards or by buying from the local farmer at a lower rate than set down by the Marketing Boards. However, there is a co-ordinated system of ensuring that the agricultural products of the Nigerian farmer reach the world market.

Several features of farm products made their marketing complex and the attainment of a good marketing system difficult. Farm products were produced in small quantities on widely scattered farms and this presented a special problem as the country embarked on commercial agricultural production. It required that the products, especially those destined for world markets, be assembled from wide areas and transported far.

The perishable nature of many of the agricultural products added a special dimension to the price-making part of marketing (United Nations Food and Agricultural Organisation, 1964; Berry Conkling and Ray, 1976). Because most agricultural products were produced seasonally and disposed of accordingly farmers did not get the best rewards for their products as prices at seasonal harvest were depressed below their average the rest of the year. Farmers were forced to sell their products at the harvest mainly on account of storage problem and inadequate transportation availability at other times during the year. Adequate storage capacity would make it possible to hold on to supplies until market conditions were favourable, rather than selling at the harvest when prices were lowest (Owen, 1968). Lack of storage facilities in Nigeria early in the century made it imperative to expand the railway facilities and to use them for the quick movement of agricultural exports to prevent spoilage, and at moderate costs.

Trade by barter and the use of many local currencies[3] were common during the early stages of Colonial rule in Nigeria. In order to unify and facilitate trade the West African Currency Board was constituted in 1912. It had the responsibility to provide for and to control the supply of currency to the British West African Colonies and Protectorates. The currency then in circulation in Nigeria was the West African pound which was tied directly to pound sterling (£). The currency was issued in denominations of pound (£), shilling (s.), and penny (d.) (see Burns, 1929). Given that this study is covering several decades with changing current value of currency, the price index is based on the 1930 average value unless otherwise stated.

In summary, over and above the soil and climatic conditions, the pattern of Nigerian agriculture was plagued by cultivation practices and land tenure systems that were too traditional to allow large scale production. Retail trade in agricultural products which was one of the major economic activities of most of the population took a special pattern in relation to railway development during the period covered by this study.

Notes

1 The decision to use the 1948-49 population estimates as an example is purely arbitrary. The fact that, except in the case of Lagos, all population figures are estimates rather than census counts in the true sense of the word should be stressed at the outset. The 1931 census was not a full count but was also based partly on estimates.

2 Middle Belt refers to the Provinces of Ilorin, Niger, Kabba, Plateau, Benue, and Adamawa.

3 The local currencies include:

a) Cowries = (Cypraea moneta) small shells, about half an inch in length, fastened together, as a rule, in strings of 40 or 100 each. These shells were imported from the East Indies.

b) Manilla(s) = a heavy horseshoe-shaped piece of metal, of brass and alloy.

c) Brass rods = about the size of small stair-carpet rods, but bent over so that the two ends nearly meet.

d) Copper wire.

Chapter 3

TRANSPORTATION NETWORK STUDIES

Introduction

Studies of the history of transportation networks, such as those studied by Jackman (1916), Taylor (1951), and Dyos and Aldcroft (1969), demonstrate that network change does not proceed in a constant manner but rather is spasmodic in character. Sorre (1954) suggests that the organisation of a network can result from two different processes. On the one hand, it can develop from a diffused movement in response to local, perceived needs and the subsequent meshing of previously unconnected links. On the other hand, it can develop from competition among routes leading to the emergence of some routes that are more important than others. He notes that both these processes must be kept in mind in order to highlight certain general aspects applicable to all modes of transportation.

Although there is no general theory or comprehensive framework within which to understand, much less explain, the process of network change, we have at our disposal a series of partial models which represent attempts to throw light on the temporal development of transportation networks. Broadly, the available modeling approaches are categorised into 'stages of growth' and 'simulation' models, although they are not mutually exclusive. The 'simulation' models are not discussed because they are beyond the scope of the thesis.[1]

Stages-of-Growth Models

Stages-of Growth models can be subdivided further into those models that pertain to coastal penetration and those that refer to mid-continental in-filling, each of which represents a variation on the basic theme of stages-of-growth.

Taaffe Morrill, and Gould (1963) were the first to construct a model which represents a generalised description of transportation network development in underdeveloped countries. Their model is an inductive one based largely on data relating to Ghana and Nigeria. The study shows that in the two countries there are broad similarities in the way in which network development proceeded. In the first stage of their "ideal-type-sequence" of network development, there is a series of scattered and poorly connected small ports along the coastline. Each port has an extremely limited hinterland as the scattered interior points are weakly connected to each other and to the ports. Strictly speaking, there is no transport network in this phase. Instead there are a number of independent networks. In the second stage, due to port competition, etc., some ports become larger and from these originate penetration lines reaching to interior resource areas. The initial penetration lines may be roads, railways or canals. This stage may be identified as the most crucial one since it establishes the fundamental alignments of the future network pattern. It also marks the beginning of a network as some interior centres are directly linked to the ports. In the third stage, the development of feeder routes and lateral interconnections occur as a result of increased interaction among the various nodes and the terminal ports. Here new growth centres are initiated at strategic points on the routes. Phase four shows how, as a consequence of lateral and diagonal route development, the competitive position of the major port centres and those at the interior terminal points is further enhanced. There is almost complete inter-connection as both lateral and diagonal links complement the initial penetration lines. The last stage of the model discusses the development of "high-priority linkages". The argument presented here is that since there is differential growth of both ports and interior nodes, some centres will tend to acquire a dominance over a substantial hinterland at the expense of other centres. The demand for transportation will be higher at these centres, as will the volume of movement between the larger centres. The consequence of these changes is that certain routes emerge as "high-priority corridors". Consequently, nodes on these corridors also benefit and grow.

Lachene (1965) approaches the problem differently by establishing a hypothetical landscape (an isotropic plane) and hypothesizing the stages in the growth of a transportation network from there. In the first stage of the model, the region is sparsely populated, and there is a low level of economic activity distributed more or less uniformly throughout the region. A network of trails or footpaths, requiring minimal levels of capital investment, constitutes the transport system. Assuming a rectilinear land subdivision system the settlement pattern and the transport network both have a rectilinear configuration. The second stage can be partitioned into two substages. In the first of these, towns form at some of the intersections, owing perhaps to comparative advantage, resource endowment, and so on. In the second phase of stage two, a road network links the settlement, again following a rectilinear alignment, and in fact is superimposed directly upon the original trails. Some of the trails have become paved roads. Since the supply of capital acts as a constraint, the total distance of this paved-road network is smaller than that of the original dirt-road grid. The abandonment of some of the older trails results owing to the gradual depopulation of the countryside as economic activities strongly concentrate in the urban centres. In stage three, the process of differential growth of nodes culminates in the emergence of three dominant urban centres. These are connected by a superior, more expensive route network, perhaps a railway or a freeway. The total length of this network is the shortest of the entire sequence.

Ekström and Williamson (1971) also make use of a hypothetical approach to study the development of transport systems in time. In the <u>initial phase</u>, a new mode of transportation is established in space. In the spread phase, there is spatial diffusion of the network. This is followed by a co-ordinating phase, in which there is an integration of different transportation networks and a reorganisation of the production and distribution systems. Two additional phases may emerge subsequently, after either the spread phase or the co-ordination phase. These are (1) a concentration phase, in which there is a channeling of flows between certain terminals and relay nodes located at certain places, serving to give a well-defined but complex structure to flows, and (2) a liquidation phase, in which a particular mode of transportation disappears or is less used because it cannot satisfy the changing requirements of the space-economy.

Evaluation of Models

The models described above are subject to criticism on a number of grounds. Any stages-of-growth approach risks the inherent danger of artificially dividing what, in fact, is a continuous and evolutionary growth process. To the extent that all models represent simplifications, this danger may be unavoidable. The stages of development are not equal in length; nor are they readily identifiable. The exceptions may be the initial and the spread, or diffusion, phases. Beyond that, the latter stages are very difficult to recognise, because the situational context is drastically transformed from simple to complex, and the stages, if they exist, seem to overlap.[2] However, the models, with all their limitations, offer considerable insight into the process of network development, and also constitute an adequate framework within which to pigeonhole the movement-related facts of regional development.

Although the Taaffe, Morrill, and Gould model is criticized as being areally specific and applies to nations with a particular political history (those that were subjected to colonial exploitation), and tropical or subtropical coastal locations,[3] it is these particular characteristics that make the model an acceptable tool for the discussion of the evolution of the Nigerian railway network. The application of this model in the thesis is confined to the first three stages of the model. The Lachene model, aside from being strictly a hypothetical one, applies to a restricted mid-continent region in a nation in which massive rural-to-urban migration has occurred and its application in the analysis of the development of Nigerian railway network is out of the question. During the period under examination most of Nigeria was rural and the possibility of massive rural-to-urban migration determining the pattern of network development would have been very remote. The model of Ekström and Williamson, in theory, is similar to those of Lachene, and Taaffe et alii; the only significant difference being the addition of a liquidation phase which is missing in the earlier models. However, the liquidation phase does not give this model an added advantage over the other two models as far as this thesis is concerned.

Railways and Agricultural Development

The development of agriculture features prominently as one of the main reasons for railway construction in most of the less developed countries. Labasse (1954, p. 189) remarks that: "... c'est le rail qui a permis l'extension de la culture de l'arachide vers l'Est du Senegal et l'exportation de la production agricole du Soudan".[4] Davies (1961, p. 427) comments that: "Le developpement des chemins de fer a encouragé les progrès de l'agriculture au Soudan". In Railways and Development in Uganda, O'Connor (1965) observes that although subsistence agriculture in Uganda has been little affected by rail transport facilities, some changes have taken place over the past sixty years which are related to the economic development which followed the building of the Uganda Railway.

> "The railways within Uganda are of great value for the efficient clearance of the export crops, and have assisted the spread of production over the country. In the past, production was concentrated in the areas best served by rail and steamer services, and this was one factor which helped Buganda and the east to establish an early lead in economic development, which they have maintained ever since" (pp. 32-33).

Writing about the effects of the railways in East Africa, O'Connor (1964) demonstrates how the railways affected the distribution of commercial agriculture and European settlement in Kenya, and the shaping of commercial activity in Tanzania. According to Hofmeier (1973), the Tanzam railway gave a new boost to Tanzania's agricultural production.[5] Also, in the context of the developing nations, others have demonstrated that the construction of the railways has led to the development and growth of new towns and markets (Perkins & Stembridge, 1957; Mabogunje, 1968).

The railways were able to bring modifications in marketing and trading patterns because the low rolling friction of the rail and the high power of the coal and diesel engines allowed them to carry a large volume of traffic at low ton-km costs. These characteristics made the railways the best mode for carrying long-haul and dry bulk commodities in cases where water transportation was not an alternative (Trelogan, 1964; Kraft, Meyer and Valette, 1971).

Recent improvements and technological changes in railway operations appear dramatic. The spread of containerization and piggy-back operations are particularly important as they promise a complete intermodal capability that will require minimal handling in transit, and thus lead to a reduction in transportation costs. Piggy-back has allowed the railway particularly to penetrate new markets by extending the geographic range and door-to-door quality of rail-oriented services.[6]

Although the Nigerian railway system never achieved the piggy-back operation level during the time of study, it provided a special means of transportation which facilitated the movement of agricultural exports to the ports. In other words, the system helped to bridge the gap between the widely scattered producing areas and the consuming (exporting) centres. The Stages of growth models provide a useful tool within which the development of the Nigerian railway system and its impact on the production and movement of agricultural exports are discussed.

Notes

1 For discussion on simulation models see Kansky (1963), Kolars and Malin (1970), Black (1971 a), and Lowe and Moryadas (1975), pp. 120-128.

2 See Lowe and Moryadas (1975), op. cit., pp. 119-120.

3 Ibid., p. 119.

4 B.E. Thomas (1957) notes that in the former French territories the production of groundnuts is almost entirely restricted to areas near ports or railways.

5 Bailey (1976) in the chapter entitled "Engine of Growth" (pp. 108 - 126) , arrived at similar conclusions regarding the effect of railways on Tanzanian agricultural development.

6 See Transportation Association of America, "Transportation Facts and Trends", Quarterly Supplement, January, 1971.

Chapter 4

THE EVOLUTION OF NIGERIAN RAILWAYS AND THEIR HINTERLAND

Introduction

Moving people and goods swiftly and efficiently from place to place has always been the prime concern in Nigeria. Raw materials (agricultural exports and mineral products) and manufactured goods are of value only when available to people for their use. In Nigeria the separation of agricultural exports and the overseas consumer has necessitated a wide-ranging and varied transportation system. The colonial administrators of the country realised early on that the more effectively the areas of demand and of supply could be linked, the less significant distances would become from the standpoint of economics.

In most of Colonial Africa, the British relied largely on the railways to form the vital link between the interior and the ports. One of the greatest advocates of the use of railways in the economic development of Nigeria was Sir F.D. Lugard. Referring to the prospects of trade in the Northern Hausa States of Nigeria, Lugard (1906, p. 6) wrote:

> "... until better transport is arranged and the Iron horse takes the place of the human carriers, Northern Nigeria cannot possibly realise the hopes and wishes of those who are assured of the great future before it."

And again, referring to the Zungeru-Barijuko Light Railway that was started a year before, he argued that the extension of this line would "render possible the export of cotton and other produce grown in the Nupe Province and in Southern Zaria" (Northern Nigeria, 1902, p. 58). However, as Schreiner (1972) rightly pointed out, while economics is the prime motivation in moving things from place to place, other significant considerations such as political and social needs do apply.

In an attempt to suggest what might have been the raison d'être for the development of the railways a <u>motivation for construction</u> table (Table 4) has been drawn.[1] The motivations tend to confirm the conclusions of Taaffe, Morrill, and Gould that agricultural as well as mineral exploitation, and the British desire to maintain administrative control of the hinterland provided the dominant motivation for the initial penetration of the interior by the railways. The dominance of agricultural motivation is very significant. Eleven of the thirteen segments of the railway indicate some agricultural influence.

The regional distribution of the lines is worthy of mention here. Over 80 percent of the lines are located in the Northern Region, 10.8 percent in the West, and 8.8 percent in the Eastern Region. The Kilometre per area unit is slightly higher in the Eastern Region than in the Northern and Western Regions respectively (Table 5). The North's open vegetation and agricultural potentials may have been responsible for its relatively extensive network. The wetness of the South, its thick rainforest vegetation

Table 4

History of Railway Construction in Nigeria, 1898-1930

Link	Date	Length (km)	Motivation[a]
Lagos-Otta	1898	32	I, II
Otta-Abeokuta-Ibadan	1901	165	II, I
Ibadan-Ilorin	1908	201	II, I
Ilorin-Jebba	1909	96	I, II
Zaria-Jos-Bukuru	1911	227	III
Jebba-Zungeru-Minna	1912	233	II, I
Baro-Kano	1912	573	II, I
Port Harcourt - Enugu	1916	243	III, II
Enugu-Makurdi-Jos	1927	596	III, II
Kaduna-Kafanchan	1927	201	I, III
Zaria-Gusau-Kaura Namoda	1929	232	II
Kano-Nguru	1930	229	II
Ifo-Ilaro-Idogo	1930	39	II

[a] Motivation for construction as interpreted by the writer, based on information derived from Colonial Reports, and Railway Reports:

I = administrative (political and military)
II = agricultural exploitation
III = mineral exploitation

Table 5

Railway Kilometres per Area Unit, 1950

Region	Area Km2	Rail Route Length Km	Km per Unit
Northern	729,393	2,467 km	3.4
Western	117,456	330 km	2.8
Eastern	76,319	270 km	3.5

Kilometre per area unit is obtained by dividing the rail route length by area and multiplying x 1,000.

Sources: Annual Reports on the Nigerian Railway, 1947-48; International Bank for Reconstruction and Development, 1955, p. 7; W. F. Stolper, 1966, p. 28.

cover and its many rivers and creeks, which furthermore provide an alternate transportation mode, may have made railway construction and expansion expensive and uneconomical.

The purpose of hinterland definition is to determine what proportion of the interior was accessible through the railways and their feeder network. The knowledge gained from this will be helpful in analysing how accessibility promoted agricultural growth by opening up new economic zones. Since the delimitation of the impact zone of the railways cannot be discussed meaningfully without reference to other existing modes of transportation, the role of these other modes is discussed to the extent that available sources permit.

