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9. ABSTRACT

Industry accounts for only about six percent of the Sahel-Sudan's GNP. Nonagricultural exports come principally from the extraction industries (iron ore in Mauritania, phosphates in Senegal). Manufacturing industries play a minor role, but significant expansions in textile production, construction, and food processing have occurred in the past decade. Goods manufactured in the Sahel-Sudan cannot, however, compete successfully in the export market with those from industrialized countries. Skill in design, uniformity in quality, and response to market conditions are at present not adequately developed.

Although urban areas still account for only 11.3 percent of the region's total population, urbanization has recently been proceeding at a rate substantially higher than the growth of the general population (7.0 percent versus 2.2 percent). The drought has contributed to the rate of urbanization, but even without drought conditions a continued high urban rate of growth can be expected.

The industrial strategy analyzed in this section is tied to agricultural development. The findings of the analysis include these: Locating industries in the rural sector so as to help develop rural areas, thereby reducing the problems in the urban centers created by high growth rates; evolving a pattern for the development of rural towns, in which industries and the service sector (education, medical, and welfare) would evolve together and serve to reduce the economic and social gap between the rural and urban areas; converting the present specialized agricultural communities into balanced agro-industrial communities capable of greater utilization of local resource and able to move fully to supply local needs.

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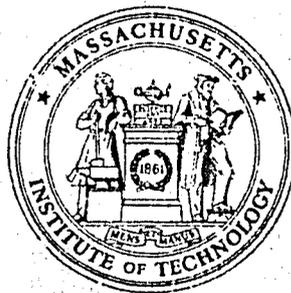
A FRAMEWORK FOR EVALUATING LONG-TERM STRATEGIES
FOR THE DEVELOPMENT OF THE SAHEL-SUDAN REGION

Annex 3

INDUSTRIAL AND URBAN DEVELOPMENT

Roy N. McPherson

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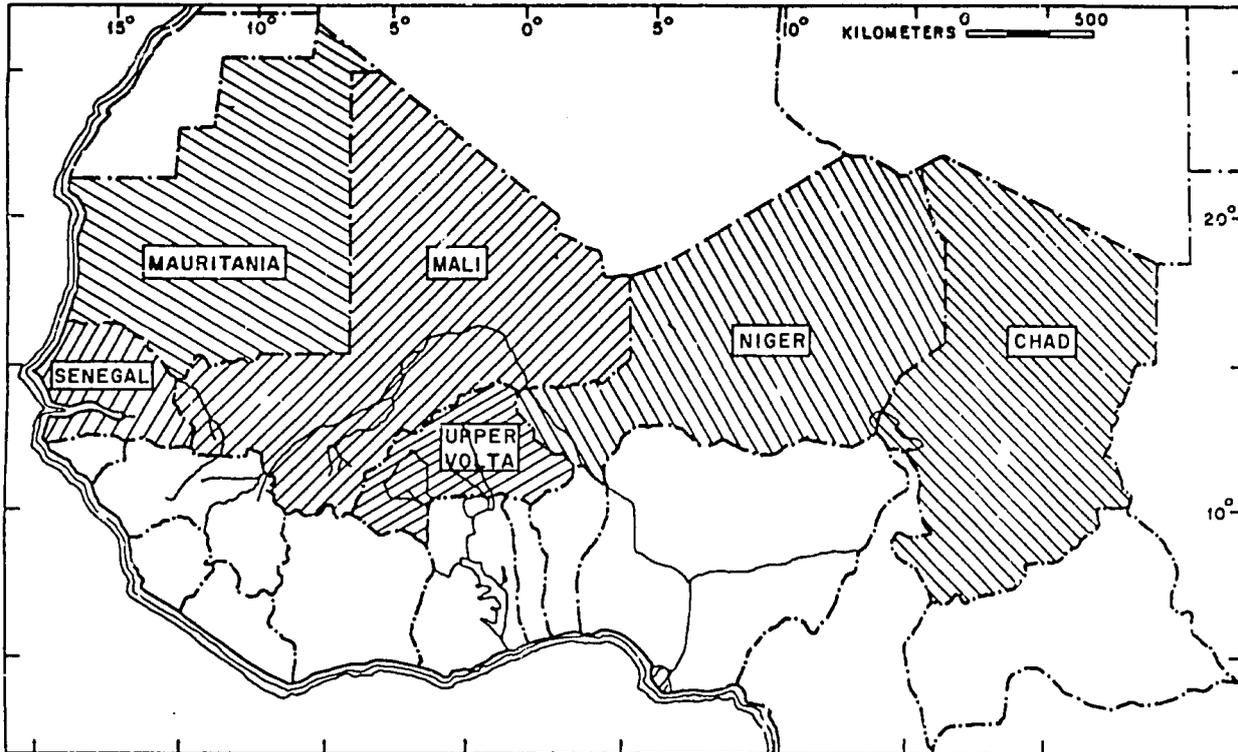


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15. Abstract



Volume 1. Summary Report: Project Objectives, Methodologies and Major Findings

Volume 2. ISYALAPS, A Framework for Agricultural Development Planning

This work was supported by the United States Agency for International Development under contract air-C-1040 and was administered by the M.I.T. Office of Sponsored Programs. This report represents tax-supported research.

The contents of this report reflect the views of the Sahel-Sudan Project at the Massachusetts Institute of Technology and do not necessarily reflect the official views or policy of the Agency for International Development.

FOREWORD

This report results from a one-year effort by a multidisciplinary team of analysts to establish a framework for evaluating long-term development strategies for the African Sahel-Sudan area.

By June 1973 it had become evident that the suffering caused by the drought was the most severe the area had experienced in the last half century. A meeting of donor organizations and U.N. agencies, called by the U.N., was held in Geneva to discuss the problem. It was clear that, while the area required immediate assistance to meet the problems of drought relief, there was also need for long-range assistance if the region were to become self-sustaining and begin an era of positive economic development and widespread improvement in the quality of life of its people. The U.S. delegation offered to undertake the first steps necessary to "identify the methodology, the data requirements and the possible alternative lines of inquiry from physical, economic, social and cultural points of view" on which to base "a comprehensive examination of technical problems and the major alternative development possibilities" for the region.* The United States Agency for International Development (A.I.D.) offered to take responsibility for this task and determined that it should enlist the assistance of the academic community in carrying out the work. A.I.D. then approached M.I.T., and a study effort was formally initiated with the signing of a contract covering the period September 1, 1973, through August 31, 1974. This contract was subsequently extended to January 1, 1975.

The goal of the U.S. effort is to develop a methodology for evaluating long-term development strategies for the Sahel-Sudan region. The

* Final Report on the Meeting of the Sudano-Sahelian Mid- and Long-Term Programme 28-29 June, 1973, Geneva. Special Sahelian Office, United Nations, New York. Statement by Donald S. Brown.

specific focus of the M.I.T. study has been on the development of an effective framework within which to appraise specific projects and programs. The term framework, in this context, refers to the accumulation, development, organization, integration, and analytical evaluation of information on the natural resources, economic resources, and human resources, including the social and political institutions, of the region. The framework is constructed in such a way that alternative strategies for the region can be identified and evaluated, in terms of both their requirements and their impacts, intended and unintended. The M.I.T. study has not been oriented toward detailed sector studies, prefeasibility studies, or project studies. Nevertheless, in the process of developing a methodology we have examined many kinds of information and a number of specific projects and have identified areas requiring further research to fill information gaps that impede long-range planning and evaluation of specific development proposals.

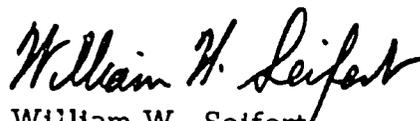
It is hoped that this framework will assist decision-makers in the Sahel-Sudan countries and in donor organizations in arriving at informed judgments concerning strategies for the long-term (20 to 25 years) social and economic development of the region.

The study was conducted under the direction of the M.I.T. Center for Policy Alternatives and was carried out by a multidisciplinary group. The Summary Report and the volume on agricultural development planning have drawn upon a number of working studies on specialized aspects of the problem prepared by the staff, i.e. (1) Economic Considerations for Long-Term Development, (2) Health, Nutrition, and Population, (3) Industrial and Urban Development, (4) Socio-Political Factors in Ecological Reconstruction, (5) A Systems Analysis of Pastoralism in the West African Sahel, (6) Technology, Education, and Institutional Development, (7) The Role of Transportation, (8) An Approach to Water Resource Planning, (9) Energy and Mineral Resources, and (10) Listing of Project Library Hold-

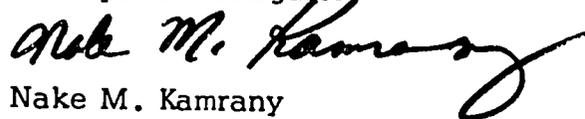
ings and Organizations Contacted. The basic elements of these studies have been drawn together in the two volumes of the final report.

In addition to M.I.T. personnel, individuals from a number of other organizations participated in the effort. Participants from the University of Arizona, in particular, made major contributions; they had primary responsibility for developing the analysis of the agricultural sector strategy. Professor John Paden of Northwestern University was a major contributor to the work on socio-political factors. Members of the Société d'Etudes pour le Développement Economique et Social (S.E.D.E.S.) in Paris provided valuable insights into various aspects of the Sahel-Sudan area. Several members of the Centre de Recherches en Développement Economique (C.R.D.E.) in Montreal developed sections on monetary policy, urbanization, and relationships between Niger and Nigeria. A list of individuals who participated in the study is included in Volume 1 of this report.

Numerous other individuals acted as consultants to the project, provided advice as the study progressed, and reviewed draft material for the reports. Help and advice were given by officials of the governments of the Sahel-Sudan countries, the Comité Permanent Inter-Etats de Lutte Contre la Sechêresse dans le Sahel (C.I.L.S.S.), members of United Nation organizations, members of the International Bank for Reconstruction and Développement, and, especially, officials of the Secretariat d'Etat and various socio-economic and technical study groups in France. Finally, representatives of A.I.D. arranged meetings in Africa and reviewed the the progress of the study. All this assistance is gratefully acknowledged.



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ABSTRACT

Industry accounts for only about six percent of the Sahel-Sudan's GNP. Nonagricultural exports come principally from the extraction industries (iron ore in Mauritania, phosphates in Senegal). Manufacturing industries play a minor role, but significant expansions in textile production, construction, and food processing have occurred in the past decade. Goods manufactured in the Sahel-Sudan cannot, however, compete successfully in the export market with those from industrialized countries. Skill in design, uniformity in quality, and response to market conditions are at present not adequately developed.

Although urban areas still account for only 11.3 percent of the region's total population, urbanization has recently been proceeding at a rate substantially higher than the growth of the general population (7.0 percent versus 2.2 percent). The drought has contributed to the rate of urbanization, but even without drought conditions a continued high urban rate of growth can be expected.

Except for Nouakchott, which was established only at the end of the French colonial rule to serve as the capital of Mauritania, the region's cities have developed from a few old trading centers. As a result, each country has only one or two cities of significant size. Since government operations, wage-paying jobs, health services, and so on tend to be concentrated in these few urban areas, the rural population (the majority of people) has poor access to such advantages.

Because of the existing land tenure system and present marketing arrangements, land does not generally have a monetary value. A man can benefit from his land only by inhabiting and working it. The communal land tenure system precludes one way in which small businesses in other areas of the world can acquire loan capital--i. e., using land as security to borrow money.

Since land provides security against unemployment, sickness, and old age, an individual must preserve his claim to it. Thus, there is a constant incentive for industrial workers to quit their jobs periodically and return to their families and land. As a result, industries needing semi-skilled or skilled labor (always in limited supply) find efficient staffing difficult.

Decision-makers of the region have tended to apply the more advanced available technologies to export-oriented production, leaving small-scale industries, which produce for local consumption, to operate with less efficient techniques. The introduction of capital-intensive methods exacerbates the urban unemployment problem by minimizing the need for unskilled labor. Simultaneously it increases the demand for the very limited number of skilled workers available.

Underdevelopment of the manufacturing-trade-distribution process has hindered industrial growth. Exported goods are shipped unfinished; most imported goods arrive finished. If industry is to grow, materials produced in the region should be processed further before being exported, and the finishing touches on imported commodities should be performed within the region.

Export-import duties, the limited and fragmented nature of industrial activities, similarities between the products of the individual Sahel-Sudan countries, and lack of an adequate transport system also tend to retard industrial development. Regional federations to establish customs unions, common market areas, and industrial preference agreements would encourage development of local industry, thus reducing the need for imports.

The industrial strategy analyzed in this section is tied to agricultural development. The findings of the analysis include these: Locating industries in the rural sector so as to help develop rural areas, thereby reducing the problems in the urban centers created

by high growth rates; evolving a pattern for the development of rural towns, in which industries and the service sector (education, medical, and welfare) would evolve together and serve to reduce the economic and social gap between the rural and urban areas; converting the present specialized agricultural communities into balanced agro-industrial communities capable of greater utilization of local resources and able to move fully to supply local needs.

Annex 3: INDUSTRIAL AND URBAN DEVELOPMENT

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Quite apart from the immediate nutritional crisis, the long-term progress of the Third World depends on agricultural development. Under a variety of economic systems--in Uruguay, the Ivory Coast, India, Taiwan, and the People's Republic of China--the most successful development plans have been those which focus on agriculture, and organize industry and distribution to serve it.

--from "Agriculture, the Island Empire" (Daedalus, 1974) by Andre Mayer and Jean Mayer.

INTRODUCTION

The great majority of the people in the Sahel-Sudan area are engaged in agriculture, including animal-raising. However, even if considerably greater agricultural productivity were achieved in the area, it is unlikely that this alone would be sufficient to improve the standard of living significantly. Furthermore, advanced agricultural techniques go hand in hand with larger operations that require relatively fewer people. For both these reasons there would be considerable advantage in developing other sectors of the economy. Since industry has been the key to development of many countries, this project has examined the potential for industrial development in the Sahel-Sudan.

The initial effort was directed toward the collection and interpretation of data relating not only to existing or proposed industry but also to such issues as urban development, labor availability, and markets. This part of the study was basically descriptive and heuristic in nature. No attempt was made to develop extensive costing models or to employ computer simulation. Nonetheless, we believe that some relatively specific guidelines for evaluating industrial development have been identified.

The original goal of this study was to develop ways of analyzing strategies for six countries of west Africa: Chad, Mali, Mauritania, Niger, Senegal, and Upper Volta. After preliminary data-gathering it became apparent that existing industrial development was interwoven throughout all countries of west Africa and that future growth was dependent upon carefully balancing man with nature in the ecological growth cycle as well as upon balancing the development of the interior and the coastal areas of the larger region. As a result, the industrial patterns for all of west Africa were

studied in order to offer an appropriate structure for evaluating a comprehensive strategy for industrial evolution.

The first chapter of this annex examines urbanized west Africa. It compares the two distinct urban patterns that have developed historically and indicates how these patterns have affected industrialization.

In Ghana, Togo, Dahomey, Nigeria, part of Upper Volta, and Niger, the urban centers had a long history, were complete, and had thriving life cycles, maintaining a strong tie between the agricultural and urban functions. Everyone lived within the walled city, never sure when marauding tribes might attack. Some farming was accomplished within the walls, but the majority of farmers worked outside the walls during the day and returned to the city in the evening. As the population increased, the arable land within the city became covered with new buildings and consequently all farming was performed outside the walls. Agricultural production increased with the urban center responding with more industrial capability, more labor, more services. It functioned in general as a complete and efficient organism.

The remaining parts of west Africa with the exception of such cities as Dakar, Abidjan, and Bamako, where there has been significant colonial influence, have remained rural in character. In these areas a twin-city system developed, where neither city maintained a strong bond with the rural farmer. The first city was usually the political center of an empire or tribal area. Contact between rural and urban people was minimal. As Berber traders pushed further into west Africa seeking possible trade, they set up separate trading centers apart from the existing urban centers. For whatever religious reasons or safety precautions, the traders maintained the separate city as a commercial center which flourished and grew to

become centers of Islamic learning as well as trading. As empires and tribal areas broke apart, the political centers of the twin-city scheme were often abandoned. The intact learning and trading center became the traditional city of the Sahel serving as crossroads to major caravan routes. For the majority of farmers and nomads there was still little contact with these centers. And with the evolution of the modern city under heavy colonial influence an even larger economic gap was created between rural and urban life. The chapter examines the problems created by the lack of integration between urban industrial patterns and rural agricultural economies. It concludes with an outline of steps that might help to alleviate these problems.

Chapter Two contains a description of a methodology developed to evaluate industrial planning, both existing and potential. It is based upon two considerations:

- (1) Industry exists for the development of resources (natural, capital, labor, managerial, and entrepreneurial).
- (2) Planning is a dynamic, iterative process, whereby strategies are altered as more information is acquired and as goals change in their order of importance.

The chapter reports comprehensive research into the first of these considerations as well as one iteration of a possible strategy. The industrial strategy considered is tied to agriculture. It seemed probable to us that, although there are other strategies that stress the development of natural resources, an overall development strategy would be best accommodated, at least initially, if industry were interwoven into the lifestyle of the rural majority.

This report continues, using Mali as a case study and evaluating the new situation which would be created under an optimum agricultural strategy (ISYALAPS)* as described in Volume 2 of this

* Integrated Sustained Yield Arid Land Agricultural Production System

series. The results of the analysis include the following findings: To develop all resources effectively and in harmony with the life-style of a rural majority, industry should be integrated with both agricultural production and urban consumption. Industry then helps to balance the purchasing power of the traditional and modern sectors, allowing the rural areas to develop along with the urban centers. The industrial strategy described in Chapter Three is not simply a selective list of appropriate types of industries. Instead, the strategy envisions a distribution of industries in rural town settings as well as in urban centers and a mix of technologies to develop the total resource base. Within this strategy, desired urban functions would become available to rural dwellers, while urban markets would be provided with agricultural products for consumption or further processing.

Chapter Four is a description of further anticipated results of such a strategy. Among these are reduction in labor migration, increase in value-added production, improved regional interaction, and generation of new industries.

Chapter Five presents a possible scenario that could be followed under an agroindustrial strategy. This chapter examines the various resources available, to determine how their potential may be realized and more efficiently utilized.

1. THE NEED FOR A COMPREHENSIVE APPROACH

Examination of the historical development of west Africa has revealed various urban and rural settlement patterns which have had and will continue to have an effect upon questions of migration, and the development of industry, infrastructure, transportation and water and energy supplies. The early cities of the Sahel-Sudan region were political centers for loosely-knit empires. As trading increased and Islam was introduced by the Berber traders separate commercial centers were established alongside the already existing political centers. This twin city scheme was symbiotic with two quite different cultures mutually benefiting one another commercially. However, as European trade increased and colonialism developed settlement patterns changed. New cities were erected and old cities exploded with growth foreign to the African climate and way of life. In Nigeria, Ghana, and other west African coastal countries, European influence has been more complementary than compromising. In these countries urban living had been the pattern long before European influence with the result that meshing of African and European cultures represented an evolutionary step.

The development of administrative centers in the area created problems of heavy migration to the cities, both in the Sahel-Sudan zones and along the west African coast. This resulted in creating an enormous economic and cultural gap between rural and urban Africa. Wage-paying jobs, health services, education facilities, etc. are concentrated in the few urban areas, with the rural population having poor access to such advantages.

Industrial development has been slow and difficult with numerous problems plaguing all aspects of production, from obtaining raw materials to locating indigenous markets. Developing countries where industry has been successful was largely due to integration

of agriculture and industry.

1.1 Situation in West Africa

One of the most impressive features of urban centers in west Africa is the rate at which they are growing. Some centers, such as Tombouctou, Kano, Ibadan, and Goa, have existed for hundreds of years or more and maintain a much different pattern than those in which a heavy European influence has been present, such as Dakar, Nouakchott, Cotonou, Lagos, Accra, and others.

Compared with industrialized countries, French- and English-speaking west Africa is underdeveloped with only forty to fifty moderately large urban centers rather than hundreds. But compared with the west Africa of earlier decades or present-day central or eastern Africa, west Africa is rapidly urbanizing. The dense concentration of agricultural people in southern Nigeria and along the coast of west Africa has provided a major potential for urbanization. These concentrations are related to historical and cultural factors which favor agriculture and the formation of villages, as well as to climatic and geographic conditions which support large numbers of farmers.

In the Sahel belt trade centers were developed in precolonial days to serve the camel caravans from across the Sahara. Imported goods were unloaded, and gold, leather, and other products were loaded for trade with north Africa. There were towns which were also political capitals of Sudanese empires. residences of local chiefs, centers of Muslim learning, markets for local crafts and agricultural products. Thus the historical and cultural tradition for urbanization in limited form has existed for centuries.

1.1.1 Location and character of cities: As can be seen in Table 1.1-1 and Figure 1.1-1, most of the large towns of west Africa are located on the coast. Except for the inland countries of Chad, Mali,

TABLE 1.1-1
Urban Populations

Country	Over 200,000	100,000- 200,000	50,000- 100,000	20,000- 50,000
Cameroun	Douala	Yaounde	Tiko-Victoria N'Kongsamba	Bamenda Maroua Kumba
Central African Republic	Bangui Boali		Bouar Berberati	Bossangoa* Bambari* Bria* Bangassou*
Chad		Ndjamena (Ft. Lamy)	Sarh (Ft. Archambault)	Moundou* Abeche*
Dahomey		Cotonou	Porto-Novo	Abomey Ouidah
Ghana	Accra Kumasi	Takoradi Tema	Cape Coast Tamale	Koforidua Obuasi Winneba Swedru Nsawam Oda Keta
Guinea		Conakry	Kandan Kindia	
Ivory Coast	Abidjan	Bouake	Man Gagnoa	Daloa* Korhogo* Grand-Bassam*
Liberia		Monrovia		
Mali		Bamako		Kayes Segou Mopti Sikasso
Mauritania			Nouakchott	
Niger		Niamey		Zinder Maradi Tahoua

TABLE 1.1-1 (continued)

Country	Over 200,000	100,000- 200,000	50,000- 100,000	20,000- 50,000
Nigeria	Lagos	Onitsha	Akure	
	Ibadan	Iwo	Jos	
	Ogbomosho	Ado-Ekiti	Calabar	
	Kano	Kaduna	Gusau	
	Oshogbo	Mushin	Kontagora	
	Ilorin	Maiduguri	Makurdi	
	Abeokuta	Enugu	Minna	
	Port Harcourt	Ede	Efon	
	Zaria	Aba	Ondo	
	Ilesha	Ife	Bauchi	109 cities 20,000- 50,000
		Ila	Offa	
		Oyo	Ilawe	
		Ikere	Owo	
		Benin City	Yola	
		Katsina	Ilobu	
		Iseyin	Ikirun	
			Shaki	
			Komo	
			Oka	
			Sapele	
		Warri		
		Lafia		
		Sokoto		
Senegal	Dakar	Kaolack	Thies St. Louis Elguinchor Rufisque	Diourbel
Sierra Leone		Freetown		Bo Town
Togo			Lome	
Upper Volta			Bobo- Dioulasso Ouagadougou	Koudougou

* Estimated

Sources: Jakande 1967; and International Bank for Reconstruction and Development, various reports.

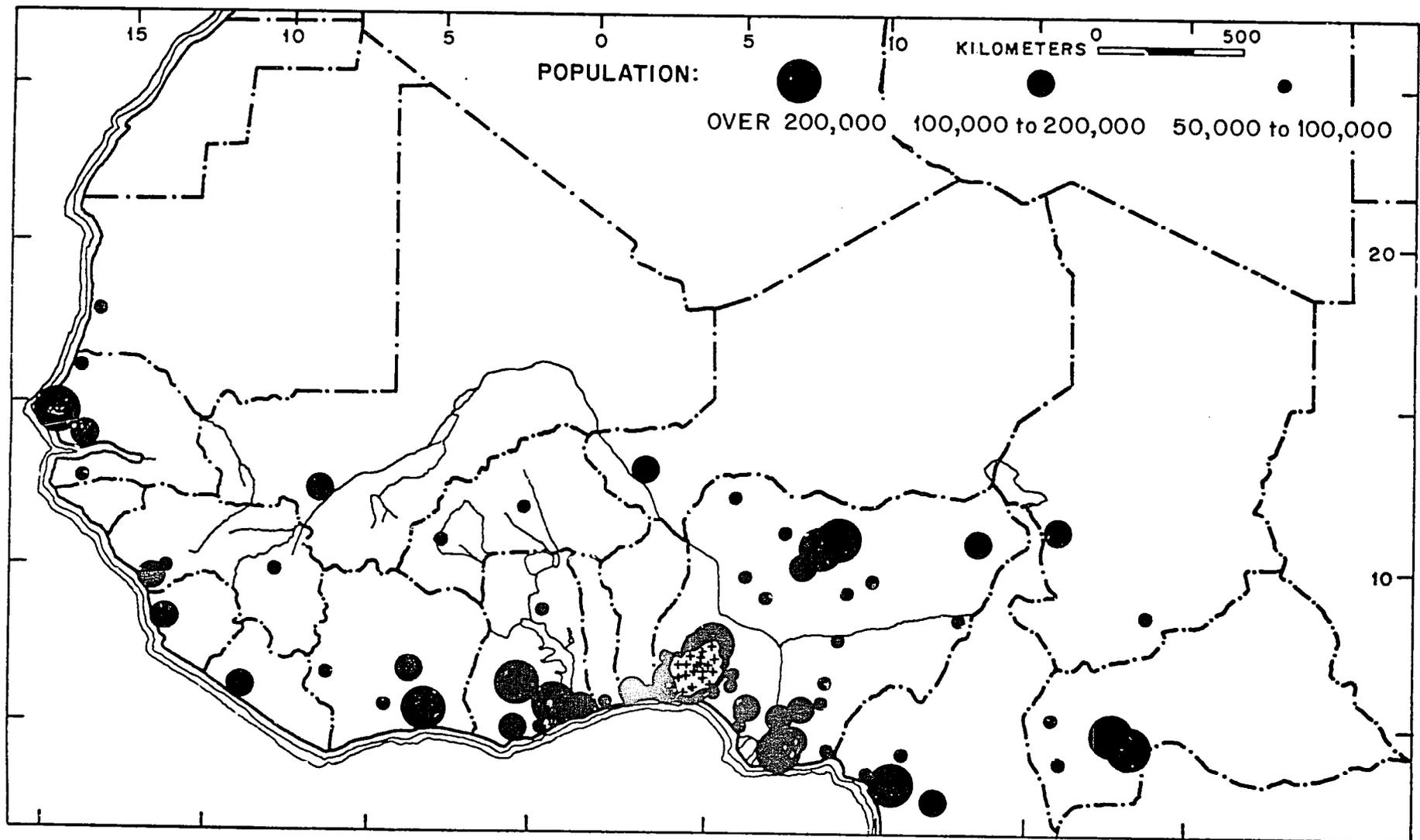


FIGURE 1.1-1 Urban Centers, 1973

Sources: Kuper 1965; and International Bank for Reconstruction and Development, various reports.

Niger, and Upper Volta, each country has a port as its most important center. There is a secondary group of centers which consists of interior trade centers located at junctions of important routes, such as roads, railways, or navigable rivers.

For economic development the coast has a greater advantage, and ports on the coast were often selected as colonial capitals. The combined political and economic functions resulted in the concentration of Europeans at these places. Consequently, the material culture that came with the Europeans has given many African towns their "Colonial French," "Colonial British," or "Colonial Portuguese" atmosphere. Buildings, railways, factories, port equipment, and street layouts all reflect British and French intervention. Morning and afternoon tea is served in hotels of former British areas. The French pastry shops, shuttered windows, and sidewalk cafes are features of French influenced towns. The list of indirect or direct influences continues through language, administration, economic policies, educational systems, and professional services. In most of the newer and larger west African centers Western or European urban planning characteristics are incorporated into commercial districts, railway freight yards, civic centers, school grounds, parks, and airports. Some west African cities have urban characteristics that have developed from indigenous cultures. Traditionally, these towns had sections that were occupied by people from different African communities. Tombouctou, as an example, is made up of three distinct ethnic groups-- the Songhai people, the Tuareg, and the Arabs. Within the traditional city people tended to associate with and live near others of the same language and customs. These people brought their techniques of house arrangement and construction, food and clothing preferences, and other traits which gave the various sections of a city a distinct appearance and atmosphere.

1.1.2 Migrational influence: Historians examining the major movements of west African history have developed three views. The first, and perhaps least stressed, maintains that these movements were the natural outcome of a more or less independent neolithic revolution among the Sudanese Negroes. The second maintains that the growth of trade, towns, and states in the western Sudan was stimulated by a continuing commercial contact across the Sahara with the Mediterranean world as far back as 500 B. C. The third view is that towns and states in the central and western Sudan were stimulated by influences other than trading (warfare and exploitation of people and raw materials) which spread westward from the area of mixed Negro and Egyptian culture in the Upper Nile Valley (from circa 800 B. C. to 350 A. D.). These views are not mutually exclusive, and in some cases they may well complement one another. The resulting effect on urban settlement is shown in Figure 1.1-2. It is proposed that the nature of precolonial movements has resulted in two types of urban settlement. As Figure 1.1-2 illustrates, the boundary between the two types would seem to be a line running from the Niger between Djenne and Tombouctou to the vicinity of Accra. The western area (northwest axis) was dominated by Mande traders and trade, and the eastern area (northeast axis) was dominated by Hausa traders and trade.

