Report for AS&P
Masterplan for an Integrated Transportation Infrastructure in Nigeria

Regional Aspects of the Socio-Economic Situation of Nigeria and Development Prospects up to 2020

DRAFT VERSION, 09.11.2001

Contributors: Dipl.-Geogr. H. Balzerek
Dipl.-Geogr. Ulaç. Demirağ
Prof. Dr. Werner Fricke
Dr. Gilbert Malchau

Coordination: Prof. Dr. Werner Fricke

University of Heidelberg
Department of Geography
Im Neuenheimer Feld 348
69120 Heidelberg
F.R. Germany

TABLE OF CONTENTS

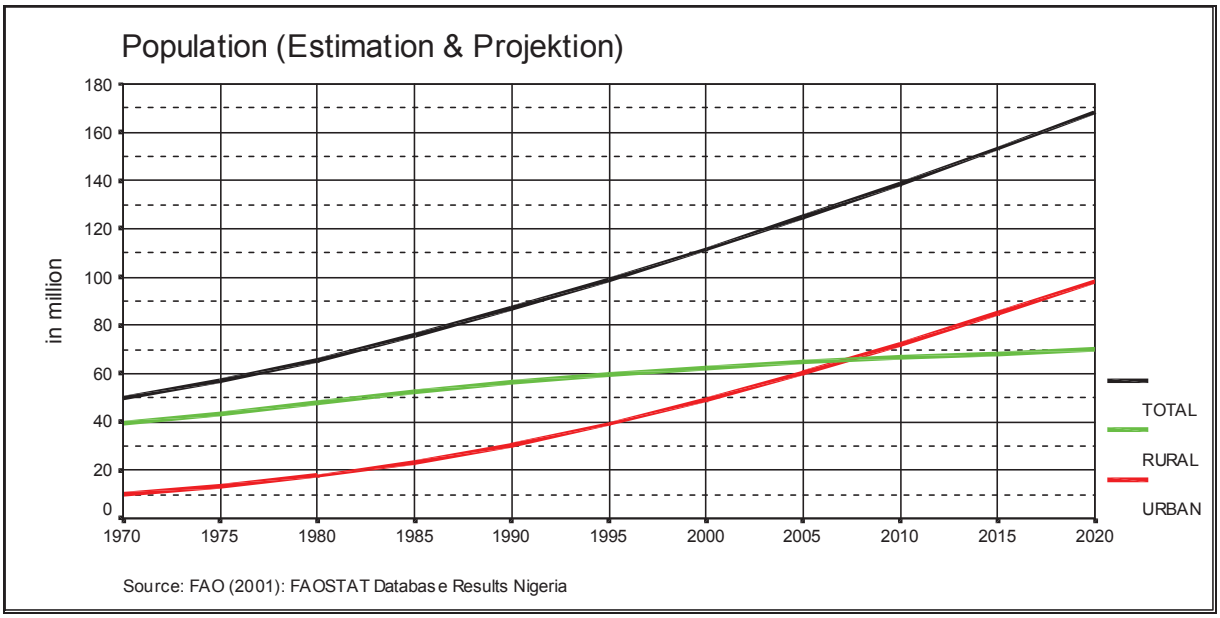
4 CROP PRODUCTION AND TRANSPORT

4.1 AGRICULTURE IN GENERAL

Nigeria is still mainly an agrarian country, with 62.5 millions out of its 111.5 millions inhabitants in 2001 living in rural areas (see Figure 4-1). Till to the late 1960s agriculture was the most important sector in the national economy and regarding to foreign trade the exportation of commodities (export crops) like cotton, cocoa, groundnuts and palm oil realized the major export earnings.

But the role of the agricultural sector has changed totally during the last 30 years. Today Nigerias economy is heavily dependent on the oil sector, which accounts for 90-95% of export revenues, over 90% of foreign export earnings and around 80% of government revenues. The contribution of agriculture to the GDP stands at 28.5% at the moment (year 2000), the percentage of the oil sector is claiming 39.4%.