Existing Networks Before The Railways

Long before the railways, a network of local tracks and simple roads suitable for transport with porters, animals, carts, and bicycles was developed in areas of major settlement. Head porterage was common in all regions. Bicycles played (and still play) a major role in the local transportation of agricultural products to the market, especially in the Eastern Region. As observed by Duckworth (1940) ten thousand cyclists passed Uyo cross-roads in one day. Most of the bicycles were loaded with from three to five tins of palm-oil; others carried:

> "sacks of garri, kernels or... heaps of yams... and almost every conceivable articles including live goats, pigs, chairs and tables," (p. 378).

Caravan routes existed between major northern centres. Kano and

Sokoto were once on international caravan routes to Timbuktu and Tripoli in North Africa. Later in the 1920s and 1930s new and improved roads were built to handle traffic by cars and lorries.

The organisation of most of the road transport business was performed by individuals with bicycles, and small local companies with one or two lorries which carried both freight and passengers. Because freight rates were not regulated, individuals and small companies charged their own rates which ranged from 2.5 to 7.5 pennies per ton kilometre.

The extensive inland waterways played an important role both in the local and international trade of Nigeria before and for sometime after the construction of the railways. It was through the inland waterways system that the country's produce was first carried from the hinterland to Burutu, Lagos and Calabar for export.

The low-lying coastal plain is traversed by several important rivers and broken up by a network of tributaries and creeks, particularly in the deltas of the Niger and Cross rivers. The numerous creeks provide transportation parallel to the sea between Lagos and Opobo. The ports served include Lagos, Epe, Sapele, Warri, Forcados, Burutu, Brass, Degema, Port Harcourt and Opobo (Map 1).

More than a thousand-six hundred kilometres of the Niger and its tributary, the Benue, are navigable for at least part of the year. These two rivers are the leading interior waterways. The Niger is navigable from June to March to the confluence of these rivers at Lokoja, 580 km from the sea. Above LoKoja, it is navigable from August to March, for a further 330 km to Jebba, but boats seldom go farther than Baro, 120 km from Lokoja. Access to the Niger from the agricultural areas around Kaduna, South of Funtua and West of Zaria was provided by River Kaduna, a tributary of the Niger. From Lokoja, the Benue river is navigable 240 km to Makurdi from June to November, and 837 km to Yola ~~from~~ July to October. Rivers Gongola and Katsina Ala contribute to the traffic on the Benue River. The Cross river which springs from the Cameroon mountains flows into the Sea at Calabar. It is navigable year-round only for 48 km. Upstream, the period of navigability decreases until Mamfe, where it is only four months. The duration of navigability and the distance covered on the Nigerian rivers are controlled primarily by water-levels which reach their peak during and/or in the period immediately following the rainy season. Including other water-ways, a total of about 6440 km is in regular use.

The organisation of river transport was mostly left in the hands of private enterprise. Three major companies controlled the movement of imports and exports along the water-ways. The Elder Dempster Lines Ltd. operated coastwise to Warri, Sapele, Burutu, Calabar and Port Harcourt. During the rainy season cargo services were operated between Calabar and Ikom and Mamfe on the Cross river, and Bansara on its tributary. John Holts Transport Limited operated frequent and regular cargo services from Warri up the Niger and Benue rivers to places as far north as Yola, and an irregular service from Warri through the creeks to Lagos. The United Africa Company Limited also operated regular and frequent passenger and cargo services on the Niger, Benue and Cross rivers and through the creeks between Lagos and Burutu.

Due to the nature of the inland waterways, large cargo vessels could not be used. The craft employed varied from local canoes, shallow-draught paddle-steamers to ferry boats and power barges. The largest river craft was a 550 ton - 800 horse-power steamer with a loaded drought of 2.29 metres (Burns, 1929). From the scanty data available an average freight rate of 1.8 pennies per ton-kilometre has been calculated for all inland waterways between 1900 and 1950.[2]

Evolution of the Railway Network

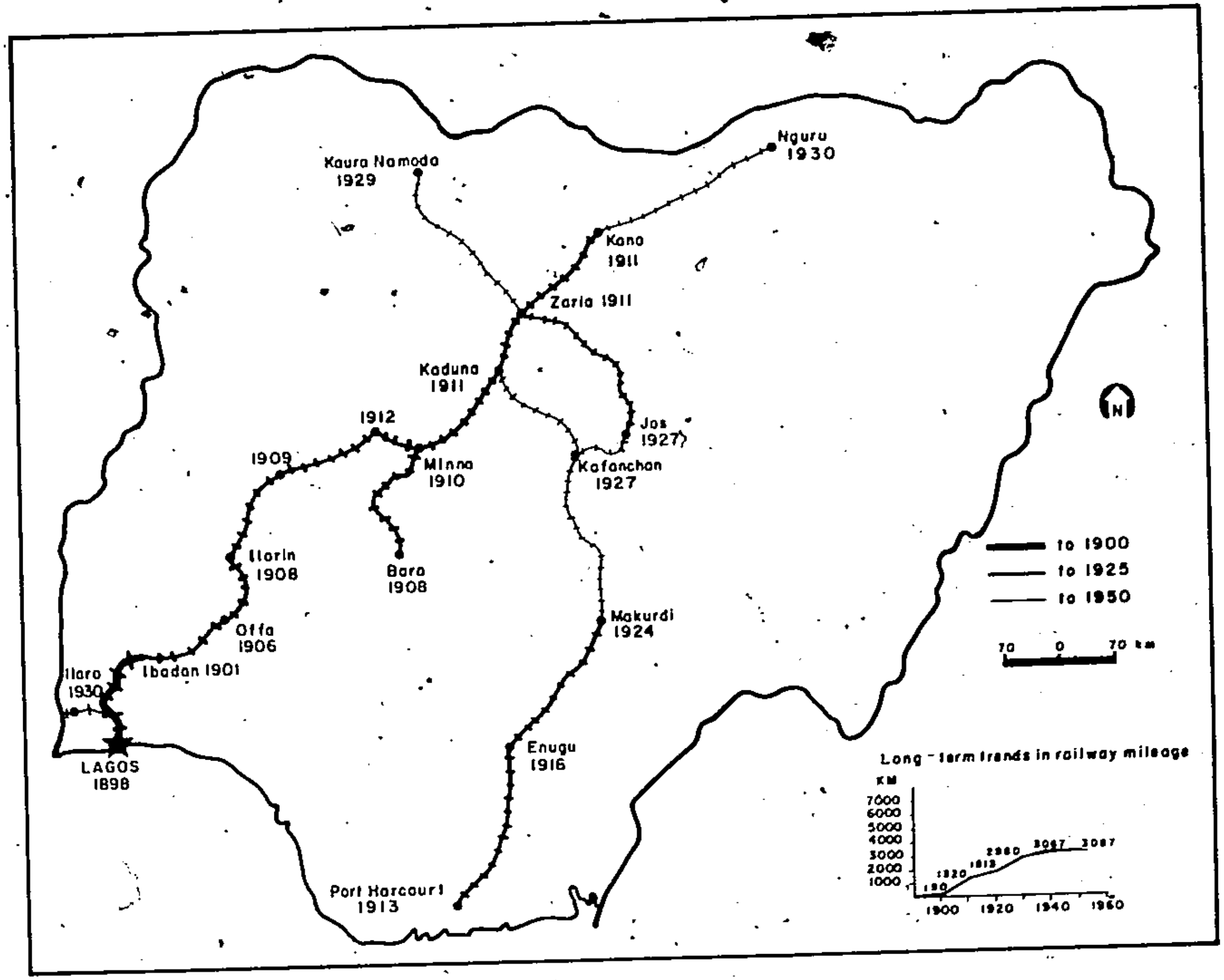
The inadequacy of the existing road and river networks for the needs of the country led to the construction of the railway lines. The growth of the Nigerian railway network proceeded in a manner commensurate with the general rules of Taaffe, Morrill, and Gould outlined earlier. The first three stages of the model are of particular interest to the thesis because they are clearly identifiable in the railway network evolution.

As the model suggests, the ports and waterways provided the initial contacts with the immediate hinterland. Ports located at the estuaries and banks of the major waterways became the centres of trade. Lagos, Sapele, Warri, Burutu, Forcados, Degema, Opobo, Oron and Calabar (Atlantic coastal ports), and Onitsha, Idah, Lokoja, Baro, Zungeru,Kaduna, Numan, Yola, Ikom, Afikpo and Itu (inland ports at the Niger, Benue, Cross and Kaduna rivers) were some of the many scattered and weakly connected centres of stage one. Most of these ports located along the Niger and Benue rivers provided the first penetration lines into the Nigerian hinterland for the Europeans. Although the first penetration inland was by the rivers, the traffic volume on the waterways remained relatively low due to difficulties associated with navigation, its limitation to daytime hours on account of inadequate facilities, the seasonal character of the rivers, the silting of the entrances of the Niger delta, the slowness of movement, and finally, the two main rivers, the Niger and Benue, traverse for the greater part of their length in Nigeria the relatively poor and less developed "Middle Belt" region.[3]

The initial railway penetration lines originated at the ports of Lagos, Zungeru, Baro, and Port Harcourt respectively. The timing of the construction of the lines varied slightly in the three regions of the country (Map 2). The construction of the first Nigerian railway commenced at Lagos (Western Region) in December, 1898, as the Lagos Government Railway, when a few hundred metres of line were laid. Moving northwards through Abeokuta the line reached Ibadan (197 km), the centre of the cocoa-growing area in 1901 and the Niger at Jebba (494 km), in 1909. The Zungeru-Barijuko Light railway (35 km), the first to be built in the Northern region, was started in 1901 at Zungeru and completed in 1902 when the line reached Barijuko (Kaduna). The main Northern

MAP 2

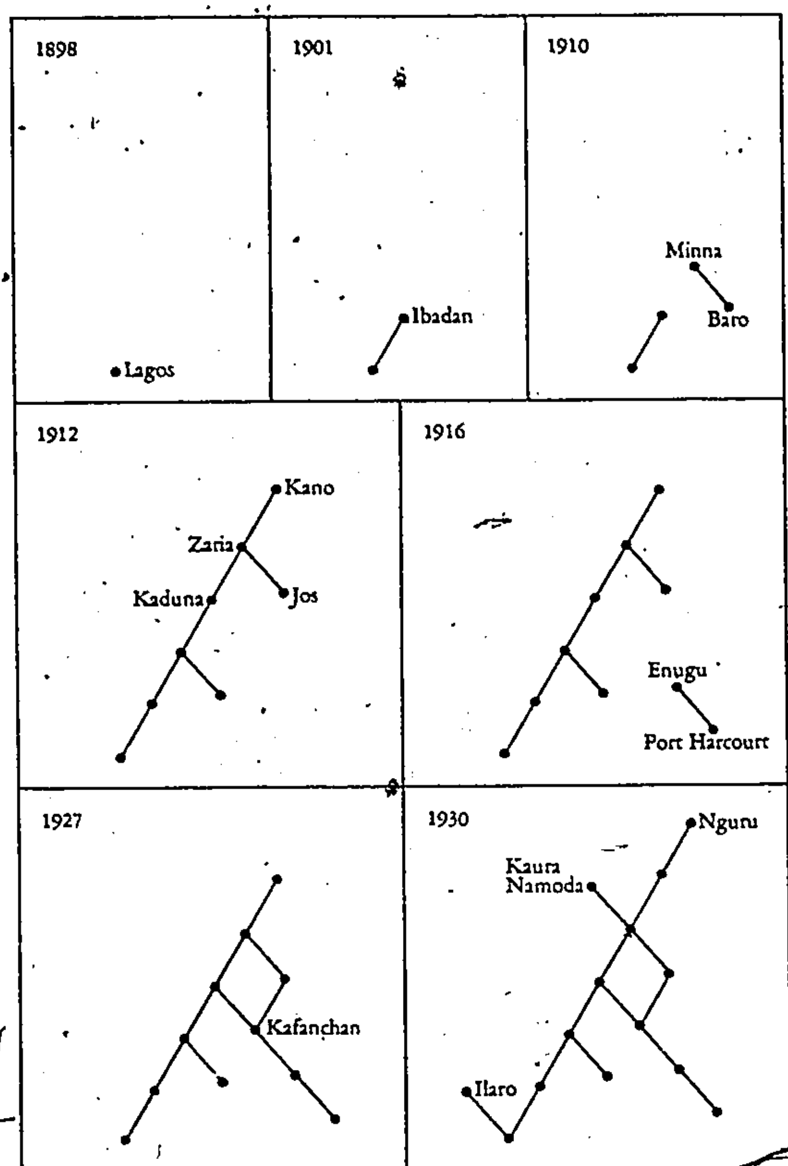
DEVELOPMENT OF NIGERIAN RAILWAYS



SOURCES: Colonial Reports; and Annual Reports on the Nigerian Railway, for various years.

MAP 2a

TOPOLOGICAL EVOLUTION OF NIGERIA'S RAILWAY NETWORK.



Note: The development of the Nigerian railway network is shown as it evolved from a simple path to a complex network.

SOURCE: Peter J. Taylor.(1977). QUANTITATIVE METHODS IN GEOGRAPHY: AN INTRODUCTION TO SPATIAL ANALYSIS. Boston: Houghton Mifflin Co., p.60.

penetration line, the Baro-Kano Railway (573 km) was begun in 1908 at Baro on the bank of the Niger river, and was completed in 1911 when the line reached Kano, the centre of the groundnut region via Kaduna and Zaria. The tin mining area near Jos was linked with this railway by the narrow gauge Bauchi Light Railway (227 km) at Zaria in 1914. The construction of the Eastern Line commenced in 1913 from Port Harcourt. Having passed through Aba (61 km) in 1916, the line reached the coal mines of Enugu (243 km) in 1916. The second phase of the railway development - the linking of more interior centres directly to the ports, was more fully realised in 1915 when the Lagos and Baro-Kano lines were connected by the Jebba bridge, and in 1927 when the Eastern line was extended from Enugu to Kaduna and Jos. Therefore between 1896 and 1927 the two main north-south links were formed thus giving remote hinterland access to the two main ports of Lagos and Port Harcourt.

Between 1927 and 1930 the third stage of network development was realised in the Nigerian railway network with the building of branch lines and extensions namely: Zaria-Kaura Namoda (232 km), Kano-Nguru (229 km), Ifo-Idogo (39 km), and Kafanchan-Jos. By the end of 1930 all the railway lines were laid with the exception of the Bukuru-Maiduguri extension (639 km) which was completed in 1964 (**Map 2a**). By 1931 the system was 3,067 km long and almost entirely single-track of 1,067 mm gauge, except for the Bauchi Light Railway with its 762 mm guage.

Associated with this stage of transportation development was the growth of new centres of economic activities. At the time of amalgamation of the railways in 1912, the number of stations open for traffic stood at 84. The number increased as the route length developed and was 138 in 1922, 216 in 1932 and 218 in 1950 (Table 6). Therefore, at the completion of the main lines in 1930 over 200 selling and buying stations had emerged along the railway lines. The most important stations included Lagos, Abeokuta, Ibadan, Ilorin, Minna, Baro, Kaduna, Zaria, Kano, Nguru, Funtua, Gusau, Kaura Namoda, Jos, Makurdi, Enugu, Aba and Port Harcourt.

Port Harcourt deserves special mention because it was not in existence before 1913 when the location was chosen as the terminus of the new Eastern Line.[4] Since then it has developed into the second largest port in the country, at the expense of some of the older established ports like Bonny, Degema and Opobo. The fact that it is a railway terminus most probably accounted for its tremendous growth.