Historically, the northwest axis appears primarily as an artery of trade developed by the Mande Dioula (Kuper 1965). The history of the town of Djenne is connected with this trade. The town's situation on the Bani River suggests that its emergence as a commercial center was not connected with west-east trade along the Niger, but with the trading that developed to the south. The same may be said of the cities of Begho, Bonduku, Kong, and Bobo-Dioulasso. But Dioula commercial expansion was not the origin of these towns. Rather, the merchants

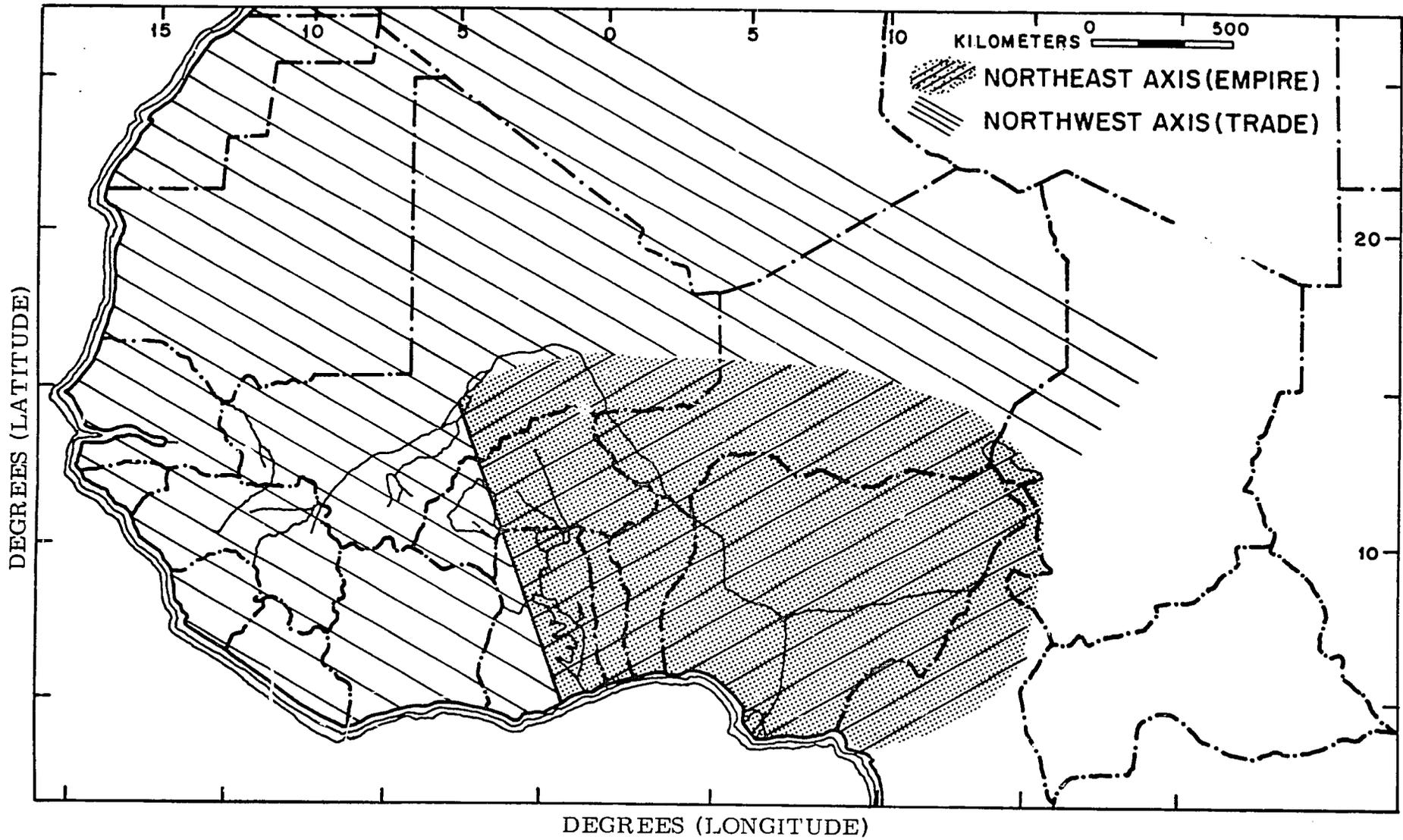


FIGURE 1.1-2 Urban Settlement Types (Traditional)

Source: Kuper 1965.

were attracted to already established pagan political centers. The typical pattern of urban settlement which resulted was one of twin cities--a separate Mande and Muslim commercial center alongside an already existing royal pagan capital.

Examining the northeastern axis reveals a different pattern of urban settlement. In this area are commonly found states whose core is a walled capital city after which the state is named. Walled cities are characteristic of the Sokoto, the Logone and the Shari valleys. Historically at least, the same pattern is traceable throughout the middle belt and southeast section of Nigeria. The urban centers in this area appear to have, but not necessarily to maintain, common features.

(1) The area occupied by the city and lying within a circle of walls is very extensive. The walls of Kano and Katsina are both nearly 14 miles around; of Ibadan, about 10 miles; of Ife, about 7 miles; of Benin, about 15 miles.

(2) The area within the walls is often appreciably larger than the area actually built up. Density of housing is usually quite high, but occupies only one-third to one-sixth of the available space. The extensive open space was probably used for public-oriented activities but reserved to absorb the local peasantry in times of civil war. This high density use of space exists today in those Yoruba cities that have not undergone extensive modern expansion.

(3) Where the terrain permits, the walls often contain within them rock outcroppings, natural mounds, or any high or prominent land form. Examples exist in Kano, Old Oyo, Abeokuta, and Ibadan.

Some of these towns have developed into great commercial centers, but the traders were natives, not immigrants, and in the whole eastern area there is virtually no duplication of the twin city pattern seen further west. The northeastern axis appears most obviously as

a political and military settlement, whereby the northwest axis reflected the extensive trading traditions.

It is not suggested that historical influences flowed only along the two major lines during the precolonial period in west African history. Within each area covered by the two axes, there are several transverse axes, each area carrying urban features perhaps unique only to the immediate surroundings. However, looking at west Africa as a single area supports the argument that two types of urban settlements did exist and resulted in quite different development during the colonial period.

1.1.3 Industry: Although evidence is incomplete, it is fairly clear that the cities of the northeast axis are relatively large, dense, and permanent and that urbanism as a way of life clearly antedated the earliest European contact, and is not an outgrowth of European acculturation. However, urbanism of the northwest axis can be explained in terms of acculturation, or the development of colonial administration headquarters, ports, and mining centers. There seems to be a major difference in the structure of urban life for the two areas. In one area existed well-established urban centers with large internal markets, a monetary system, true middlemen, and an efficient farming economy which structurally has not changed even with colonial acculturation; while in the northwest area urban centers existed in weak dualism based upon a trading economy which abruptly changed with French colonialism. Since there was no strong economic base, and cultural and social ties were strongest in rural areas, the establishment of new urban centers or modification of traditional urban centers has structurally changed the urban pattern. The adjustments to a new urban setting and the adaptation of new standards and forms of life have been much more difficult in the northwest axis where traditionally the people have been less urbanized. The pattern of

urbanization has had direct bearing upon the development of industries.

Industrialization caused the development of urban life in Europe and America, whereas introduction of industrialization by the colonial powers to the northeast axis where concentrations of resources (labor, capital, and natural resources) already existed merely supplemented urbanization. But in the northwest industrialization, being modeled after European methods, did not mesh well with the loosely connected, sparsely located resources. This has been a major handicap for industrial development in most countries where urbanization did not already exist prior to industrialization.

In the northeast axis farming was and still is the base of the economy. Many farmers are city dwellers who commute daily to the country to work their farms. As fewer people are needed for farming, more people remain in the city and are absorbed by various specialized trades to supply the ever-increasing need for goods and services. In turn, the craft form of specialization makes each individual economically dependent upon the society as a whole and as the market grows, actually accentuates the division of labor. The enlarged market is only in part supplied by the city's hinterland with the majority being supplied by the large numbers that the city itself contains. The city dominates the surrounding hinterland in terms of the division of labor which urban life occasions and promotes. As the tendency of each city is to specialize in those functions in which it has the greatest advantage, instability increases. But in the northeast axis most of the markets are within the urban centers and the degree of specialization actually provides a basis for the development of larger, denser, and more stable communities. One may easily see how such an urban setting could industrialize effectively with minimal disturbance to the structure of urban life.

-Location and production: In order to more accurately plan for industrial development for the six drought-stricken countries, an examination of the entire west African area was made. This offered a method of comparing one country to another by looking at the region as a whole, enabling us to better realize what potentials for development exist.

The Standard Industrial Classification (SIC) was used as an initial breakdown, but after further investigation of existing industries the following classification headings for industries were used:

- (1) Extraction
- (2) Food Manufacturing
- (3) Textile
- (4) Tobacco-Beverage
- (5) Leather-Leather Products
- (6) Furniture-Wood Products
- (7) Chemicals, Rubber, Paper and Printing
- (8) Petroleum-Petroleum Products
- (9) Mechanics-Mechanical and Electrical Manufacture
- (10) Construction
- (11) Transport
- (12) Energy-Water

The pattern that industrial development has taken in west Africa is not atypical of developing countries. Appendix I shows that most industries are located in the coastal countries, and closer examination indicates that, except for Nigeria, the majority of these industries are in port cities. The coast of west Africa is poor in natural harbors; Freetown in Sierra Leone has the best one. The port cities of Dakar, Conakry, Monrovia, Abidjan, Accra, Lome, Cotonou, Lagos, and Douala have risen in importance as a result of extensive harbor

construction by the French and English. There has been little effort to industrially develop the interior of even the coastal countries even though much of the agricultural products exported from the countries is grown in the northern sections of the coastal countries. Cocoa, coffee, cotton, and yams are commodities which, if not exported as raw material, are processed in the port cities. Appendix I also gives production volumes for the various industrial sectors.

The value of industrial products also shows that the coastal countries have an economic advantage. Table 1.1-2 lists production values for 1971 in the various sectors. Food processing and textiles in most cases have the highest value; the exception is Mauritania. Even though the total production value is high, 85 percent of it lies in iron ore production. Table 1.1-3 compares the production value per capita of various west African countries.

-Capacity: The production and capacity of industries in west Africa are listed in Appendix I of Working Notes #22 (Sahel-Sudan Project internal working paper). It appears that extraction industries run very close to capacity, while food and textile industries run somewhat lower. There might be several reasons for this, such as:

(1) The drought has affected growing conditions which, in turn, have resulted in a reduction in crop and livestock processing.

(2) Extraction industries structurally operate closer to capacity unless there is a reduction in raw material or large additions to existing facilities are made.

(3) Tariffs by coastal countries on slaughtered meat and other processed commodities have lowered the production level of slaughter plants, textile plants, furniture-making businesses, leather shops, etc. in the interior (see Table 1.1-4).

TABLE 1.1-2
Production Value 1971 (Millions U. S. Dollars)

Industry Sectors	Central African					
	Cameroun	Republic	Chad	Dahomey	Ivory Coast	Mali
Extraction	--	--	--	--	--	--
Food Manufacturing	57.60	3.46	14.40	2.02	82.44	7.45
Textile	31.28	24.48	28.58	19.26	57.96	10.80
Tobacco-Beverage	43.20	4.68	5.40	3.96	31.00	4.50
Leather	0.90	--	--	--	--	--
Furniture-Wood products	20.84	7.74	--	0.22	68.76	--
Chemicals, Rubber, Paper, Printing	28.40	--	1.04	17.35	57.89	--
Petroleum	1.12	--	--	--	21.13	--
Mechanics	30.74	1.08	2.81	0.11	30.96	1.14
Construction	9.65	0.18	--	2.70	14.83	0.13
Transport	7.02	1.26	1.22	0.86	18.54	0.96
Energy-Water	20.16	2.34	9.94	2.81	31.32	4.14
TOTAL	250.91	45.22	63.39	49.29	414.83	29.12

Continued

TABLE 1.1-2 (continued)
 Production Value 1971 (Millions U. S. Dollars)

Industry Sectors	Mauritania	Niger	Senegal	Togo	Upper Volta
Extraction	81.36	7.38	17.71	18.00	--
Food Manufacturing	10.80	44.14	129.06	1.01	7.92
Textile	--	3.60	37.55	5.29	5.40
Tobacco-Beverage	--	1.08	13.50	4.14	3.24
Leather	--	0.83	--	--	0.11
Furniture-Wood products	--	0.65	3.02	0.18	0.72
Chemicals, Rubber, Paper, Printing	--	2.27	24.77	24.01	0.83
Petroleum	--	--	16.92	--	--
Mechanics	--	0.29	8.68	0.22	0.36
Construction	--	1.80	6.23	1.37	0.11
Transport	--	--	5.51	--	2.84
Energy-Water	3.42	4.82	16.56	2.59	3.96
TOTAL	95.58	66.86	279.51	56.81	25.49

Source: EDIAFRIC 1972.

TABLE 1.1-3
Production Value per Capita

Country	Production Value/Capita (U.S. Dollars)
Cameroun	43
Central African Republic	30
Chad	17
Dahomey	18
Ghana	--
Guinea	--
Ivory Coast	79
Liberia	--
Mali	6
Mauritania	80 (12 without mining)
Niger	17
Nigeria	--
Senegal	73
Sierra Leone	--
Togo	30
Upper Volta	5

Sources: United Nations 1973; and EDIAFRIC 1972.

TABLE 1.1-4
Industrial Production 1971

Country	Major Industries	Production (metric tons)	Capacity (metric tons)	Percent of Capacity
Chad	Cotton	130,371	220,000	60
	Slaughtered meat	38,298	51,600	74
	Total industry	191,700	309,400	
Mali	Cotton	52,760	96,000	55
	Rice	40,000	130,000	31
	Peanut	17,714	23,000	77
	Total industry	126,200	258,500	
Mauritania	Iron-ore extraction	8,451,000	12,000,000	70
	Total industry	8,500,700	12,156,000	
Niger	Peanut	77,709	181,800	43
	Cement	33,275	35,000	95
	Total industry	136,025	267,275	
Senegal	Phosphate extraction	1,594,457	1,700,000	94
	Peanut	614,525	1,493,000	41
	Peanut oil	520,000	750,000	69
	Cement	241,185	300,000	80
	Marine salt	100,000	125,000	80
	Fish	74,719	160,000	47
	Total industry	3,556,700	5,404,000	
Upper Volta	Slaughtered meat	7,330	12,800	57
	Peanut	5,450	11,000	50
	Sugar	11,200	15,000	75
	Cotton	31,771	65,000	49
	Grain	23,300	27,000	86
	Total industry	94,800	155,400	

Source: EDIAFRIC 1972.

-Employment: Employment figures are expectantly low in west Africa. The sixteen countries examined have a total population of approximately 127 million, but only 540 thousand or less than 0.5 percent of the total population are employed in industry (see Tables 1.1-5 and 1.1-6). The extraction and textile industries employ the majority, nearly 50 percent of the industrial labor force. Of these two industries extraction is the greater employer.

A way of examining the degree of industrialization of a country is through employment (see Table 1.1-7). Column A ranks in descending order percentages of west African industrial employment located in each country. Column B lists what percentage of the total west African population lives within each country. Column C is the ratio of A to B and is listed in descending order from most industrialized to least industrialized. The four countries of Chad, Mali, Niger, and Upper Volta are the least industrialized, while Senegal and Mauritania fall closer to 1.0 or "normal" industrialization. If mining were not included in Mauritania, it would fall below Upper Volta in the listing.

Examination of the Sahel countries revealed an unusually large labor force because each country has nearly 50 percent of its population in the labor force due to subsistence farming (see Table 1.1-8). The percentage of the labor force which is in industry is quite low, ranging from 0.1 percent in Upper Volta to 1.1 percent in Senegal. In most industrialized countries the percentage of the labor force in industry will range from 8 to 12 percent, but usually a smaller percentage of the population operates in the active labor force. In developing countries the percentage of the population in the labor force decreases as the farming economy becomes more efficient and as urbanization patterns begin to form. Within the cities the people in the age group from 15-20 years are going to schools, and women usually take a lesser role in the labor force.

TABLE 1.1-5
Employment of Industries (1971-1972)

	Central African					
	Cameroun	Republic	Chad	Dahomey	Ghana	Guinea
Extraction	--	200	--	--	28,000	*8,000
Food Manufacturing	4,580	340	660	320	4,500	* 850
Textile	5,750	5,420	4,570	1,940	24,700	1,300
Tobacco-Beverage	3,210	160	270	160	4,200	780
Leather	200	--	--	--	900	70
Furniture-Wood Production	8,200	4,100	--	60	15,200	830
Chemicals, Rubber, Paper, Printing	21,900	60	80	1,350	8,500	* 450
Petroleum	20	--	--	--	1,100	--
Mechanics	3,330	180	120	--	3,700	*1,100
Construction	600	60	--	90	3,200	480
Transport	480	190	60	110	1,300	170
Energy-Water	1,260	320	* 350	130	6,100	* 920
TOTAL	49,530	11,030	6,110	4,160	101,400	14,950

* Estimated

Continued

TABLE 1.1-5 (continued)
Employment of Industries (1971-1972)

	Ivory Coast	Liberia	Mali	Mauritania	Niger	Nigeria
Extraction	*4,500	21,000	--	4,880	1,150	59,000
Food Manufacturing	4,570	* 850	3,900	1,540	730	12,500
Textile	3,100	* 900	2,750	--	950	46,100
Tobacco-Beverage	1,180	* 400	70	--	* 70	6,000
Leather	--	* 100	170	60	30	1,300
Furniture-Wood Production	9,700	*3,500	50	--	120	13,400
Chemicals, Rubber Paper, Printing	7,850	*1,550	180	20	190	13,300
Petroleum	260	* 600	--	--	--	1,900
Mechanics	2,310	*2,000	800	--	220	27,000
Construction	640	* 550	220	--	270	3,100
Transport	930	* 200	460	--	--	1,900
Energy-Water	1,660	*1,300	* 800	* 260	360	8,300
TOTAL	41,700	32,950	9,400	6,760	4,090	193,800

* Estimated

Continued

TABLE 1.1-5 (continued)
Employment of Industries (1971-1972)

	Senegal	Sierra Leone	Togo	Upper Volta	TOTAL
Extraction	1,350	9,000	1,550	280	138,910
Food Manufacturing	6,960	900	250	660	44,110
Textile	5,060	*1,190	830	950	110,510
Tobacco-Beverage	710	* 600	270	170	18,250
Leather	--	* 400	--	30	3,260
Furniture-Wood Production	810	*3,800	--	110	59,880
Chemicals, Rubber, Paper, Printing	1,800	*5,100	150	160	62,640
Petroleum	220	* 400	--	--	4,500
Mechanics	1,560	*2,200	60	130	41,710
Construction	620	7,400	40	40	17,310
Transport	410	* 550	--	140	6,900
Energy-Water	2,370	1,870	450	350	26,800
TOTAL	21,870	33,410	3,600	3,020	537,780

*Estimated

Sources: EDIAFRIC 1972; and United Nations 1972.

TABLE 1.1-6
Industrial Employment

Country	Population (1971)	GNP/Capita	% of Population Employed in Industry
Cameroun	5,900,000	180	0.84
Central African Republic	1,500,000	140	0.74
Chad	3,800,000	80	0.13
Dahomey	2,800,000	94	0.15
Ghana	9,300,000	272	1.10
Guinea	4,000,000	120	0.37
Ivory Coast	5,300,000	310	0.79
Liberia	1,600,000	231	2.10
Mali	5,140,000	70	0.07
Mauritania	1,200,000	140	0.56
Niger	4,000,000	90	0.10
Nigeria	69,000,000	105	0.29
Senegal	3,860,000	230	0.45
Sierra Leone	2,700,000	160	1.20
Togo	1,900,000	140	0.19
Upper Volta	5,350,000	60	0.06

Sources: United Nations 1970; and International Bank for Reconstruction and Development, various reports.

TABLE 1.1-7
Degree of Industrialization

Ranking	A		B		C	
		Percentage of Industrial Employment		Percentage of West Africa Population		Degree of Industrialization
1	Nigeria	36.8	Nigeria	54.0	Liberia	4.77
2	Ghana	19.2	Ghana	7.3	Sierra Leone	2.86
3	Cameroun	9.3	Cameroun	4.6	Ghana	2.63
4	Ivory Coast	7.9	Upper Volta	4.2	Cameroun	2.02
5	Sierra Leone	6.3	Ivory Coast	4.2	Ivory Coast	1.88
6	Liberia	6.2	Mali	4.0	RCA	1.67
7	Senegal	4.1	Niger	3.2	*Senegal	1.37
8	Guinea	2.8	Guinea	3.1	*Mauritania	1.20
9	RCA	2.0	Senegal	3.0	Guinea	0.90
10	Mauritania	1.2	Chad	2.9	Nigeria	0.68
11	Mali	0.9	Dahomey	2.5	Togo	0.40
12	Chad	0.8	Sierra Leone	2.2	Dahomey	0.30
13	Dahomey	0.7	Togo	1.5	*Chad	0.28
14	Niger	0.7	Liberia	1.3	*Mali	0.23
15	Togo	0.6	RCA	1.2	*Niger	0.22
16	Upper Volta	0.5	Mauritania	1.0	*Upper Volta	0.12

* Sahel countries of study

TABLE 1.1-8
Employment, 1971

Country	Population	Labor Force	% of Total Population	Total Salaried	Total Industry	% of Labor Force
Chad	3,800,000	2,000,000	53	26,000	7,300	0.4
Dahomey	2,800,000	1,400,000	50	--	4,160	0.3
Ivory Coast	5,300,000	1,700,000	32	--	41,700	2.4
Mali	5,140,000	2,400,000	47	69,000	7,400	0.3
Mauritania	1,200,000	600,000	50	17,500 (without mining)	6,760 1,880	1.1 0.3
Niger	4,000,000	2,000,000	50	31,000	4,090	0.2
Nigeria	69,000,000	24,100,000	35	--	193,800	0.8
Senegal	3,860,000	1,950,000	51	78,500	21,870	1.1
Upper Volta	5,350,000	2,700,000	50	33,000	3,020	0.1

Sources: EDIAFRIC 1972; and United Nations 1972.

In general, industrialization is moving slowly and for the most part only since 1960. Table 1.1-9 shows the growth rate of the various west African countries compared to selected industrialized countries. It can be seen that for the year 1968, the gross value added in manufacturing as a percent of value added in commodity production was highest for Senegal, Ghana, Cameroun, Nigeria, Ivory Coast, and Togo, respectively. The obvious commonality of these countries is their location on the shore where shipping of commodities occurs and where most of the markets exist for the internal countries. Even with the high value added in manufacturing, when examined over the period 1960-1969, Senegal suffered and currently maintains a negative growth rate.

1.1.4 Problems of industrial development: Factors that are known to affect the location and development of industry can be listed as raw materials, fuel, labor, wage levels, markets, capital, space (land), climate, water, taxes, transportation, government, and foreign trade (Yeates et al. 1971). There are other factors which can be important with respect to location of industries within urban areas, but we are mainly concerned with factors influencing the location of industries at settlements.

-Raw materials: Traditionally industrial location analysis has placed high emphasis on the role of raw materials in attracting various industries. Throughout west Africa cotton, peanut, meat, wood, rice, and leather processing plants are distributed fairly evenly over the growing area, usually in the smaller rural towns. However, it should be noted that most processing of raw materials in the hinterland of west Africa is for export and consequently has little value added before exportation.

-Fuel: Whether from coal, natural gas, petroleum, nuclear power, or hydroelectric power, fuel is an important input into

TABLE 1.1-9

Growth Rate

	Gross value added in manufacturing as a percent of value added in com- modity production 1968	Average annual growth (%) of real GNP per capita 1960-1969
WESTERN AFRICA		
<u>Non-Industrial</u>		
Central African Republic	13.5	0.0
*Chad	--	-1.3
Congo, Peoples's Republic of	--	2.3
Dahomey	5.2	0.9
Gabon	9.0	0.6
Gambia	--	0.7
Guinea	9.9	2.6
Ivory Coast	19.1	4.7
Liberia	8.1	1.3
*Mali	13.2	1.2
*Mauritania	4.9	4.6
*Niger	8.5	-0.9
Sierra Leone	9.7	1.2
Togo	15.3	0.0
*Upper Volta	7.3	0.1
<u>Industrializing</u>		
Cameroun	21.7	2.0
Ghana	23.5	0.0
Nigeria	19.5	-0.3
*Senegal	29.0	-0.1
SELECTED INDUSTRIALIZED COUNTRIES		
Australia	67.0	2.9
Canada	65.5	2.8
France	78.6	4.8
United Kingdom	80.2	1.8
United States	80.5	3.2

* Sahel-Sudan countries under examination.

Sources: United Nations 1969; United Nations 1968; and International Bank for Reconstruction and Development, various reports.

industry. Since it is used to create energy, the availability of fuel is an important criteria for location of industries. In west Africa charcoal, gas, oil, and hydroelectric power serve as principal fuel sources in the urban areas. Most of the power for industries is served through public utilities, but often an industry must generate its own power through thermal generators using even peanut shells for fuel.

-Labor: The availability of labor and its productivity are critical factors in every industrial sector with labor requirements being different for each industry. In west Africa there is a serious problem of "non-committed" or migrant labor. In most of west Africa, where land-tenure and market arrangements do not give land a money value, a man secures benefit from his claim to the land by keeping his family on it and working it. Land provides social security against unemployment, sickness, and old age, but the individual cannot use it in this manner if he does not preserve his claim to it. As a result, he has a constant incentive to move between an industrial job on the coast or major urban centers and his family and land. Given the prevalence of migrant labor, industries that need semi-skilled or skilled labor find it difficult to become efficient and survive.

Another special aspect of the labor-supply problem is the relatively unlimited supply of labor. Several parts of west Africa, such as Cameroun, Ivory Coast, Nigeria, and Senegal, have developed modern economies. But even in these the labor requirements are so small in relation to the sea of subsistence activities, and the mobility of labor is so great that, within a reasonable wage range, the supply of labor can be considered virtually unlimited.

The unemployment problem is great but conceptually is different from that in industrialized countries where large-scale unemployment results from a deficiency of demand. In west Africa the problem is a

structural one. Here the governments have tended to bias investment decisions against labor-intensive methods. The resulting effect is to disproportionately increase urban incomes over rural incomes. Preference for capital-intensive methods usually arises from the shortage of skilled labor, and through the use of machinery the requirement for skilled labor may be minimized. There is reluctance on the part of the employers to recruit labor which would need considerable on-the-job training since most have had little previous experience in regular-wage employment. The use of machinery avoids the problems encountered in the organization of training and development of disciplined work habits. This is very appealing on the surface and in many situations quite applicable, but in west Africa it should be examined closely.

-Wage levels: When comparing west African countries, one finds that the wage levels for the interior countries are much lower than for the coastal countries. This has also added to the labor-migration problem. Figures 1.1-3 through 1.1-5 indicate how unevenly distributed the wage level is for west Africa. Even when there is work available during harvesting time in the hinterland, many choose to work in the coastal areas where the wage level may be two to four times higher.

-Markets: A very important problem is that the west African market is too small. The size of the market depends primarily on the incomes of the farmers and herders who make up the majority of the population as seen in Table 1.1-10. Therefore, it seems that the most effective steps which can be taken to insure development of the manufacturing industry will be actions which will have the effect of increasing agricultural production. Regardless of what is invested in manufacturing and mining, the main opportunities for economic growth will be the increased development in agriculture. These factors

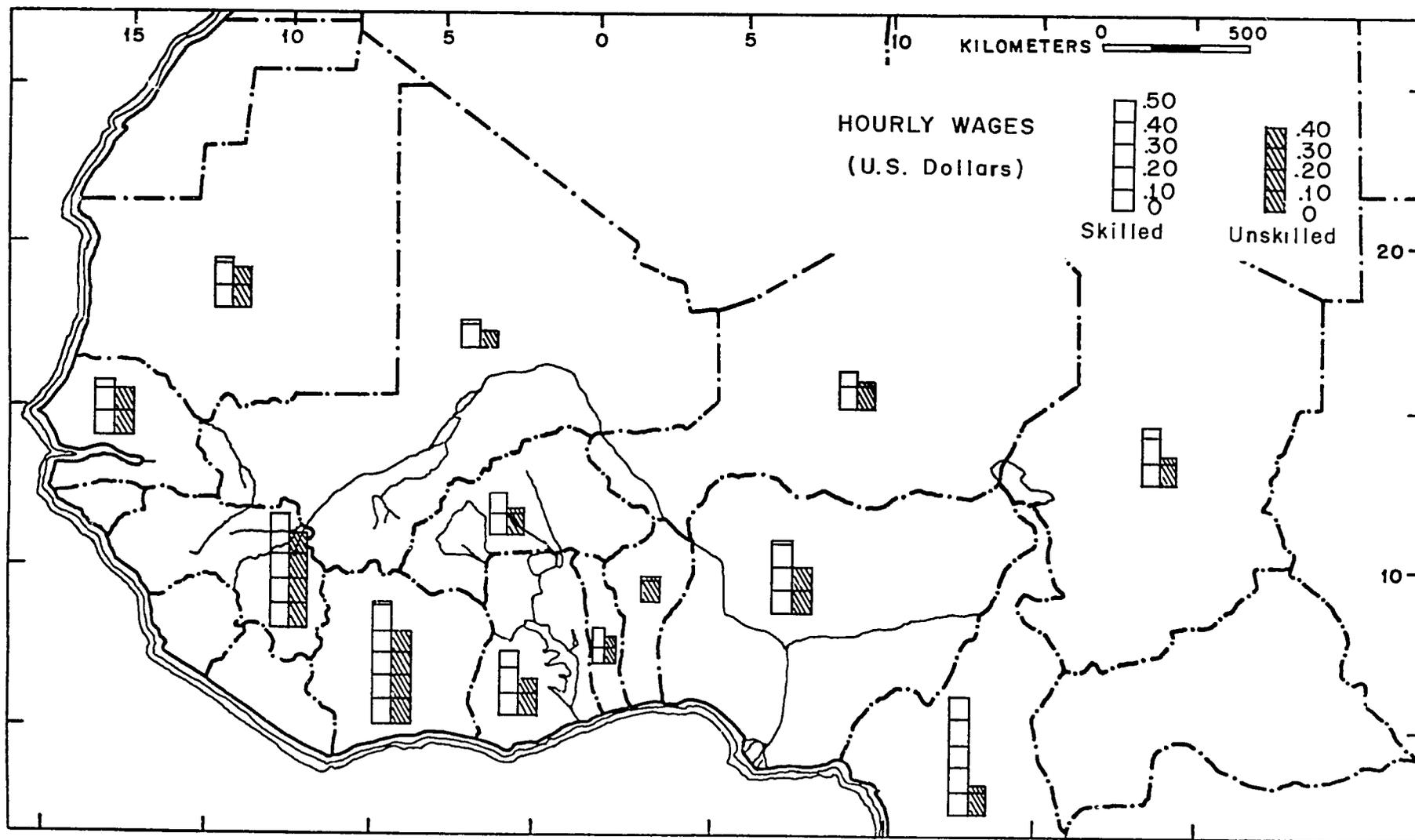


FIGURE 1.1-3 Wage Distribution--Laborers (Skilled and Unskilled), 1972

Sources: Commission des Communautés Europeennes 1972; and International Bank for Reconstruction and Development, various reports.

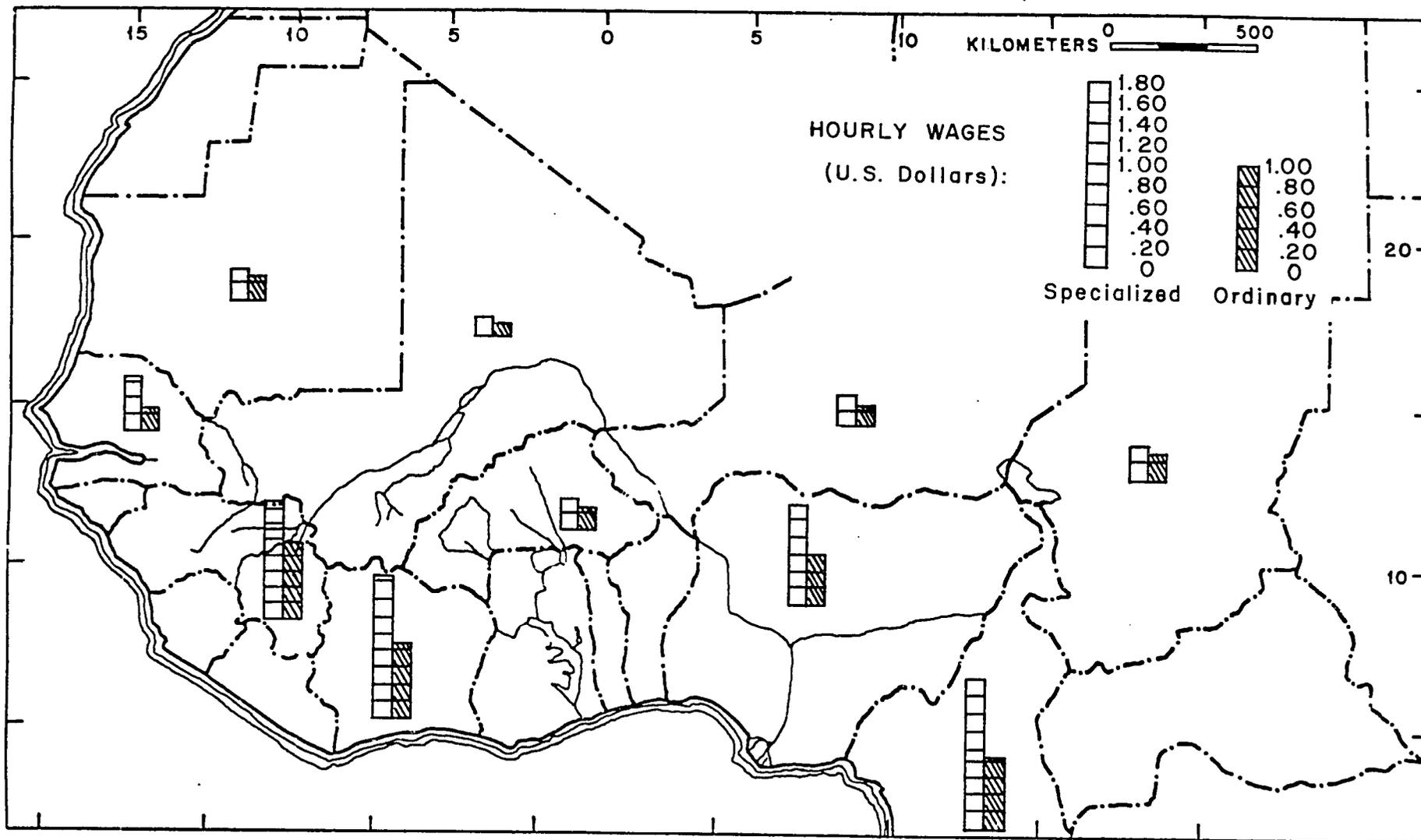


FIGURE 1.1-4 Wage Distribution--Technician (Ordinary and Specialized)

Sources: Commission des Communautés Europeenes 1972; and International Bank for Reconstruction and Development, various reports.

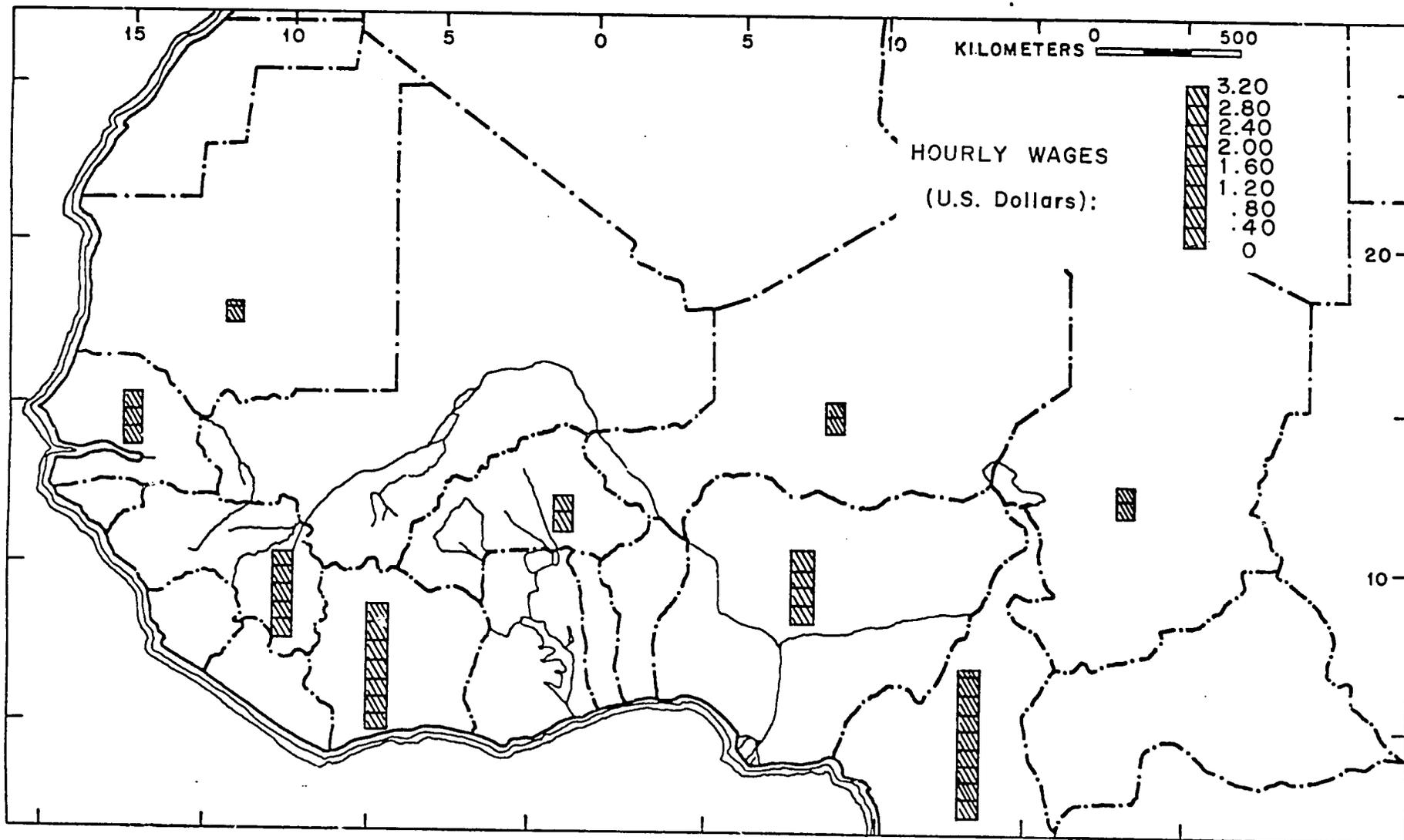


FIGURE 1.1-5 Wage Distribution--Manager, 1972

Sources: Commission des Communautés Europeenes 1972; and International Bank for Reconstruction and Development, various reports.

TABLE 1.1-10
Estimated Percent of Urban Populations, 1967

Country	Percent Urban
Cameroun	17.0
Central African Republic (RCA)	27.0
Chad*	9.0
Dahomey	16.1
Ghana	26.0
Guinea	12.5
Ivory Coast	22.0
Liberia	15.0
Mali*	9.6
Mauritania*	6.1
Niger*	6.1
Nigeria	17.0
Senegal	29.2
Sierra Leone	13.0
Togo	19.5
Upper Volta*	6.6

* least developed internal markets

Source: Republique Francaise 1970; and International Bank for Re-
construction and Development, various reports.

are self-reinforcing. As manufacturing and towns grow, the internal markets for agricultural products will also grow. The internal market can then gradually provide more and more of the impetus that export markets currently provide.

There is the possibility of manufacturing for export to the growing markets of the industrialized countries. Unfortunately, west African goods cannot compete successfully on equal terms in the areas of skill of design, uniformity in quality, and response to market conditions.

-Capital and entrepreneurship: Usually capital is not an important factor affecting location of manufacturing, but obviously capital-scarce areas are restricted in industrial development. In west Africa many Syrians, Cypriots, and Lebanese are successful entrepreneurs since they are willing to work long hours, to save and reinvest, to please their customers, and to pay their creditors. The successful non-African entrepreneur is not a problem unless he becomes one politically. His presence provides a propulsive impetus in augmenting the opportunities for African entrepreneurs. At the same time there is a danger that the creation of local entrepreneurship may be discouraged for too long.

-Space (land): Although space, or land, is very important with respect to industrial development within urban areas, it is a most important consideration in the rural areas of west Africa as well. The communal land tenure makes it difficult for infant industries to secure the land they need. Governments can intervene to acquire the land, although the acquisition takes time and often results in discouraging results. The problem created by the lack of land collateral is not easily changed. Wherever tribal or communal land tenure exists, one of the ways in which small businesses in other areas of the world acquire loan capital is shut off. Elsewhere, a man who wishes to borrow money

to enlarge his business can use land as security for a bank loan. Not being able to do this will continue to handicap the establishment of industries by African entrepreneurs.

-Climate: Climate seems to affect industrial development usually if there is a well-established infrastructure which would allow an industry to locate in a more pleasant environment. In west Africa a vast proportion of the total manufacturing activity is located along the coastal regions, but this does not imply that these areas are ideally suited for industrial development in terms of climate. The climate in the Sahel zone has no significant effect upon the actual workings of industry. As far as managers and workers are concerned, there is little doubt that most people prefer to live in a mild and equable climate, and much of the expansion of modern manufacturing has in fact taken place in those parts of highly developed countries where such climates exist. The underlying factor which is likely to be of increasing importance in developed countries is that as more leisure time is made available, people seek locations where year-round recreation is possible. In a developing country the infrastructure that would allow such fluidity is usually lacking.

-Water: Water is introduced into rural or urban areas for many purposes: (1) drinking and culinary uses; (2) bathing and washing; (3) heating and air conditioning; (4) lawns, gardens, and street cleaning; (5) creation of hydraulic and steam power; (6) recreational uses; (7) industrial uses; and (8) protection of life and property. In parts of west Africa the access and distribution of water is a major restriction for industrial development. Industries require large volumes of water for cooling purposes, steam generation, processing of raw materials, and sanitation purposes. In the production of basic commodities like chemicals, foods, and textiles, the tonnage of water often exceeds that of the material being processed. Finishing and fabrication processes

usually need smaller amounts of water. Most of the water used becomes waste water and will usually be burdened with polluting substances. For economy of water supply and waste-water disposal industries that need large amounts of water are usually located on sizeable rivers, lakes, or tidal estuaries. As can be seen in Figure 1.1-6 the location of industries in west Africa has followed this pattern. The quantity and quality requirements of needed waters for industry must be projected into the future and placed in balance with the total water economy. Water availability, variability of its quality, cost of water purification, problems of drought and flood, upstream pollution, downstream effects of waste discharge, and cost of waste water treatment are necessary considerations that are particularly critical in the Sahel-Sudan zones. This region's economy is best served by long-range integrated plans for both urban and industrial development.

Among possible measures of conservation by regional authorities are: (1) selection of industrial processes that use minimal amounts of water; (2) mandatory recirculation of cooling water through ponds or towers; (3) mandatory use of counter-current washing equipment; (4) required reuse of slightly soiled water; and (5) reward to industries which prevent waste of water.

-Taxes: In order to induce an economy to shift from a static state to a dynamic one a regular increase of accumulation must take place. Accumulation is usually based on savings, but in the developing countries where low standards of living exist and where little money is in economic circulation, savings play a very limited role.

There are several obstacles that one should be aware of when examining the possibility of industrial development and how accumulation may be generated in the form of taxation.

(1) In west Africa, a large part of the population lives in a

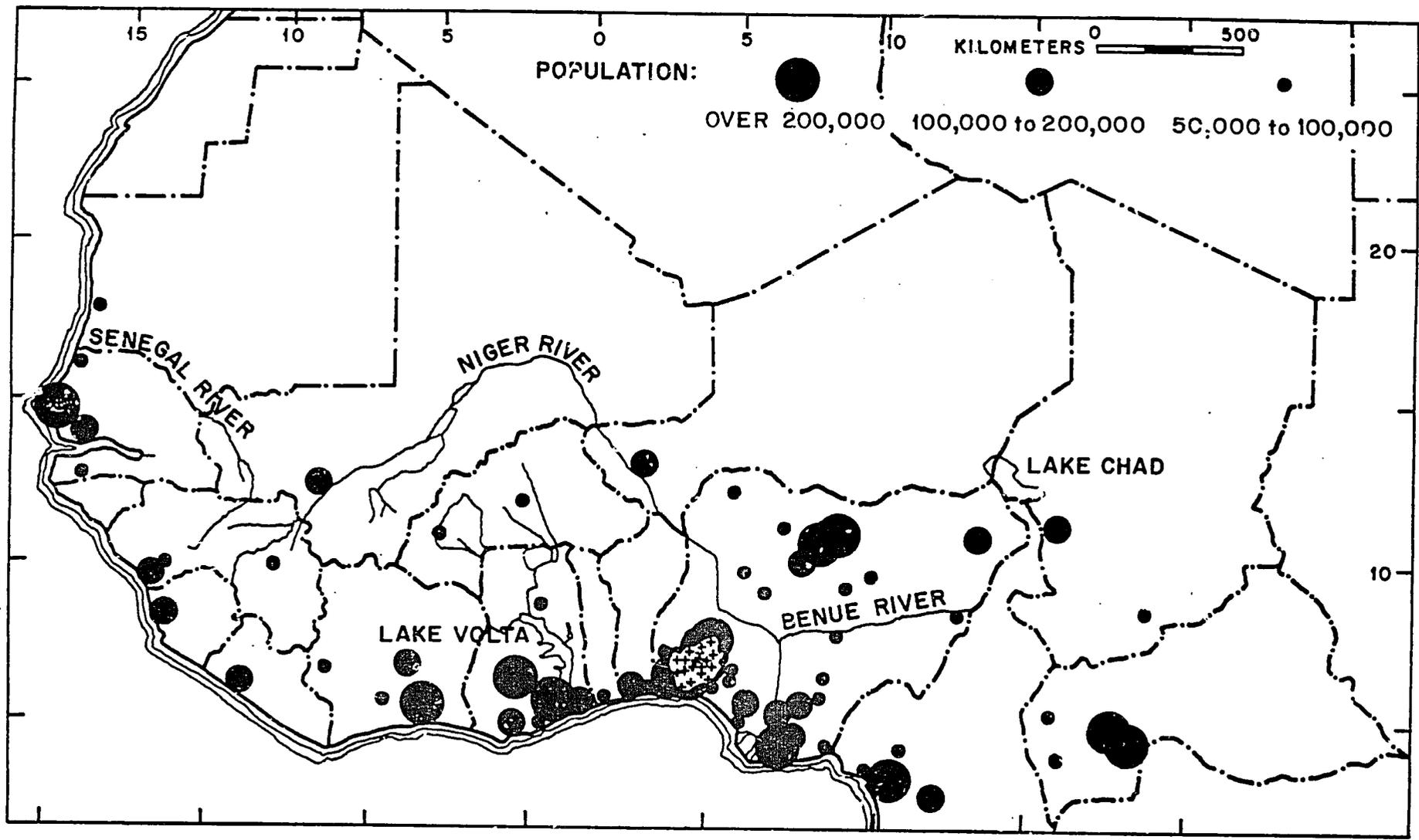


FIGURE 1.1-6 Location of Industries

Source: EDIAFRIC 1972.

subsistence economy and is not involved in the circulation of goods and money; nor are the small African and non-African entrepreneurs capable of achieving a significant accumulation.

(2) Developing countries attract in the form of taxes a smaller portion of their national income than industrially advanced countries. In developing countries if 8 to 15 percent of the national product is collected in the form of taxes it is possible for advanced countries to collect 25 to 30 percent.

(3) Another obstacle is that few countries in west Africa have any profitable undertakings. Industries such as textile manufacturing might be established in order to raise the country's income.

(4) Foreign capitalists expatriate most of the profit. They export capital from a country already poor in capital.

(5) The structure of the existing stock of invested capital is usually not favorable to economic growth. The problem lies in the abundance of trade capital and in the scarcity of permanently engaged capital that could be used for crediting industrial investments.

-Transportation: The influence of transportation on the development of industries is very significant. In those areas of west Africa that have a reasonably developed transport facility, industry is also developed. Those areas that are favored with several different types of transportation facilities, such as water, rail, highways, and airports, are particularly well-suited to the development of manufacturing (see Appendix to Volume 9, Inventory of the Transport Facilities).

-Government: A government is usually able to affect development of industries through two extremely important techniques:

(1) Through expenditures of government funds for defense, welfare, education, etc. the location and development of industries can be encouraged or discouraged.

(2) Through regional development policies that are either concerned

with assisting areas of unemployment or areas of slow growth and economic stress, a government often establishes programs of tax holidays and capital grants.

However, these two techniques are not effective unless the government is in a good bargaining position with foreign investors. The situation within the countries of Chad, Mali, Mauritania, Niger, and Upper Volta is that bargaining is voluntarily compromised by the governments in order to establish the industry within their country.

-Foreign trade: There are traditionally two kinds of changes in foreign trade patterns which could affect industrial development: (1) changes in the direction of trade and (2) significant changes in the raw materials being used.

For west Africa the possibility does exist for either or both of these changes to occur. As these countries become more independent and develop trade between themselves, industrial development will obviously be affected.

As can be seen, many variables exist which can accelerate or retard the development of industries in west Africa. While planning a development strategy, it is hoped that all the variables will be examined in the best interests of west Africa. This means that instead of solving the constraints of any variable by eliminating the variable, such as solving the constraints of labor by proposing high capital-intensive techniques, it would be more beneficial to the Africans if a plausible solution to their specific problems could be found.

1.2 Industry and Agriculture in Tandem

In wealthy countries such as the United States industry fills the market with a seemingly infinite array of products. It continues to grow and expand while the relative importance of agriculture has decreased considerably. As a result, developing countries see in industrialization

a clear indicator of economic growth. In west Africa many of the countries have placed great stress on investment in sectors other than agriculture, as Table 1.2-1 shows.

The more developed countries like Cameroun and Nigeria have placed greatest investment emphasis on the infrastructure. But in countries where urbanization has always been the theme of development, it is not surprising that the highest percentage of investment is in the infrastructure. For the most part, the developing countries of the Sahel have emphasized other sectors at the expense of agriculture. Even in countries where the greatest investment is in agriculture, emphasis has been on export-oriented goods with less concern for domestic markets.

In general, there are three main reasons for the reduction in emphasis or neglect of the agricultural sector: (1) neglected state of agriculture as compared to industry; (2) lack of integration between various sectors of the economy; and (3) the nature of industrial enterprises.

1.2.1 Industry without agriculture: In developed countries, industrial growth was achieved only after there was a revolution in agricultural production. When changes occurred in production techniques which resulted in increased yields, it was possible for workers to be released from agriculture and absorbed in other sectors. Only then could other commodities be produced which would contribute to a higher standard of living.

In most of west Africa the emphasis of the limited technological development which has existed has been in industry, while the agricultural worker has been left to outmoded methods of production resulting in a large difference in output. Because of the low level of productivity the agricultural population lacks the purchasing power for industrial products. And since the peasants constitute the majority of

TABLE 1.2-1
Planned Percentage Distribution of Investments

	Total	Agriculture	Mining and Manufacturing	Power, Transport, and Communications	Services
Cameroun	100	12.3	1.4	35.7	50.6
Chad	100	28.7	5.3	51.6	14.4
Ghana	100	20.0	29.0	20.0	32.0
Guinea	100	10.8	17.2	52.4	19.6
Mali	100	42.7	13.6	4.0	39.7
Mauritania	100	20.1	43.3	11.0	25.6
Niger	100	31.9	6.1	39.0	23.0
Nigeria	100	10.0	13.0	45.0	32.0
Senegal	100	45.0	20.0	11.0	24.0

Source: International Bank for Reconstruction and Development, various reports.

the population, the capacity of a domestic market for industrial goods is limited.

Developing countries are also finding it increasingly difficult to compete on the world market with its own industrial products. Therefore, the capacity for industrial growth is contingent upon increased productivity and consequent increased consumptive capacity by the agriculture population .

1.2.2 Lack of industrial integration: In developed countries agricultural development keeps pace with industrial development. Improvements in agricultural efficiency continue with new inputs from industry (fertilizers, machinery, pesticides, etc.). This results in a steady increase in yields and a more efficient use of workers. Developing the interdependency between sectors will result in: (1) proportion of agricultural inputs obtained from industry and services increases, and (2) the portion of agricultural output diverted to industrial processing (canning, dairy products, oils and fibers) increases.

As a country becomes more developed, the ties between agriculture, industry, and services draw closer. Both the percentage of agricultural output for industrial processing and the amount of agricultural output from industry rise steadily as the national economy expands.

1.2.3 Industry that impedes: Industrialization has frequently failed because of the type of industry that was set up. Advisors to developing countries have tended to foster and encourage the establishment of capital-intensive industries which yield a high return per unit of labor and investment. However, there are problems which do not justify the hopes placed in them, such as: (1) lack of managers to manage such enterprises and lack of skilled workers to maintain equipment; (2) need for considerable investment capital, frequently in the form of loans; and (3) inability of capital-intensive industries to furnish

solutions to major problems of the developing countries (employment and standard of living).

1.2.4 Industry that assists: In contrast to capital-intensive industries, smaller, more labor-intensive industries can create a larger number of jobs for the same amount of capital. Labor-intensive industries do not require workers with a high degree of professional skill and can utilize the unskilled manpower available in developing countries. It is also easier to obtain local capital for a large number of small industries than for a few large ones.

Labor-intensive industries because of their character and adaptable size do not have to be located in large urban settings. Many can be dispersed in the outlying areas and in rural towns resulting in the development of the interrelationship between industry and agriculture without necessitating large-scale investment.

Locating such industries in the rural areas offers several advantages:

(1) Villagers can find employment near their homes, so migration to the large cities is reduced. This preserves the stability of the rural society and reduces immediate need for housing and services in the urban centers.

(2) The industrial workers within the rural area begin to create an indigenous market for agricultural produce.

(3) Transport costs for processing agricultural products are reduced and a greater part of the final price is left with the farmer.

(4) An incentive is created for the farmer to share in the ownership of the processing plants, and the gap in living standards between urban centers and rural areas is further reduced.

In summary the establishment of industries in the rural areas in conjunction with introduction of improved methods of agricultural production is needed to complete the economic circle that connects

agriculture and industry. This will result in several sequential consequences:

(1) An expanding market will encourage the farmer to increase and diversify production.

(2) Money received for surplus products can be used to acquire industrial goods for home and farm.

(3) The growing demand for industrial products increases opportunities for absorbing excess labor.

(4) A higher standard of living of industrial workers creates demand for high-quality food allowing the farmer to get a better return for his efforts.

1.3 Support System That Supports

The system of services that directly supports production and helps to improve the farmer's condition is varied and includes farm services such as supply, marketing, credit facilities, and instruction; public services such as education, sanitation, and nutrition; and infrastructure including roads, warehouses, water, and energy.

The problem of organizing the supporting system and making it work efficiently under the conditions prevailing in a developing country is critical in the overall development plan. Also since the nature and components of the various services change during the process of development, the structure of the supporting system must be capable of growth in order to fill the need as required. In short, the supporting system must first come to life and must be able to grow efficiently with the inherent character of continued change allowing it to modify itself as the need changes. In order for the supporting system to come to life and be successful, there must be a balance between three principles: (1) maximum dispersal of service units, (2) efficiency of the services both as to price and quality, and (3) physical concentration of

services that function on a similar scale (Weitz 1971).

1.3.1 Maximum dispersal: The demand for services comes from a mass of small agricultural/industrial producers which are scattered over a wide area with little or no transport facilities. As a result the supporting system must be located near or easily accessible to the rural community in order to be useful and successful. If the system is too far removed the farmer must rely upon traditional suppliers to whom he will pay higher prices for less effective services.

The method of dispersing services is also important and must be adapted to the farmer's level of understanding. If it is too formal or complex, he will refrain from using the services.

1.3.2 Efficiency of services: Services to be provided must be efficient as to price and quality. They must operate at such a level as to benefit from economies of scale, with the scale being dependent upon the nature of the particular service and the amount of capital available. As is typical in developing countries, the need to increase the size of the supporting units and concentrate them in a few places often conflicts with the principle of maximum dispersal. In order to retain this principle and in general raise the standard of services in the rural areas, a large supply of qualified manpower is needed. But usually such people are unwilling to live in the villages because of the lack of services and because of the urban functions to which they have become accustomed. Therefore, while the location of services in the village would allow maximum dispersal, it is inefficient with regard to quality and costs of maintaining such services.

1.3.3 Concentration of services: In order to create an effective supporting system, the location of various services and the links between them becomes very critical for development. Services that function on a similar scale should be concentrated in a single physical location for several reasons: (1) the farmer is able to obtain

everything he needs conveniently in one place; (2) maximum development of resources can be achieved; (3) cooperation between various service elements can be facilitated; and (4) development of such a physical focal point can attract the necessary skilled personnel needed to successfully maintain the supporting system for services.

The support system cannot be the same in all areas but must be designed for each country according to its needs and potentials. As a case study, Mali will be used to show how such a development strategy can be applied and implemented in a specific area with specific goals in mind.

2. EVALUATION OF INDUSTRIAL PLANNING

This chapter is concerned with a methodology for systematic generation and evaluation of various industrial plans. The first section is a description of the method and its operation. The remaining sections examine the country of Mali as a case study and how the methodology works with this specific situation.

2.1 Description of Method

The method developed for evaluation of industrial planning exists in four distinct parts (see Figure 2.1-1):

- (1) identification of existing or proposed situation;
- (2) analysis of the various resources available for development;
- (3) generation of an alternative agricultural/industrial mix; and
- (4) evaluation of the new mix.

The existing situation would be the starting point for a development analysis. This would include such information as the following:

- (1) survey of all available resources;
- (2) meteorological conditions (climate, rainfall, and temperature);
- (3) geological surveys (soil structure, mineral and oil deposits);
- (4) sociological survey (composition of population);
- (5) sources of water (rivers, lakes, and oceans);
- (6) population trends (level of education, availability of skills, and training facilities);
- (7) distribution of industry and agriculture (production and capacity);
- (8) pattern of imports and exports;
- (9) price and cost structure;
- (10) present and potential markets; and
- (11) sources of power, transport, and communications.