Impacts of the Railways on Existing Transportation Networks

a) Railways and Inland Waterways

A situation of complementarity did exist between these two modes at the initial stages of railway development. The Baro-Kano line was designed so that the railway would link with water-transport at Wushishi (Zungeru) on the Kaduna river, and Baro on the Niger river. The completion of the link did enormously

Table 6

Nigerian Railways: General Statistics, 1912-37

Year.	Miles Open (Mean Mileage)	No. of Stations.	Train Mileage.	Gross Receipts.	Working Expenses.	Net Receipts.	Proportion of Working Expenses to Gross Receipts.	Net Receipts on Capital invested.
	Miles.	No.	Miles.	£	£	£	Per cent.	Per cent.
1912	823	84	91,806	485,341	342,925	142,416	70·6	2·53
1913	924	91	1,235,545	713,628	385,130	328,498	53·9	5·43
1914	950	99	1,334,137	763,913	448,979	314,934	58·7	4·73
1915	976	100	1,047,601	622,469	436,198	186,271	70·08	2·74
1916	976	98	1,336,677	786,655	478,893	307,762	60·88	4·47
1917	976	101	1,429,518	1,030,711	553,855	476,856	53·73	6·83
1918	1,120	125	1,727,526	1,252,647	740,684	511,963	59·13	5·65
1919	1,126	127	1,754,773	1,466,872	843,767	623,105	57·52	6·71
1920	1,126	128	1,768,069	1,626,799	1,041,523	585,296	64·02	5·63
1921/2	1,126	134	1,759,839	1,438,763	1,126,726	312,037	78·31	2·59
1922/3	1,126	138	1,691,508	1,425,812	978,110	447,702	68·60	3·52
1923/4	1,126	138	1,826,982	1,653,115	902,048	751,067	54·57	5·84
1924/5	1,220	148	2,064,008	2,052,905	948,902	1,104,003	46·22	7·38
1925/6	1,265	148	2,374,416	2,353,464	*1,071,787	1,281,677	45·54	8·62
1926/7	1,265	148	2,623,818	2,396,011	*1,118,624	1,277,387	42·63	8·51
1927/8	1,597	177	2,941,190	2,435,411	*1,187,037	1,248,374	48·74	6·52
1928/9	1,625	189	3,313,138	2,528,107	*1,262,726	1,265,381	50·00	6·49
1929/30	1,744	196	3,727,244	2,692,661	*1,337,419	1,355,242	49·67	6·50
1930/1	1,851	218	3,501,248	2,154,731	1,313,208	841,523	60·95	† 3·89
1931/2	1,905	216	3,271,515	1,837,977	1,162,252	675,725	63·24	† 3·06
1932/3	1,905	207	3,441,517	1,870,426	1,086,136	784,290	58·07	† 3·40
1933/4	1,905	209	3,333,414	‡ 1,868,172	1,070,826	787,346	57·32	† 3·46
1934-35	1,900	212	3,599,018	§2,007,674	1,040,805	966,869	51·84	† 4·20
1935-36	1,900	210	3,521,400	1,945,109	‖1,032,582	912,527	53·09	†3·98
1936-37	1,900	212	4,246,655	2,866,958	1,159,720	1,507,238	43·48	†6·53

* Renewals charges shown in previous reports now omitted
‖ Excludes £292,382, adjustment of capital.
† Capital includes cost of raising loans.
¶ Excluding Motors

SOURCES: Annual Reports on the Nigerian Railway and Colliery, 1933-34, p. 80; Annual Reports on the Nigerian Railway and Colliery, 1936-37, p. 91.

facilitate the transport of stores, goods, mails, and passengers between Baro and the rest of the northern hinterland (Colonial Reports, Northern Nigeria, 1911). A rail-ferry service was operated at Jebba before the railway bridge was completed in 1915. The rail-river policy was mainly in effect in the Northern provinces, but the linkage was abandoned for the following reasons: (1) Looking at both systems in the national context, the navigable rivers run parallel to the railways especially in the Eastern and and Western parts of the country. Since the railways are faster and more directly in contact with the two main ports, Lagos and Port Harcourt, and the hinterland, the two modes were allowed to operate as independent systems. (2) The cost of transloading freight from one mode to the other was very high.

As a result the competition between the two systems was more pronounced than their complementarity. The erosion of river transport by the railways, the corresponding decline of some of the ports, both coastal and inland, and the growth of railway ports and towns can be identified easily. The decline of some of the delta ports began with the building of the railway penetration line from Lagos and was accentuated by the building of the eastern line and the concomitant growth of Port Harcourt. The traffic at Opobo was captured by Port Harcourt and Koko's share was taken over by Sapele in the 1940s. The economic importance of Baro, Idah, and River Kaduna dwindled rapidly.

Table 7

Niger Traffic at Baro, 1935-1950

(tons)

Year	Imports	Exports
1935-36	23,261	35,172
1949-50	4,807	22,351

Source: International Bank for Reconstruction and Development (1955).

> "The opening of railway communication between Baro and Zungeru has caused a cessation of all important transport on the Kaduna (river). No Government Steamers are now sent up that water-way," (Colonial Report, Northern Nigeria, 1911, p. 23).

The total number of passengers to and from Baro during 1913 was 1,120, as compared with 1,660 in 1912, a decrease of nearly 33 percent. A similar decline is observed in the Niger transport service as a whole. In 1913, 13,209 passengers were carried, as compared with 20,830 in 1912.[5] The decline continued all through the 1900-50 period. Railway records showing the tonnage of imports trans-loaded to the railway at Baro and the tonnage of exports railed to Baro for loading on to river convoys between 1935 and 1950 indicate that there was a noticeable decline in traffic on the Niger river. Table 7 shows a decline of 79 percent (imports) and 36 percent (exports) at the station between 1935 and 1950. The lower rate for shipping groundnuts direct by rail to Lagos at 1.95 pennies per ton km must have been preferred to the 3.1 pennies per ton km on the Baro Line eventually leading to the decline in the volume of trade at Baro. Tables 8 and 9 further illustrate the railway-river competition. Both tables show a decline in the amount of traffic at the non-railway ports, and growth of traffic at the railway ports. After 1941,

Table 8

Share of Palm Produce Exports by
Rail and Non-Rail Ports, 1929-1950

(tons)

Ports	1929	1930	1931	1932	1933	1934	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Lagos (R)	98,935	106,691	100,636	115,857	93,300	94,137	174,330	196,836	208,603	181,479	167,862	175,176	195,791	176,245	214,863	254,776
Koko (N-R)*	12,390	8,409	12,177	21,932	16,026	13,267	7,361	338	338	-	-	-	-	-	-	-
Sapele (N-R)	15,171	11,981	10,002	13,949	7,300	10,454	12,413	17,411	9,076	10,602	7,224	2,001	3,077	5,187	7,861	5,592
Warri (N-R)	32,514	30,947	31,010	33,554	26,395	35,332	25,357	14,559	8,902	4,471	6,127	4,378	10,236	4,766	9,290	6,220
Burutu/Forcados (N-R)	41,972	56,529	46,258	45,515	47,642	37,682	14,135	21,485	10,284	10,324	12,660	7,971	14,074	22,667	14,291	10,898
Degema (N-R)	34,541	33,463	32,853	35,006	39,230	48,236	48,085	29,519	17,052	24,679	24,026	25,016	27,351	39,629	57,457	60,448
Port Harcourt (R)	42,862	44,964	42,616	56,429	50,954	46,549	96,429	124,773	135,787	121,603	115,648	97,429	119,649	115,670	131,650	147,491
Opobo (N-R)*	37,938	35,408	33,004	32,333	36,776	50,260	30,273	11,018	-	2,615	-	-	-	-	-	-
Calabar (N-R)	57,808	58,124	52,330	61,830	64,294	63,536	96,705	79,606	82,192	81,457	82,315	70,455	71,141	101,300	109,761	94,776
Grand Total	374,191	386,599	364,754	416,374	382,725	399,461	505,177	495,625	466,476	355,813	405,862	377,426	441,319	465,464	545,171	500,063
Non-Rail Ports	232,334	234,941	221,472	244,088	238,463	258,775	23,440	174,016	122,506	52,711	132,352	109,821	125,879	173,549	198,660	177,794
Rail Ports	141,857	151,658	143,282	172,286	144,262	140,686	270,767	321,609	343,970	303,102	273,510	267,605	315,440	291,915	346,513	402,269
Non-Rail Ports %	62.1	60.8	60.7	58.6	62.3	64.8	46.4	35.1	26.3	14.8	32.6	29.1	28.5	37.3	36.4	30.7
Rail Ports %	37.9	39.2	39.3	41.4	37.7	35.2	53.6	64.9	73.7	85.2	67.4	70.9	71.5	62.7	63.6	69.3

* = Koko and Opobo were closed as Ports 1947 and 1945 respectively.

(R) = Coastal port with railway link to hinterland.

(N-R) = Coastal port without railway link to hinterland.

$\bar{X}$ = Average.

Summary

Rail Ports	$\bar{X}$ 1929-34	=	38.4%
	$\bar{X}$ 1941-50	=	54.4%
	1929-50	=	16% Gain
Non-Rail Ports	$\bar{X}$ 1929-34	=	61.6%
	$\bar{X}$ 1941-50	=	45.6%
	1929-50	=	16% Loss

SOURCES: Colonial Reports on Nigeria, 1929-34; Department of Statistics (Nigeria Trade Reports), 1941-50.

Table 9

Share of Groundnut Exports by
Rail and Non-Rail Ports, 1929-1950

(tons)

Ports	1929	1930	1931	1932	1933	1934	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Lagos (R)	111,489	106,192	128,307	129,223	146,116	199,300	230,657	185,957	134,990	141,550	172,756	198,803	173,622	200,220	260,204	207,845
Warri (N-R)	4,496	4,310	1,755	4,587	5,575	3,302	5,203	2,776	1,560	1,970	1,540	6,043	7,098	3,264	1,580	746
Burutu/Forcados (N-R)	22,601	19,174	18,071	28,697	42,351	32,175	978	-	3,943	3,525	1,562	6,665	13,577	10,069	5,506	2,292
Port Harcourt (R)	8,772	16,638	11,606	25,616	10,563	10,108	10,338	-	2,016	9,148	384	74,156	61,546	31,587	111,023	110,973
Total All Ports	147,358	146,314	159,739	188,123	244,885	247,176	188,733	142,509	142,509	156,193	176,242	285,667	255,843	245,140	378,318	316,856
Total Rail Ports	120,261	122,830	139,913	154,839	156,667	209,408	240,995	185,957	137,006	150,698	173,140	272,959	235,168	231,807	371,227	313,818
Total Non-Rail Ports	27,097	23,484	19,826	33,284	43,938	35,477	6,181	2,776	5,503	5,495	3,102	12,708	20,675	13,333	7,086	3,038
Total Rail Ports %	81.6	83.9	87.6	82.3	76.6	85.5	97.5	98.5	96.1	96.5	98.2	95.6	91.9	94.6	98.1	99.0
Total Non-Rail Ports %	18.4	16.1	12.4	17.7	23.4	14.5	2.5	1.5	3.9	3.5	1.8	4.4	8.1	5.4	1.9	1.0

(R) = Coastal ports with railway link to hinterland.

(N-R) = Coastal ports without railway link to hinterland.

$\bar{X}$ = Average

Summary

Rail Ports $\bar{X}$ 1929-34 = 82.9%
$\bar{X}$ 1941-50 = 96.6%
1929-50 = 13.7% Gain

Non-Rail Ports $\bar{X}$ 1929-34 = 17.1%
$\bar{X}$ 1941-50 = 3.4%
1929-50 = -13.7%

SOURCES: Colonial Reports on Nigeria, 1929-34; Department of Statistics (Nigeria Trade Reports), 1941-50.

the non-railway ports lost their leadership in palm traffic with a decline of 16 percent between 1929 and 1950. The same pattern is repeated in the case of groundnut exports. They started off with about 18 percent of the traffic in 1929 and declined to 1.0 percent in 1950. It is interesting to note that although there was a general decline of palm exports at the non-railway ports, Calabar kept its position as one of the major exporting centres of palm produce, and showed significant gains all through the period. This was mainly due to its location on the Cross river which drains extensive oil palm producing areas with inadequate links to the railway. These include Afikpo, Obubra, Ikom, Ugep, Ikot Ekpene, and Uyo areas.

The railway link with the hinterland helped the growth of both Lagos and Port Harcourt, and led to the concentration of export activities, particularly groundnuts exports, at these two ports. This shift to the railway network and the corresponding relative decline of the river network resulted because transportation by river was slow and possible for part of the year only. Moreover, the producing areas of the North were more directly tapped by the railways.

b) Railways and Road Network

The railway-road relationship developed gradually from a feeder network to "rival" networks. During the 1920s and 1930s the Nigerian railway enjoyed a virtual monopoly of the inter-regional and long distance transport industry (Table 10) and especially in the Northern half of the country. Since the 1940s their monopolistic position has gradually been eroded by road transport.

A co-ordinated approach in the railway-road networks was envisaged when the colonial government upgraded cart tracks into feeder roads as it tried to channel trade to the railways before the 1930s. Table 11 shows some segments of the road network that were specifically designed to act as feeders to the railway, notably in the Northern and Western regions of Nigeria. The feeder road system was one of the ways in which efforts were made to ensure that the railway system was used more nearly to capacity. For example the railway administration maintained a motor transport service in the Zaria and Sokoto Provinces. Based mainly on Gusau, Kaura Namoda, and Sokoto, with repair facilities at Zaria, this service which connects with places not touched by the railway was well patronised while earnings showed a steady increase.[6] The development of feeder roads occurred in the form of improvement of some of the existing links, such as the Sokoto-Gusau-Zaria, Katsina-Kano, Katsina-Mallam Fashi-Funtua, Birnin Gwari-Funtua, Maiduguri-Potiskum-Jos, Oyo-Ibadan, Abakaliki —Enugu, Owerri-Aba roads, and the construction of new ones to new resource areas like Ife-Iwo, Sumaila-Kano, and Kontagora-Zungeru roads.

It was not long before road development, especially that parallel to the railway lines began creating intense competition

Table 10

Estimated Distribution of Traffic Between Modes, 1938-39 and 1948-49

%

Mode	1938-39	1948-49
Railway	66	63
Road	21	29
Rivers and Creeks*	13	8
	100	100

* It is estimated that 80% of this traffic is carried on the Niger and Benue rivers.

Source: International Bank for Reconstruction and Development, 1955, p. 59.

due principally to the establishment of transportation facilities in excess of the number actually needed to meet the requirements of trade in a particular area. The increasing role of the road system was eaqually due to the construction of faster and better roads which further popularised long distance travel by increasing speed differentials between modes. The road system had the advantage of being more flexible, quicker, and accessible to more remote areas than the railways. Its competitive advantage stemmed also, from the small scale of the operational unit. With a carrying capacity of three to five tons the problem of excess capacity on the return-haul was nowhere as severe as in the case of the railway or the boats where hundreds of tons were required. If a full load could not be quickly secured, passenger traffic provided a ready supplement (Kilby, 1969). Above all, the dramatic increase in road traffic after 1945 was made possible by public and private investment in commercial vehicles.

From a pre-war figure of 32,200 km the total mileage has grown to more than 74,060 kilometres in 1960.[7] Between 1945 and 1950, the number of commercial vehicles imported into the country increased at an annual rate of 26.4 percent, while the number of passenger cars increased at an average of 46 percent. The number of bicycles imported shows a significant growth, too (Table 12).

The post-war economic boom resulting from the demand for Nigerian products overseas gave more purchasing power to many Nigerians. New enterprises, mostly small scale, sprang up. The trucking industry was one of the most attractive areas in which to invest.

Table 11

Railway Principal Feeder Roads Built in Northern and Western Nigeria Between 1905 and 1930

Route	Date	Feeder to (Station/Line)
	Western Nigeria	
Ibadan-Oyo	1905	Railway at Ibadan
Iwo-Ife	1906-07	Ibadan-Lagos Line
Ibadan-Ilesha	1917	Ibadan Railhead
Abeokuta-Kajola-Asha	1924	Abeokuta Station
	Northern Nigeria	
Zaria-Sokoto	1917	Zaria Railhead
Kano-Katsina	1924	Kano Station
Kano-Daura	1924	Kano Station
Ilorin-Ado-Awtum	1924-25	Ilorin Station
Funtua-Yashi	1926-27	Funtua Station
Gusau-Anka	1930	Gusau Station
Zaria-Kafanchan	1930	West-East Lines
Oturkpo-Katsina Ala	1930	Oturkpo Station

Sources: Colonial Reports, Northern Nigeria, and Nigeria; **Annual Reports on the Nigerian Railway.**

Table 12

Importation of Road Vehicles, 1939-1950

No.

Date	Commercial Vehicles	Cars - Kit Cars	Bicycles
1939	217	626	6,647
1940	376	148	5,766
1941	443	56	2,189
1942	575	40	5,568
1943	7	15	8,211
1944	1,611	41	14,057
1945	65	67	14,935
1946	1,200	672	34,488
1947	1,684	1,740	50,085
1948	2,048	1,726	104,490
1949	2,867	2,142	129,546
1950	2,973	2,154	154,632

Source: Department of Statistics: Digest of Statistics, 1938-1950.

The trucking industry largely replaced the traditional human and animal carriers, especially in the sphere of inter-regional trade.

Road competition was very keen with respect to short hauls. The complete take-over of all cocoa and palm kernel traffic by road transport in Western Nigeria between Ikirun and Lagos about 1948, is a classic example of competition by a parallel road for the traffic for which the railway was built, and from areas which that railway had developed. The road system took over because it quoted a lower rate, 1.3 pennies and under per ton kilometre, for this area than the railway (Nigerian Railways, 1949-50).