In developing countries much of the necessary information is not

available, but a complete and detailed dossier does not have to be compiled in order for the strategy to be implemented. As Figure 2.1-1 indicated, the act of evaluating is an iterative process whereby with each iteration new information has been added, goals have changed, and in general, the pattern of development has varied. Synergistic development is a recurrent situation, each iteration being slightly different but always maintaining the form of industrial/agricultural propagation.

The second step is the analysis of the situation, whether existing or proposed (see Figure 2.1-1). Synergistic industry is examined as the development of resources, and is placed in matrix form to simplify analysis. The resources are listed as:

- (1) labor (distribution, skill, wages, and migration);
- (2) management or entrepreneurship (distribution, education, and salaries);
- (3) capital (money and land); and
- (4) natural resources (minerals, water, wood, livestock, crops, and fuel).

Each resource is tested in an industrial setting to determine the feasibility of its development. The industrial setting is made up of five parts, and includes:

- (1) source of investment (indigenous to area or derived from elsewhere);
- (2) control of industry (public/private, local/foreign);
- (3) type (producer/consumer goods, scale);
- (4) environment or setting (inflationary/stable monetary setting, urban/rural, labor/capital intensive); and
- (5) purpose (quantitative changes/structural transformations, economic/political aims).

The results of the analysis are instructive in determining where

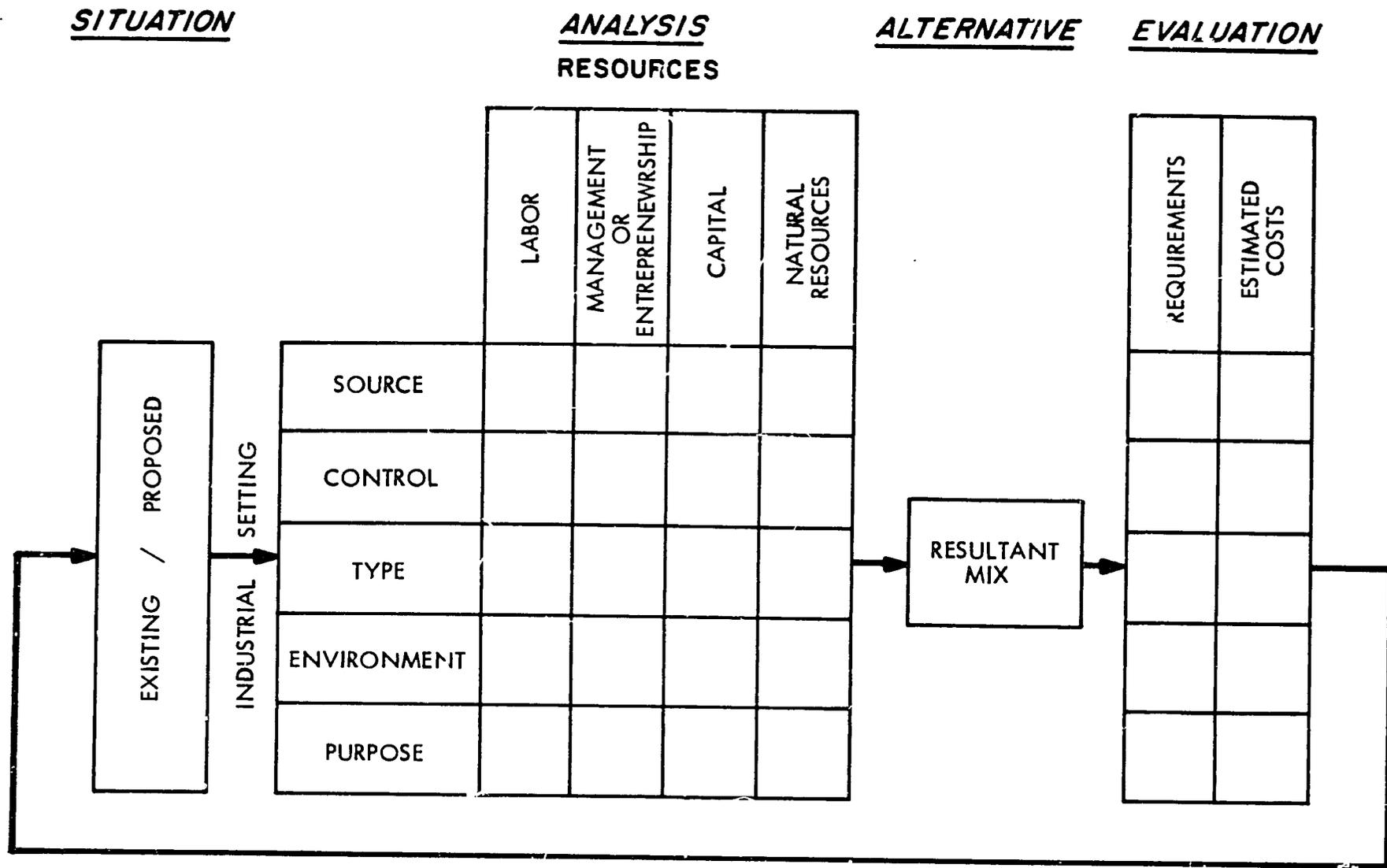


FIGURE 2.1-1 Evaluation of Industrial Development

emphasis should be placed and what the necessary agricultural/ industrial mix need be in order to achieve the desired result. With each iteration the mix would become more interdependent, tying agriculture and industry closer to one another.

The last step would evaluate the resultant mix and determine the requirements necessary for its implementation and the estimated costs involved.

As the sequence is repeated, the existing/proposed situation will change suggesting a direction and indicating limitation of a particular agricultural/industrial plan.

2.2 Situation (Mali Case Study)

Until independence, industry in Mali was virtually negligible, but a considerable effort has been made subsequently and some range of traditional import-substitution industries has now been established, including a considerable number of food industries and plants to fabricate some of the simpler metal products. The current industrial development effort is along the same lines, and industries under construction or being seriously studied include cotton processing, sugar refining, further meat processing (including dairy products), rice processing, sawmilling, sack-making, plastics manufacturing, cement, ceramics, and refractory brick processing, agricultural equipment manufacturing, and the assembly of transistor radios. There is also a plan to establish an iron and steel works, but this depends on a firm agreement with neighboring countries and the building of the barrage at Gouina.

The effort made within a short space of time in Mali is noteworthy, but again it will be seen that for some years to come there will be only limited development of intermediate and capital goods and that such is evidently impossible without cooperation with neighboring

countries, a point much more fully appreciated by the Malian than by the Guinean authorities. Another positive feature is the emphasis that has been placed in recent years on mineral surveying as a basis for substantial industrialization at a later stage.

As in other countries, administrative expenses have increased at a rapid rate, and there have been a number of extravagant infrastructural projects--official buildings, hotels, and airports. More detailed information concerning the situation in Mali can be found in Appendices I, III, and IV.

2.3 Analysis

2.3.1 Resources for development: The employment situation in Mali reflects the strong orientation toward agriculture. At present the employment potential is in agriculture, including livestock, cash crops, and food production. Although investment in the food industry is not high, the value of food production is 25.6 percent of total production (see Table 2.3-1).

Next to food production the cotton ginning industry provides a large percentage of industrial employment. The highest production value is in the processing of cotton for export to Europe. Hence, further investments are taking place in this sector. As Table 2.3-1 indicates, 45 percent of current industrial investment is in the textile industries.

Expansion of industries in Mali has been limited by available energy and water resources. As a result, one-fifth of the current industrial investment is in the production, transport, and distribution of water and electrical power. Mali is not close to being industrialized. However, the future development of the country is strongly dependent upon the absorption of available manpower, which is dependent upon agriculture and industry, which in turn develops much faster if power

TABLE 2.3-1

Industrial Employment and Investment in Mali

Industrial Sector	Workers Employed	%	Value of Production		Original Investment		Total Investment	
			Million MF	%	Million MF	%	Million MF	\$
Food	3,900	41.50	4,140	25.60	60	3.60	3,150	11.50
Tobacco	70	0.74	2,500	15.50	40	2.40	1,140	4.20
Textile	2,750	29.25	6,000	37.10	1,200	73.30	12,300	45.00
Other Industries	1,880	20.00	1,230	7.60	240	14.60	5,240	19.20
Energy	800	8.51	2,300	14.20	100	6.10	5,500	20.10
TOTAL	9,400	100.00	16,170	100.00	1,640	100.00	27,330	100.00

Source: EDIAFRIC 1972.

and water resources are already available.

Since agriculture is the base of the economy and will, in all probability, continue as such for the next three decades, employment of the majority of the labor force will be in this sector. Regardless of which development alternative is selected, agriculture will be the hub from which development schemes will radiate, including industry. As a result one strategy for agricultural development has been selected in order to examine the potential of industrial development. Under the ISYALAPS (Integrated Sustained Yield Arid Land Agricultural Production System) strategy (Table 2.3-2) increased production would support a minimum of 10.8 million people and employ almost 2 million workers out of a labor force of 3.5 million (see Volume 2, Sections 4.3-4.5).

Table 2.3-3 lists the population projections for Mali assuming a constant growth rate. It indicates that the ISYALAPS strategy must be fully implemented by 2010 in order to independently support the population of that country. Examination of employment under the same strategy reveals potential problems. Assuming that improvements are made only in agriculture and not in ancillary services--education or health--the percentage of the population in the labor force would fluctuate from the current 47 percent. Under this assumption there would be little variation in investment planning, resulting in minimal change in salaried labor. Table 2.3-4 shows the distribution of labor under these assumptions. The labor force would reach 3.5 million before 1990 resulting in high unemployment.

Table 2.3-5 shows salaried employment figures under other assumptions. As the agriculture strategy is implemented, ancillary services are also developed. This means that rather than import fertilizers, farm implements, and irrigation equipment, the goods would be locally manufactured, preferably in the same location as

TABLE 2.3-2
Human Carrying Capacity, Mali, ISYALAPS Strategy

	Ecologic Zone					
	Subdesert	Sahel	Sudan	Woodland	Irrigated	Total
Net calories produced x 10 ⁹	18	57	493	4,639	2,666	7,873
Population supportable x 10 ⁶	0.025	0.078	0.675	6.354	3.652	10.784
Net protein produced x 10 ⁶	2,336	6,079	23,958	164,009	54,707	251,089
Population supportable x 10 ⁶	0.106	0.276	1.089	7.455	2.487	11.413
Wood produced x 10 ⁶ kg			1,179	4,910		6,089
Population supportable x 10 ⁶			2.358	9.820		12.178
Animal units	416,640	840,560	786,240	954,800		2,998,810
Population employable x 10 ⁶	0.052	0.105	0.049	0.059		0.265
Area in dryland agriculture km ²		13,272	32,760	40,920		86,952
Population employable x 10 ⁶		0.265	0.655	0.409		1.329
Area irrigated km ²					3,960	3,960
Population employable x 10 ⁶					0.040	0.040
Area in wood km ²			21,840	27,280		49,120
Population employable x 10 ⁶			0.044	0.027		0.071
Population in other agricultural activities* x 10 ⁶		0.050	0.093	0.124	0.006	0.273
Total population working in agriculture x 10 ⁶	0.052 +	0.420 +	0.841 +	0.619 +	0.046 =	1.978

* milk, poultry and eggs, fish production

Source: Matlock et al. 1974.

TABLE 2.3-3
Population Growth, Mali

<u>Year</u>	<u>Population</u>	<u>Average Growth Rate %</u>
1920	2.52	.39
1930	2.59	.73
1940	2.78	1.20
1950	3.14	1.80
1960	3.75	2.30
1965	4.20	2.60
1970	4.75	2.60
1975	5.36	2.60
1980	6.14	2.60
1985	7.01	2.60
1990	7.97	2.60
1995	8.83	2.60
2000	9.79	2.60
2005	10.83	2.60
2010	11.11	2.60

TABLE 2.3-4
Salaried Labor Distribution, Mali

YEAR	%	1970	1980	1990	2000	2010
% of population in labor force		47.00	47.00	47.00	47.00	47.00
% of labor force as salaried		2.80	2.80	2.80	2.80	2.80
Size of labor force (x 10 ⁶)		2.33	2.88	3.75	4.60	5.22
PRIMARY						
Agriculture	71.0	48,990	61,240	76,550	96,450	121,530
SECONDARY						
Manufacturing	13.2	9,108	11,480	14,460	18,220	22,960
Energy & Water	2.4	1,656	2,090	2,630	3,320	4,180
Construction	0.7	483	610	770	970	1,220
Transportation	0.2	138	180	220	280	350
SUBTOTAL		11,385	14,360	18,080	22,790	28,710
TERTIARY						
Business, Commerce and Services	12.5	8,625	10,870	13,700	17,260	21,740
<u>TOTAL</u>	100.0	69,000*	86,470	108,330	136,500	171,930

Assumption: Constant labor force and constant salaried labor.

*44,000 are government employed.

TABLE 2.3-5
Salaried Labor Distribution

YEAR	%	1970	1980	1990	2000	2010
% of Population in Labor Force		47.00	42.00	37.00	34.00	32.00
% of Labor Force as Salaried		2.80	7.00	10.00	12.00	15.00
Size of Labor Force (10 ⁶)		2.33	2.58	2.95	3.33	3.55
PRIMARY						
Agriculture	71.0	48,990	128,170	209,370	283,590	374,870
SECONDARY						
Manufacturing	13.2	9,108	23,830	38,930	52,720	69,700
Energy & Water	2.4	1,656	4,340	7,080	9,590	12,670
Construction	0.7	483	1,260	2,060	2,800	3,700
Transportation	0.2	138	360	590	800	1,060
SUBTOTAL		11,385	29,790	48,660	65,910	87,130
TERTIARY						
Business, Commerce & Services	12.5	8,625	22,560	36,860	49,930	66,000
TOTAL	100.0	69,000*	180,520	294,890	399,430	528,000

Assumption: Decreasing labor force and increasing salaried labor.

* 44,000 are government employed.

agricultural production. Also, health care services, formal education, and technical training would become an integral part of development. The overall impact is a slight reduction in the percentage of the population of the labor force with a high increase in the percentage of the labor force that would become salaried.

The ISYALAPS strategy will increase agricultural production and consequently increase opportunities for development of processing industries. Table 2.3-6 compares present production and percentage processed by industry to production and processing under the ISYALAPS strategy. In order to meet the processing demands, greater investments must be made in the processing of wheat, peanuts, and cotton.

2.3.2 Industrial characteristics: In the Republic of Mali there are 49 industrial plants, 14 of which are state owned. Most of the industries are based on consumer goods for export to Europe. Table 2.3-7 gives a breakdown of the industries with investments and planned investments. Additional information on industries in Mali may be found in Appendix III.

2.4 Resultant Mix

Under the ISYALAPS strategy the agricultural sector would dominate the economic development of Mali. The majority of the industries developed will be for the processing of agricultural crops with the development of additional consumer goods industries increasing as the need arises. As the purchasing power of the rural sector grows, the market for consumer goods and services will also increase proportionately. In the following section is a description of the new situation under the ISYALAPS strategy after one iteration through the methodology.

2.4.1 New situation: As Table 2.3-6 showed, the emphasis in agriculture will be to greatly increase wheat production as a food crop and peanut and cotton production as cash crops. Table 2.4-1

TABLE 2.3-6
Processing Industries Under ISYALAPS

PRODUCT	(1971) Present Production*	% Processed	ISYALAPS Production*	Amount to be Processed*	Existing Capacity*	% of Capacity Increase Needed
Millet and Sorghum	900,000	0.2	947,000	200,000	180,000	11%
Corn	80,000	N. A.	720,000	108,000	** 36,000	20%
Rice	150,000	29.0	317,000	157,500	102,000	54%
Wheat	4,000	N. A.	475,000	142,500	**2,600	5,380%
Peanuts	175,900	2.0	386,000	154,400	23,000	571%
Cotton Seed	52,760	100.0	321,000	321,000	96,000	234%
Cotton Lint	25,000	47.0	130,000	61,100	26,000	135%
Livestock	84,000	N. A.	152,000	25,840	** 14,000	85%
Fish	90,000	30.0	130,500	39,150	30,000	31%
Poultry	4,200	N. A.	6,000	1,020	** 700	46%

*metric tons/year

**estimated

TABLE 2.3-7
Industrial Investment

Sector/Product (Number of Sites)	Investments to Date (Millions MF)	Planned Investments (Millions MF)
<u>Food Processing</u>		
(1) Dairy	250	
(1) Fruits and vegetables	316	
(4) Grain	740	
(1) Sugar	1,447	
(2) Other	1,130	102
Subtotal	3,883	
<u>Textile</u>		
(2) Weaving	10,550	250
(8) Ginning	1,725	2
Subtotal	12,275	
<u>Tobacco and beverage</u>		
(2) Tobacco--cigarettes	1,080	
(1) Brewery	60	70
Subtotal	1,140	
<u>Leather</u>		
(1) Tanning	200	
<u>Chemical, rubber, printing</u>		
(1) Bleach, vinegar	245	40
(1) Liquid gas	70	
Subtotal	315	
<u>Mechanics, mechanical and electrical manufacturing</u>		
(3) Metal equipment	455	
(1) Electrical appliances	50	
Subtotal	505	
<u>Construction</u>		
(2) Tile, brick	580	
(1) Cement	3,300	
Subtotal	3,880	
<u>Transport</u>		
(1) Bicycle, motorcycles	330	
<u>Energy and water</u>		
(11) Electricity	5,500	67,025
(5) Water		530
Subtotal	5,500	
49 Industrial plants		
TOTAL	28,028	68,019

Source: EDIAFRIC 1972.

TABLE 2.4-1
Labor/Output Ratio
(Number of salaried workers/Production in millions of U. S. dollars)

Industry Sector	Cameroun	Central African Republic	Chad	Dahomey	Ivory Coast	Mali	Mauritania	Niger	Senegai	Togo	Upper Volta
1) Extraction	---	---	---	---	---	---	60	156	76	86	---
2) Food Processing	80	98	46	158	55	523	142	16	54	248	83
3) Textile	184	221	160	101	140	255	---	264	135	157	176
4) Tobacco and Beverage	74	34	50	40	38	16	---	65	53	65	52
5) Leather	222	---	---	---	---	---	---	36	---	---	273
6) Furniture and Wood Products	394	530	---	273	141	---	---	185	268	---	153
7) Chemicals, Rubber, Print, Paper	771	---	77	78	136	---	---	84	73	6	193
8) Petroleum	18	---	---	---	12	---	---	---	13	---	---
9) Mechanics, Mech. & Elec.	108	167	43	---	75	701	---	759	180	273	361
10) Construction	62	333	---	33	43	1,500	---	150	100	29	364
11) Transport	68	151	49	128	50	479	---	---	74	---	---
12) Energy and Water	63	137	35	46	53	193	76	75	143	---	88

relates labor-output ratios of various west African countries in the different industrial sectors. Mali is by far the most labor intensive of the countries examined. Under ISYALAPS the ratio is kept constant. If other iterations are made, the ratio would be changed to examine the situation under a variety of technologies and under different desirable goals set by Africans. Table 2.4-2 shows the employment situation under ISYALAPS, using the degree of labor intensity that now exists. When compared to the probable labor distribution in Table 2.3-5, the conclusion is that the jobs generated will be sufficient to employ the labor force. The excess jobs created can therefore be used to absorb labor displaced in the agricultural sector if more capital-intensive techniques are used. It also gives some indication of how capital intensive the industries can become before there is danger of excessive unemployment in the secondary sector. Table 2.4-3 shows how labor could be redistributed if more intensive techniques are used in the agricultural sector. It would be possible in Mali's case to redistribute 14 percent of the agricultural laborers to industry and services without losing agricultural production. Again each succeeding iteration would offer a more optimal distribution.

2.4.2 Estimated costs: Estimation of the cost of developing industries which are tied directly to agricultural production is difficult, and the results are often inexact, but estimates of various strategies must be made in order to offer some direction in planning. One would hope that as more information is gained and other iterations are made under different assumptions the ability to accurately estimate costs will improve.

Table 2.4-4 compares the capital-output ratios of eleven west African countries. There are problems with such ratios for developing countries since the results are often predicated upon the capital output

TABLE 2.4-2
Jobs Under ISYALAPS Strategy

Industries for Agricultural Processing	Laborers/Unit Output (Number/ Million U.S. \$)	Projected Output Under ISYALAPS (Millions U.S. \$)	Employment Generated (Salaried)
Food Processing	523	92.8	48,500
Textile	255	64.6	16,473
Tobacco and Beverage	16	13.4	214
Mechanics	701	2.3	1,612
Construction Material	1,500	1.5	2,250
Transport Equipment	479	2.1	1,006
Energy and Water	193	66.0	<u>12,000</u>
		TOTAL	82,055

TABLE 2.4-3

Redistribution of Labor under ISYALAPS Strategy

	% (1971)	Possible % (ISYALAPS)	Number of Jobs Generated (1990)
Primary			
Agriculture	71.0	56.8	167,500
Secondary			
Manufacturing	13.2	23.0	66,800
Energy and Water	2.4	4.1	12,000
Construction	0.7	0.8	2,250
Transportation	0.2	0.3	1,006
Tertiary			
Business, Commerce and Services	12.5	15.0	
<u>TOTAL</u>	100.0	100.0	294,890

TABLE 2.4-4
 Capital/Output Ratio
 (Millions U. S. \$/Millions U. S. \$)

Industry Sector	Cameroun	Central African Republic	Chad	Dahomey	Ivory Coast	Mali	Mauritania	Niger	Senegal	Togo	Upper Volta
1) Extraction	---	---	---	---	---	---	3.65	6.0	3.02	2.89	---
2) Food Processing	0.54	0.98	0.02	0.40	0.55	0.83	1.65	0.17	1.0	4.36	0.61
3) Textile	0.87	0.64	0.46	1.77	0.86	2.22 *	---	2.47	0.73	1.11	1.63
4) Tobacco and Beverage	0.73	1.54	1.06	0.63	0.63	0.49	---	2.04	0.45	1.23	1.05
5) Leather	0.22	---	---	---	---	---	---	0.60	---	---	1.82
6) Furniture and Wood Products	1.19	1.68	---	2.27	0.54	---	---	1.08	0.17	0.56	0.28
7) Chemicals, Rubber, Print, Paper	0.94	---	0.38	0.59	1.64	---	---	0.97	0.75	0.09	1.45
8) Petroleum	0.71	---	---	---	0.87	---	---	---	0.88	---	---
9) Mechanics, Mech. & Elec.	0.44	0.91	0.32	1.82	0.61	0.88	---	1.72	0.69	1.82	0.56
10) Construction	1.90	2.83	---	0.59	0.56	58.50** 1.60	---	4.00	0.29	1.09	4.55
11) Transport	0.24	0.25	0.16	0.81	0.33	0.63	---	---	0.16	---	0.25
12) Energy and Water	3.89	4.23	2.37	2.10	3.66	2.61	3.54	3.24	1.32	1.97	3.81

* recently developed textile plant

** brick and tile factory at far below capacity

of one or two industrial plants. If the particular industry is just recently established or recently expanded, the ratio gives little indication of how actual investment costs compare to production value. But if west African industrialization is examined in total, a more accurate picture can be developed, and deviations by individual sectors can be placed in better perspective.

Two sectors in Mali appear to be above the average for west Africa: textile and construction. Both are due to below-capacity operation by individual companies. The porcelain-tile company in the construction sector is operating at less than 30 percent of capacity after making total investments of 500 million MF. In estimating required capital, the ratio for the construction was assumed as the average for west Africa. Table 2.4-5 is a first iteration estimation of costs for processing and auxiliary industries. Costs for the infrastructure or support system are not examined here but would be included in the overall development scheme for Mali.

Only industries which are tied to agricultural production have been examined. Currently there are a few industries which produce consumer goods for the urbanites, but the production level is quite low and the consumption costs quite high. It is hoped that successive iterations will be able to more accurately reflect the level of the purchasing power of the rural sector and estimate at what time and place and at what costs these consumer-good industries would have an indigenous market.

TABLE 2.4-5
Capital Requirements for Agricultural Processing Industries

Industries for Agricultural Processing	Capital/Unit Output (Million U.S. \$/ Million U.S. \$)	Projected Output Under ISYALAPS (Millions U.S. \$)	Capital Needed (Millions U.S. \$)
Food Processing	0.83	92.8	77.02
Textile	2.22	64.6	143.40
Tobacco and Beverage	0.49	13.4	6.57
Mechanics	0.88	2.3	2.02
Construction	2.00	1.5	3.00
Transport	0.63	2.1	1.32
Energy and Water	2.61	66.0	<u>172.26</u>
		TOTAL	405.59

3. STRATEGY FOR INDUSTRIAL PLANNING AND DEVELOPMENT

What is meant by "strategy"? Is it a conscious attempt to select the best available alternatives to achieve specific goals, or is it the process of preparing a set of decisions for action in the future directed toward optimum achievement of goals? Whatever definitions are made, one common concept must be woven throughout--specific goals must be carefully defined. The goals defined will reflect the realistic political, social, economic, and ecologic setting. The goals are on a sliding time scale and will change in priority with time, but in order to make decisions that can be labeled pre-project or strategy planning, those goals should be stated and integrated into any planning projects that might result from such decision-making.

Usually the term strategy is used to describe the establishment of decision rules applicable to problems under the following conditions:

- (1) Decisions must be made at successive moments in time;
- (2) future circumstances are uncertain;
- (3) uncertainty diminishes with time (Theil et al. 1965).

The example of a strategy problem frequently used is a chess game. The good player not only decides his next move but how he will respond to various circumstances resulting from that move and previous moves. The game is also characterized by long periods of time between moves. In proposing a strategy one quickly realizes the complexity when the game becomes multi-dimensional chess-by-committee where the participants are interagency working groups, councils of ministers, planning commissions, or any parties or agencies with divergent interests. And since decision making by autocratic methods is discouraged, the chess-by-committee game becomes all too real. In order to simplify the problem and prevent critical time delays there must be a commitment to a particular strategy. Some countries may be capable of trying several alternatives at once, but most developing

countries can effectively undertake only one development strategy at a time. As a result each planning project to be examined must support the strategy consistently, or otherwise it will serve as a counter-productive element in the primary strategy. Not that other alternatives should not be seriously examined, but the uncertainties are too great to play one strategy against another. Instead, decisions should be sequential and careful consideration should be given to the previous decision before making the next.

The strategy for industrial development is based upon and inter-related to one agricultural strategy. This means that decisions for or against industrial projects will be dependent upon and consistent with the decisions made under the agricultural strategy. The primary objective of the industrial strategy is to maximize resource development of west Africa--where resource includes labor, capital, entrepreneurship, and natural resources. The various alternatives within this strategy will be concerned with the achievement of maximum net cash income to farmers.

To be able to state objectives and formalize a strategy is often more difficult than going about setting the steps to implement that strategy. Once formalized, decision making would become sequential dealing with the following steps of pre-project planning.

- (1) Analyze innovation (core projects for the region). Are they
 - (a) acceptable and profitable for the farmers,
 - (b) able to be extended,
 - (c) applicable in a substantial number of districts within the region,
 - (c) applicable to a significant percentage of the farmers?
- (2) Analyze infrastructure (institutions). Does it provide a long-range preferred institutional structure that can provide almost all the farmers with all the services they need based upon the following factors:

- (a) adequate institutional coverage to support a continuing volume of innovations,
- (b) economy of personnel and keeping these at community-village level,
- (c) minimal existing organizational change,
- (d) maximum farmer participation,
- (e) promotion of private development (unless precluded for ideological reasons),
- (f) infrastructure flexibility to support a wide variety of innovations and service a variety of farm systems?

(3) Strategy phasing (order and sequence). After innovations and institutional selection, placement within a time frame becomes critical (Kulp 1970).

The remaining sections of this chapter deal with these steps in a strategy for industrial planning and development in west Africa.

3.1 Development of Rural Towns

To improve the state of the rural population in any of the countries of west Africa, it is necessary not only to increase agricultural productivity but also to introduce processing and supporting industries which begin to bind the rural and urban economies. This approach allows the introduction of industries into rural areas which can be built up from the experience of these people while at the same time improving rural production, income, and standard of living.

3.1.1 Need for rural towns: For agriculture to be developed, it is necessary that urbanization be decentralized. A system of rural towns based on a hierarchy of functions is needed to efficiently accelerate national development and fulfill three main functions (Weitz 1971).

(1) The rural town scheme provides the basis for activating the support system explained in Section 1.3. Dispersing of services will

require professional workers such as teachers, doctors, engineers, technicians, and agricultural advisors and instructors. However, as exemplified in many developing countries it is impossible to persuade such people to live in a village. They prefer an urban center where they can live and enjoy all the amenities offered in only that setting. If the rural towns are not large enough to fulfill the needs, there will be a migration of professionals to the major urban centers curtailing any effort for agricultural development.

(2) Rural towns offer a logical location for the development of agricultural and ancillary industries (see Section 1.2.4).

(3) Rural towns provide the farmer with the option of urban culture without forcing abrupt life-style changes. This hastens the process of modernization by creating a market for agricultural products, obtaining services, and allowing the farmer an alternate source of employment without breaking family ties.

3.1.2 Rural town size and location: For a rural town to fulfill the functions listed in the previous section, it must be large enough to maintain an effective level of services. Optimal sizing is impossible since this is a function of place and time. The range can exist from 10,000 to 100,000 inhabitants.

The population of rural settlements in Mali has fluctuated between 5,700 and 6,500 since 1920. It seems this level of inhabitants has provided the services, not necessarily sufficiently but perhaps minimally, due to transport and market restrictions. It is assumed under the ISYALAPS agriculture strategy that increased services will be required in areas of higher intervention levels. The rural town sizing therefore will be dependent upon the distribution of supportable population under ISYALAPS.

Tables 3.1-1 and 3.1-2 indicate the distribution of the population now and possible distribution under ISYALAPS. Figure 3.1-1 indicates

TABLE 3.1-1
Distribution of Population under ISYALAPS

	<u>Population Distribution (%)</u>	<u>Distribution of Urban Population (30% of Total)</u>
Desert	0	
Subdesert	0.2	6,500
Sahel	0.7	22,800
Sudan	6.2	201,500
Woodland	59.0	1,917,500
Irrigated	<u>33.9</u>	<u>1,101,800</u>
TOTAL	100.0	3,250,100

TABLE 3.1-2
Distribution of Urban Settlements in Mali, 1970

	<u>% Over 20,000</u>	<u>% 5,000-20,000</u>	<u>% Under 5,000</u>	<u>TOTAL</u>
Desert	0	0	100	100
Sahel	0	33	67	100
Sudan	12	35	53	100
Woodland	10	20	70	100

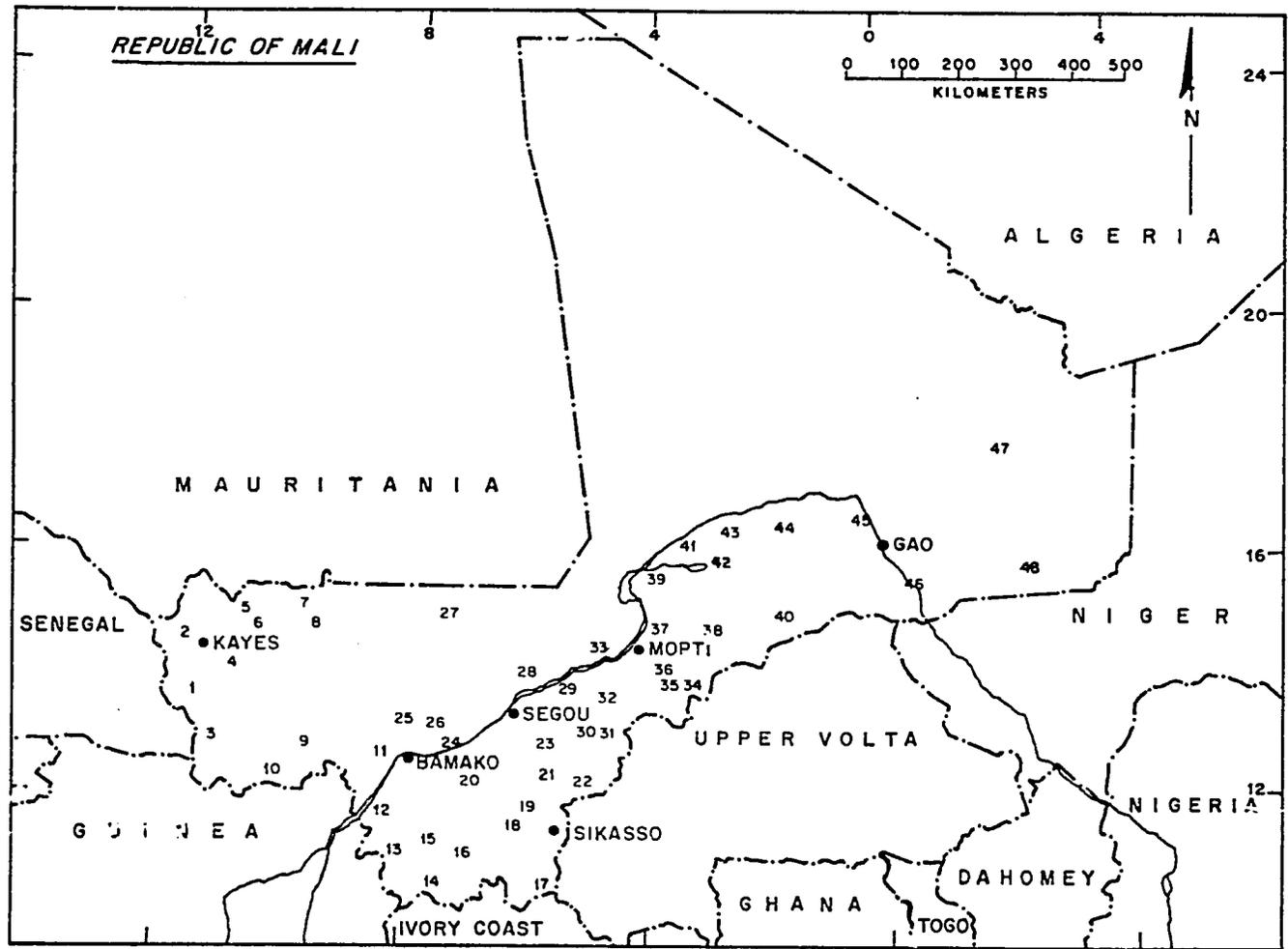


FIGURE 3.1-1 Urban Centers and Rural Towns under ISYALAPS

Key on Page 73.

Key to Figure 3.1-1

Urban Centers and Rural Towns under ISYALAPS

Urban Centers

Kayes
Bamako
Sikasso
Segou
Mopti
Gao

Rural Towns

- | | | |
|-----------------|----------------|---------------------|
| (1) Sadiola | (18) Nkourala | (34) Koro |
| (2) Kéniéba | (19) Kignan | (35) Bankass |
| (3) Ambidédi | (20) Dioïla | (36) Bandiagaba |
| (4) Bafoulagé | (21) Koutiala | (37) Kona |
| (5) Yelimané | (22) Yorosso | (38) Douentza |
| (6) Diakon | (23) Bla | (39) Niafounke |
| (7) Nioro | (24) Koulikoro | (40) Hombori |
| (8) Diéma | (25) Kolokani | (41) Goundam |
| (9) Kita | (26) Banamba | (42) Dire |
| (10) Kourague | (27) Nara | (43) Tombouctou |
| (11) Négala | (28) Niono | (44) Gourma-Rharous |
| (12) Kangaba | (29) Massina | (45) Bourem |
| (13) Yanfolila | (30) San | (46) Ansongo |
| (14) Manankoro | (31) Tominian | (47) Kidal |
| (15) Bougouni | (32) Djenne | (48) Ménaka |
| (16) Kolondiéba | (33) Ténenkou | (49) Ouélessébougou |
| (17) Kadiolo | | |

the possible location of the rural towns for 1990 under the ISYALAPS plan. These would not be new towns but existing towns where the infrastructure has been built up, where medical and educational services have been located and where the major production areas would exist. There would be approximately 49 rural towns with populations of 10,000 to 20,000 for a total rural town population of 735,000. Within the production areas there would be a total of 340 rural settlements, roughly seven centers to one rural town, with populations of 1,000 to 10,000 for a total rural settlement population of 1,700,000. The rural settlements already exist but would need some infrastructure, storage facilities and road improvements.

Figure 3.1-1 also shows where the major urban centers would be located. Gao would probably be the smallest and Bamako the largest with populations of 30,000 and 700,000 (based upon 6 percent annual growth rate). Including the other urban centers, the total urban center population would be 950,000.

The major urban centers could continue growing and remain the regional centers where heavy industries and major institutions would be located. Agro-processing industries and some medical and educational institutions would be located in the rural towns providing a market and source of supplies for the rural settlements and farmers.

3.1.3 Industry types: Improving the state of the rural population will of necessity include more than just increasing agricultural production. Industries that are agro-processing and agro-supporting must be introduced simultaneously with the various intervention levels of agricultural production.

From the existing situation, industries such as rice mills, oil mills, bakeries, sugar factories, fruit and vegetable canning, and fish processing can be introduced or expanded. On the other hand, where the social and economic parameters allow, more sophisticated industries

such as solvent extraction plants for oil extraction, rice mills with silos, elevators and conveyors can be introduced. In this area there is a vast area of sophisticated industries for the conversion, preservation, grading, storage, and packaging of agricultural products. All such industries add value to agricultural products helping to balance the rural and urban economies.

On the input side of agricultural production, many agro-supporting industries are needed to supply the farmer with plows, harrows, seed drills, weed killers, fertilizers, pesticides, fungicides, and a variety of equipment for irrigation. This will increase yields and provide needed, balanced growth between the agricultural and industrial sectors.

A type of industry that has trouble existing in rural economies but could be used to produce a surplus for reinvestment is that of the household or cottage industry. Although rural families have always engaged in household industries, these generally fail to provide more than a subsistence occupation. In order to create surplus, it is necessary to upgrade the technology used. Attention to design, better matching of technology to specific job, standardization of parts, and an efficient transport and marketing system must all be coordinated in order to succeed with this type of industry. Many of the household activities, such as spinning, weaving, manufacture of carpets, tobacco, goods from indigenous metals or woods, could be increased by improving the technology and techniques. There is no ready-made scheme for such industries, but the present system for an area must be studied in order to suggest the introduction of specific equipment, tools, and practices which would result in higher productivity and increased earnings for the rural farmer.

3.1.4 Markets and African entrepreneurship: The indigenous market system in west Africa will only develop as the gap between rural

and urban economies is reduced. At what point along the development road this occurs is impossible to determine, but some of the first markets which will grow will be in the following areas: (1) construction materials including concrete products, bricks, tile, and pipe; (2) millwork, woodwork, and furniture; (3) household goods such as food products, bread and bakery products, and beverages; (4) garments, shoes and leather products; and (5) artisanal objects.

Markets for all of the above industries exist to some extent in most of west Africa but on a limited basis and in an unstable economic setting. As a result few people rely on their production as a source of income. The size of the market also restricts the quality of such products, but as the rural market grows and becomes more stable, people will be able to develop small enterprises as a viable alternative to farming or herding. As competition grows, the quality of production will improve. However, the competition among some small enterprises in the fields of trade, woodworking, and metal working will become keen because of overcrowding. Moreover, as the artisanal industries are able to increase their output by partial mechanization, new marketing problems may arise. Such specific problems are often difficult to anticipate, but if a development strategy for a region is able to interrelate the rural and urban sectors and carefully join industry with agriculture, the risks involved for change are not so overwhelming. The markets may easily expand to the region's larger urban centers or to urban areas outside of the production areas. However, in order for the market to expand, it must be complemented on the demand side by a growing local entrepreneurship.

The availability of entrepreneurship in west Africa is dependent upon the ability of the potential entrepreneur to fulfill the following requirements: (1) ability to combine various factors of production for the purpose of producing some needed service or product; (2) willingness

to take risks; (3) ability to perceive opportunities for production and capability of exercising the initiative required to take advantage of them; (4) ability to assemble and direct the means of production; (5) demonstrated capacity for innovation; and (6) high need for achievement (deWilde 1971).

These requirements are filled to various levels of competency, but for the most part African businessmen operate at low levels of managerial and technical skills and within a traditional framework that currently hampers development.

The constraints which currently hamper such development may be summarized as follows:

(1) Management--managerial deficiencies exist in accounting, costing, stock control, direction of labor, and market assessment.

(2) Technical skills--a systematic method of obtaining skills and imparting these skills to others is lacking.

(3) Dispersal of effort--because of market constraints many African businessmen will operate more than one business which tends to overtax their ability to supervise and control their resources.

(4) Sociological--because of the differences in the structure of businesses in the rural and modern sectors difficulties arise over the criteria of credit worthiness and in recognition of the fact that loans with modern financial institutions must be promptly repaid.

(5) Regulations--the licensing and the conduct of businesses or the standards of products often create difficulties for the small or medium African entrepreneur.

With the creation of rural town development, it would be possible to remove most of the constraints which currently exist. Formal managerial and technical training could be awarded on the rural town level through workshops and extension services while at the same time creating a framework by which the skills learned could be passed on to

others within the community. The problems of credit, financing, and regulatory licensing could be handled through cooperatives or granges located in the production areas involving many rural towns.

3.2 Necessities for Implementation

The prime test of any strategy is its implementation. Unfortunately, many strategies or their alternatives are never implemented because one or more of the following is lacking: (1) organizational structure, (2) infrastructure, (3) trained personnel.

The organizational structure is the framework in which planning programs and specific projects operate; the infrastructure includes the physical dispersion of services, goods and technologies. The trained personnel make the two work together for complete implementation.

3.2.1 Organizational structure: In order for the countries of west Africa to achieve their individual and collective development aims, some coordination between the different government agencies within each country must be established. Many times this is accomplished through a central planning authority, but such an organization usually acts at the national level and often has no powers of implementation. Whatever such an organization is called, it must be capable of accomplishing four objectives: (1) coordination of national planning with planning on the local level in all sectors of the economy; (2) continuous coordination of the various economic and service functions within the development region; (3) active and continuous interrelation between planning and implementation to insure the efficient transfer of resources from one project to another as change warrants it; and (4) active participation of the local population in order to mobilize local resources (Weitz 1971).

The organizational structure of government agencies is strictly vertical; even circumstances requiring interagency negotiations are

referred to administrative bodies in the national capital. Ideas originating in the field must climb the bureaucratic ladder to be evaluated and coordinated, the impossible multi-dimensional chess-by-committee game.

Many governments have now begun to look for other patterns of organization. The usual solution has been the establishment of special authorities for development, since this allows the scope of activity to be horizontal by region, not vertical by function. Usually such authorities already established fall into two main categories: (1) development authorities responsible for planning and coordination between the organs of implementation, and (2) development authorities that are themselves entrusted with responsibility for implementation (Weitz 1971).

Authorities of the second kind are generally formed to meet development needs of new regions where the regular government agencies are inactive because of overlapping jurisdictions. In these circumstances the area or region under development is "expropriated" and placed in the care and responsibility of an authority organized for this purpose. Hopefully, this would be temporary, with the authority relinquishing its power after the intensive development period. Obviously the length of time would be dependent upon several factors:

- (1) technical--land clearance and reclamation, establishment of an infrastructure, erection of irrigation installations;
- (2) organizational--mobilization of suitable manpower, allocation of financial resources;
- (3) economic--structure of economy, nature of supporting system, scale and location of industrial activity, and pace of industrial development; and
- (4) social--readiness and ability of the rural settlers to undertake responsibility for organizing production and service activities (Weitz 1971).

The choice of one or the other of a particular authority depends upon conditions prevailing in the country with the difference between the two types being only the extent of their responsibility. The first one mentioned is designed for operation in a settled area, the second for operation in a new region.

Whichever system is used, the authority must be totally aware of the changes that are needed for development. It must introduce its program gradually and adapt it specifically to the ability of the population to absorb the changes that will be demanded of it. Simpler projects should precede the more complicated ones, and projects with more immediate results should take precedence over long-term intentions.

3.2.2 Infrastructure: The final payoff of the implementation of a strategy will occur in the farming areas with added income and a higher standard of living for the individual farmer. This comes about largely through adoption of innovations by the farmers and herders. However, there are important works which must be planned to complement the individual endeavors of the farmer.

Infrastructure is used here to mean rural public works or community projects of strictly local scale which result from the planning or the organizational structure. The discrete physical projects will fall into one of four categories:

(1) transport--this generally means roads, railroads, and waterways. This category can be subdivided into: connecting roads, which link market points; access roads, which link villages to market points; and spans, which include bridges.

(2) water control--this involves irrigation, drainage, and flood control elements which are made up of five distinct parts: dams, reservoirs, canals, lateral canals, and embankments.

(3) water supply--this usually involves provisions for drinking water, including digging, purification, and distribution.

(4) community buildings--within this broad spectrum fall projects such as schools, clinics, marketplaces, community centers, and crop and animal storage facilities (Kulp 1970).

These are all a vital part of the rural standard of living and must therefore become an integral part of planning for the rural town economy.

3.2.3 Trained personnel: Staff is likely to be the most binding constraint on organizational structure and infrastructure development. This is usually caused by the shortage of trained personnel and by inefficiencies in their use. There are two main areas of concern in dealing with the personnel who not only do the planning but implementing as well: (1) attracting manpower to a region, and (2) training personnel to become proficient in pragmatic planning methods.

There is an indispensable prerequisite for maintaining direct contact between the local population and officials responsible for development. Attracting suitable personnel to come and live in the region under development is a problem difficult to solve. Conditions must be such that an official who has acquired an education and has raised his standard of living will forgo the amenities found in the large urban centers to move to a small rural township. This not only applies to the man who was raised in the urban center but also to the person who was born in the region and left to acquire a profession. Special incentives for attracting personnel may be used such as the following: (1) higher salary and higher administrative grade than their urban counterpart, (2) higher expense allowance, (3) easy terms of payment for housing, (4) priority in further education or training (Weitz 1971).

However, incentives are helpful but not usually sufficient. There must exist some spirit of voluntary service, an appreciation and pride in the significance of the work, or the personnel will find it increasingly difficult to work in an atmosphere that often goes spiritually unrewarded.

In developing countries most of the professional personnel available

are not aware of the everyday attitudes and feelings of the people in the rural areas. Alleviation of the social gap between the professionals and villagers can only be solved by training people who have field experience and are able to learn simple tools for micro-planning. Sophisticated planning methods are unsuitable in the field, but experts with practical experience and academic knowledge of these sophisticated techniques can contribute significantly to the training of teams of local planners. The methods of instruction and training must be pragmatic with the topics for study and analysis being based on reality. This method of training, applied on a large scale, can aid greatly in solving the problem of shortage of trained personnel.

3.3 Phasing of Implementation

The last step of pre-project planning, once the rural town strategy and implementation plan are developed, is to combine them all in a time frame.

3.3.1 Sequencing of innovations: The development plans for rural towns and supporting infrastructure must be sequenced within one of three groups of time periods:

(1) 20-30 years--plans covering this time period usually describe the general direction in which the economic system should advance and describe the major changes that will take place.

(2) 4-6 years--this medium range is a period that permits the completion of most projects. Because of the nature of some long-range projects or prolonged trade cycles, this is sometimes extended to ten years.

(3) 1 year--these are usually the most detailed and specific plans and are reflected in national budgets.

Regional development projects should run no more than ten years since changes in applied technology will prolong a project in order to

continually update it. The medium-range plans are translated into annual plans and serve as a way of evaluating the work under implementation. These yearly evaluations serve as feedback to the region under a development scheme to indicate what adjustments must be made in the physical master plan. Unexpected obstacles and changes in situations make it necessary for such a master plan to be adjustable if the condition warrants it.

4. ANTICIPATED RESULTS OF STRATEGY IMPLEMENTATION

The strategy described in Chapter Three involves much more than vertical industrial planning. If industry is to benefit west Africa in a qualitative sense it must be tied horizontally to agriculture. It is hoped that raising the income of the rural farmer will come about with minimal stress for him and that the changes that occur will be worth the traditions and techniques that he must sacrifice.

4.1 Reduce Migration

The present problem of migration from the interior of west Africa to the coastal countries draining the interior of needed labor, could be solved if there was a way of increasing the wage level of the farmer at the same time providing him with the services needed and offering him alternate employment options without removing him from the area. Rural town development could create the tool for tying the urban and rural sectors for certain desirable results.

4.1.1 Absorb excess labor: As the agriculture sector increases crop and livestock yields, less labor will be required to maintain the farm. Industries that do not require urban location could be located in a rural setting and absorb the labor released from farming. Family bonds are maintained, and the extended family structure has minimal change forced upon it.

4.1.2 Substitute urban functions: Currently, the urban centers of the coast offer many experiences and a standard of living that cannot be maintained in the rural setting. The wage levels are higher and many services are available only in the urban center. With the development of rural towns certain social amenities could be provided which will keep the rural farmer from migrating to the city and conversely attract the professional or skilled personnel that is needed to implement the strategy in the rural setting.

4.1.3 Creation of better skills: Because of standardization of industrial requirements, competition between African entrepreneurs, and regular adoption of new technologies, the skill level in the various trades will increase. The rural town offers the mechanism of dispersing information in the form of technical and formal schooling, workshops and apprentice programs. Currently, the migrant laborer goes to the city and is employed as unskilled labor and is purposely kept at a low skill level or is changed from one job to another, resulting in no net proficiency gain of a skill which would help him to advance in the urban setting or apply as an employable skill in the rural setting.

4.1.4 Improve quality of urban life: Reduction of migration to the urban centers will allow urban centers to keep better pace with the services required of its ever increasing resident population. Constant migration to a major urban center always taxes the city's resources which often results in rapid deterioration of areas within the city.

4.2 Value Added Production

4.2.1 Further processing of raw materials: Establishment of rural towns with the supporting infrastructure will allow the west Africans to attack the problem of how to develop industrial production at both ends of the manufacturing-trade-distribution process by taking materials they produce and processing them further before export to the urban centers or foreign countries. At the other end the last stages of manufacture on imported commodities could be performed in the urban centers before distribution to the rural areas. If a given raw material or product is reduced substantially in weight or size through processing in the rural town industries, there will be the added advantage of lowered transport costs. At the other end, if a manufactured commodity is bulkier than the materials of which it is

made (furniture, assembled cars, and farm equipment) there may be advantages in lower transport costs here too if the last stages of assembly or finishing are done in or close to the ultimate market.

4.3 Regional Integration

Because of the vertical and horizontal structure of the regional authority described in Section 3.2.1, it is possible to have regional integration on various planning levels. This would allow on a regional level evaluation of an industrial plan in terms of markets, variety and integration of products, labor and skill requirements, land tenure, local entrepreneurship possibilities, and availability and transport of raw materials and finished products.

4.3.1 Creation of internal markets and new industries: As manufacturing and rural towns grow, the internal market for agricultural products also grows. The internal market can then gradually provide more and more of the propulsive impulse that export markets currently provide in west Africa. As the quality of manufactured goods increases, the market in industrialized countries will grow, but development of the external market is not a main objective of this strategy.

New industries will be generated as the market grows supplying the rural areas with more consumer goods. Instead of just processing industries which transform the primary agricultural product into a finished product for consumption, coordinated and neutral industries can also be developed.

Coordinated industries are those that fit into the work schedule of the farm so that employment is provided in addition to the farm. This usually occurs in marginal areas where the farming population cannot achieve a standard of living from agriculture alone and need another source of income. Examples of such industries may be tobacco sorting and drying, cotton weaving, and assembly of electronic or optical

components. These village plants utilize part-time work, and despite the low wages they pay, they provide a productive outlet for the dormant labor in the agricultural sector.

Neutral industries are designed to assist development in rural areas although they have no direct connection with local agriculture. Their main purpose is to absorb surplus manpower. Examples of these industries are diamond polishing, jewelry manufacture, ceramics, and glassware. These are usually labor-intensive operations (Weitz 1971).

There are many ways to coordinate industrial and agricultural activities within the rural setting. Each region is unique and must be examined with all pertinent factors in mind. In all cases however, the concept of developing industry and agriculture in tandem should prevail.

5. A SCENARIO FOR RESOURCE DEVELOPMENT

In this report the term "industrialization" was used in its broader definition of development of resources of west Africa (Section 2.1). In this manner industrialization in west Africa is conceived of as part--no more than a part--of the much broader process of economic development which in the present context involves the raising of standards of living through a steady increase in the efficiency of factors of production. One method of achieving such an increase is by the continual transfer of resources (labor, capital, entrepreneurship, and natural resources) from less productive to more productive states. This transfer entails movement between agriculture and manufacturing.

The industrial strategy discussed in Section 3 is a strategy involving more than one sector of the economy. Over-rapid and unbalanced growth of the industrial sector, unless accompanied by complementary changes in the agricultural sector, might in the long-run retard economic development creating balance of payments difficulties, inflation, excessive urbanization, and the disruption of accepted social patterns. Although the industrial strategy is broadly defined and intricately woven to agricultural development, there are many steps which may be taken with each resource to encourage its development and aid in the raising of standards of living in west Africa.

5.1 Labor

The problem of labor migration, wages, and unemployment has been discussed in earlier sections. Most of these problems are tied to other sectors directly, but steps may be taken to help in the development of labor as a resource.

5.1.1 Labor force inventory: Although the number of people that are employed by industry is known, the size of the labor force, number and percent unemployed, seasonal variations in employment,

skills abundant in the area or in short supply, categories of employment, and management potential represent inventory information needed to fulfill the industrial strategy. The inventory is costly, both in manpower and time, but labor is perhaps the best potential resource French west Africa has to develop.

5.1.2 Wages and hours: Wage rates and average work weeks have been included for Mali in the case study and are available for each of the west African countries. The extent of domination of wage structure by a single company or industry, the cost of living index, overtime compensation and fringe benefits for industrial employees are information which are still needed but which could be acquired through site visitation. In order to aid in the rural town development, the wage levels and benefits must be brought into closer alignment with those in industries in the urban areas. A trade-off could be made if the rural worker were able to obtain goods and services in the rural town at lower cost than in the urban areas.

5.1.3 Productivity: Knowing the problems of productivity, labor turnover, accident rates and local practices on vacations, lunch periods, and breaks would help in designing specific methods of production using a technology to help mesh the traditional with the modern sector. The technology required would be broad-based in the rural town setting and narrow-based in the major urban areas (Soussou 1974). This would improve the quality of production and the skill of the worker which is desperately needed.

5.1.4 Vocational training: An inventory of existing vocational training facilities has been made (Appendix III). Although the inventory is not complete, there is an obvious shortage of vocational schools and especially schools for acquiring skills in agriculture. As new industries are developed in the rural towns, vocational schools with programs that correlate with needed industrial skills must become

part of the packaged planning for industry. This would help to increase the craftsmanship and maintain a uniform quality for labor-intensive production. This would also provide the vehicle by which localized traditional crafts could be passed to the next generation if the local market or an external market were available.

5.1.5 Labor legislation: In French west Africa there are some laws dealing with minimum wage, union activities, fair employment practices, collective bargaining, and safety and health laws. Additional legislation is needed (especially minimum wage, and safety and health standards). But in these areas the laws are often difficult to enforce and vary widely depending upon location and type of industry. However, enforcement of such laws will greatly affect the creation of rural type industries and their long-term contribution to rural town development

5.1.6 Rural town facilities: Perhaps less directly tied to industry, but necessarily important for rural town development will be consideration for housing, market places, medical facilities, and educational facilities for industrial workers and their families. Much of this can be achieved through a type of aided self-help project where the residents of a rural town work in cooperation with the agriculture-industry sectors and the government. The main objectives would be:

(1) to construct facilities at the lowest initial cost by omitting part of the cost of labor--the labor being provided by the cooperatives themselves;

(2) to train workers in saleable construction skills whereby the construction industry can be supplied with semi-skilled and skilled laborers as rural town development increases;

(3) to maintain community cooperation and responsibilities through cooperative group action; and

(4) to train rural town workers to assume responsibility for managing their own affairs through some form of land ownership.

5.2 Capital

Lack of financial institutions and provisions for capital or savings in west Africa has been an inhibiting factor in economic development. But the ability of any country to make use of savings depends on the complete social and economic environment which involves: (1) creating profitable options, and (2) formulating rational economic plans. Usually the demand for capital in a capitalist economy tends to create its own supply, for as profitable opportunities can be seen, people become capitalists rather than consumers. But this is somewhat dependent upon financial institutional factors such as the existence of a local capital market, which does not exist in most of west Africa. Credit policies are also a controlling factor for an already scarce resource.

5.2.1 Sources of industrial capital: Until the economic setting offers a better opportunity for capital to be created through saving, sources of capital for industrial development must come from elsewhere.

Perhaps the single best source is from foreign investors who see potential in west Africa. Much of the industrial development in existence has come about from foreign sources. Unfortunately, the type and structure of this development has not contributed to raising the general standard of living.

A second source that is open to west Africa is from the budgetary operations of the government. For publicly financed industrial development, the government must develop fiscal policy which will raise the finance needed. Even in west Africa some people have sufficient wealth and income that their taxation could significantly add to financial resources available for industrial development. Imple-

mentation of taxation, however, will depend upon the political power of the government and the degree to which conflict of interests situations exist within the government structure.

Ploughed-back industrial profit or savings from other sectors of the economy is a third source of capital for industrial development (Gerschenkron 1968). Industries such as tobacco, beverage, or textiles could currently aid in creating capital for other industries. As the agricultural sector grows and becomes more profitable, there will be a need to direct savings made here to industrial development.

A fourth and much needed method for developing capital will be through credit created by banks. Initially, state owned financial institutions make credit available to home construction and agricultural development. Perhaps ties between the agricultural and the industrial sectors could be closer and made earlier if industrial credit were available for agro-processing industries.

Each form of financing will require a specific institutional framework. The west African countries, individually and collectively, must develop specific policies which will create capital through one or all of the methods discussed, and in addition fit it to their existing socio-political situation.

5.3 Entrepreneurship

Entrepreneurs are often seen as being a particular psychological type representing a particular ethnic group. Although much of the entrepreneurship of French west Africa is made up of French, Syrians, Cypriots, and Lebanese, their success is determined more by the social and economic environment of west Africa than by their psychological type. The economic structure has tended to inhibit the growth of private entrepreneurial ability for several reasons:

- (1) Many existing industrial enterprises do not provide a relevant

and successful example to potential local entrepreneurs to stimulate their own independent activity.

(2) Because foreign investors have greater experience and easier access to ready and often cheaper sources of capital than local entrepreneurs, foreign investors have a competitive advantage.

(3) Local enterprises in west Africa face well-established non-African enterprises dominate the markets.

(4) Because of the low productivity of agriculture and the demand for luxury, high profit consumer goods, entrepreneurs are often forced into fields which contribute little towards industrialization, namely into service industries (Sutcliffe 1971).