Another example of the shift to road use is observed in the movement of both imports and exports via Lagos and for imports via Port Harcourt. Almost non-existant before 1945, the growth of road traffic at Lagos wharf had risen from eight percent of import tonnage in 1948-49 to 25 percent in 1952-53. Corresponding figures for export were six percent and 14 percent. At Port Harcourt wharf, nine percent of import tonnage was cleared by road in 1948-49 and 27 percent in 1952-53 (IBRD, 1955).

In summary, the railways linked the main agricultural and mineral producing areas and centres to the two major export ports of Lagos and Port Harcourt. Through the feeder network, the railways reached out and tapped the hinterland of some inland centres. The cocoa areas of Oyo (53 km) and Ogbomosho (103 km) were under the influence of the railways via Ibadan, while far away places such as Katsina (175 km), Daura (132 km), Birnin Kudu (135 km), and Sokoto (221 km), groundnut and cotton areas, were served by Kano and Gusau stations, respectively. The Jawa groundnut area (74 km) was tapped by the Nguru railway station, while goods from the Potiskum area (230 km) found their way to Jos station.

Transportation Cost

Transportation cost is an important modal characteristic in well developed transportation systems. In the less developed environment of Nigeria the new availability of transport seems to have played a more important role than transportation cost in the expansion of agricultural production for export.[8] On the other hand railway transportation cost, though effectively subsidised by the colonial administration, has doubtlessly moderated the spatial impact of railways.

Most short-haul movements are undertaken by the producers themselves either to the local markets, ports or railway stations and producers do not calculate the effective cost. Although it has been observed (IBRD, 1974) that transport accounted for as much as 30-40 percent of total marketing costs for cotton, 35-55 percent for groundnuts, and about 20 percent for cocoa, these were mainly long-haul transportation cost. The producers made some gain because in most cases the only cost they incurred was the long-haul transportation cost. Also production cost by native methods apparently is valued at nil, a production behaviour common among Nigerian farmers which is "uneconomic" in the Western context. In such a situation farmers continue to produce as long as their products can earn some cash in the market.

In constructing transportation systems in Nigeria, the focus was primarily placed on access in general. The penetration of the productive hinterland, and the linking of these resource-rich regions with the coast seemed more important than the mere consideration of cost,. speed, etc., as independent variables in the construction of the Nigerian railways.

Notes

1 These quotations from Colonial Reports that form the basis for the construction of Table 4 are arranged in a chronological order.

> "The railway has been constructed as far as Abeokuta, and surveys to Ibadan, about 120 miles from Lagos Island, have been made. It is hoped that this town, the centre of practically of all Yorubaland, will in the near future be within easy access from headquarters."
>
> (Colonial Report, Lagos, 1896, p. 11.)

> "... beyond Ibadan to the eastward very little oil is prepared, and no attempt is made to collect the kernels, though the 'ElaiisGuineensis' abounds there. No doubt when the railway to Ibadan is completed these industries will receive a great impetus ..."
>
> (Colonial Report, Lagos, 1896, p. 13.)

> "The railway is being rapidly constructed, and it is within the bounds of practical politics to think hopefully of the time when the railway will tap the underdeveloped countries in the 'hinterland' of the Colony as well as on the Niger, thereby expanding and developing the Colony and adding to its revenue."
>
> (Colonial Report, Lagos, 1897, p. 10.)

> "The interior resources will, no doubt, be further developed, and the rich lands turned to better account now that the railway has been opened, passing, as it does, through the most important districts of the Protectorate."
>
> (Colonial Report, Lagos, 1900-01, p. 18.)

"So vast an area as Nigeria, comprising in all some 380,000 square miles ... cannot be commercially developed except by railways."

(Colonial Report, Northern Nigeria, 1900-01, p. 19.)

"Every yard ... of a railway from the Niger to Kano would, by superseding the present caravan transport tend greatly to promote the development of trade."

(Lugard (1902), Colonial Report, North Nigeria, 1902, p. 20.)

The Zungeru-Barijuko (Kaduna) to Baro would "traverse the greatest trade route in Nigeria, and render possible the export of cotton and other produce grown in the Nupe province and in Southern Zaria. Without it cotton cannot, ... be profitably exported from those districts."

(Colonial Report, Northern Nigeria, 1902, p. 58.)

"... the extension of the railway to Oshogbo ... when opened will give a new impetus to the trade of the country, and in a minor degree to the erection of the Customs, warehouses and public officers quarters required in connection with the amalgamation of the Colony of Lagos and the Protectorate of Southern Nigeria ..."

(Colonial Report, Southern Nigeria, Lagos, 1905, p. 13.)

"The increase in the export of this valuable product (hides) is most gratifying, and as communication with Northern Nigeria is facilitated, it is expected to divert the greater proportion of this trade, which at present is said to go across to Tripoli."

(Colonial Report, Southern Nigeria, Lagos, 1905, p. 22.)

"It is probable that this industry (groundnut production) will show a considerable development when the railway is constructed to Jebba ..."

(Colonial Report, Southern Nigeria, 1906, p. 31.)

"The construction of the Eastern Railways will add, it is believed, enormously to the wealth and prosperity of Nigeria."
(Colonial Report, Southern Nigeria, 1913, p. 27.)

"The advent of the railway in May gave a considerable impetus to the output (of coal) which had previously been curtailed owing to the restricted stacking space ..."
(Colonial Report, Nigeria, 1916, p. 10.)

2 This was computed from the identical rates adopted by two of the three major commercial companies operating most of the Niger fleet - The United African Company Limited, and John Holts Line Limited. The rates on the Calabar river averaged about 1.3 - 1.9 pennies per ton-km. Rates to and from the French Cameroons on the Niger and Benue were 3.4 pennies per ton-km for cotton goods and 1.0 pennies for groundnuts. Rates between the delta and Baro varied from 2.5 pennies per ton-km for cotton goods to 0.9 for groundnuts in 1948. (IBRD, 1955).

3 The "Middle Belt" of Nigeria, which lies approximately 9^{o}N and 11^{o}N, contains about two-fifths of the country's area but less than a fifth of the population.

4 The site was chosen because its deep waters were suitable for a port a bit inland and capable of taking ocean-going vessels.

5 Colonial Reports, Northern Nigeria, 1913, pp. 20-21.

6 Colonial Reports, Nigeria, 1930, p. 25.

7 Ministry of Trade and Industry, Northern Nigeria, 1963 op. cit.

8 In discussing the effects of transportation on economic activities, it is apparent that not only the provision of facilities, but also the charge made for their use, is of concern for the producer and consumer of goods. A particularly exhaustive survey of the principles of railway rating has been provided by Locklin (1974). Other transportation texts covering transportation costs include Isard (1956), Location and Space Economy, Marvin Fair and E.K. Williams (1960), Economics of Transportation, D.P. Locklin (1960, 1966), The Economics of Transportation, and R.J. Sampson and M.T. Farris (1966), Domestic Transportation: Practice, Theory and Policy. In the case of Nigeria such general principles of railway rating do apply. Classification and differential tarrif of commodities in particular greatly assisted Nigeria's export crops.

Chapter 5

THE GROWTH OF AGRICULTURAL EXPORTS IN NIGERIA

Being an agricultural country with over 80 percent of her labour force in farming, Nigeria's economic progress has been achieved in great part, until recently, through the growth of indigenous peasant agricultural production for export. About 80 percent of the total growth was due to expansion of the cultivated area and the remainder to increased yields (until the late 1940s). The expansion in export crop trade is shown in Table 13.

This chapter is devoted to the examination of the production and growth of the selected cash crops: palm produce, groundnuts, cotton, and cocoa. The historical evolution and statistical description of each of the selected crops are presented with the hope that, in addition to assembling scattered historical facts of interest in themselves, this perspective will give rise to a fuller understanding of some of the factors that contributed to the growth or decline of the crops examined.

Between 1900 and 1930, great strides were taken in the expansion of the Nigerian export economy as some of her agricultural products gained significant positions in the world trade. By 1930 export volume had increased more than fivefold and export value sevenfold. Of particular significance is the tremendous growth in the importance of new cash crops. This is indicated by the fact that the value of palm produce exports, which had accounted for 80 to 90 percent of the total value of

Table 13

Five Year Average Rates of Exports of Palm Produce, Groundnuts, Cocoa, and Cotton, 1900-1949

(tons)

Years	Palm Produce	Groundnuts	Cocoa	Cotton (lint)
1900-04	176.511	475	305	132
1905-09	195.418	1,531	1,147	1,383
1910-14	251,989	8,195	3,857	1,884
1915-19	265,053	41,300	13,887	2,112
1920-24	293,373	44,286	27,279	3,951
1925-29	378,184	119,068	45,483	6.038
1930-34	396,888	188,745	62,979	4,593
1935-39	466,208	211,142	96,571	8,331
1940-44	454,984	181,838	82,379	9,913
1945-49	447,920	268,409	96,614	5,508

Sources: Department of Statistics (Nigeria Trade Reports).

recorded Nigerian exports, had fallen to 47 percent by 1929, while increasing in absolute terms by 192 percent. The main new export products were groundnuts, cocoa, cotton, hides and skins. These new products brought more and more farmers into contact with the world market and with outside ideas. Because of the new role of groundnuts, Northern Nigeria's participation in the national export economy received a boost.

Generally speaking, Nigerian agricultural production expanded throughout the Colonial period. Not only were new crops introduced into the system, but more land was brought under cultivation. For instance land under groundnuts increased from an estimated 2,360 acres in 1900 to over 1.2 million acres in 1949. The huge volumes of crop exports confirm this claim. The cultivation of food crops received due attention, though there are no figures to show their actual growth (Census of Agriculture, 1950-51).[1]

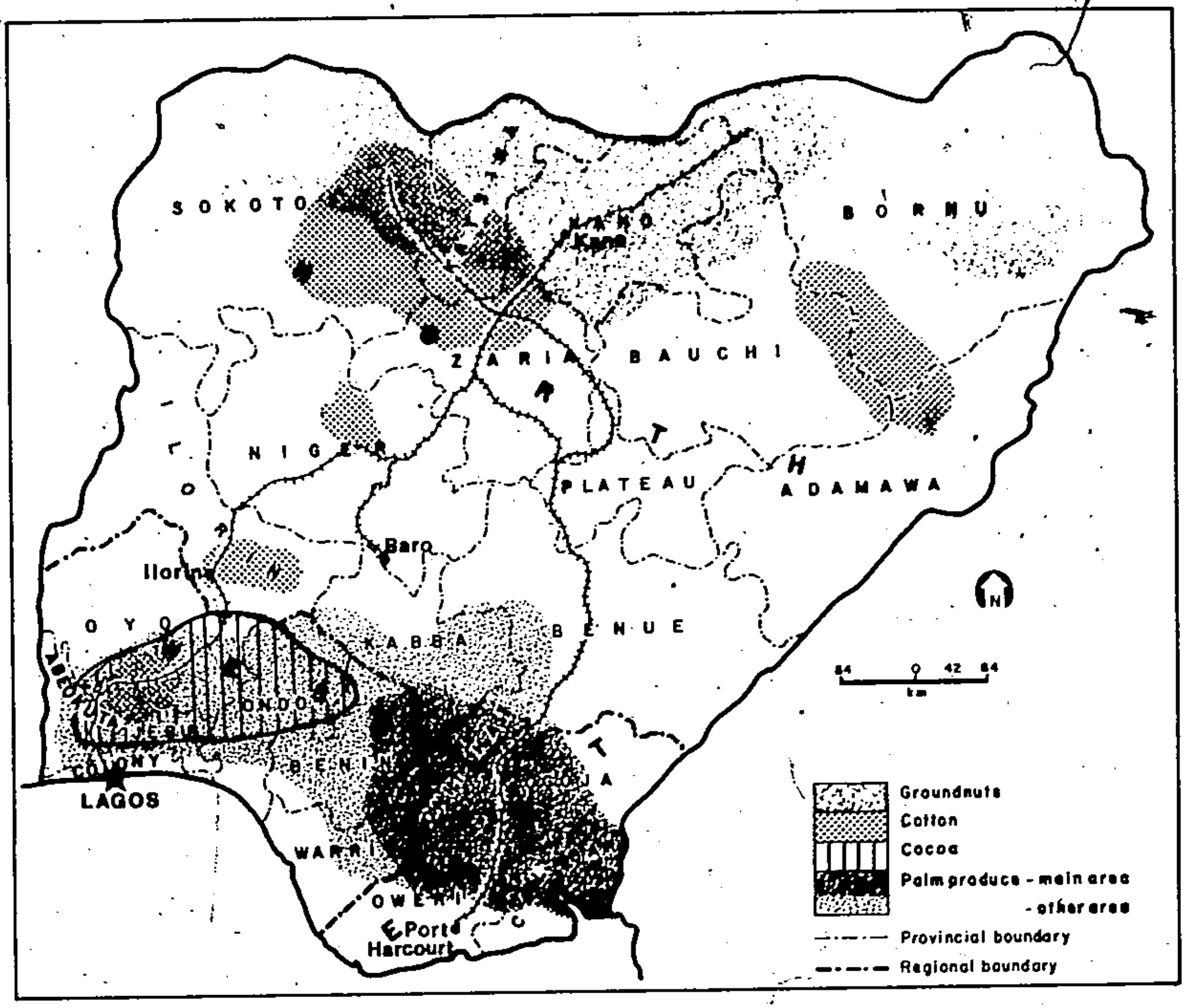
Since agricultural export products were not grown by foreign producers on capital intensive plantations, but by indigenous farmers on small farms, conversion to total commercial agriculture was very slow and rare. Over 90 percent of the farmers who produced cash crops also produced food crops. Most of the cash crops served local needs - substantial amounts of groundnuts, palm oil, and cotton outputs were consumed locally.[2] Cocoa was the only cash crop that had no immediate and direct local use, but the cash earned from its cultivation was more than enough to buy food crops locally. The introduction of a cash economy through agricultural export gave the Nigerian farmer more purchasing power and thus improved his standard of living. Internal trade was enhanced rather than hindered because trade-by-cash replaced trade-by-barter, which was not an efficient form of exchange.

A closer examination of some of the selected cash crops will reveal the performance of individual crops and the huge success scored by the agricultural sector in the economic development of Nigeria.

Palm Produce Production[3]

The oil palm is indigenous to West Africa and grows wild. The oil palm belt covers the whole breadth of Southern Nigeria, but the main producing area is Eastern Nigeria (Map 3). Although the East and West both produce palm products, the West produces more kernels than oil. The difference in production between the East and West is due to the fact that the West produces low quality oil[4] which does not command high prices in the world market. On account of this, and on account of alternative employment opportunities for men cultivating cocoa, which is more remunerative, a high proportion of the wild palm fruit is not harvested, but rather left to drop and rot on the ground with only the palm kernel eventually being extracted by the women (United Africa Company, 1947; Nwanze, 1961). The East, on the other hand, produces high grade palm oil which has a very high market value. The production of high grade oil in addition to the fact that the East does not enjoy the alternative cultivation

MAP 3
RAILWAYS AND PRODUCING AREAS OF MAJOR COMMERCIAL CROPS



SOURCES: Annual Reports on the Nigerian Railway and Colliery, 1934; W.A. Hance, 1975, p. 213.

of an export crop of high value, has led to a thorough and more systematic harvesting of palm for oil in the East than in the West. A sample of stations on the railway with an annual output of 500 tons or more of kernels and palm oil respectively, based on the 1933 and 1934 figures, shows that the West had 13 stations exporting palm kernels and 1 station exporting palm oil, while the East had 8 stations exporting palm kernels and 9 stations exporting palm oil.

From the beginning palm oil has had a large internal as well as overseas export market. Oil palm products are the oldest established exports of Nigerian agriculture. The expansion of palm products started in the 1840s in response to the decline in the Slave trade, as a substitute export, and to growing demands in Europe and elsewhere for vegetable oils. The export of palm oil increased from 55 tons in 1785 to some 20,000 tons in 1842 (The Central Office of Information, 1960). By 1900, exports had reached 45,508 tons. Palm kernels became important around 1870 following the discovery of their usefulness for margerine. In 1900, 85,624 tons of palm kernels were exported. Exports of both oil and kernels maintained steady growth, with only a slight drop during the war period, 1940-45 (Table 13).

Together the oil and kernels made up 80-90 percent of total Nigerian exports at the very early stages. They accounted for large proportions of total world exports of these products: palm oil accounted for 22.5 percent (1938) and 36.5 percent (1954), and palm kernels for 45.5 percent and 56.7 percent (Helleiner, 1966). The United Kingdom and Germany were the principal importers. The relative importance of palm produce in the overall total exports diminished with the appearance of important exports of groundnuts and cocoa.