The existing supply of African industrial entrepreneurs is limited, and there is no guarantee that if deficiencies in other factors could be remedied (capital, labor, and infrastructure), local entrepreneurs would emerge to develop industries.

5.3.1 Selection of entrepreneurs and enterprises: Since governments are often pressed to help as many people as possible, they tend to resist selective approaches even if these are based on objective criteria. Constraints are often ignored and quick, spectacular results are often demanded. Considering the actual managerial and technical limitations of African enterprise, organizations must be established to promote African enterprises and must be accorded a wide degree of autonomy and freedom in adopting a discriminating program. But often comprehensive information on the number, size, and distribution of African businesses is available only for establishments with more than ten employees resulting in little knowledge of the vast majority of small African businesses where perhaps the greatest potential lies for African entrepreneurship. Until such a survey is completed, the promotional organizations can improvise ad hoc methods for

selecting African business enterprises in which they can engage. Several interim selection methods that can be used are:

- (1) using referrals from banks or ministries of trade and industry;
- (2) exploiting existing data; and
- (3) participation in training courses and seminars to locate participants who are particularly keen and achievement-minded and therefore likely to respond positively to assistance that may be made available to them.

As important as the selection of entrepreneurs is the selection and promotion of enterprises, ranging from the upgrading and development of artisanal enterprises to the promotion of modern manufacturing. Until recently, there has been little attention paid to determination of industrial activities that African businesses are best qualified to develop.

-Processing of raw materials in the local areas should be encouraged. This would be particularly important if rural town development occurs in conjunction with large-scale agricultural production. Among these enterprises are: (1) quarrying and crushing of stone, gravel, and sand; (2) processing of agricultural products; (3) brick-making; (4) curing and tanning of hides and skins; (5) drying, smoking, and freezing of fish; (6) charcoal making; (7) methane production; and (8) sawmilling and timber processing.

-Production of goods for the local market will be also important as rural town development occurs and the local market for consumer goods increases. Lack of an adequate, low-cost national transport network and limited purchasing power in the rural areas would serve as an incentive for local, small-scale manufacturing industries. Even as the purchasing power rises and transport improves, opportunities for local production will still exist for goods that by virtue of their bulk, weight, or perishability cannot be transported over long distances.

Among such items are: (1) concrete blocks, tile, brick and pipe; (2) doors, windows and partitions; (3) furniture, wooden and cardboard containers; (4) boats, carts, and bicycles; (5) household items such as beds, bedsprings, and mattresses; (6) clothes, footwear, beverages and bakery goods.

-Modern manufacturing is perhaps the least likely to succeed under existing conditions, but as the agriculture sector increases in production, rural development will increase, creating an ever expanding domestic market for manufactured goods. As the domestic market grows, locating these industries in the major urban areas will promote better economy of scale conditions and lead to more successful competition with imported goods.

5.3.2 Management training: Management training has been provided in west Africa in the countries of Ivory Coast and Senegal. But in order for management training to occur under a rural town development plan, other methods for imparting relevant management techniques will have to be employed. Currently, only businessmen in urban centers benefit from management courses with smaller, rural communities lacking the number of businessmen necessary to maintain a management training center on a permanent basis. Various techniques could be used: (1) vocational instruction; (2) rural town representation; and (3) traveling team instruction.

Under the rural town development strategy, rural town elements would not necessarily physically evolve at the same time, but elements such as vocational training, formal education, management training, processing industries, medical and hospital services, housing, etc. would be designed to develop at various levels, i. e. village, regional, area centers, or rural towns.

Initially management training programs could be incorporated with formal institution or vocational training courses probably given on the

rural town level. This would allow special skills to surface and indicate a direction for entrepreneurial development in the particular area. Once an interest for entrepreneurship is expressed, the government may take more positive action for management training. As rural towns will develop at different rates, traveling teams of instructors based in the major urban centers would go from town to town in a predetermined pattern to offer instruction in management training and technical skills, and through competitive games, case studies, discussions, and questionnaires help the potential entrepreneur understand the factors of business. Hopefully at the rural town level, one or more businessmen could be found to serve as representatives to disperse technical information to the village and area centers and to offer feedback to the traveling team instructors. As the rural towns grow, the representatives may become instructors for formal management courses. Whatever technique is used, the importance of tying the rural sector to the modern sector through an instruction-feedback training method cannot be overemphasized. The gap between the two sectors cannot be reduced if there is a constant information-dispensing lag.

It is most important that information on management training or technical skills be adapted to the specific requirements of the businessman in a particular area. The teaching techniques must be simple, relevant, and practical with a minimum of record-keeping. It is more important for the businessman to understand his business and how to improve it than to maintain impressive balance sheets. Instruction should be so as to stimulate patterns characterizing entrepreneurs which include: (1) setting goals, (2) making specific plans, (3) taking risks, and (4) analyzing mistakes and successes to realign plans and goals.

5.4 Natural Resources

Generalizations about the availability and development of resources for industrialization are difficult since the supply is not a fixed, independent factor. Availability of capital and labor may fluctuate depending upon many factors. This is especially true of natural resources since supply of some natural resources is fixed while others fluctuate, with their development heavily dependent upon infrastructure and technology available.

5.4.1 Supply of natural resources: The supply of most natural resources in west Africa is somewhat fixed. In principle Mauritania has a specific amount of iron ore; Senegal, a specific amount of phosphate; Mali, a specific amount of cultivable land, etc. But in much of west Africa the existence of natural resources is unknown. Knowledge of the types, quantities, and qualities of the resources available can dramatically change perspectives about the role of natural resources in economic development. It is still possible that some areas of west Africa which now appear to be poorly endowed with natural resources may be in fact very wealthy. Surveys of the area are incomplete and need to be continued and completed.

Renewable resources, such as fishing and forest products, are not fixed. Through improvements in forest management, replacement of timber lost, and planting in new areas the supply of wood as a raw material could be increased. Restocking of lakes and rivers with fish, control of fish catches, and introduction of new species could assure a constant, renewable fishing resource. Research into what renewable resources are available which could be improved upon is needed throughout west Africa.

5.4.2 Infrastructure: Whatever natural resources exist, they can be developed only if the infrastructure is simultaneously developed. Transport, water control and supply, and community construction

must be present if natural resources are to contribute to the raising of standards of living in west Africa.

5.4.3 Choice of technology: Technology used in developing countries is often poorly suited to the objectives desired. The fact that technology must be appropriate to the relative cost of labor and capital, scale of production, and available managerial and labor skills is universally known and widely accepted but usually not observed in practice.

In west Africa increase in employment is obviously a matter of high priority. Indiscriminate substitution of capital for labor should be avoided. The appropriate combination of labor and capital cannot be determined outside the region under study. Rather than merely importing advanced technology, west Africa should expend substantial amounts of time and money on developing local and regional research institutes with the specific objective of generating technologies appropriate to west Africa. Arbitrary adoption of technologies from more advanced countries locks the developing country into an existing social, political, technical, and economic system, automatically limiting the options for development, and creating an inflexible system unable to adapt as the developing country's objectives change. Local development of appropriate technologies will be a time-consuming and costly process, but in the long run, might well provide west Africa with more choices and open a development path with fewer obstructions and more benefits than reliance on technologies imported from the industrialized countries.

CONCLUDING REMARKS

Industry in west Africa has catered to the foreign market. Raw materials are exported to Europe and the United States with little real value accruing to the Africans. Problems of the quality of goods manufactured locally, market conditions, labor and wages, land tenure, entrepreneurship, transportation and water and energy availability have limited the growth of industry in the Sahel-Sudan zones.

The industrial strategy we examined is tied to agricultural development. Other strategies which could have been proposed, i. e. exploitation of mineral resources, concentration on heavy industries, or on evolution of a large scale labor intensive scheme which is export oriented. Using simple decision making methodology and maintaining that a priori development of west African resources should be for west Africa, it was felt that industrial development should be based upon and interrelated to an agricultural strategy. Had more time been available, other strategies would also have been examined and listed herein. Industrialization is a key to economic development in west Africa. These countries should industrialize as rapidly as possible, but assigning the first priority to agriculture in their development plans will be the best way to reach this goal. Placing high initial emphasis on industry will not necessarily prove most efficient.

More intense agricultural production will require industries which are directly linked to agriculture, both in the processing chain and the physical location. Creation of such industrial enterprises in rural town settings and the training of a stable, skilled labor force for industry are tasks which play an important role in the development of west Africa. Location of industries in the rural setting will not only benefit agricultural production but will create a more balanced regional development and reduce the economic gap of the rural and urban sectors.

Producing adequate food for the agricultural labor force and for workers in closely related activities is the first requirement of agriculture. Once this is met, then resources may be redirected toward general, industrial developments that are not linked to agriculture. However, before this industrial strategy can begin, leaders of developing as well as donor countries must understand that assigning priority to agriculture does not denote narrow-minded, backward planning but rather, in the long run, will allow a country to exercise more planning choices and to develop at a pace that is suitable to its social, political, and economic environment.

REFERENCES

- Adelman, A., and Thorbecke, E. 1966. The theory and design of economic development. Baltimore: Johns Hopkins Press.
- Adler, J.H. 1949. The under-developed areas: their industrialization. New Haven.
- Ady, P. 1966. Uses of national accounts in Africa. In African studies in income and wealth, ed. L. H. Samuels, pp. 52-65. New York: Quadrangle Books.
- Allen, C. H. 1969. The political economy of African trade unions (Mimeo).
- Ames, E., and Rosenberg, N. March 1963. Changing technological leadership and industrial growth. Economic Journal.
- _____. July 1965. The progressive division and specialization of industries. Journal of Development Studies.
- Arrighi, G., and Saul, J. 1969. Nationalism and revolution in sub-Saharan Africa. In Socialist register 1969, eds. J. Milliband and J. Seville. London.
- Atkinson, A. B., and Stiglitz, J. G. September 1969. A new view of technological change. Economic Journal.
- Aubrey, H. G. June 1949. Deliberate industrialization. Social Research.
- _____. September 1951. Small industry in economic development. Social Research.
- Baer, W., and Herve, M.E.A. February 1966. Employment and industrialization in developing countries. Quarterly Journal of Economics.
- Baranson, J. 1969. Industrial technologies for developing economies. New York.
- Bascom, W. 1968. The urban African and his world. In Urbanism in world perspective: a reader, ed. Sylvia Fava. New York: Thomas Crowell Company.
- Becker, G. 1969. Investment in on-the-job training. In Economics of education, ed. M. Blaug. London.

- Berg, E.J. 1971. Structural transformation vs. gradualism: recent economic developments in Ghana and the Ivory Coast. In Ghana and the Ivory Coast: perspectives on modernization, eds. P. Foster and A. R. Zolberg, pp. 187-230. Chicago: University of Chicago Press.
- Bhagwati, J. and Desali, P. 1970. India: planning for industrialization. London.
- Bhalla, A. S. September 1964. Investment allocation and technological choice - a case of cotton spinning techniques. Economic Journal.
- Blair, J. M. May 1948. Technology and size. American Economic Review, Papers and Proceedings.
- Bose, M. October 1954 and January 1955. Economies of small scale and cottage industries in India. Indian Journal of Economics.
- Bottomley, A. June 1965. The fate of the artisan in developing economies. Social and Economic Studies.
- Chang, P. K. 1949. Agriculture and industrialization: the adjustments that take place as an agricultural country is industrialized. Cambridge (Massachusetts).
- Commission des Communautés Europeennes 1972. Les conditions d'installation d'entreprises industrielles.
For: Chad, Mali, Mauritania, Niger, Senegal, Upper Volta.
- Dalby, D., and R. J. Harrison, eds. 1973. Centre for African Studies School of Oriental and African Studies. Drought in Africa. London: Univ. of London.
- Davis, J. M. ed. 1967. Modern industry and the African. London.
- Deane, P. 1962. The industrial revolution in British Central Africa. Civilizations, No. 3.
- _____ 1965. The first industrial revolution. Cambridge.
- De Gregori, T. R. 1969. Technology and the economic development of the tropical African frontier. Cleveland: Case Western Reserve Univ.

- Dekker, G. 1965. Climate and water resources in Africa. In Man and Africa, eds. G. Wolstenholme and M. O'Connor. London.
- De Wilde, J. C. 1971. The development of African private enterprise. International Bank for Reconstruction and Development. December 10, 1971
- Diaz-Alejandro, C. F. May 1965. Industrialization and labour productivity differentials. Review of Economics and Statistics.
- _____ 1965. On the import intensity of import substitution. Kyklos.
- Doxiadis, C. 1963. Architecture in transition. New York: Oxford Press.
- Dumont, R. 1969. False start in Africa. New York: Praeger.
- Eckaus, R. S. 1962. Technological change in the less developed areas. In Development of the emerging countries, Brookings Institution. Washington.
- _____ 1969. Comment on Becker's Analysis of on-the-job training. In Economics of education, ed. M. Blaug. London
- Ediafric 1972a. Les plans de developpement des pays d'Afrique noire. Paris.
- _____ 1972b. L'usine Africaine. Paris.
- _____ 1973. Les projets industriels des pays d'Afrique noire. Paris.
- Elkan, W. January 1959. Criteria for industrial development in Uganda. East African Economic Review.
- Elliot, C. M. 1969. Agriculture and economic development in Africa: theory and experience 1880-1914. In Agrarian change and economic development, eds. E. L. Jones and S. J. Wolf. London.
- Enke, S. February 1962. Industrialization through greater productivity in agriculture. Review of Economics and Statistics.
- Ewing, A. F. November 1964. Industrialization and the UN Economic Commission for Africa. Journal of Modern African Studies.

- _____ 1968. Industry in Africa.
- _____, and Patel, S. J. 1965. Perspectives for industrialization in Africa. In Man and Africa, eds. G. Wolstenholme and M. O'Connor. London.
- Felix, D. October 1960. Agrarian reform and industrial growth. International Development Review.
- _____ 1964. Monetarists, structuralists and import-substituting industrialization: a critical appraisal. In Inflation and Growth in Latin America, eds. W. Baer and I. Kerstenetsky. Homewood (Illinois).
- Flanders, M. J. April 1969. Agriculture versus industry in development policy: the planners' dilemma re-examined. Journal of Development Studies.
- Frank, C. R. Jr. July 1968. Urban unemployment and economic growth in Africa. Oxford economic papers.
- _____ 1971. Public and private enterprise in Africa. In Government and economic development, ed. G. F. Ranis, pp. 88-123, New Haven: Yale Univ. Press.
- Galbraith, J. K. 1967. The new industrial state. London.
- Geiger, T. December 1962. Modernization in Africa: realities and misconceptions. International Development Review.
- _____, and Armstrong, W. 1964. The development of African private enterprise. Washington.
- Gerschenkron, A. 1968. The typology of industrial development as a tool of analysis. Continuity in history. Cambridge (Massachusetts).
- Grayson, L. E. April 1973. The role of suppliers' credits in the industrialization of Ghana. Economic Development and Cultural Change. 21:477-499.
- Green, R. H. August 1965. Four African development plans: Ghana, Kenya, Nigeria and Tanzania. Journal of Modern African Studies 3:249-280.

- _____. Reflections on economic strategy, structure, implementation and necessity: Ghana and the Ivory Coast, 1957-67. In Ghana and the Ivory Coast: perspectives on modernization, eds. P. Foster and A. Zolberg, op. cit., pp. 230-264.
- Grunwald, K., and Ronall, J. O. 1960. Industrialization in the Middle East. New York.
- Hammond, J. L., and Hammond, B. 1966. The rise of modern industry.
- Hazlewood, A. May 1966. The "Shiftability" of Industry and the Measurement of gains and losses in the East African common market. Bulletin of the Oxford University Institute of Economics and Statistics.
- _____ ed. 1967. African integration and disintegration. London.
- Hill, P. October 1966. A plea for indigenous economics. Economic Development and Cultural Change 15:1-20.
- Hirsch, S. 1967. Location of industry and international competitiveness. Oxford.
- Hopkins, T. On economic planning in tropical Africa. In Imperialism and underdevelopment, ed. R. I. Rhodes, op. cit., pp. 156-162.
- Hoselitz, B. F., and Moore, W. E. eds. 1963. Industrialization and society.
- International Bank for Reconstruction and Development International Development Associations
- 1967 Economic trends and prospects in the republic of Guinea. 2 vols.
- 1970 The current economic position and prospects of Sierra Leone.
- 1971a The current economic position and prospects of Liberia.
- 1971b The current economic position and prospects of Mauritania. 4 vols.
- 1972a The recent economic development of Cameroon. 2 vols.
- 1972b Current economic situation and prospects of Ghana. 2 vols.
- 1972c Current economic situation and prospects of Ivory Coast.
- 1972d Economic position and prospects of Niger.
- 1972e The current economic position and long term prospects of Nigeria. 4 vols.
- 1972f Current economic situation and prospects of Togo.
- 1972g Current economic position and prospects of Upper Volta.
- 1973a Chad's economic development: constraints and potential.
- 1973b Economic situation and prospects of Dahomey.
- 1973c Recent economic developments in Mali.
- 1973d The economy of Senegal. 5 vols.

- International Monetary Fund 1968. Surveys of African economies, vols. 1, 3. Washington D.C.
- Jakande, L. K. 1967. West Africa Annual. Lagos, John West Publications.
- Johnson, H. G. 1968. US economic policy toward the development countries. Economic Development and Cultural Change.
- Kamarck, A. M. 1971. The handbook of African development. Rev. ed. New York: Praeger.
- Kilby, P. June 1961. African labour productivity reconsidered. Economic Journal.
- _____ 1962. The development of small industry in eastern Nigeria. Lagos.
- _____ May 1964. Technical education in Nigeria. Bulletin of the Oxford University Institute of Economics and Statistics.
- _____ 1965. African enterprise: the Nigerian industry. Stanford.
- _____ 1969. Industrialization in an open economy: Nigeria 1945-66. Cambridge.
- Killick, A. 1966. Labour: industrial labour productivity in Ghana. In A study of contemporary Ghana, eds. W. Birmingham, I. Neustadt, and E. N. Omaboe, Chapter 7. London.
- Klaassen, L. H. 1967. Organization for Economic Cooperation and Development. Methods of selecting industries for depressed areas. Paris.
- Kulp, E. M. 1970. Rural development planning. New York: Praeger.
- Kuper, H. ed. 1965. Urbanization and migration in west Africa. Los Angeles: Univ. of Calif. Press.
- Lacroix, J. L. 1967. Industrialization au Congo. Paris.
- La Statistique Generale de la Comptabilite Nationale et de la Mecanographie 1973. Annuaire-statistique 1971 de la republique du Mali.

-
- July 1972. Comptes economiques du Mali.
- Lewis, W. A. 1953. Report on industrialization and the Gold Coast. Accra.
- _____ 1966. Development planning. New York: Harper & Row.
- Livingstone, I. 1968. Agriculture versus industry in economic development. Journal of Modern African Studies.
- Malezela, the Hon. J. S. January 1972. Some issues of development planning in east Africa. The African Review 1:1-7.
- Marris, P. October 1968. The social barriers to African entrepreneurship. Journal of Development Studies.
- Matlock et al., 1974. A Framework for Agricultural Development Planning in the Sahel-Sudan Region. Sahel-Sudan Project and Center for Policy Alternatives, M.I.T. Cambridge.
- Mercier, C. 1966. Petrochemical industry and the possibilities of its establishment in the developing countries. Paris.
- Ministere de l'Economie Rurale et de la Cooperation, 1964. Projet de programme de developpement accelere de la productivite d'arachide et de mil, dans les regions de Thies, de Kaolack, et de Diourbel.
- Ministere du Plan et de L'Industrie Republique du Senegal October 1969. Rapport annuel de la direction de l'industrie, 1968.
- Ministere de la Planification et du Developpement Industriel 1973. Developpement industriel. Republique Islamique de Mauritanie.
- Mosher, A. 1966. Getting agriculture moving. New York: Praeger.
- Murakami, A. September 1968. Two aspects of the exports of manufactured goods from developing countries. The developing economies.
- Myers, R. H. December 1965. Cotton textile handicraft and the development of the cotton textile industry in modern China. Economic History Review.
- Nafziger, E. W. October 1969. The effect of the Nigerian extended family on entrepreneurial activity. Economic Development and Cultural Change 18:25-33.

- Nelson, H. D. et al 1972. Area handbook for Chad. Washington, D. C.: Foreign Area Studies Government Printing Office.
- Neumark, S. D. 1964. Foreign trade and economic development in Africa: an historical perspective. Stanford (California).
- Organization for Economic Cooperation and Development.
- 1968a The financing of industrial development. Paris.
- 1968b Manual of industrial project analysis in developing countries, Methodology and case studies, Vol. 1. Development Centre. Paris.
- 1968c Manual of industrial project analysis in developing countries, Annex to Vol. 1, Industrial Profiles. Development Centre. Paris.
- Onyemulukwe, C. C. 1966. Problems of industrial planning and management in Nigeria. London.
- Pearson, D. 1969. Industrial development in east Africa. Nairobi.
- Pfeffermann, G. 1968. Industrial labour in Senegal. New York.
- Republique Francaise 1970. Secretariat d'Etat aux Affaires Etrangeres, Direction de l'Aide au Developpement. "Perspectixes d'Evolution 1970-1985 pour 14 etats africains et malgache." Vol. II Population urbaine et rurale.
- Roberts, T. D. et al. 1963. Area handbook for Senegal. Washington, D.C.: Foreign Area Studies Government Printing Office.
- Roemer, M. November 1972. The neo-classical employment model applied to Ghanaian manufacturing. Development Research Group, Center for International Affairs, Harvard University, Report #225.
- Rosenstein-Rodan, P. N. n.d. How to industrialize an under-developed area. (Mimeo). Centre for International Studies, M.I.T. Cambridge (Massachusetts).
- Rweyemamu, J. F. 1971-72. Planning, socialism and industrialization: the economic challenge. Development and Change. 3:26-42.
- Schatz, S. P. 1964. Development bank lending in Nigeria. Ibadan.
- _____ November 1968. The high cost of aiding business in developing economies: Nigeria's loan program. Oxford economic papers. 2:428-435.

- December 1969. Crude private neo-imperialism: a new pattern in Africa. The Journal of Modern African Studies. 7:677-688.
- Secretariat d'Etat aux Affaires Etrangeres Charge de la Cooperation Mars 1973. Dossier d'information Haute Volta 1971-1972. Paris.
- Seers, D. 1970. The stages of economic growth of a primary producer in the middle twentieth century. In Imperialism and underdevelopment, ed. R. I. Rhodes, pp. 163-180. New York: Monthly Review Press.
- Sen, A. K. 1967. Choice of technology: a critical survey of a class of debates. United Nations Industrial Development Organization. New York.
- Societe de l'Assistance Technique et de Cooperation (SATEC) 1967. Programme de developpement accelere de la productivite d'arachide et de mil, dans les regions de Thies, de Kaolack, et de Diourbel-- Rapport annuel.
- Societe d'Etudes pour le Developpement Economique et Sociale Novembre 1972. Industries d'exportation et transferts d'activites. Prepared for Comite d'Organisation des Recherches appliquees sur le Developpement Economique et Social (C.O.R.D.E.S.). Paris.
- Societe Nationale d'Etudes et de Promotion Industrielle 1973. 50 unites de documentation interessant le developpement industriel. Dakar.
- Sokolski, A. 1965. The establishment of manufacturing in Nigeria. New York.
- Soussou, J. et al., 1974. The Role of Technology in the Redevelopment of the Sahel-Sudan Region. Sahel-Sudan Project and Center for Policy Alternatives, M.I.T. Cambridge.
- Stepanek, J. E., and Prien, March 1950. The role of rural industries in underdeveloped areas. Pacific Affairs.
- Sutcliffe, R. B. 1971. Industry and underdevelopment. Reading (Massachusetts): Addison-Wesley Publishing Co.
- Thiel, H; Boot, J. C.; and Kloek, T. 1965. Operations research and quantitative economics. New York: Mcgraw-Hill.
- Turcan, P. et al 1974. The urban framework of the republic of Niger. Prepared for: Center for Policy Alternatives, Massachusetts Institute of Technology.

United Nations 1963. The role of small industry. Report of Conference on Science and Technology for Development, Vol. 4, Ch. 3. New York.

United Nations 1966. The promotion of industrial standardization in developing countries. Report of the United Nations Interregional Seminar. New York.

United Nations (1968-1973). U.N. Statistical Yearbook (1967-1972).

United Nations Department of Economic and Social Affairs 1955. Processes and problems of industrialization in under-developed countries. New York.

1965.

Industrial estates in Africa. New York.

United Nations Economic Commission for Africa

1963 Industrial growth in Africa. New York.

1964 Report of the west African industrial coordination mission (Mimeo). Addis Ababa.

1968 Survey of economic conditions in Africa 1960-64 (Mimeo). New York.

n.d. A note on the present stage of industrial development in Africa. Economic Bulletin for Africa. 1:1-9.

United Nations Educational, Scientific & Cultural Organization 1964. Agricultural planning and village community in Israel.

United Nations Industrial Development Organization 1969. Monographs on industrialization of developing countries: problems and prospects. New York.

- a. Non-ferrous metals industry
- b. Construction industry
- c. Building materials industry
- d. Engineering industry
- e. Iron and steel industry
- f. Fertilizer industry
- g. Textile industry
- h. Chemical industry
- i. Food-processing industry
- j. Industrial research
- k. Small-scale industry
- l. Standardization
- m. Industrial information

- n. Manpower for industry
- o. Administrative machinery
- p. Domestic and external financing
- q. Industrial planning
- r. Regional co-operation in industry
- s. Promotion of export-oriented industries
- t. General issues of industrial policy
- u. Technical co-operation in industry.

Uppal, J. S., and Salkever, L. R. eds. 1968. Africa, problems in economic development. New York: The Free Press.

Van Arkadie, B. 1964. Import substitution and export promotion as aids to industrialization in east Africa. East African Economic Review.

Waggaman, Wolcott, et al. June 1967. Manual on design for low-cost and aided self-help housing. Washington, D.C.: Department of Housing and Urban Development.

Weitz, R. 1971. From peasant to farmer. New York: Columbia Univ. Press.

Weitz, R. ed. 1971. Rural development in a changing world. Cambridge (Massachusetts): M.I.T. Press.

Wells, F.A., and Warmington, W.A. 1962. Studies in industrialization: Nigeria and the Cameroons. London.

Wood, R. N. November 1966. The east African common market: a reassessment. Bulletin of the Oxford University Institute of Economics and Statistics. 28:273-280.

World Bank 1972. Industry, sector working paper.

Yeates, M. H., and Gardner, B. J. 1971. The north American city. New York: Harper and Row.

APPENDIX I

**LOCATION AND PRODUCTION OF INDUSTRIAL
PRODUCTS IN WEST AFRICA**

**Source: EDIAFRIC 1972; International Bank for Reconstruction
and Development, various reports.**

Location and the production level of west African industries were examined on a product-by-product basis for industries employing ten or more people. This information was available for the first time in 1972, making trend analysis almost impossible. However, the importance of such information lies in how the west African countries relate to one another now and offers an overall industrial pattern which reveals areas of duplication or dearth.

The data were classified using the Standard Industrial Classification (SIC) system, but after further investigation of existing industries, the following classification headings were used:

- (1) Extraction
- (2) Food Manufacturing
- (3) Textile
- (4) Tobacco-Beverage
- (5) Leather-Leather Products
- (6) Furniture-Wood Products
- (7) Chemicals, Rubber, Paper, and Printing
- (8) Petroleum-Petroleum Products
- (9) Mechanics-Mechanical and Electrical Manufacture
- (10) Construction
- (11) Transport
- (12) Energy-Water

This information was aggregated within each heading and figures were generated to easily compare industries throughout west Africa. With the exception of the textile manufacturing, the distribution of industries is predominantly in the coastal countries. Some industries, such as extraction and tobacco processing do not exist in the Sahel-Sudan region, yet the raw material is available.