Groundnuts Production

Groundnuts were introduced into West Africa by the Portuguese. Of the total amount of groundnuts grown in Nigeria, by far the greatest quantity comes from the Sudan provinces of the Northern Region. The main groundnut belt stretches from Kano province westward into Sokoto and eastward into Bornu (Map 3). Expansion began in the Kano area and then moved further and fuhther 'backwards' into Katsina, Sokoto, and Bornu provinces. In 1943-44 Kano province alone produced over 56 percent of total marketed output.

In recent years groundnuts have made up from 17 to 24 percent of Nigeria's export. At the turn of the century groundnut exports were very small with 203 tons in 1901. The export did not reach any significant volume until 1913 when 19,288 tons were exported. There after volume increased rapidly. By 1929 groundnuts with 147,379 tons accounted for 14 percent of total exports as against 2.6 percent in 1913 (Trade Reports). The 1930s and 1940s saw the continued expansion of groundnuts with an annual average of 211,142 tons between 1935-39, and 268,409 tons between 1945-49 (Table 13).

Most of the exports were produced on small peasant holdings.

It has been estimated that the area planted in groundnuts throughout the country reached over one million acres in 1950 (Sample Census of Agriculture, 1950-51).

Cotton Production

Cotton is the second most important peasant export crop in Northern Nigeria. Originally cotton was grown in both the Western and Northern regions for the local textile industries. It was also formerly grown for export on a considerable scale in the dry-forest zone of South-Western Nigeria, but as a result of the superior attractions of cocoa as an export crop, and the ravages of pests; export production in the South has dwindled to insignificant proportions. In recent years, almost all cotton production for export has taken place in the North, principally in Zaria, Kano, Katsina, and Sokoto provinces (Map 3). The main producing area forms a more or less continuous belt, aligned along the railway from Kaura Namoda towards Jos and coinciding with the zone of Zaria-type soils. On the basis of yield per acre[5] (1948), total acreage under export cotton may be estimated at between 90,000 and 170,000 acres. No data were available on production for local use, but this has been estimated to be at least as great as the volume of production for export (Buchanan & Pugh, 1955). So the aggregate area under the crop would appear to be between 180,000 and 340,000 acres.

The British Cotton Growing Association did much to stimulate the growth of cotton through the provision of seeds and ginning facilities. They did establish a few plantations and experimental cotton farms. The American Allen long staple cotton which they introduced into the country found suitable soil in the Savannah areas of the North.

The first recorded export of cotton from Nigeria was in 1856 (Johnsrud, 1960). It was not until 1906 that the exports of cotton began to assume real importance. That year, 1,826 tons were exported. A volume of 5,721 tons was achieved in 1921. After the depressions of the early thirties, new records were reached in 1936 and 1942. There was a decline in production during the war years, but exports climbed again in the 1950s. The figures used here are those for raw cotton (lint). Cotton seeds were exported too, and followed a similar pattern as cotton lint. The United Kingdom was the greatest importer of Nigerian cotton, with about 95 percent. Like the other export crops, the cotton output depended very much on peasant cultivation.

Cocoa Production

Cocoa was brought to Nigeria from Brazil by way of the Spanish and Portuguese islands of San Thomé, Principé and Fernando Po in the latter half of the 19th century. The seeds were introduced to the Ibadan and Ondo areas in the 1890s. The initial response of farmers to cocoa was very slow because the crop had no domestic use. As the knowledge of the crop grew and the external demand for it increased, more and more farmers in the West took to growing cocoa.

The cocoa belt covers a total area of over 16,100 square km embracing the province of Oyo, and parts of Ondo, Abeokuta, and Ijebu Ode provinces. Over 90 percent of Nigeria's cocoa production takes place in this belt. Generally, the rate of cultivation is about one acre in ten; but in the heart of the 'cocoa belt' six cultivated acres out of ten are in cocoa (Galletti et al., 1956). Cultivation takes place upon small peasant-owned holdings ranging from a little above 1 to 2.5 acres. The rate of planting steadily rose to a maximum in 1926-31, when about 25,000 - 35,000 acres were planted per year. Between 1934-38, yearly plantings tended to decline. Scarcity of accessible newland for planting contributed to decline of planting (cf. IBRD, 1955). But the situation changed relatively in the late 1940s when it was estimated that there were 560,000 acres of cocoa in Western Nigeria (1948), the bulk of which was concentrated in a fairly limited area around Ibadan (IBRD, 1955; see Map 5). It is probable that as the roads were extended away from the railways planters of new cocoa farms tended to look for land along the new road facilities (Map 5).

Cocoa accounted for about 15-20 percent of the total value of Western Nigeria's agricultural output (Okigbo, 1962), and an average of 18 percent of total principal exports, rising from a mere 2.3 percent in 1913 to 21.5 percent in 1950. The first exports of cocoa were made in 1895 when 21 tons were shipped (Udo, 1970). From 1901 on, production rose rapidly (Table 13). In 1911, 4,401 tons were exported, an increase of 729 percent over the 1904 figure. By 1937 an incredible 2245 percent increase over 1911 had been attained. The greatest importers of Nigerian Cocoa were the United Kingdom and Germany.

Notes

1 The view of Lappé and Colin (1977) that the Colonial enforcement of export agriculture handicapped future development by orienting indigenous production and trade patterns to serve narrow export interests, and that the internal trade that might have served as the means for autonomous development was disrupted or even destroyed in the wake of all-encompassing colonial cash crop systems, is open to criticism. In the Nigerian case there is little or no evidence for Lappé and Colin's claims. The growth of agricultural production for export did not result from a reduction in production of goods for domestic use, but from the increased employment of the previously under used production factors of land and labour. The Agricultural census data (1950-51) and Annual Report of the Forest Administration, 1952-53, indicate that the traditional subsistence economy remained more or less intact in all parts of the country, and that the cultivation of food crops was primary in the Nigerian agriculture. For example, yams, cassava and grains (staple foods) constituted 57 per-cent of the total agricultural product in 1952, while palm produce, cocoa and groundnuts (major export crops) accounted for only 16 percent (IBRD, 1955). The national average of land under tree and non-tree crops in 1950-51 were 12.2 and 3.2 percent respectively (Table 1), while areas under principal field crops shows that the staple (food) crops occupied nearly

75 percent, and groundnuts (export) about five percent of the national average (Table 2).

2 Helleiner (1966) suggests that about 30 percent of the Nigerian output of groundnuts is consumed domestically. They are valuable as a foodstuff because of their high protein content. See Helleiner, 1966, p. 108.

3 For export purposes, oil palm produce is composed of two elements - palm oil and palm kernels.

4 Methods of extraction of the palm-oil are very variable, but may be grouped into "hard-oil" and "soft-oil methods. In the former the fruit is softened by fermentation and mashing, and the oil partly runs out and is partly squeezed out of the softened mass. In the "soft-oil" process the fruit is softened by boiling and pounding, and the oil is separated by working the softened mass in water from which the oil is skimmed off. The "hard-oil" method, which is practised in the Western Region, gives a higher extraction rate, but the resultant oil is less valuable to the overseas manufacturer and commands a lower price than soft oil. For more information on methods of extraction see Annual Bulletin of the Agricultural Department, Vol. 1, (1922), pp. 30-32.

5 The prevailing estimates for cotton yields per acre before 1912, were 300-350 lb (Eicher & Liedholm, 1970). The

contemporary estimate of long-term average yields with traditional methods is about 250 lbs per acre. On account of the time span of the study, the average of the two estimates, 287.5 lb per acre, is the unit for the conversion of cotton output into land-use data.

Chapter 6

THE RELATIONSHIP BETWEEN RAILWAY CONSTRUCTION AND THE GROWTH OF EXPORT AGRICULTURE

At this point, it is necessary to reiterate that the objective of this thesis is not to determine whether the railway was the only factor, or even the main factor that affected agricultural expansion during the Colonial era but rather to argue that the access provided by the railway network helped the growth of commercial agriculture in Nigeria between 1900 and 1950. While recognizing the role of land, labour, capital, and entrepreneurship in economic development,[1] it is important to recall that transportation policy can be used as an instrument of economic development and that the distance between points of supply and demand is a factor which tends to produce friction for the movement of goods between such points (Ullman, 1956).

In the early twentieth century there was a demand for the Nigerian agricultural exports overseas, but it was not economically viable to produce and move certain goods from areas of supply to points of demand, on account of the high cost of transportation. The incentives to produce more than what was deemed necessary for regional consumption were stifled. The surge of production that immediately followed the introduction and expansion of the railways played an instrumental as well as permissive role in the growth of production. For example, between 1912 and 1913, a year after the penetration of railways into Northern Nigeria, the value of agricultural exports from the North increased from £246,857 to £618,000, an increase of 150 percent; groundnuts export increased by 666 percent, followed by benniseed, 157 percent, gum arabic, 133 percent, cotton lint, 45 percent, hides and skins, 41 percent and sheanut products by 20 percent (Colonial Reports, Northern Nigeria, 1913).

The discussion in this chapter is centered on the type of access provided by the railways, how this access provided production incentives for the farmers, and how it consequently affected the production pattern of some of the individual cash crops.

Type of Access and Production Incentives

The Nigerian railway system is mainly a goods service. Of the 3,842 units of rolling stock in use in 1934, 3,529 were devoted to goods service while only 313 were specifically for coaching services (Table 14). In 1913, coaching services contributed 18.6 percent of gross earnings, while goods services accounted for 79.5 percent. The contribution of goods services rose to 81.6 percent in 1930-31 and 86.2 percent in 1933-34. Of the total goods traffic in 1902, agricultural products contributed 64 percent (Nigerian Railway, 1933). This position remained virtually unchanged through the entire period with an average of 64.4 percent per annum in 1931-1950 (Table 15). Thus agricultural products railed kept pace with the overall growth of railway traffic.

TABLE 14

CONDITION OF LOCOMOTIVES AND ROLLING STOCK, 31st MARCH 1934.

DESCRIPTION.	Locomotives.												Coaches.				Goods.			
	3' 6", Gauge.						2' 6" Gauge.						3' 6" Gauge.		2' 6" Gauge.		3' 6" Gauge.		2' 6" Gauge.	
	Shunting.		Main Line.		Total.		Shunting.		Main Line.		Total.									
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
In Service	38	70·4	125	65·1	163	66·2	1	33⅓	4	40	5	38·4	283	90·3	11	91·7	3167	89·7	63	82·9
Under Repair	4	7·4	24	12·5	28	11·4	—	—	1	10	1	7·6	13	4·4	—	—	53	1·5		
Awaiting Repair ...	12	22·2	30	15·6	42	17·1	1	33⅓	2	20	3	24·0	17	5·3	—	—	309	8·8		
Laid aside ...	—	—	†13	6·8	13	5·3	1	33⅓	3	30	4	30·0	—	—	1	8·3	—	—	13	17·1
Total ...	54	100	192	100	246	100	3	100	10	100	13	100	313	100	12	100	3529	100	76	100

NOTE :—Table excludes Engine 95 of Obsolete design out of service. Utilised at Locomotive Drivers' Training School.

† Obsolete and about to be written off.

SOURCE: Annual Reports on the Nigerian Railway and Colliery, 1933-34, p. 98.

Table 15

Railway Goods Traffic
1931-32, 1946-47 and 1949-50

(tons)

Year	Total Goods (Paying) Traffic	Total Agricultural Products (Traffic)	% Agricultural to Total Goods
1931-32	581,094	340,912	58.7
1932-33	613,550	395,521	64.5
1933-34	599,546	394,036	65.7
1934-35	624,445	421,538	67.5
1935-36	709,102	429,680	60.6
1936-37	891,848	556,939	62.4
1946-47	967,206	660,726	68.3
1947-48	892,676	580,726	65.1
1948-49	1,024,896	660,068	64.4
1949-50	1,045,968	696,016	66.5
			$\overline{X}$ = 64.4

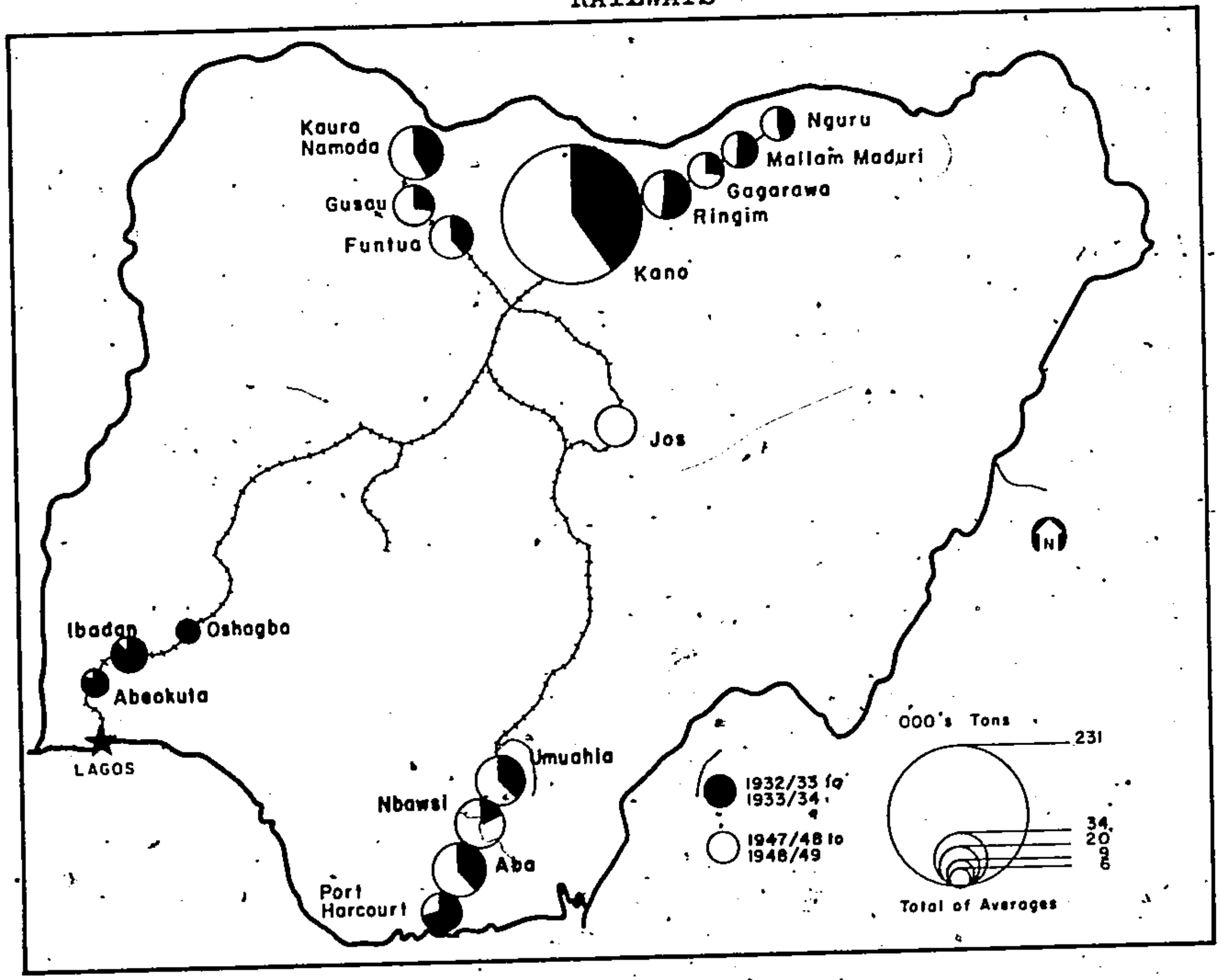
Sources: Adapted from *Annual Reports on the Nigerian Railway*.

From the point of external trade the most important result of railway construction was the establishment along the routes of European firms and collecting centres in the manner of the riverine and coastal stations. These firms and centres rapidly attracted markets and trading communities around them and formed the nuclei of expanding and new commercial towns. Some of the older towns with long commercial tradition developed into buying centres for agricultural export goods. Ibadan became a cocoa centre, Zaria was associated with cotton, and Kano with groundnuts, hides and skins (Schatzl, 1973). Map 4 shows that there were 17 stations along the railway producing and handling over 4,000 tons of the sum of the two major selected cash crops during the 1932-34 and 1947-49 periods.[2] It is evident from the map that there are three major zones of relatively intensive production, coinciding broadly with the Northern Cotton and Groundnut Belt, the Eastern Palm Belt, and the Cocoa Belt of Western Nigeria. The dominance of the Northern Region in general, and Kano in particular, emphasises the role of the northern products, especially groundnuts, in the export economy of Nigeria before the 1950s. It also indicates the dependence of the northern products on the railway for movement to the ports. Referring to this dependence Lamb (1925, p. 19) writes:

> "In the Northern Provinces the history of export cotton production, like that of groundnut production, has been closely linked with the history of railway

MAP 4

GROWTH OF AGRICULTURAL CENTRES ALONG THE RAILWAYS



Note: The centres shown on this map are those that exported annually over 4,000 tons of selected cash crops between 1932 and 1949. See Table 15a for details.

Table 15a

Railway Centres Exporting Over 4,000 Tons of the Sum of The Two Major Selected Cash Crops, 1932-34 and 1947-49.

(nearest 000 tons)

CENTRES	AVERAGE 1932/3-1933/4	AVERAGE 1947/8-1948/9
	(GROUNDNUTS + COTTON)	
Maidobi	6,000	2,000
Kano	93, 000	138,000
Zakirai	8,000	4,000
Taura	10,000	4,000
Ringim	17,000	14,000
Gagarawa	6,000	13,000
Mallam Maduri	10,000	9,000
Nguru	7,000	8,000
Funtua	9,000	14,000
Gusau	7,000	13,000
Kaura Namoda	15,000	19,000
Jos	-	21,000
Majia	-	8,000
	(COCOA + PALM KERNEL)	
Abeokuta	6,000	3,000
Ibadan	13,000	5,000
Oshogbo	5,000	1,000
	(PALM OIL + PALM KERNEL)	
Aba	14,000	20,000
Nbawsi	6,000	15,000
Umuahia	13,000	19,000
Port Harcourt	12,000	8,000

NOTE: The above figures are obtained by summing the 2-year averages of the two major selected cash crops at each centre.

SOURCES: Annual Reports on the Nigerian Railway, 1932-34 and 1947-49.

expansion, and it was not until the railway reached Kano in 1912 that the export cotton production attained any importance."

The location and spacing of these stations were determined primarily by the population density and the productivity of the areas they serve. There is a strong relationship between population density and the heavily cultivated areas. In the north, settlements started around the fertile spots and have continued to grow from there. The heavily cultivated and densely populated zone north of Zaria had a greater number and more closely spaced stations than the Kaduna and Jebba areas. In the latter areas the rail passes through the less fertile, less cultivated, and more sparsely populated "Middle Belt" of Nigeria. The cocoa and palm belt — section between Offa and Lagos shows a high concentration of collecting stations also (Maps 1 and 7).

The provision and distribution of collecting centres enabled more farmers in various parts of the country to reach national and international markets more effectively. The direct access to markets provided by the railways offered the farmers the hope of realising better prices for their products, and thereby induced them to produce more. Furthermore, these stations made possible the concentration of markets at certain points, and thus helped the bulking of what is by nature a scattered and small scale production.

Cost, Speed, and Consistency of Movement

The prices payable to the producers depended heavily upon transport cost. Between 1900 and 1950 the estimated cost of transport per ton km was 1.80d by river, 2.16d by rail and 4.50d by road.[3] Because of the principle of low freight rates on the railways and government subsidy, the network competed favourably with the river system. With only an 0.36d per ton km difference in freight rates between the two networks in 1900-50, in addition to the advantage of speed and frequency, the railway was able to divert most of the traffic from the Niger and Benue. The average of 4.50d per ton km on the road system gave the railways, with 2.16d per ton km, an easy edge over the road transportation in long hauls. On the other hand the road competed vigorously with the railway for short hauls and especially in those areas where there were slight differences in the rates per ton km charged by the two systems.

The railways increased the agricultural production of the hinterland by giving the farmers access to the best markets at low transportation costs. The aim of the railways has always been to supply transportation at the cheapest possible cost to the community. To encourage the natives to use the railways, the third class fares were fixed at an 0.16d per passenger-kilometre and this included a luggage allowance of 25.4 kg for each passenger (Colonial Report, Northern Nigeria, 1934). The figures of average receipts

Table 16

Railway Freight Rates: Agricultural Exports, 1952-53

Commodity	Distance	Rate per Ton	Rate per Ton-km (pence)
Cocoa	193 km (Ibadan-Lagos)	32/6	2.03
Cotton, Ginned	1159 km (Gusau-Lagos)	132/3	1.37
Groundnuts	1127 km (Zaria & North to the ports)	182/3	1.95
Groundnuts	560 km (Zaria & North to Baro)	142/9	3.08
Hides & Skins	1357 km (Nguru-Lagos)	228/-	2.03
Kola-nuts	1084 km (Ifo-Kano)	305/-	3.39
Palm Oil	61 km (Aba-Port Harcourt)	20/-	3.95
Yams	161 km	16/-	1.20
Yams	805 km	28/6	0.43
			$\overline{X}$ = 2.16

Source: Adapted from International Bank for Reconstruction and Development, 1955, p. 469.

per passenger-kilometre, first, second, and third class combined[4] show that cost per passenger-kilometre was still under 1d in 1950. Low transportation cost and the 25.4 kg allowance per passenger offered the farmers opportunities to visit a larger number of local, and sometimes distant periodic markets along the railway to dispose of small quantities of farm products.

The special rates for some principal exports and certain local commodities along some sections of the line were efforts to promote production, especially in those areas where high cost of transportation deterred production. Low costs at certain sections were set to attract traffic to the railway network (see Table 16). In an unsuccessful effort to meet road competition along the Ibadan-Lagos line, the rate for cocoa was reduced to 32/6d in 1952 from 45/- per ton in 1948. In general the rate policy favoured long distance freights and local food crops and was specially designed to make the northern products accessible to the coast. Rates were slightly higher on exports coming from areas where there was no road or river competition (Zaria to Baro), and for exports moving short distances as a result of high terminal costs associated with the railways. For example the palm tree rate, was 3.95 pennies per ton km between Aba and Port Harcourt. This may have contributed to the low percentage of the product (palm oil) railed in this zone.

The £12 per ton paid for groundnut exports at buying station on the railway and a minimum of £9 per ton at non-railway locations (in 1945), led to the concentration of buying activities at certain centres along the railway. The £3 difference in minimum prices between the railway and non-railway location was a strong incentive to draw producers to the railway buying stations. It is not unusual in this part of the country for farmers to sacrifice time and leisure in order to make a profit of a few pence.

The cost and time saving of railways compared to alternative modes is illustrated in Hodder's (1959) study of tin-mining on the Jos Plateau. He observes that before the railway reached the plateau in 1927, the road journey from the mines to the coast took 35 days. With the railway connection to Port Harcourt, not only was the journey reduced to less than 35 hours but the cost came down by nearly 75 percent. To bring produce from Ibadan to Ikorodu by foot took three days. An extra day must be added for the journey to Lagos. The railway reduced this to half. The journey from Lagos to Zaria which used to take weeks, was accomplished in a little over 38 hours, or to Rahama at the foot of the Bauchi Plateau in a little over 44 hours, after the completion of the Lagos-Kano line (Colonial Reports, Northern Nigeria, 1912). The punctuality of the trains was commendable. The 1934 statistics show that only 2 percent of the passenger trains and 6 percent of the freight trains, were over 30 minutes late (Nigerian Railway).

The consistency of the railways in supplying access routes throughout the year was welcomed especially in the Northern region, where all season roads were few in number and rivers prone to low water levels during the dry season. In Nigeria the major demands for transport for most of the export crops are concentrated in the period from November to February (the peak harvest season)[5], which happens to be the season when most sections of the inland waterways are not navigable. With the railway it was possible to spread the movement of products instead of over-taxing the facilities in an attempt to clear the exports before the "bad season" as was the case with river and early road systems.

Production Response to the Railways

While it is true that the railway system has been effective in promoting export crop production, the response of the different crops to and their dependence on the system varied greatly. The varying response was due mainly to the nature of the crop, the spatial configuration of its producing area, and demand for the crop. When the railway was extended to the producing areas of annual crops like groundnuts, cotton, and sheanuts, the increase in output was noticeable within 18 months. For some tree crops like oil palms, rubber, and gum arabic that grew wild, increased harvesting resulted almost immediately with the introduction of rail lines and feeder roads. The response came much later from crops such as cocoa. Cocoa had to be planted and required between 4-7 years to reach producing age. The Ibadan

Table 17

Percentage of Total Groundnut, Palm Produce, Cocoa, and Cotton Exports Moved by Rail, 1931-32 and 1949-50

Year	Groundnuts	Palm Kernel	Palm Oil	Cocoa	Cotton
1931-32	84.0	15.6	25.5	34.1	54.2
1932-33	97.0	24.2	23.2	37.3	67.8
1933-34	84.0	15.9	29.7	44.9	79.3
1934-35	89.8	19.3	19.9	37.9	80.2
1935-36	89.4	22.3	24.9	40.2	60.5
1936-37	88.7	18.7	27.4	34.6	92.9
1937-38	87.6	21.7	25.2	36.7	80.7
1946-47	98.0	17.5	42.8	11.9	91.2
1947-48	95.6	16.2	43.3	8.0	95.9
1948-49	134.4*	15.3	40.9	3.8	92.3
1949-50	102.8*	10.3	36.9	.9	99.0
Averages	95.6	16.6	28.4	26.4	81.3

* See Note 6 at the end of this Chapter.

Sources: Adapted from Annual Reports on the Nigerian Railway; Colonial Reports on Nigeria; Department of Statistics (Trade Reports) for the various years.

experience is a good example of this delayed response. The railway reached Ibadan in 1901 and the output of cocoa only started to show marked increases about 1908. The market value, transportation cost and the location of the producing areas were also contributory factors to the response of individual ~~cash~~ crops to the railway. The production of northern export crops seem to have responded more rapidly and favourably to the system than the southern export crops, because the railway afforded the much needed direct link with the coast and external market, which until then had been partially fulfilled by river transport.

Between 1902 and 1950 the average percentage railed stood at 22.5 for palm produce, 26.4 for cocoa, 81.3 for cotton, and 95.6[7] for groundnuts (Table 17). The relatively low proportion of palm produce railed was due to the following factors:
1) The palm belt runs in a East to West direction in the rainforest zone - an area that does not permit extensive railway construction on account of its numerous rivers and creeks, and its thick vegetation. The railway runs in a North to South direction cutting through only part of the producing areas. A similar pattern is noticeable in the Western Region. 2) The rivers and road networks presented alternative and competitive modes of transportation. The railway freight rates for short hauls were higher in most cases (Table 16). 3) The bulking of palm kernels, in particular, in bags or sacks made them easily transportable by simple means. Several bags could easily be carried

to the coast, at a time, on bicycles.

River transport seems to have been the main competitor for moving palm products to the coast. A comparison of the river-ports with the rail-ports indicates that the river-ports handled an average of 54 percent while the rail-ports handled about 46 percent of the exports of palm produce between 1929 and 1950 (Table 8). It has been suggested that the railways handled about 23 percent of palm produce for internal trade (Annual Reports on the Nigerian Railway, 1947-48). If one assumes that the average percentages of 16.6 (palm kernel) and 28.4 (palm oil) railed for export, and 23 percent railed for internal trade between 1902 and 1950 reflect the railway impact, it could be said that about 45 percent of all palm products were moved by the railway during this period.

The high dependence of groundnut exports on the railways is clearly shown by the dominance of groundnuts in the overall goods and agricultural traffic by the railways for selected years (Tables 17 and 18). Groundnuts became a major export after the completion of the rail link from Kano to Lagos in 1912. Previously, supplies from the producing areas of the North could only be evacuated via head porterage to the Niger, and from there by boat to the coast. The 1929-1950 comparison of the share of groundnut exports by rail and non-rail ports (Table 9) indicates that the rail-ports gained 13.7 percent relative to the non-rail ports traffic. The dominance of the rail-ports is remarkable, rising from 81.6 in 1929 to 99 percent in 1950.

The groundnut exports from the Kano region alone showed an increase of 1,536 percent within two years, from 1911, before the arrival of the railway, to 1913, a year after the railway

Table 18

Percentage Contribution by Groundnuts, Palm Produce, Cocoa, and Cotton to Total Agricultural Goods Traffic by Rail, 1931-32 to 1949-50

Year	Groundnuts	Palm Produce	Cocoa	Cotton
1931-32	46.3	22.9	5.3	1.8
1932-33	50.1	23.4	6.7	2.5
1933-34	52.3	20.2	6.9	3.0
1934-35	52.2	18.6	7.0	6.2
1935-36	38.3	24.5	8.2	10.5
1936-37	51.3	21.0	5.0	5.2
1946-47	42.4	13.9	10.9	2.2
1947-48	42.1	18.2	1.5	2.3
1948-49	50.0	16.2	.5	1.7
1949-50	56.0	14.6	.1	2.9
Average	48.1	19.4	5.2	3.8

Sources: Annual Reports on Nigerian Railway, 1933, p.87; 1934, p. 107; 1934-35, p. 132; 1936-37, p. 120; 1947-48, p. 16; and 1949-50, p. 20.

reached Kano. This increase is attributable to the extension of the railway hinterland into the producing areas. Reactions of some of the contemporary newspapers to the improved trade around Kano in 1913 point to a casual relationship between the arrival of the railway and increased production and trade. The March 14 issue of <u>Africa Mail</u> reported that:

> "A really quite extraordinary rush of traffic has taken the railway by surprise at Kano, and although it was fully expected that Kano trade would develop yet it was hardly anticipated that during what is practically the first full season of the line being really open for traffic, a trade in groundnuts alone would tax the resources of the railway" (Morel, 1913, p. 238).

And Lamb (1913, p. 663) writes:

> "the arrival of the railway at Kano has within eighteen months given tremendous stimulus to groundnut cultivation in the neighbourhood... Every available piece of land is being planted with groundnuts...".

The increases observed in groundnut production, particularly in 1926, 1929 and 1933, are related to the expansion of planting in areas east of Sokoto province where the extension of the Bauchi Railway to Funtua, Gusau (1926) and Kaura Namoda (1929), and its feeder roads opened up trade; and the new areas that were steadily developed on the Nguru Branch Line (1930). From the percentage railed it seems that the railway was responsible for stimulating most of the production increases witnessed during this period.

Small quantities of cotton , about 11 tons in 1900, were exported early in the century. It was not until 1906 after the building of railways and roads into the Western Region, that exports began to assume importance. The opening of the railway link to the North in 1912, among other things, seems to have given cotton exports a further fillip. By 1916, a volume of over 3,300 tons had been achieved, an increase of 135 percent over 1906. Further increases were recorded in the 1930s. These were attributed to the extension of the railway hinterland and more especially to the shift in production areas. By this time the North was becoming a major producer of commercial cotton. The shift in production areas occurred primarily because the cotton produced in the West was of low quality, and the high quality cotton introduced into Nigeria by the British Cotton Growers Association, later in the century, adapted better to the compact-silty-fine-sand-soil in the North. As the demand and market value of this low grade cotton fell, some of the areas traditionally reserved for cotton growing in the West were being planted with cocoa which had become a more lucrative cash crop.