Abbreviations

hl--hectoliters

kg--kilograms

kWh--kilowatt hours

m--meters

m³--cubic meters

T--metric ton

EXTRACTION

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN	None	
RCA	482,357 carats	
CHAD	None	
DAHOMY	None	
GHANA		
Accra	611,000 T bauxite alumina 22,000 kg gold 2,600,000 carats	2,400,000 T
GUINEA		
Conakry	3,008,000 T iron, bauxite	
Boke	74,000 carats	
IVORY COAST		
Séguéla		
Bouaké		
<u>Total</u>	<u>326,000 carats</u>	--
LIBERIA		
Monrovia	25,000,000 T iron 35 kg gold 739,000 carats	1,100,000,000 T
MALI	None	
MAURITANIA		
F'derik	8,457,000 T iron	12,000,000 T
Akjoujt	7,650 T copper	25,000 T
<u>Total</u>	<u>8,464,650 T</u>	<u>12,025,000 T</u>
NIGER		
Arlit	625 T	750 T

EXTRACTION

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
NIGERIA		
Lagos	800,000 T	664,000,000 T
	70,570,000 T	1,000,000,000 T
	crude oil	
<u>Total</u>	<u>71,370,000 T</u>	<u>1,664,000,000 T</u>
SENEGAL		
Dakar	1,700,000 T phosphate,	1,900,000 T
	45,000 m ³ salt	110,000 m ³
SIERRA LEONE		
Freetown	3,640,000 T iron, bauxite	5,300,000 T
	2,000,000 carats	
TOGO		
Lomé	1,717,500 T	1,803,000 T
	16,000 m ³	20,000 m ³
UPPER VOLTA	None	

FOOD MANUFACTURING

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
N'Kongsamba	31,818 T	38,400 T
Douala	61,435 T	125,575 T
	1,500,000 packages biscuits	4,400,000 packages
Yaoundé	12,217 T	20,500 T
Kaélé	560 T	950 T
<u>Total</u>	<u>106,030 T</u>	<u>185,425 T</u>
	1,500,000 packages	4,400,000 packages
RCA		
Bangui	12,200 T	17,000 T
Bambari	8,124 T	12,500 T
<u>Total</u>	<u>20,324 T</u>	<u>29,500 T</u>
CHAD		
Ndjamena (Fort Lamy)	53,832 T	75,300 T
	9,200 hl	9,200 hl
Fort Archambault	1,794 T	3,600 T
Kélo	1,418 T	5,760 T
<u>Total</u>	<u>57,044 T</u>	<u>84,660 T</u>
	9,200 hl	9,200 hl
DAHOMÉY		
Cotonou	4,716 T	37,690 T
GHANA		
Accra	300,000 T	800,000 T
GUINEA		
Conakry		
Kankan		
Mamou		
Foulayah		
<u>Total</u>	<u>39,000 T</u>	<u>77,510 T</u>
IVORY COAST		
Abidjan	347,753 T	1,250,843 T
	121,000 hl	146,000 hl
Bouaké	5,900 T	16,758 T
Man	500 T	5,824 T
Gagnoa	1,900 T	11,648 T

FOOD MANUFACTURING

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
IVORY COAST (continued)		
Bongouanou	1,900 T	11,648 T
Séguéla	1,900 T	11,648 T
Yamoussokro	1,900 T	11,648 T
Daloa	1,900 T	11,648 T
Korhogo	1,900 T	11,648 T
Bouna	200 T	2,912 T
<u>Total</u>	<u>365,753 T</u>	<u>1,346,225 T</u>
	121,000 hl	146,000 hl
LIBERIA		
Monrovia	41,200 T	
MALI		
Bamako	20,659 T	27,500 T
	7,200 hl	22,000 hl
Ségou	45,500 T	110,000 T
	3,500 hl	5,000 hl
<u>Total</u>	<u>66,159 T</u>	<u>137,500 T</u>
	10,700 hl	27,000 hl
MAURITANIA		
Nouadhibou	34,847 T	328,900 T
Kaédi	120 T	3,000 T
<u>Total</u>	<u>35,967 T</u>	<u>331,900 T</u>
NIGER		
Niamey	13,437 T	37,500 T
	6,000 hl	18,000 hl
Maradi	57,529 T	105,000 T
Zinder	20,180 T	81,000 T
<u>Total</u>	<u>91,146 T</u>	<u>223,500 T</u>
	6,000 hl	18,000 hl
NIGERIA		
Lagos	1,230,000 T	
	23,400,000 biscuits	
	28,200,000 pieces	
	confection	

FOOD MANUFACTURING

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
SENEGAL		
Dakar	605,129 T	1,568,985 T
	9,000 hl	219,000 hl
St. Louis	20,668 T	144,720 T
	36,000 hl	36,000 hl
Ziguinchor	93,393 T	152,129 T
Diourbel	17,350 T	32,500 T
	21,000 hl	36,000 hl
Kaolack	152,000 T	235,000 T
<u>Total</u>	<u>888,540 T</u>	<u>2,133,334 T</u>
	66,000 hl	291,000 hl
SIERRA LEONE		
Freetown	60,000 T	120,000 T
TOGO		
Lomé	40,307 T	54,520 T
UPPER VOLTA		
Ouagadougou	5,614 T	9,000 T
Bobo-Dioulasso	7,970 T	17,800 T
Banfora	33,730 T	39,000 T
<u>Total</u>	<u>47,314 T</u>	<u>65,800 T</u>

TEXTILE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Kaélé	22,500,000 m	31,000,000 m
	52,340 T	87,500 T
	1,668 hl	5,000 hl
Douala	400,000 m	800,000 m
	10,800,000 pieces	15,000,000 pieces
	470 T	1,120 T
Yaoundé	299,000 pieces	470,000 pieces
	100,000 m ²	200,000 m ²
	<u>Total</u>	<u>22,900,000 m</u>
	11,100,000 pieces	15,500,000 pieces
	52,810 T	88,620 T
	1,668 hl	5,000 hl
RCA		
Bangui	17,000,000 m	19,300,000 m
	74,903 T	129,720 T
	2,700,000 pieces	3,600,000 pieces
CHAD		
Fort Archambault		
Moundou		
Beinamar		
Daher		
Doba		
Gore		
Guidari		
Kélo		
Pandzanque		
Bongor		
Fianga		
Gounou-Gaya		
Léré		
Pala		
Onoko		
Koumra		
Kyabe		
Moissala		
Bouso		
Kokabri		
Am-Timan		
Melfi		
Ndjamena (Fort Lamy)		

TEXTILE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CHAD (continued)		
<u>Total</u>	130,371 T 13,500,000 m	220,000 T 14,000,000 m 800,000 pieces
DAHOMY		
Cotonou	8,900,000 m 11,012 T 4,200,000 sacks 450,000 pieces	10,000,000 m 31,859 T 5,200,000 sacks 800,000 pieces
<u>Subtotal</u> Parakou		8,500,000 m 21,000 T
Kandi		14,000 T
Savalou		7,500 T
Bohicon		10,000 T
<u>Subtotal</u>	<u>36,055 T</u>	
<u>Total</u>	<u>47,067 T</u>	<u>84,359 T</u>
	8,900,000 m 4,200,000 sacks 450,000 pieces	18,500,000 m 5,200,000 sacks 800,000 pieces
GHANA		
Accra	36,000,000 m	
GUINEA		
Conakry	3,300,000 m ² 507,000 pieces	22,000,000 m ² 1,013,000 pieces
IVORY COAST		
Abidjan	3,800,000 sacks 30,500,000 m 10,010,000 pieces 1,270 T	5,200,000 sacks 40,300,000 m 15,630,000 pieces 2,820 T
Bouaké	1,800,000 sacks 900,000 m 53,159 T	20,000,000 sacks 900,000 m 86,475 T
Korhogo	3,728 T	28,000 T
<u>Total</u>	<u>5,600,000 sacks</u> 31,400,000 m 10,010,000 pieces 58,157 T	<u>7,200,000 sacks</u> 41,200,000 m 15,630,000 pieces 117,295 T

TEXTILE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
LIBERIA	None	
MALI		
Bamako		34,000 T
		8,000,000 m
Ségou	53,540 T	5,800 T
		9,000,000 m
Koutiala		47,000 T
Sikasso		10,000 T
<u>Total</u>	<u>53,540 T</u>	<u>86,800 T</u>
		17,000,000 m
MAURITANIA	None	
NIGER		
Niamey		7,500,000 m
<u>Subtotal</u>		<u>120 T</u>
Maradi		
Madaoua		
<u>Subtotal</u>	<u>13,050 T</u>	<u>14,900 T</u>
<u>Total</u>	<u>13,050 T</u>	<u>15,020 T</u>
		7,500,000 m
NIGERIA		
Lagos		
Kaduna (95%)		
Onitsha		
Aba		
<u>Total</u>	<u>270,000,000 m</u>	
	21,200,000 pieces	
SENEGAL		
Dakar	15,260 T	34,930 T
	29,800,000 m	55,000,000 m
	10,100,000 pieces	12,900,000 pieces
Thiès	6,800,000 m	10,000,000 m
	1,200,000 pieces	1,800,000 pieces
Tambacounda	16,013 T	32,000 T
<u>Total</u>	<u>31,273 T</u>	<u>66,930 T</u>
	36,600,000 m	65,000,000 m
	11,000,000 pieces	14,700,000 pieces

TEXTILE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
SIERRA LEONE		
Freetown	349,000 pieces	
TOGO		
Lomé	12,100,000 m	21,500,000 m
	425 T	600 T
Atakpamé	681 T	200 T
Sokode	162 T	600 T
<u>Total</u>	<u>12,100,000 m</u>	<u>21,500,000 m</u>
	1,268 T	1,400 T
UPPER VOLTA		
Koudougou	7,882 T	12,300 T
	4,800,000 m	6,000,000 m
Bobo-Dioulasso	21,784 T	30,000 T
Ouagadougou	3,774 T	25,000
	<u>900,000 pieces</u>	<u>1,200,000 pieces</u>
<u>Total</u>	<u>33,440 T</u>	<u>67,300 T</u>
	4,800,000 m	6,000,000 m
	900,000 pieces	1,200,000 pieces

TOBACCO--BEVERAGE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Douala	1,330,000 hl 32,300 T	2,560,000 hl 56,800 T
Yaoundé	6,650 hl 1,074 T	23,000 hl 1,500 T
<u>Total</u>	<u>1,336,650 hl</u> 33,374 T	<u>2,583,000 hl</u> 58,000 T
RCA		
Bangui	140,450 hl 666 T	200,000 hl 810 T
CHAD		
Moundou	85,000 hl 12,000,000 packages	95,000 hl 20,000,000 packages
DAHOMY		
Cotonou	147,000 hl 11,400 T	175,000 hl 14,000 T
GHANA		
Accra	425,000 hl 81,500,000 packages 388 T	
GUINEA		
Conakry	19,000,000 packages 24,000 hl 35,000,000 boxes matches	24,000,000 packages 120,000 hl 45,000,000 boxes
IVORY COAST		
Abidjan	400,000 hl 60,000 T	730,000 hl 90,075 T
Bouaké	45,000 hl 2,000 T	400,000 hl 8,000 T
<u>Total</u>	<u>445,000 hl</u> 62,000 T	<u>1,130,000 hl</u> 98,075 T
LIBERIA		
Monrovia	200 T 3,000 hl	

TOBACCO--BEVERAGE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
MALI		
Bamako	6,000 hl 2,700 T 360,000 packages	20,000 hl 5,475 T 480,000 packages
MAURITANIA	None	
NIGER		
Niamey	44,000 hl 160 T	65,000 hl 800 T
NIGERIA		
Lagos	1,400,000 hl	
Kaduna	425,000 packages	
SENEGAL		
Dakar	257,200 hl 30,000 T 88,000,000 packages	345,000 hl 36,500 T 95,000,000 packages
SIERRA LEONE		
Freetown	38,000 hl 11,000,000 packages	
TOGO		
Lomé	175,000 hl	305,000 hl
UPPER VOLTA		
Ouagadougou	93,000 hl	140,000 hl
Bobo-Dioulasso	6,000 T 15,000,000 packages	7,000 T 15,000,000 packages

LEATHER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN Douala	425,000 pieces	1,000,000 pieces
RCA	None	
CHAD	None	
DAHOMY	None	
GHANA	--	--
GUINEA Conakry	200 T	1,000 T
IVORY COAST	None	
LIBERIA	None	
MALI	--	2,000 T 35,000 pieces
MAURITANIA Kaédi		1,440 T
NIGER Maradi	200,000 pieces	500,000 pieces
Zinder	180,000 pieces	300,000 pieces
NIGERIA Kano Sokoto Maiduguri Katsina Nguru Zuru		
<u>Total</u>	<u>21,000,000 pieces</u>	
SENEGAL	None	
SIERRA LEONE	None	
TOGO	None	

LEATHER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
UPPER VOLTA Ouagadougou	150,000 pieces	210,000 pieces

FURNITURE - WOOD PRODUCTS

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Douala	427,676 m ³ raw lumber	533,000 m ³
	200,895 m ³ rough sawn and finished	231,500 m ³
	200 T	300 T
Yaoundé	25,000 pieces	25,000 pieces
	209,970 m ³ raw lumber	253,400 m ³
	58,229 m ³ rough sawn and finished	76,600 m ³
N'Kongsamba	405,000 pieces	450,000 pieces
	9,800 m ³ raw lumber	10,000 m ³
	3,500 m ³ rough sawn and finished	4,200 m ³
<u>Total</u>	<u>647,446 m³</u> raw lumber	<u>796,400 m³</u>
	262,624 m ³ rough sawn and finished	312,300 m ³
	430,000 pieces 200 T	475,000 pieces 300 T
RCA		
Bangui	125,425 m ³ raw lumber	138,000 m ³
	58,586 m ³ rough sawn and finished	77,000 m ³
	1,224 T	1,700 T
Nola	75,000 m ³ raw lumber	95,000 m ³
	15,000 m ³ rough sawn and finished	55,000 m ³
Bozoum	21,000 m ³ raw lumber	16,000 m ³

FURNITURE - WOOD PRODUCTS

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
RCA (continued)	3,409 m ³ rough sawn and finished	5,000 m ³
Carnot	5,400 m ³ raw lumber	15,000 m ³
	6,500 m ³ rough sawn and finished	15,000 m ³
<u>Total</u>	<u>226,825 m³</u> raw lumber	<u>264,000 m³</u>
	83,495 m ³ rough sawn and finished	152,000 m ³
	1,224 T	1,700 T
CHAD	None	
DAHOMEY		
Cotonou	--- sawn and finished	5,000 m ³
GHANA		
Accra	10,200,000 m ³ raw lumber	
	421,000 m ³ rough sawn	
GUINEA		
Conakry	33,000 pieces 67,000 m ³ raw lumber	66,500 pieces 117,000 m ³
IVORY COAST		
Abidjan	1,060,668 m ³ raw lumber	1,370,000 m ³
	1,102,970 m ³ finished	1,459,500 m ³
	250,000 pieces	350,000 pieces
LIBERIA		
Monrovia	1,600,000 m ³ raw lumber	

FURNITURE - WOOD PRODUCTS

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
MALI	None	
MAURITANIA	None	
NIGER		
Niamey	--- fence-making --- barbed wire	11,450 pieces 150,000 m ² 120 T 1,000 km
NIGERIA		
Lagos		
Kaduna		
Kano		
Port Harcourt		
Lokoja		
<u>Total</u>	<u>566,000 m³</u> rough sawn	
SENEGAL		
Dakar	11,000 m ³ rough sawn and finished	23,000 m ³
SIERRA LEONE		
Freetown	2,700,000 m ³ raw lumber	
TOGO	None	
UPPER VOLTA		
Bobo-Dioulasso	74,000 pieces 2,500 T	30,000 pieces 3,000 T

CHEMICALS, RUBBER, PAPER, PRINTING

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Yaoundé	3,300 T rubber	4,000 T
Douala	64,120 T rubber	103,135 T
N'Kongsamba	20 T	50 T
<u>Total</u>	<u>67,440 T</u>	<u>103,185 T</u>
RCA		
Bangui	3,400 T	5,000 T
Bangassou	50 T	100 T
<u>Total</u>	<u>3,450 T</u>	<u>5,100 T</u>
CHAD		
Njdamera (Fort Lamy)	1,225 T	1,400 T
DAHOMY		
Cotonou	3,000,000 copybooks	8,000,000
	86,176 T	92,600 T
GHANA		
	None	
GUINEA		
Conakry	---	---
IVORY COAST		
Abidjan	198,108 T	334,220 T
	11,800,000 cartons	14,000,000
	10,000,000 books	20,000,000

	printing	
Sassandra	16,568 T	17,300 T
<u>Total</u>	<u>214,676 T</u>	<u>351,520 T</u>
	11,800,000 cartons	14,000,000 cartons
	10,000,000 books	20,000,000 books
LIBERIA		
Monrovia	70,000 T	

CHEMICALS, RUBBER, PAPER, PRINTING

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
MALI		
Bamako	100,000 m ³	360,000 m ³
MAURITANIA		
Nouadhibou	150,000 m ³	460,000 m ³
NIGER		
Niamey	3,000 T 100,000 m ³	4,900 T ³ 350,000 m ³
NIGERIA		
Lagos		
Port Harcourt		
Jebba		
Kaduna		
Kano		
Sokoto		
<u>Total</u>	<hr/> 108,200 hl 176,718 T 188,000,000 cartons	
SENEGAL		
Dakar	104,518 T	184,960 T ³ 950,000 m ³
SIERRA LEONE		
Freetown	1,730 hl	
TOGO		
Lomé	13,050 T	20,450 T
UPPER VOLTA		
Ouagadougou	463 T 17,600 cartons	940 T 22,000 cartons

PETROLEUM AND PETROLEUM PRODUCTS

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROON Douala	4,600 T	10,000 T
RCA	None	
CHAD	None	
DAHOMEY	None	
GHANA Accra	816,000 T	1,450,000 T
GUINEA	None	
IVORY COAST Abidjan	787,000 T	971,000 T
LIBERIA Monrovia	510,000 T	600,000 T
MALI	None	
MAURITANIA	None	
NIGER	None	
NIGERIA Lagos	1,917,000 T 70,570,000 T crude oil	2,750,000 T
SENEGAL Dakar	568,000 T	809,000 T
SIERRA LEONE Freetown	308,000 T	500,000 T
TOGO	None	
UPPER VOLTA	None	

MECHANICS, MECHANICAL AND ELECTRICAL MANUFACTURE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Douala	83,936 T	122,020 T
	151,000,000 pieces	301,000,000 pieces
Yaoundé	1,115 T	1,360 T
<u>Total</u>	<u>85,051 T</u>	<u>123,380 T</u>
	151,000,000 pieces	301,000,000 pieces
RCA		
Bangui	20,058 pieces	107,650 pieces
	158.5 T	210 T
	6,316 carats	12,000 carats
CHAD		
Ndjamena (Fort Lamy)	3,000 T	4,000 T
	35,000 pieces	50,000 pieces
DAHOMY		
	None	
GHANA		
Accra	100,000 pieces	
GUINEA		
	40,000 pieces	
IVORY COAST		
Abidjan	42,007 T	71,150 T
	70,000 m	98,000 m
	151,650,000 pieces	539,450,000 pieces
LIBERIA		
	None	
MALI		
Bamako	240 T	360 T ²
	9,600 m ²	14,400 m ²
	8,000 pieces	43,500 pieces
MAURITANIA		
	None	
NIGER		
Niamey	---	4,500,000 pieces
	---	90 T

MECHANICS, MECHANICAL AND ELECTRICAL MANUFACTURE

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
NIGERIA		
Lagos		
Port Harcourt		
Kano		
<u>Total</u>	<u>1,220,000 pieces</u>	
SENEGAL		
Dakar	4,411 T ² 76,000 m ² 26,500,000 pieces	5,390 T ² 89,800 m ² 276,000,000 pieces
SIERRA LEONE		
Freetown	73,000 pieces 410 T	
TOGO		
Lomé	310 T 192,400 pieces	1,600 T 250,000 pieces
UPPER VOLTA		
Ouagadougou	---	---

CONSTRUCTION

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Douala	1,000,000 bricks 189,500 T ₂ 45,000 m ²	5,000,000 bricks 215,500 T ₂ 45,000 m ²
Yaoundé	30,000 m ²	40,000 m ²
<u>Total</u>	<u>1,000,000 bricks</u> 189,500 T ₂ 75,000 m ²	<u>5,000,000 bricks</u> 215,500 T ₂ 85,000 m ²
RCA		
Bimbo	6,900 T	8,000 T
CIVAD		
	None	
DAHOMY		
Cotonou	87,188 T	200,900 T
GHANA		
Accra	531,000 T	
GUINEA		
Conakry	32,000,000 T granite	640,000,000 T
Seredou N'Zerekore	2,340,000 bricks 220,000 m ²	15,600,000 bricks 552,000 m ²
IVORY COAST		
Abidjan	568,000 T ₂ 115,000 m ²	1,000,000 T ₂ 250,000 m ²
Bouaké	10,000 T	10,000 T
<u>Total</u>	<u>578,000 T₂</u> 115,000 m ²	<u>1,010,000 T₂</u> 250,000 m ²
LIBERIA		
Monrovia	91,000 T	
MALI		
Bamako	43,300 T	61,550 T
MAURITANIA		
	None	

CONSTRUCTION

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
NIGER		
Niamey	9,700 T	12,000 T
	50,000,000 tile	200,000,000 tile
Malbaza	33,275 T	35,000 T
<u>Total</u>	<u>42,975 T</u>	<u>47,000 T</u>
	50,000,000 tile	200,000,000 tile
NIGERIA		
Lagos		
Sokoto		
Ashaka		
Kano		
Kaduna		
<u>Total</u>	<u>710,000 T</u>	
SENEGAL		
Dakar	262,857 T ²	338,500 T ²
	27,500 m ²	30,000 m ²
SIERRA LEONE		
Freetown	---	---
TOGO		
Lomé	50,000 T	100,000 T
UPPER VOLTA		
Ouagadougou	4,984 T	12,000 T

TRANSPORT

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Douala	444 vehicles	650 vehicles
	17,848 bicycles	20,000 bicycles
	41,029 misc.	50,370 misc.
<u>Total</u>	<u>59,321</u>	<u>77,020</u>
RCA		
Bangui	7,779 bicycles	12,000 bicycles
	6,149 misc.	7,450 misc.
<u>Total</u>	<u>13,928</u>	<u>19,450</u>
CHAD		
	5,400 bicycles	12,000 bicycles
	7,950 misc.	15,000 misc.
<u>Total</u>	<u>13,350</u>	<u>27,000</u>
DAHOMY		
Cotonou	666 vehicles	800 vehicles
	9,972 misc.	10,500 misc.
<u>Total</u>	<u>10,638</u>	<u>11,300</u>
	95,278	100,000
	inner tubes	
GHANA		
Accra	2,500 vehicles	
GUINEA		
Conakry	330 vehicles	1,000 vehicles
IVORY COAST		
Abidjan	5,206 vehicles	6,300 vehicles
	33,000 bicycles	66,000 bicycles
	5,000 misc.	20,000 misc.
<u>Total</u>	<u>43,206</u>	<u>92,300</u>
	462,000	1,000,000
	inner tubes	
LIBERIA		
	None	
MALI		
Bamako	5,600 bicycles	60,000 bicycles
	4,110 misc.	20,000 misc.
<u>Total</u>	<u>9,710</u>	<u>80,000</u>

TRANSPORT

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
MAURITANIA	None	
NIGER	None	
NIGERIA		
Lagos		
Port Harcourt		
Zaria		
<u>Total</u>	<u>7,500 vehicles</u> 268,000 tires	
SENEGAL		
Dakar	232 vehicles	1,460 vehicles
SIERRA LEONE	None	
TOGO	None	
UPPER VOLTA		
Bobo-Dioulasso	24,300 bicycles <u>10,700 misc.</u>	35,000 bicycles <u>11,000 misc.</u>
<u>Total</u>	<u>35,000</u> 930,000 inner tubes	<u>46,000</u> 1,000,000

ENERGY AND WATER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
CAMEROUN		
Douala		
Yaounde		
Garoua		
Bafang		
Dschang		
Ebolowe		
Edea		
Foumban		
Kribi		
Maroua		
M'Bakao		
M'Balmayo		
N'Gaoundere		
N'Kongsamba		
Sangmelina		
Bafoussam		
<u>Total</u>	<u>1,320.7 million kWh</u> 14.0 million m ³	<u>233,000 kW</u> ³ 33.58 million m ³
RCA		
Boali		8,750 kW
Bangui		3,300 kW
Bouar		750 kW
M'Baiki		240 kW
Bossangoa		220 kW
Bambari		240 kW
N'Dele		70 kW
<u>Total</u>	<u>46 million kWh</u>	<u>13,570 kW</u>
CHAD		
Ndjamena (Fort Lamy)	35.5 million kWh 4.2 million m ³	20,500 kW ³ 6.3 million m ³
Fort Archambault	8.9 million kWh 0.3 million m ³	5,500 kW ³ 1.9 million m ³
Moundou	3.0 million kWh 0.4 million m ³	2,500 kW ³ 1.0 million m ³
Abeche	0.7 million kWh 0.2 million m ³	1,000 kW ³ 0.9 million m ³
<u>Total</u>	<u>48.1 million kWh</u> 5.1 million m ³	<u>29,500 kW</u> ³ 10.1 million m ³

ENERGY AND WATER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
DAHOMEY		
Cotonou		10,970 kW
Porto-Novo		1,200 kW
<u>Subtotal</u>	<u>35.0 million kWh</u>	
Bohicon	1.8 million kWh	490 kW
Parakou	3.5 million kWh	450 kW
<u>Total</u>	<u>40.3 million kWh</u>	<u>13,110 kW</u>
GHANA		
Akosombo		768,000 kW
Accra		13,040 kW
Tema		30,000 kW
Sekondi		7,000 kW
Kumasi		6,900 kW
<u>Total</u>	<u>2,944 million kWh</u>	<u>825,000 kW</u>
GUINEA		
Conakry		12,800 kW
Fria		41,000 kW
Mamou		850 kW
Kinkon		3,200 kW
Labe		3,200 kW
Dabola		1,000 kW
Siguiri		2,030 kW
Kankan		2,030 kW
Seredou		500 kW
Nzerekore		1,050 kW
Kindia		20,000 kW
Telimele		1,000 kW
Boke		2,030 kW
Gaoual		2,030 kW
<u>Total</u>	<u>450 million kWh</u>	<u>92,720 kW</u>
IVORY COAST		
Abidjan		
Bouaké		
Bingerville		
Brand-Bassam		
Bonoua		
Adiake		
San Pedro		
<u>Subtotal</u>	<u>31.6 million m³</u>	<u>42.8 million m³</u>

ENERGY AND WATER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
IVORY COAST (continued)		
Aboisso		
Ayame		
Daloa		
Divo		
Gagnoa		
Issia		
Abidjan		
Bouaké		
Grand-Bassam		
Korhogo		
Lakota		
Man		
Sikensi		
Tiebissou		
Toumodi		
<u>Subtotal</u>	<u>588.0 million kWh</u>	<u>178,900 kW</u>
LIBERIA		
Monrovia		17,000 kW
Mount Coffee		102,000 kW
Saniquellie		1,000 kW
Gbarnga		1,000 kW
Harper		1,000 kW
Greenville		1,000 kW
Buchanan		1,000 kW
Robertsport		1,000 kW
<u>Total</u>	<u>650 million kWh</u>	<u>125,000 kW</u>
MALI		
Felou		625 kW
Sotuba		6,800 kW
Dar-Salam		15,000 kW
Bougouni		110 kW
Gao		650 kW
Kayes-Paparrah		700 kW
Mopti		670 kW
Ségou-Markala		2,125 kW
Sikasso		670 kW

ENERGY AND WATER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
MALI (continued)		
Tombouctou		250 kW
Fana		750 kW
Koutiala		820 kW
<u>Subtotal</u>	<u>44.2 million kWh</u>	<u>29,170 kW</u>
Bamako		
Kayes		
Bougouni		
Gao		
Sikasso		
<u>Subtotal</u>	<u>6.4 million m³</u>	<u>10.9 million m³</u>
MAURITANIA		
Nouakchott	7.9 million kWh	2,720 kW
Nouadhibou	8.5 million kWh	11,000 kW
Kaédi	0.7 million kWh	500 kW
Rosso	0.5 million kWh	310 kW
Akjoujt	---	11,000 kW
Atar	---	500 kW
Zouerat	---	11,000 kW
<u>Total</u>	<u>78 million kWh₃</u> <u>1.2 million m³</u>	<u>37,030 kW</u> <u>2.2 million m³</u>
NIGER		
Niamey	36.2 million kWh	12,400 kW
Zinder	2.2 million kWh	970 kW
Maradi	2.5 million kWh	1,100 kW
Agadez	0.6 million kWh	260 kW
Tahoua	0.4 million kWh	270 kW
<u>Total</u>	<u>41.9 million kWh</u>	<u>15,000 kW</u>
NIGERIA		
Lagos		148,000 kW
Kainji		320,000 kW
Ughelli		72,000 kW
Afam		72,000 kW
Onitsha		15,500 kW
Kaduna		31,000 kW
Sokoto		450 kW
Katsina		450 kW
Maiduguri		450 kW

ENERGY AND WATER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
NIGERIA (continued)		
Kano		23,000 kW
Zaria		450 kW
Jos		28,000 kW
Ibadan		19,000 kW
Yola		450 kW
<u>Total</u>	<u>1,550 million kWh</u>	<u>730,750 kW</u>
SENEGAL		
Dakar		118,000 kW
Saint-Louis		1,200 kW
Kaolack		1,500 kW
Tambacounda		450 kW
Dara		450 kW
Linguere		450 kW
Diourbel		1,500 kW
Goudiri		450 kW
Matam		450 kW
Kedougou		450 kW
Niokolo Koba		450 kW
Velingara		450 kW
Kolda		450 kW
Sedhiou		450 kW
Ziguinchor		4,850 kW
Bignona		450 kW
Guinguineo		300 kW
Thiès		450 kW
Mbour		300 kW
Mboro		300 kW
Bambey		300 kW
Ndangane		300 kW
<u>Total</u>	<u>350 million kWh₃</u> <u>25.7 million m³</u>	<u>133,950 kW</u> <u>23.7 million m³</u>
SIERRA LEONE		
Freetown		23,000 kW
Guma		2,400 kW
Kenema		3,000 kW
<u>Total</u>	<u>207.9 million kWh</u>	<u>28,400 kW</u>

ENERGY AND WATER

<u>Location</u>	<u>Production</u>	<u>Capacity</u>
TOGO		
Lomé		9,750 kW
Kpime		2,000 kW
Atakpamé		200 kW
Sokode		200 kW
Lama-Kara		400 kW
Dapango		400 kW
Bassari		400 kW
Mongo		400 kW
<u>Subtotal</u>	<u>74.4 million kWh</u>	<u>13,750 kW</u>
Lomé		
Anecho		
Tsevie		
Palime		
Atakpamé		
Dapango		
<u>Subtotal</u>	<u>3.076 million m³</u>	<u> </u>
UPPER VOLTA		
Ouagadougou	19.8 million kWh	7,500 kW
Bobo-Dioulasso	8.9 million kWh	3,440 kW
Ouahigouya	0.3 million kWh	500 kW
Koudougou	5.5 million kWh	2,250 kW
<u>Subtotal</u>	<u>34.5 million kWh</u>	<u>13,690 kW</u>
Ouagadougou		
Bobo-Dioulasso		
Ouahigouya		
Koudougou		
Banfora		
Kaya		
Fada-N'Gourma		
<u>Subtotal</u>	<u>3.5 million m³</u>	<u>80 million m³</u>

APPENDIX II

SURVEY OF REPUBLIC OF MALI

Source: Commission des Communautés Europeennes 1972

Since data were readily available and most of the climatic zones of west Africa are represented in Mali, it was used to model the agricultural strategy proposed in Volume 2 of this study. In order to better represent the industrial and urban development strategy, the same country was used as an example and was tied directly to one agricultural scheme (ISYALAPS). Herein is information used to develop the Mali Case Study (Section 2.2) and is representative of data available for the remaining countries of Chad, Mauritania, Niger, Senegal, and Upper Volta.