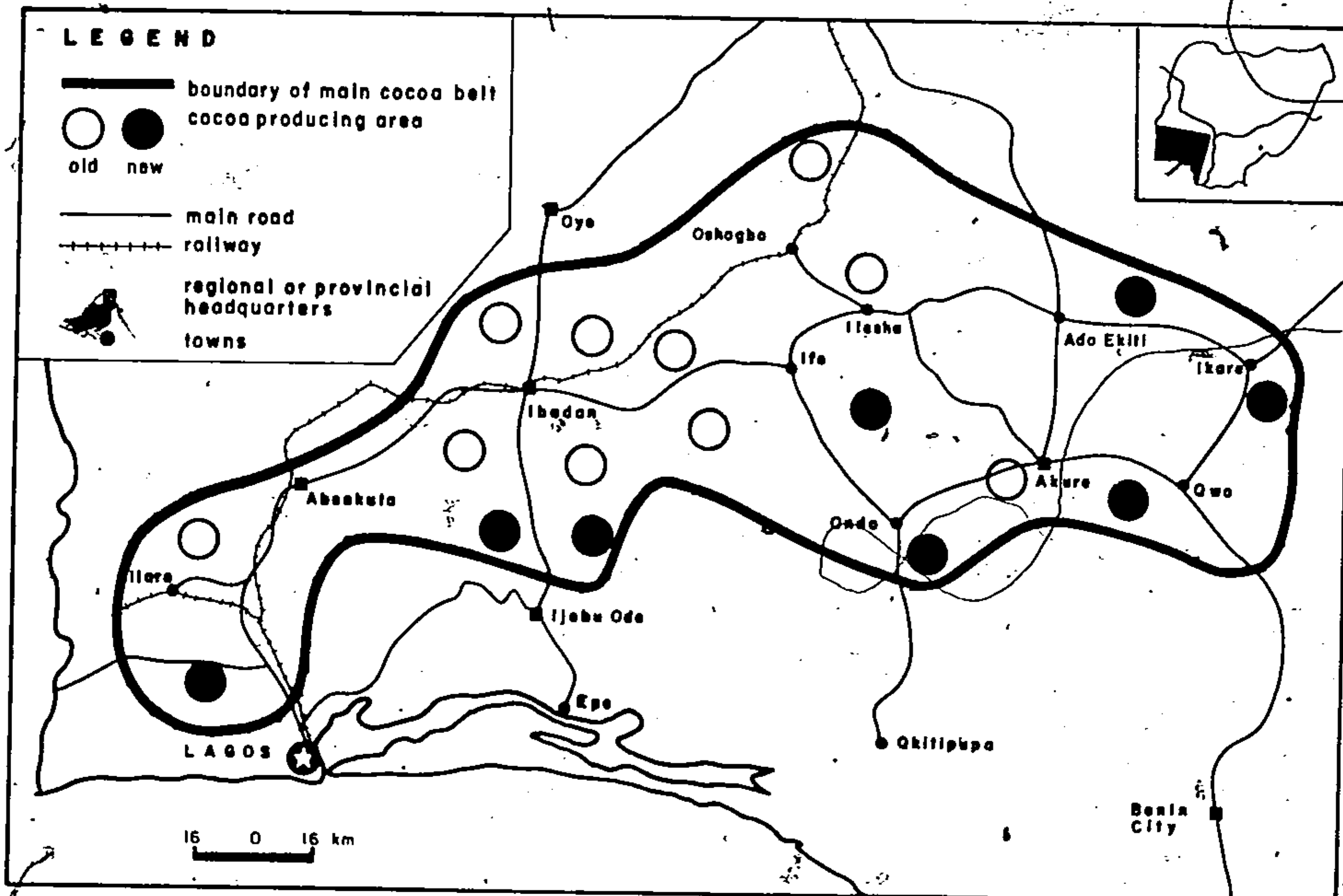
An average of 81 percent of export cotton was railed to the ports between 1931 and 1950 (Table 17). Based on this proportion railed, one can assume a high dependence of cotton moveme nt on the railway system. As the production and export of groundnuts and cotton did not begin on a substantial scale until after 1912, it is probably not an exaggeration to say that the availability of railway transport has been the single most important factor in the economic development of Northern Nigeria.

The railways played a major role in the cultivation and export of cocoa up to the early 1940s when the shipment by rail declined from 37 percent in 1933-34 to 0.9 percent in 1949-50. The decline was caused by the intense competition and virtual takeover of all short distance rail traffic by road, and by the fact that except between Ibadan and Oshogbo, and the Abeokuta province, the rail bypasses the main p roducing areas. The rail was fed by a feeder road network. By 1921 a service of motor lorries connecting the towns of Ibadan, Oyo, Ogbomosho and Oshogbo, and between Oshogbo and Ilesha, was operating (Colonial Report, Nigeria, 1921).

Since the second world war the railway has increasingly become an auxiliary to the road transport system in the cocoa producing areas . The road system has expanded well into the main cocoa producing areas and is serving them well. The main artery is the trunk road running from Lagos to Abeokuta and Ibadan, thence to Ife and Ilesha, then south-east to Akure and through the

MAP 5

EXPANSION OF PRODUCTION IN THE COCOA PRODUCING AREAS OF WESTERN NIGERIA



Sources: Annual Reports on the Nigerian Railway, for various years; Galletti, Baldwin and Dina, 1956, Appendix Map.

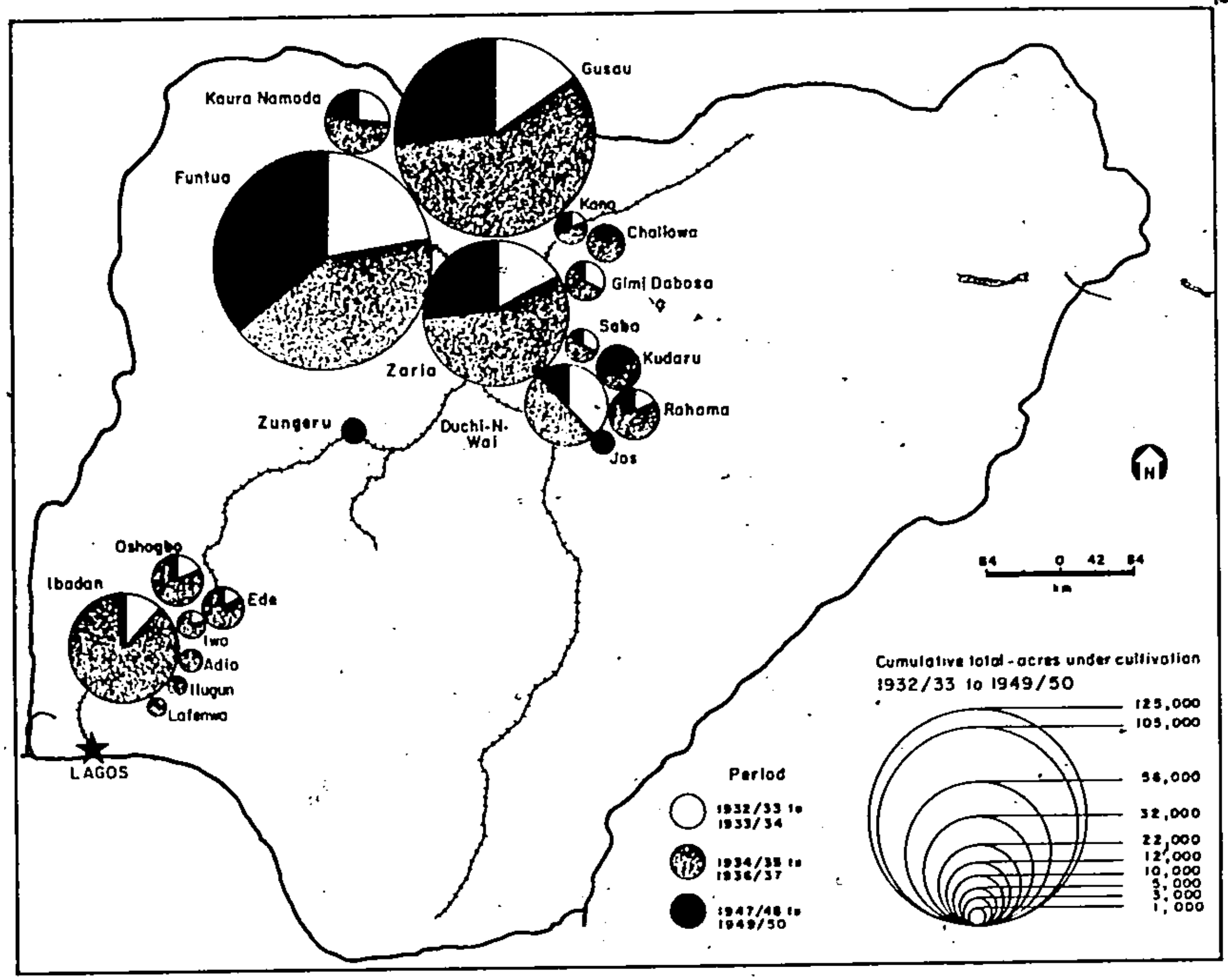
south-eastern part of Ondo province to Benin. From Ibadan a trunk road runs ~~north~~ to Oyo, Ilorin, and the Northern Region (Map 5). The volume of commodities shipped between Ikirun and Lagos by the rail is much less than before the war and much less than at the principal stations in the Northern and Eastern Regions (Galletti et al., 1956). The figures for cocoa and palm kernels show that the movement of cocoa and palm kernels by train has dwindled away (Table 20). The small quantity still carried by the railway is probably confined to what is produced in the areas in close proximity to the railway stations. The low estimated acreages under cocoa, ranging from 1,000 to 8,300 acres planted annually between 1947 and 1950 suggest the shrinking hinterland impact of the railways in Western Nigeria as a result of the road system operating independently and no longer serving, in most cases, as feeder network to the railways. This limiting of hinterland is clearly shown in the lack of cocoa output at those railway stations that heavily depended on the feeder network in the past. The producing stations not solely dependent on feeders, Ibadan, Ede, Oshogbo, Ilorin and Agbodo, show a lesser decline of production railed.

Railways and Land-Use

Using the volume of crops railed, an attempt has been made to estimate the acreage under specific crops in the economic hinterland of some railway stations (Maps 6, 7 and 8). It must be emphasized that this type of measurement is not the best way

MAP 6

ESTIMATED ACREAGE UNDER COTTON: RAILWAY STATION AREAS, 1932-1950



Notes: See Table 19 for sources and actual figures. For the exact location of centres see Map 1. Circle sizes are based on cumulative total acres cultivated during the three periods.

Table 19

Estimate* of Acreage Under Cotton:
Railway Station Areas, 1932-33 to 1949-50

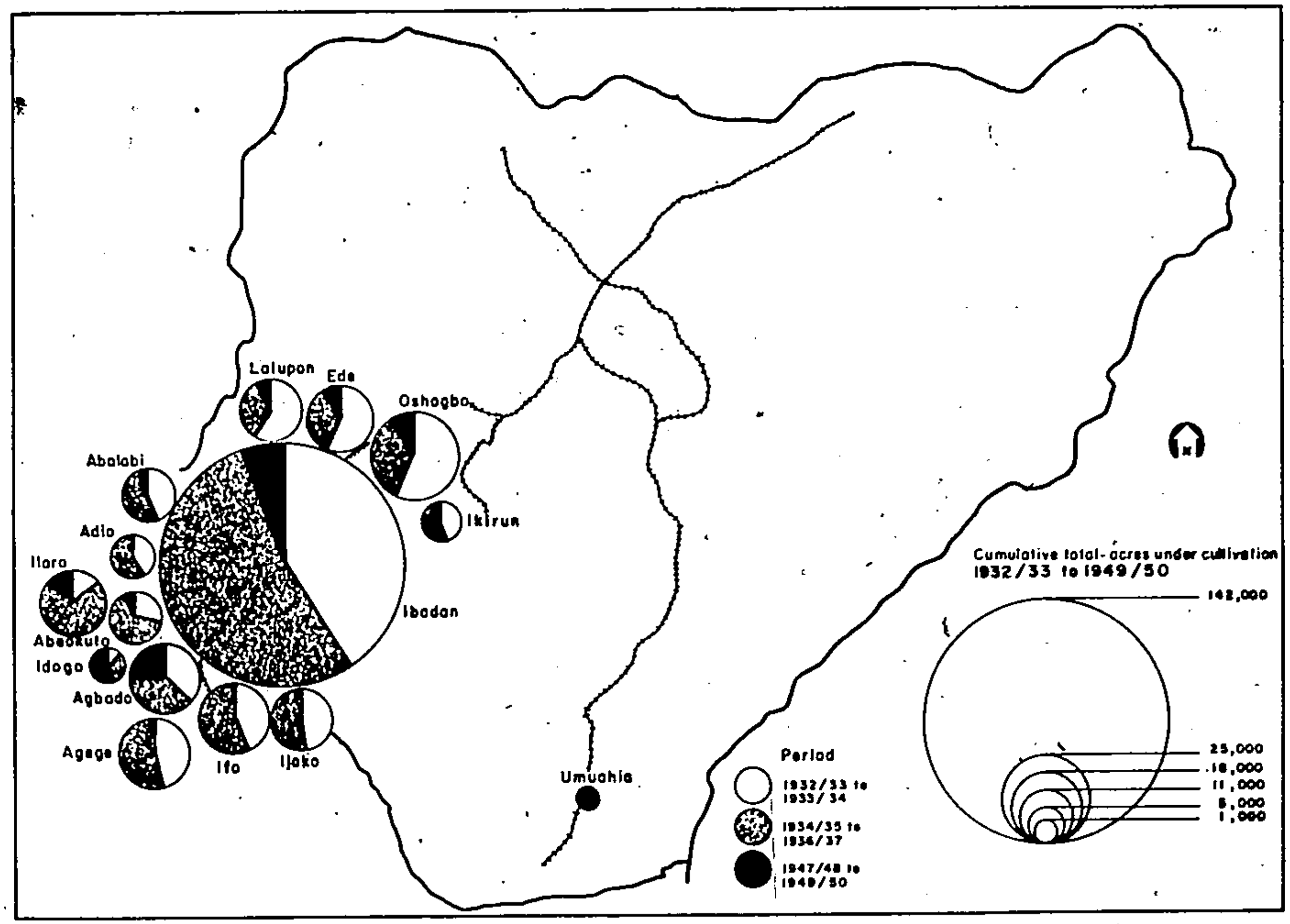
Stations	1932-33 1933-34	1934-35 1936-37	1947-48 1949-50
Lafenwa	284	765	179
Ilugun	-	1,152	16
Adio	-	1,725	-
Ibadan	3,758	27,955	135
Iwo	737	2,569	-
Ede	996	4,742	21
Oshogbo	2,002	8,604	114
Zaria	9,838	31,823	15,146
Gimi Dabosa	2,040	3,979	299
Challowa	-	4,847	12
Kano	885	1,996	1,244
Saba	1,297	2,282	423
Duchi-N-Wai	8,469	10,801	2,285
Kudaru	-	4,550	2,298
Rahama	1,922	6,797	1,621
Funtua	27,755	51,869	44,478
Gusau	15,933	61,972	28,456
Kaura Namoda	3,222	6,451	2,657
Jos	-	-	1,963
Zungeru	-	-	2,148
$\overline{X}$	84,711	244,587	109,260

*Estimates are based on the annual averages of crop output moved by rail. The figures are calculated by dividing the quantity of crop railed by estimated yield per acre.

Sources: Adapted from Annual Reports on the Nigerian Railways for the various years.

MAP 7

ESTIMATED ACREAGE UNDER COCOA: RAILWAY STATION AREAS, 1932-1950



Notes: See Table 20 for sources and actual figures. For the exact location of centres see Map 1. Circle sizes are based on cumulative total acres cultivated during the three periods.

Table 20

Estimate* of Acreage Under Cocoa:
Railway Station Areas, 1932-33 to 1949-50

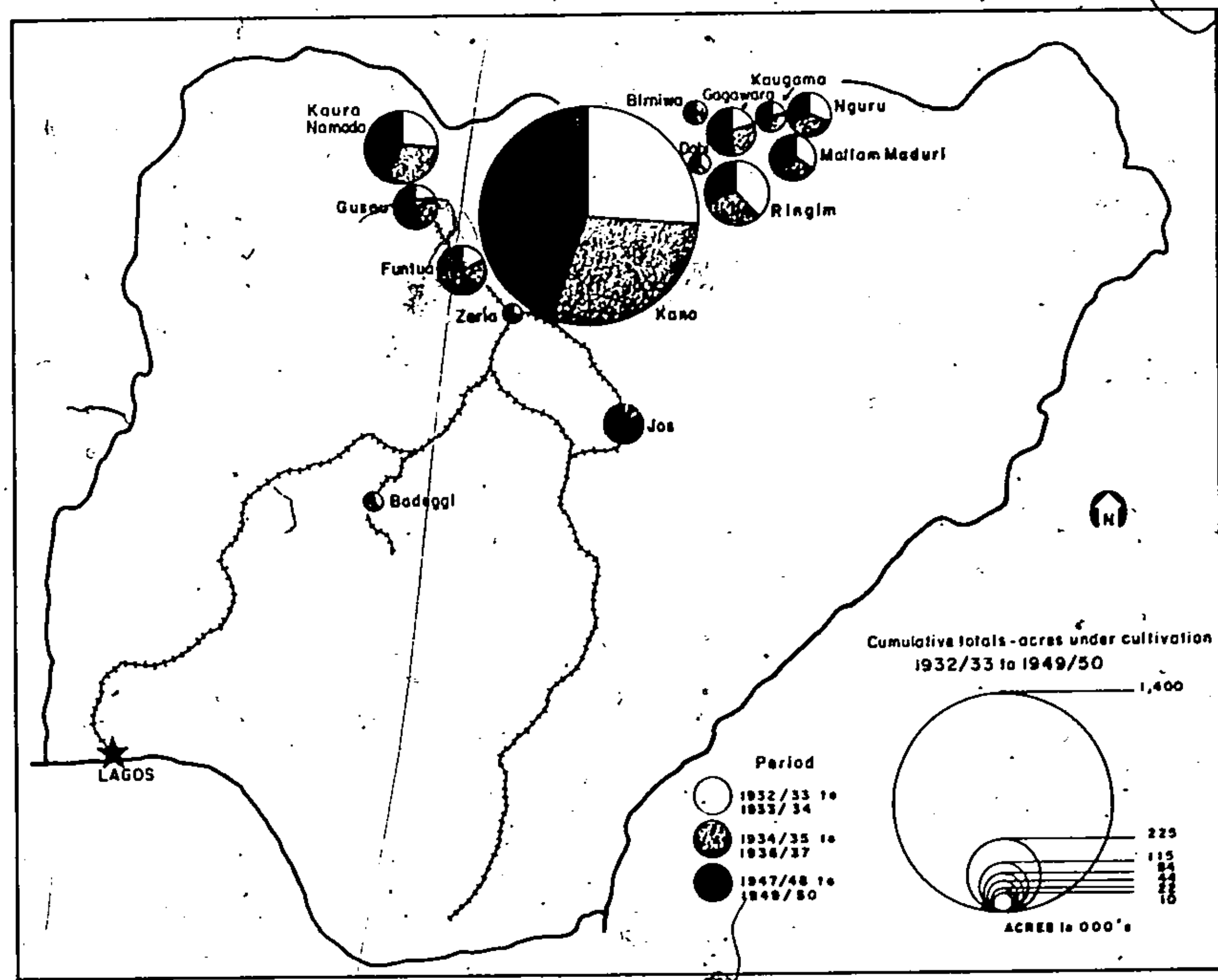
Stations	1932-33 1933-34	1934-35 1936-37	1947-48 1949-50
Abalabi	4,825	5,766	382
Abeokuta	3,297	7,090	998
Adio	3,363	4,878	-
Agbado	6.732	6,798	4,614
Agege	8,690	9,798	-
Ede	8,844	5,328	1,386
Ibadan	58,049	75,367	8,288
Idogo	712	1,509	2,583
Ifo	7,830	10,244	-
Ijoko	7,239	7,986	-
Ikirun	2,816	3,086	416
Ilaro	3,437	10,368	2,585
Lalupon	8,755	5,038	1,010
Oshogbo	14,312	8,807	2,288
Umuahia	-	-	2,009
Grand Total	160,525	184,871	26,207

* Estimates are based on the annual averages of crop output moved by rail. The figures are computed by dividing the quantity of output railed by an estimated yield per acre.[8]

Sources: Based on Annual Reports on the Nigerian Railways, for the various years.

MAP 8

ESTIMATED ACREAGE UNDER GROUNDNUTS: RAILWAY STATION AREAS, 1932-1950



Notes: See Table 21 for sources and actual figures. For the exact location of centres see Map 1. Circle sizes are based on cumulative total acres cultivated during the three periods.

Table 21

Estimate* of Acreage Under Commercial Groundnuts:
Railway Station Areas, 1932-33 to 1949-50

Stations	1932-33 1933-34	1934-35 1936-37	1947-48 1949-50
Badeggi	4,119	3,862	2,104
Birniwa	6,550	9,331	6,873
Dabi	6,717	7,409	3,700
Funtua	20,566	23,880	66,624
Gagarawa	24,574	30,916	58,681
Gusau	18,867	24,296	56,963
Jos	3,760	9,928	69,900
Kano	367,803	416,856	626,807
Kaugama	10,569	15,487	18,208
Kaura Namoda	58,977	69,443	95,883
Mallam Maduri	37,815	31,972	37,634
Nguru	28,696	33,338	29,965
Ringim	65,579	54,619	50,437
Zaria	3,176	4,537	2,715

* Estimates are based on the annual averages of crop output moved by rail. The figures are computed by dividing the quantity of output railed by an estimated yield per acre.[9]

Sources: Based on Annual Reports on the Nigerian Railways for the various years.

determine the degree of land-use or hinterland delimitation of any particular area. In the absence of actual land-use and total agricultural production data, the railway export data are the best alternative. The degree of interpretation and generalisation is limited to what the data allow. ~~In~~ spite of these limitations, some general land use patterns can be identified from the estimates for the period before the 1940s. Acreage under cultivation increased at all station areas, with greater increases showing at the core areas. For instance, acreage under cotton rose from an annual average of 84,700 in 1932-34 to 244,600 in 1935-37. Although there was a decline in the acreage planted in cotton during the period 1947-50, the area cultivated was still about 29 percent higher than in the 1932-34 period (Table 19). This decline is understandable if we recall that in the Western Region some cotton lands were being planted in cocoa during this period. Zaria, Funtua and Gusau show as core zones. Cocoa cultivation increased at an annual rate of 15 percent between 1932 and 1937. Ibadan, Abeokuta, Agege, Ilaro, Oshogbo and Ifo were the main producing areas (Table 20 and Map 7). In aggregate they had about 122,000 acres planted in cocoa in 1937. In all, the railway agricultural hinterland contributed about 27 percent of all land planted in cocoa between 1932 and 1937. A simialr pattern of increased land use shows at all major groundnut producing areas, even in the 1940s. Acreages rose from 2,360 in 1900 to over 1,249,850 in 1949-50, accounting for nearly 84 percent of all land in groundnut production for export (1949).

A similar trend is observed in Kano, the centre of production, where acreage almost doubled from 1932-34 to 1947-50 (Table 21 and Map 8). Funtua, Gusau and Kaura Namoda areas show remarkable increases in land devoted to groundnuts.

There is also indication of a shift to new areas for cultivation. Map 5 shows some new areas being planted in cocoa in the West. Umuahia in the East, featured for the first time in the 1940s as a cocoa collecting centre where a new area of at least 2,000 acres was being planted with cocoa (Map 7). Cotton was being exported from the Jos and Zungeru areas in the 1940s. The cotton exports recorded at Jos were produced in parts of Bauchi and Bornu provinces and moved by road to the Jos railhead. As more areas were planted in cocoa in Western Nigeria, cotton production ceased to feature prominently as an export at Ibadan, Ede, Oshogbo, and other Western Stations that used to export cotton. Export cotton growing had become the preserve of Northern Nigeria by the late 1930s (Map 6).

The general pattern of land use decreasing with distance from the core zones of any production area is also traceable from the cotton estimates. Kadaru and Rahama mark the decline away from Funtua and Zaria. The low acreage under cotton at Kano was not due essentially to groundnut competition for land, but to the fact that Kano lies at the fringe of the cotton belt. Funtua and Gusau, which serve areas that lie within the main producing zones of both crops show significant recordings of production volume which tend to suggest that proportionately large areas around these stations were devoted to the cultivation of these crops

(Map 6). The peripheral zones for cocoa are marked by Ikirum to the North, Idogo to the West, and Ikeja to the South.

There is some evidence that the development of export oriented agriculture was initially restricted to "the irradiation area of the railways, the inter-regional roads and auxiliary local roads" (Schatzl, 1973, p. 89). Intense cultivation seems to have developed around the collecting stations because of their nodal location and initial access to external markets.

In summary, the argument presented in this chapter stresses that by providing better access to competitive markets, the railways have encouraged commercial agriculture especially in the previously more isolated areas, which were thought to be suitable for the exploitation and marketing of the natural resources. The market and supply areas became more extensive as railway transportation expanded, thereby making production profitable over a wider area. The production and distribution of commercial agriclture which were plagued with inefficient transport facilities, tended to be spatially more concentrated around areas of greatest advantage (railway stations) with the construction and subsequent extension of the railway network.

Notes

1 Myint's "vent-for-surplus development hypothesis argues that effective demand was the major constraint on economics which had a sparse population in relation to natural resources. The opening up of trade provides an opportunity for the profitable employment of hitherto idle resources. The surplus land and under-employed labour were utilized, when new demands arose, to add export crops to the normal staple food production with little risk involved (Myint, 1958; S. S. Berry, 1970, pp. 16-17).

2 The figures are obtained by adding the 2-year averages of two of the selected export crops at each centre. The choice of crops combined is based on the two most important (by quantity) crops exported from the station. For the Northern Centres groundnuts and cotton are summed, for the Western Centres, cocoa and palm kernels are summed, while the Eastern stations feature the combination of palm oil and palm kernels. The centres chosen are those that produced and exported an average of 4,000 tons and over of the combined crops, per year.

3 The estimated cost of transport in Nigeria during the 1900-50

period for the various modes was as follows:

Railway	2.16d per ton-km
River	1.80d per ton-km
Road	4.50d per ton-km

The estimate was based on rates obtained from Colonial Reports; Nigerian Railways; and Ministry of Trade and Industry, Northern Nigeria ,1963 , p. 216.

4 The average receipts per passenger-km, first, second, and third class combined between 1934 and 1950 were .20d for 1934-35, .21d for 1939-40, .43d for 1944-45, and .39d for 1949-50. Based on Nigerian Railway, 1949-50, p. 2.

5 See Hay, 1973, p. 22.

6 The average of 89.3 percent for groundnut export railed between 1931 and 1948 is closer to normal conditions than the 95.6 percent between 1931-1950, because the latter average is inflated by the recordings for 1948-49 and 1949-50, when the quantity railed exceeded the quantity exported. Considerable damage was done to groundnuts enroute to the ports because of bad loading and the poor condition of the tarpaulins covering the bags during the rainy season. Slowness of manual handling and lack of open space for sorting and rebagging limited the amount handled and shipped. Also the lack of a lighterage wharf caused delays in transshipments (see IBRD, 1955,

p. 517).

7 The railway economic hinterland accounted for 167,000 out of 617,000 estimated acres under cocoa between 1932 and 1937.

8 A recent estimate of between 300-450 lb has been calculated with due considerations for all factors that generally control local cocoa production (Helleiner, 1966). Since, the computations in this thesis required single figures rather than ranges, the mean of 300-450, which is 375 lb per acre, has been used for the calculation of land-use under cocoa.

9 Estimates of groundnut yields per acre prevailling before 1912 were 550-600 lb of shelled groundnuts (Helleiner, 1966). A yield survey carried out by the Agricultural Department in 25 districts of Kano province between 1943 and 1948, shows a six year average for yields in lb shelled-nuts per acre as follows:

Wide spacing	512 lb
Close spacing	612 lb

These yields were recorded from plots planted by local farmers and from small plots sown by Agricultural Department staff. The mean of the lows and highs of the estimated yields, which is computed as 568.5 lb per acre, is used for the calculation of acreage under groundnut production.

Chapter 7

CONCLUSION

While various traditional means of transportation existed in Nigeria before the advent of railways, the only feasible transportation of relatively large amounts of goods was by waterways. Given the low quality of overland transport this meant that economic development was limited to areas in the immediate neighbourhood of the coast and navigable inland waterways. The advent of railways as major penetration lines in the early 1900s, providing cheap and rapid conveyance of large quantities of goods, opened up new possibilities for the Nigerian export trade. As a competitor the railway system outclassed the inland waterways and held out successfully, during most of the period under consideration, against the road system in the movement of agricultural exports.

The evolution of the Nigerian railways induced locational shifts not only in production zones but also in the development and growth of new economic centres. The locational shifts led to a greater concentration of production and marketing of agricultural export crops in the areas near the railways than in those far from them. For example, the initial cocoa farms were located principally on both sides of the line running between Ilorin and Abeokuta. The geographical distribution of export cotton followed the expansion of the railways into the provinces of Zaria, Katsina, and Sokoto in the late 1920s. Prior to that cotton cultivation was centred around Ibadan, Ilorin and Lokoja. Groundnut production extended from the main producing provinces of Kano and Katsina along the railways and main roads into Sokoto and Bornu provinces in the 1930s. On the basis of this opening-up of the country by the railways hand in hand with the creation of relatively efficient feeders, Kano, Nguru, Funtua, Gusau and Kaura Namoda became important groundnut collecting and trading centres, while Zaria, Kaura Namoda, Funtua and Gusau became the main cotton markets. Ibadan, Abeokuta, Oshogbo and Ilaro developed as important cocoa collecting centres along the rail. The importance of Aba, Umuahia, N'bawsi and Port Harcourt as palm produce marketing centres grew with the development of the railway system.

As inter-regional lines the railways were of importance for the economic structure in so far as they fully integrated the rapidly expanding and important groundnut, cotton and cattle areas of the North, the cocoa areas of the West, and the palm produce areas of the East, into the international economy and oriented them towards the ports of Lagos and Port Harcourt. By linking the agricultural regions with the coast, the railways provided inter-regional geographical linkages on which the flows of most of the export goods were channeled between 1900 and 1950.

New access routes and markets and reduced transport cost led to the expansion in cultivation and export of agricultural products. The increase in agricultural output is reflected in both the quantities railed and exported before 1950. Because they aided in the development of the export sector, the railways indirectly helped generate new capital for internal development of the country.

This instrumental role of the railways in the expansion of export agriculture during the colonial period cannot be replicated in the post-colonial era for the following reasons. The demand pattern has greatly changed as the former importers of Nigerian agricultural exports have found substitutes in the form of synthetic materials and animal fats. The local consumption of raw materials has increased with the establishment of processing and manufacturing industries. The textile industries at Kano, Kaduna, Lagos and Aba now consume a significant proportion of cotton output. The palm oil processing industries at Aba, Sapele and Benin; and the Soap Manufacturing industries located at Lagos, Aba, Kano, etc., absorb a substantial amount of palm produce output. Furthermore, the consumption of palm oil as a food item has increased considerably as the population of the country grew from about 24 million in 1950 to an estimated 80 million in 1980. Equally important is the fact that the composition of the Nigerian export economy has changed completely since the discovery of petroleum in the mid-1960s. Today crude oil contributes nearly 95 percent of the total export. Since the oil wells are located in the coastal region of the country, the railways are of no great use in the movement of crude oil. The scanty shipment of refined oil alone to the northern parts of the country is not sufficient to maintain railway traffic as the agricultural export crops did.

However, attempts are being made recently to rejuvenate the Nigerian Railways. The provision of ₦885 million ($1,858 million Canadian) by the Federal Government for the modernisation of the railways both in physical and manpower aspects during the 1975-1980 Development Plan Period, was primarily to enable the railways to cope with the new physical demands of the Nigerian economy (Federal Ministry of Information, 1976). With this modernisation and some modifications the future role of the once outward-looking railways lies in the promotion of internal trade in both agricultural and imported products.

With respect to the future role of agriculture in Nigeria, the policy of the present government is a clear indicator of what is to be. The government's emphasis on increased production of food crops through the establishment of large scale food production projects, of agricultural co-operatives and group farming, and the provision to farmers of improved seeds and seedlings, and of fertilizers at subsidised prices suggests that agriculture has still a vital role to play in the economic development of the country. The government policy aims at ensuring adequate food supplies for the population and expanding production of export crops with a view to increasing and further diversifying the nation's foreign exchange earnings, and significantly increasing the production of agricultural raw materials to support domestic manufacturing activities. Increasing food production is economically significant because in 1975 alone over ₦300 million ($630 million Canadian) was spent on importation of foodstuff.

The present attempt to explain the relationship between railway development and the growth of export agriculture leaves many problems unsolved or partially treated. The difficulty to demonstrate in some detail the agricultural land-use development accompanying the evolution of the railways and the role of transportation costs in the distribution of agricultural production for export is the function of limited and inconsistent data. Part of this is due to logistical problems which precluded visits to archives in Britain and Nigeria and to the field area. At the initial stage of the research project it was hoped that the gaps in the main data sources would be solved by locating the sources and communicating with the appropriate authorities and departments both in Nigeria and Britain. Despite repeated contacts and long delays, the wish to bridge all the gaps in data failed. The substitution of secondary data was inappropriate in some cases because the data have been tampered with or re-arranged, thereby making their reliability suspect.

These constraints limited the research methodology to simple and unsophisticated techniques, and above all led to a descriptive rather than an analytical approach. In spite of these limitations some compelling relationships between railway development and the growth of export agriculture in Nigeria between 1900 and 1950 have emerged.

Where historical data are inadequate further research could focus on current agriculture and railway traffic in order to deduce and simulate earlier relationships. This would facilitate greater analytical depth.

Finally, I have come to appreciate a remark of Carl Sauer that may be applied to all works in historic geographical research:

> "Let no one consider that historical geography can be content with what is found in archive and library. It calls, in addition, for exacting field work" (J. Leighly, 1963, ed., p. 367).

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