II.1 Geographic Situation

The Mali Republic lies between 10° and 25° north latitude, between 4° east longitude and 12° west longitude. It covers an area of 1,240,000 km², having a maximum distance from north to south of 1,600 km and from east to west of 1,800 km. The republic is completely landlocked and is bounded on the north-west by Mauritania, north-east by Algeria and the Sahara Desert, east by Niger, south-east by Upper Volta, south by Guinea and Ivory Coast, and west by Senegal. Its largest river is the Niger. Access to the sea is by road and railroad (see Figure II.1-1).

- 1) Railroad. Bamako-Kayes-Dakar: 1,290 km.
- 2) Road and Railroad. Mopti-Bobo-Dioulasso (485 km of road) and Bobo-Dioulasso-Abidjan (950 km of rail) = 1,435 km.
- 3) Road and Railroad. Bamako-Ouangolodougou (Ivory Coast) (570 km of road) and Ouangolodougou-Abidjan (610 km of rail) = 1,180 km.

The republic is divided into 6 regions, each region being subdivided into smaller areas (42 in total) and each area having districts within its boundaries (see Table II.1-1).

II.1.1 Population: The total population was 5,022,000 in 1970 and is estimated to be 5,430,000 in 1974. Accepted growth rate is 2% per year. Nearly 10% of the total population or 543,000 people live in urban communities of greater than 5,000 persons. The active

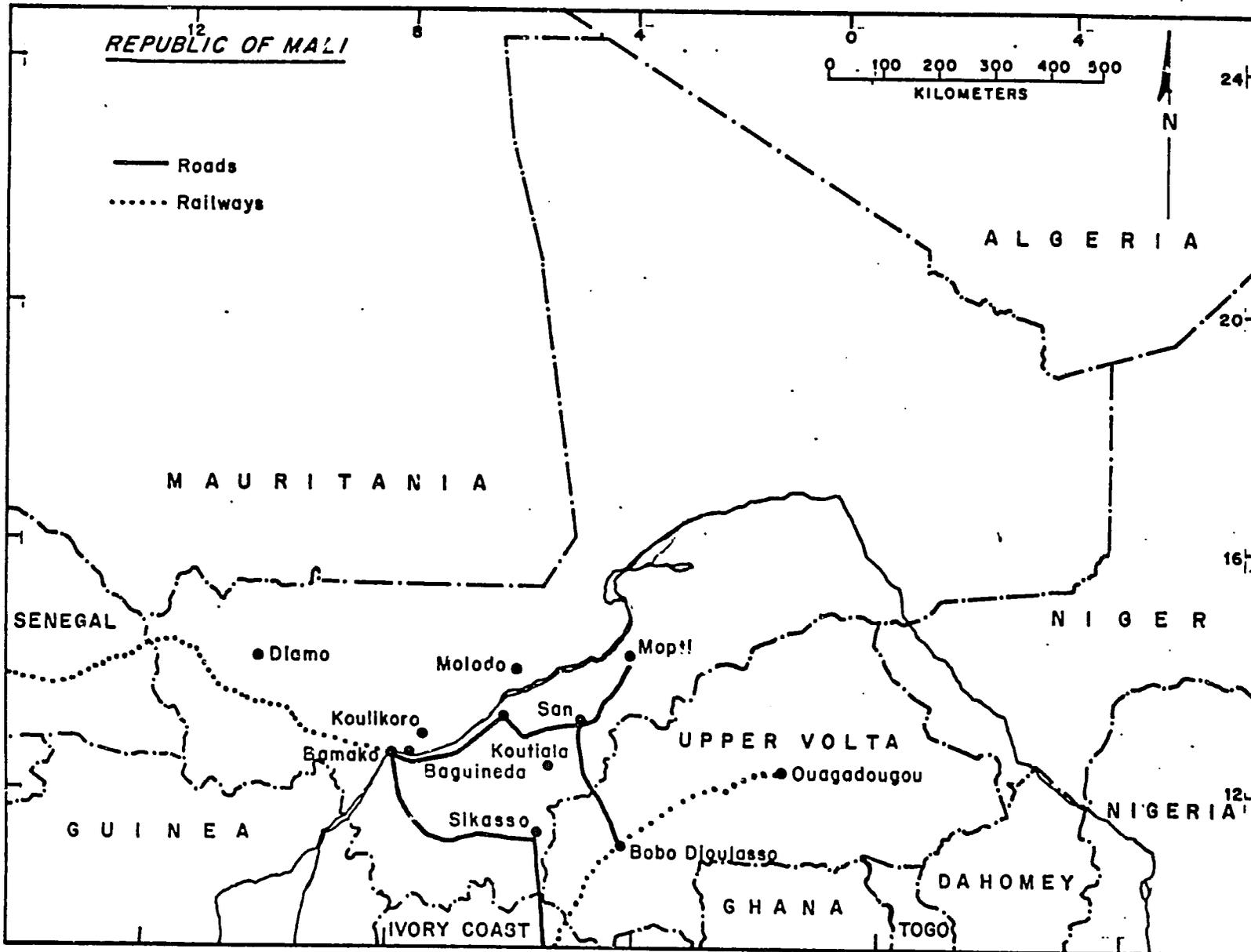


FIGURE II.1-1

TABLE II.1-1 ADMINISTRATIVE DIVISIONS

<u>Region</u>	<u>Population (1969)</u>	<u>Main City</u>	<u>Population (1969)</u>
Bamako	917,000	Bamako	189,000
Gao	606,000	Gao	14,000
Kayes	744,000	Kayes	30,000
Mopti	991,000	Mopti	34,000
Segou	759,000	Segou	32,000
Sikasso	912,000	Sikasso	24,000
TOTAL	4,929,000		

labor force in 1969 was 2,326,000 people (between 15 and 59 years of age) with total salaried people approximating 65,000 in 1969. Of total salaried 9,400 are employed in industries with 2,000 of these classified as seasonal workers.

There are five cities of greater than 20,000 population:

Bamako	189,000
Mopti	34,000
Segou	32,000
Kayes	30,000
Sikasso	24,000

II.1-2 Agro-climatic zones: Mali has four distinct climatic zones which can be classified as follows (see Figure II.1-2):

<u>Zone</u>	<u>Region</u>	<u>Agricultural Activity</u>
Woodland	south of 13th parallel	cotton, rice, millet, and other crops
Sudan	from 13th to 15th parallel	peanuts, millet, live-stock
Sahel	from 15th to 17th parallel	livestock
Desert (subdesert)	north of 17th parallel	

TABLE II.1-2. AGRO-CLIMATIC ZONES

A survey of the various mineral resources for Mali can be found in Appendix II of Annex 9.

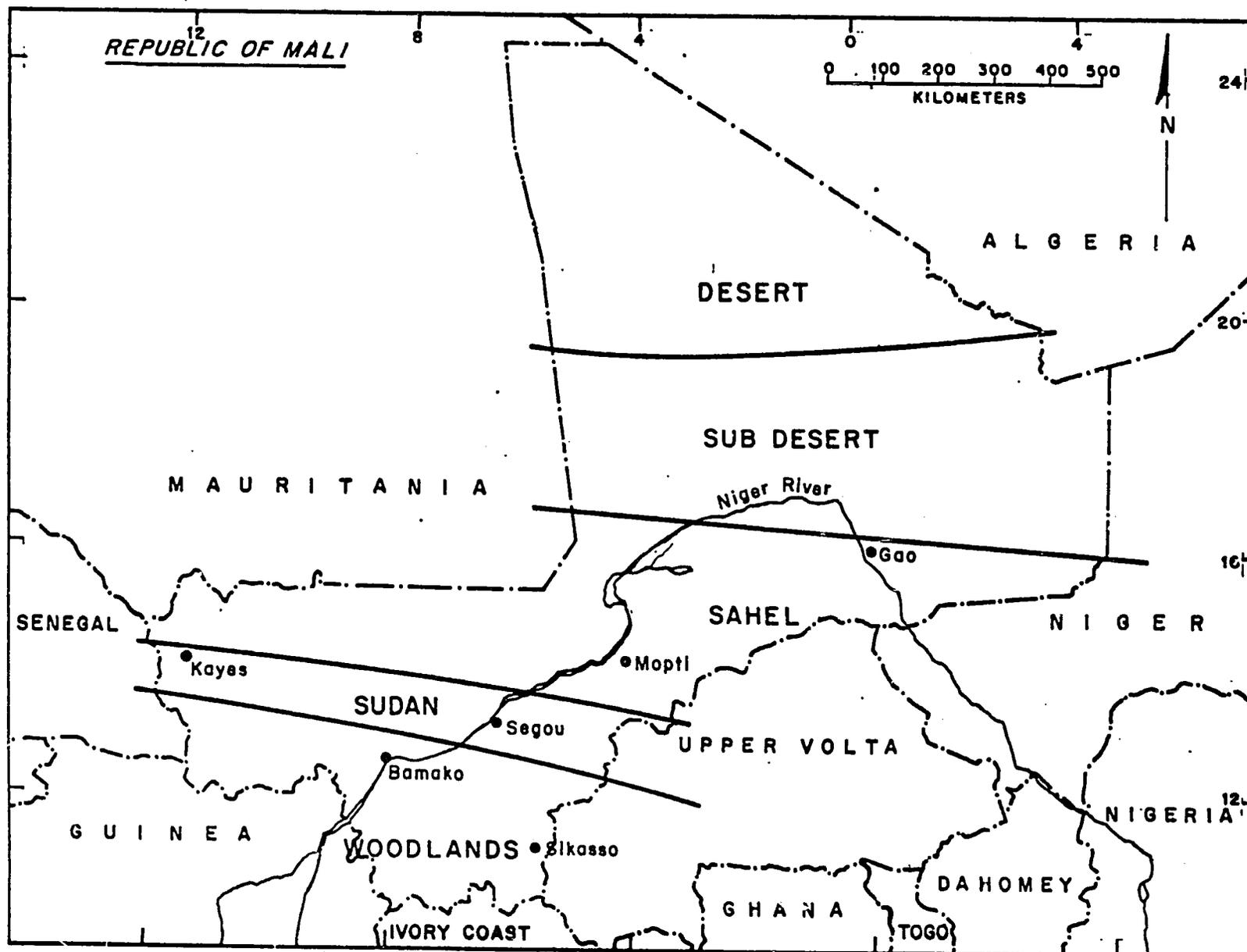


FIGURE II.1-2

II.2 Economy

II.2.1 Currency: Until July 1962, Mali was in the west African Monetary Union and its currency was the CFA franc. At that time she introduced her own currency, the Mali franc, which was at par with CFA franc and equivalent to .02 new francs (French). Then in March of 1968 the Malian franc was devaluated to 50% of the CFA franc.

Through August 10, 1969	U.S. \$1.00 = MF 493.71
August 11, 1969-August 14, 1971	U.S. \$1.00 = MF 555.42
December 20, 1971-Feb 13, 1973	U.S. \$1.00 = MF 511.57
From February 26, 1973	U.S. \$1.00 = MF 460.41

II.3 Employment and Wages

The labor force was estimated to be 2,236,000 persons in 1969 (15 to 59 years of age). The number of salaried workers was 65,000 (1969) with 40,000 persons employed as civil servants. The number of salaried persons in the secondary and tertiary sectors are as follows for 1969:

Secondary sector	6,008 state industries
	1,978 private industries
	<u>2,630</u> public works
	10,616
Tertiary sector	8,063

The origin of the salaried workers are found in Table II.3-1.

	Malian Workers	African, non- Malian Workers	Non- African	Total
manual labor	95.5	4.5	0	100
workmen and spe - cialists	96	3.6	0.4	100
foreman	95	3	2	100
administrator (jr.)	88	2	10	100
administrator (sr.)	56.5	2	41.5	100

TABLE II.3-1. ORIGIN OF LABORERS BY PERCENTAGE

Hourly salaries for Malians and expatriots are listed in tables II.3-2 and II.3-3 respectively.

	<u>Monthly(FM)</u>	<u>Hourly(FM)</u>	<u>Hourly U.S.\$</u>
manual labor	5,610	33	.07 U.S. \$/hr
ordinary technician	10,200	60	.13 U.S. \$/hr
special technician	15,300	90	.20 U.S. \$/hr
foreman	34,000	200	.43 U.S. \$/hr
foreman (technical)	50,000	294	.64 U.S. \$/hr

TABLE II.3-2. MALIEN WAGE LEVEL (1971)

	<u>Monthly (FM)</u>
Foreman (technical)	400,000
Engineer	425,000
Administrator (Jr.)	450,000
Administrator (Sr.)	600,000
Director	850,000

TABLE II.3-3. EXPATRIOT WAGE LEVEL (1971)

<u>Merchandise Exports, f.o.b.</u>		<u>Merchandise Imports, c.i.f.</u>	
Ivory Coast	27.2	France	44.4
France	20.2	Ivory Coast	10.5
Consigned Goods 1/	14.5	Senegal	6.3
Senegal	8.1	People's Republic of China	6.2
Ghana	7.9	U.S.R.	6.0
Japan	2.7	U.S.A.	5.5
Upper Volta	2.5	Federal Republic of Germany	3.6
Niger	1.8	United Kingdom	2.4
Republic of China (Taiwan)	1.8	Italy	1.8
U.S.S.R.	1.7	Japan	1.6
United Kingdom	1.6	Netherlands	1.5
Greece	1.5	Belgium-Luxemburg	1.4
Other	<u>8.5</u>	Other	<u>8.8</u>
Total Recorded Exports	100.0	Total Recorded Imprts	100.0

TABLE II.3-4. GEOGRAPHICAL DISTRIBUTION OF FOREIGN TRADE, 1971

1/ Goods sent to the ports of Dakar and Abidjan the final destination of which is not known.

Q=quantity in metric tons
V=value in millions FM

TABLE II.2-1 MERCHANDISE EXPORTS

Products	1967		1968		1969		Production(T)	1970	
	V	Q	V	Q	V	Q		V	Q
Cotton fiber	1,456	10,220	3,119	11,309	4,312	14,907	16,900	4,565	16,600
Cattle (on hoof)	884	(n.a.)	1,965	6,354	3,290	9,870	741,000	4,045	(n.a.)
Thread and weaving	0	0	0	0	122	120	2,815	1,650	2,904
Peanut(Shelling)	842	17,440	1,300	15,851	814	10,400	11,330	1,634	17,624
Fish (salted and smoked)	757	7,385	1,271	6,354	1,637	5,930	24,300	1,521	5,744
Sheep and Goats (on hoof)	160	(n.a.)	183	385	627	1,384	1,700,000	917	(n.a.)
Peanut Oil	(n.a.)	(n.a.)	47	388	335	2,315	3,627	1,169	13,100
Cattle feed	111	5,756	120	3,123	237	6,440	11,300		
Cotton ginning	103	8,603	198	14,000	193	10,146	28,100	278	18,194
Fruit of butter nut tree	(n.a.)	(n.a.)	119	2,180	343	5,460	80,000	(n.a.)	(n.a.)
Butter (from butter nuts)	(n.a.)	(n.a.)	183	1,370	444	2,362		(n.a.)	(n.a.)
Other	(n.a.)	(n.a.)	335	5,134	974	7,053		(n.a.)	(n.a.)
TOTAL	4,859	(1)	8,840	66,448	13,328	76,387		19,004	123,817

V = value in millions MF
Q = quantity in metric tons

Product	1968		1969		1970
	V	Q	V	Q	V
Cerals	17.5	409	3,451.9	52,932	170
Fruits and vegetables	(n. a.)	(n. a.)	(n. a.)	(n. a.)	70
Cola Nuts	813.4	13,556	745.3	12,397	680
Sugar	2,408.5	30,391	1,420.6	16,510	3,480
Flour	489.9	7,987	537.9	9,542	710
Milk	96.1	336	201.1	496	442
Tea, coffee	346.6	659	480.8	1,604	830
Drink (liquor)	265.7	1,194	222.2	1,501	(n. a.)
Salt	359.2	12,535	478.1	17,510	1,110
Petroleum products	2,400.4	67,688	2,680.0	69,645	2,950
Cement	558.7	26,008	577.0	22,600	80
Metals and tools	1,114.8	13,734	1,182.7	6,380	1,861
Chemical products	801.8	4,715	775.5	3,166	1,650
Machinery	893.8	914	1,265.5	1,073	3,500
Electrical manufacture	908.6	948	953.9	1,227	(n. a.)
Vehicles	2,159.6	3,238	2,455.5	4,043	2,800
Thread and fabric	1,893.6	2,672	1,871.6	1,975	2,300
clothes	221.0	175	231.5	309	(n. a.)
Sacks	317.3	1,148	145.3	1,579	(n. a.)
Pharmaceutical products	1,112.9	2,057	909.2	358	1,050
Tires-tubes	434.5	1,029	381.5	710	480
Paper Cartons	476.6	1,504	251.5	552	700
Wood	93.4	106	167.3	3,600	(n. a.)
Other	1,716.8	25,899	3,808.1	15,791	1,513
Total	19,900.7	218,902	25,194.0	245,500	26,370

TABLE II.2-2 MERCHANDISE IMPORTS

APPENDIX III

TRAINING AND PROFESSIONAL INSTITUTES
1969-1970

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March, 1974

The information in this appendix was received in the spring of 1974 from the Ministries of Education in the Sahel countries. Although Chad is not included and gaps of information exist, there are conclusions which may be drawn about the pattern of vocational training for occupations in west Africa.

The institutionalized vocational training programs are usually typified by several items:

- (1) several years of formal schooling is prerequisite;
- (2) enrollment is small in relation to needed occupational training;
- (3) programs are full-time and of long duration (nine months to three to four years);
- (4) unit costs are higher than academic secondary schools;
- (5) these programs are usually urban-centered divorced from rural economic realities and are foreign to the lifestyles and daily obligations of rural people to be a feasible solution to their needs;
- (6) little effort is directed in the field of agricultural training where the majority of people will spend their lives and are in need of a wide spectrum of skills and knowledge to aid in better farm management and improved rural family life; there is especially a serious neglect of girls in agricultural training programs.

In order to provide more west Africans with vocational training at a lower unit cost, the following criteria would help in achieving that goal:

- (1) Rural vocational training programs should be developed which are locally based and integrated into the economic and social life of the rural community.

- (2) Training in agriculture and other fields should be tied to useful productive activities that will provide people an opportunity to earn while they learn.
- (3) The people developing skills should be encouraged and assisted to engage in joint productive enterprises of their own making.

MALI

- Cours Pigier; typing, accounting, stenography, accountant's aide, office work. 194 students of which 64 female. 2-year course.
- Cours Jeanne d'Arc; commercial courses. 129 students of which all are female. 3-year course.
- Ecole Dactylographie; commercial courses. 73 students of which 59 are female. 1-year course.
- Centre de Formation Professionnelle; electricity, mechanic, accountant's aide, construction, office work. 362 students of which 55 are female (office work, accounting). 3-year course.
- Centre de Formation Professionnelle de Niarela; electricity, mechanics, construction. 142 students, all male. 3-year course.
- Centre d'Apprentissage Agricole de M'Pesoba; agricultural training. 75 students, all male.
- Centre d'Apprentissage de Samanko; water, forests, rice and cotton farming, rural development. 65 students, all male.
- Centre d'Apprentissage de Samé; agriculture. 71 students, all male.
- Institute Polytechnique Rural (Technicians); agriculture, animal husbandry, water and forests, rural development. 70 students, all male.
- Institute Polytechnique Rural (Engineers); agriculture, animal husbandry, water and forests, rural development. 210 students, all male.
- Ecole Nationale d'Administration; economics, administration, justice, finance. 295 students of which 49 female.
- E. C. I. C. A. ; industry, commerce, administration. 817 students of which 110 female. 4-year course.
- Ecole Nationale d'Ingenieurs; civil engineering, topography, geology, electrical engineering. 85 students, all male. 2-year course.

Ecole Secondaire de la Santé; nursing, midwife, social assistant, sanitary, technical assistant, medical secretary. 240 students of which 120 females. 3-year course.

Ecole des Infirmiers Vétérinaires; 101 students, all male. 3-year course.

Ecole des Aides Sociales et Infirmiers; Aides Sociales--monitors for child care. 49 students, all female. 1-year course. Infirmiers--hospital care, pharmacy, obstetrics. 180 students of which 32 female. 3-year course.

Ecole de Médecine; 29 students of which 7 female. 2-year course.

Ecole Normale Supérieur; secondary school teacher training. 232 students of which 21 are female. 4-year course.

Instituts Pédagogiques d'Enseignement Générale (4); 727 students of which 126 female. 2-year course.

Ecole Normale d'Enseignement Technique Féminin; 91 students, all female. 4-year course.

Ecole Normale Secondaire; 355 students of which 51 female. 4-year course.

MAURITANIA

Mamdou Tcouré Vocational Training Center; plumbing, bricklaying, electricity, auto and diesel engines. 132 students 17 years or older. 9-month course. (Nouadhibou)

Nouakchott Technical College; manual skills, auto mechanics, electricity, sheet metal skills, etc. 207 students. 3-year course.

Nouakchott Technical Lycée; B. E. I. (Diploma of Industrial Studies). 134 students. 3-year course.

National School of Administration; training for middle-level staff for ministries. 120 students. 2-year course.

Ecole Nationale d'Enseignement Commercial et Familial; commerce, secretary, homemaking. 82 students.

Agricultural Training and Extension Center; training for extension agents. 50 students. 3-year course. (Kaedi)

School of Nursing; 36 students for state-registered male nurse, 25 students for 1st cycle male nurse. 2-year course. (Nouakchott)

Ecole Normale Supérieure; secondary school teacher training. 72 students. 2-year course.

Ecole Normale d'Instituteurs; 86 students in Cycle A (4-year course), 151 students in Cycles B and C (3-year course).

MIFERMA; basic education, management. Two schools in Cansado and Zouerate. 600 students.

Maurelac; electricity, mechanics, literacy. 22 students.

Institut Islamique.

NIGER

Lycée Technique de Maradi; three degrees awarded--Baccalauréat Technique, B. E. I. -Industriel, B. E. C. -Commercial. 170 students of which 3 are females.

Le Centre de Formation et de Perfectionnement Professionnel; skill improvement course for workers.

Centre d'Apprentissage Berliet; training for chauffeurs and mechanics. (Niamey)

Ecole des Cuirs et Peaux; leather craftsmanship. (Maradi)

Institut Pratique de Développement Rural; trains agricultural monitors.

Ecole des Assistants et Agents Techniques d'Elevage.

Ecole de Santé.

Ecole Normale de Zinder; instructor and rural development training, diploma for primary level teaching. 169 students of which 23 are female.

Cours Normal de Tahoua; assistant instructor training, diploma for primary school teaching. 95 students of which 3 are female.

Cours Normal de Tillabéri; assistant instructor training. 116 students, all female.

SENEGAL

- Ecole Normale d'Enseignement Technique Masculin et Féminin.
(Dakar)
- Centre de Formation de Moniteurs d'Economie Familiale Rurale.
(Thiès)
- Lycée Technique; brevet de technicien. (Dakar, St. Louis)
- Collège Enseignement Moyen. (Dakar, Dioubel)
- Centre Commercial Privé Cap Vert. (Dakar)
- Collège St. Michel. (Dakar)
- Collège Immaculée Conception. (Dakar)
- Centre Professionnel Féminin St. Joseph de Cluny. (St. Louis)
- Ecole Technique Jean XXIII Kaolac.
- Ecole Ménagère Familiale et Rurale de Kolado.
- Centre Qualification Industrielle. (Dakar)
- Centre Apprentissage Régie Chemin de Fer. (Thiès)
- Centre Formation et de Perfectionnement de Personnel Secretariat.
(Dakar)
- Centre Formation Artisanale. (Dakar)
- Centre de Formation Hôtelière. (Dakar)
- Ecole Agents Techniques. (Louga)
- Ecole Agents Techniques. (Zinguinchor)
- Centre Formation Horticole. (Cambarene, Diourbel, Thiès, St. Louis)
- Ecole Nationale Formation Maritime. (Dakar)
- Ecole Nationale des T. P. et du Bâtiment. (Dakar)

- Ecole Nationale des Cadres Bambey.
- Centres Régionaux d'Enseignement Technique. (one per region)
- Centre Ménager Joal, Tradaye, N'Diagana, Bambey, Ziguichor,
Soutiou, Bigona, M'Lomp, Tambaconda.
- Centre de Perfectionnement de l'Arsenal. (Dakar)
- Centre de Perfectionnement Société Phosphates de Taiba.
- Centre Régional Enseignement Technique Masculin. (Ziguinchor)
- Centre de Perfectionnement des Pêcheurs Lacustres. (M'Banre)
- Centre de Perfectionnement des Paysans. (Querina, Kerouane, Ogo)
- Centre de Perfectionnement des Paysans et Artisans Ruraux. (Missira,
Kael, Sedhiou)
- Centre Perfectionnement d'Eleveurs. (Lagbar)
- Centre National des cours professionnels Dakar, St. Louis.
- Cours Professionnels de Secrétariat à Thiès (697).
- Centre Technique de Formation Professionnelle.
- Ecole des Agents Techniques de l'Elevage et des Industries Alimentaires. (St. Louis)
- Ecole des Agents Techniques des Pêches et de l'Océanographie.
(Thiaroye)
- Ecole des Agents Sanitaires et Agents d'Assainissement. (St. Louis,
Khombole)
- Ecole des Infirmiers et des Infirmières d'Etat.
- Centre d'Enseignement Spécial de soins infirmière.
- Ecole Nationale des Postes et Télécommunications.
- ENEA Dakar--Centre de Formation et Perfectionnement Administratifs.

UPPER VOLTA

Lycée Technique d'Ouagadougou; economics, industrial technician, all engineering. B. E. C. I. and B. E. T. diplomas. 568 students of which 92 female.

Technique. (Ouagadougou)

Ecole Technique Professionnelle. (Bobo-Dioulasso)

Centres de Formation Professionnelle; mechanic, electricity, construction, masonry. (Bobo-Dioulasso, Fada N'Gourma, Nouma)

Centre d'Enseignement Commercial; 453 students.

Formation Administrative et Juridique; administration, financial assistant, secretary. 71 students.

Ecole Professionnelle des Agents de Douane; 84 students (10 Voltaiques).

Ecole Nationale de Police; 49 students.

Ecole Nationale des Postes et Télécommunications; 24 students.

Centre d'Instruction de la Gendarmerie; 33 students. (Bobo-Dioulasso)

Cours Pigier; commercial courses. 30 students.

Centre de Formation Professionnel; secretary, accountant's aid, stenography. 80 students. (Ouagadougou)

Ecole Inter-Etats de l'Équipement Rural; 14 students (3 Voltaiques).

Centre de Formation et de Démonstration Agricole. Technical agents--4-5 year course; 25 students. Monitors--9-month course; 60 students.

Centre de Formation Artisans Ruraux; 12 students.

Centre de Formation Professionnelle des Postes et Télécommunications.

Formation des Artisans d'Art; 15 students.

Ecole Privée Technique d'Hamdallaye; stenography, economics, social workers, homemakers. 39 students, all female.

Centre Ménager Familial (4); homemaking.

Ecole des Infirmiers Vétérinaires; 15 students (8 voltaïques).
(Ouagadougou)

Ecole Rurale; 700 schools; 30,005 students of which 2,765 are female.

Centre Inter-Etats des Adjointes Techniques et Génie Rural. (Sara)

Ecole Forestière; 10 students. (Dinderess)

Ecole Jamot; nurses for epidemic diseases. 26 students (12 voltaïques).

Cours Normaux Publiques (3); assistant teachers. 104 students of which
12 female. 2-year course. (Ouagadougou, Ouahigouya,
Koudougou)

Cole Normale d'Ouagadougou; trains instructors for primary schools.
147 students of which 6 female.

Centre d'Education Spécialisée (3); rural education teachers. 98
students of which 26 female. 10-month course. (Ouagadougou,
Kamboincé, Farakaba)

Institut Universitaire de Technologie Pédagogique; trains secondary
school teachers. 25 students. 2-year course. (Ouagadougou)

Centre d'Enseignement Supérieur (CESUP); 192 students of which
127 letters and sciences, 50 teacher-training, 15 technology.
(Ouagadougou)