Figure 4-1: Population of Nigeria (Estimation & Projection)



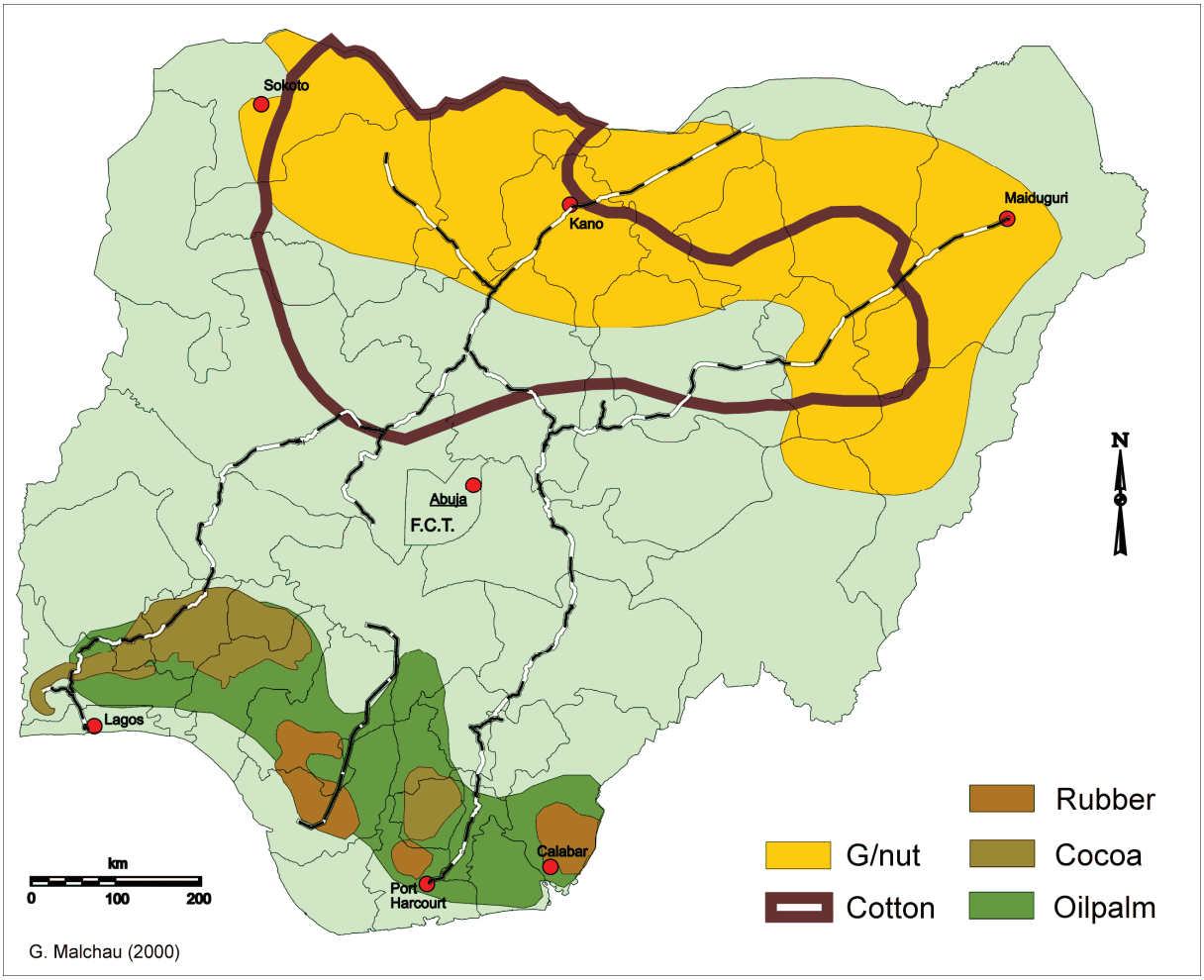
In contrast to the late 1960s nowadays Nigerias agricultural sector has to feed more than 110 million people (around 50 million in 1970) and Nigeria has to import agricultural products (in 1998) for nearly 1.3 billion US$ or 14% of all imports (IMF 2000). The agricultural imports are including not only processed food, fish, meat, and even basic food crops like rice and wheat, but also former cash crops like palm oil. The export earnings from cash crops - only cocoa and rubber on a low level remained – came up to 105 million US$ in 1998.

One of the most serious problems for the agricultural sector in future is the declining share of the rural population against the total population. The rural population as the productive part in feeding Nigeria has to provide foodstuffs for an increasing urban population. Probably in 2007 the ratio rural/urban population will be around 1:1, and in 2020 already 1:1.43.

4.1.1 Export Crops and Food Crops

Export crops are those crops of the agricultural production are meant for export, especially for the world market. Sometimes they are also called cash crops. This definition is not used, because many foodcrops are also cash crops in the sense that they are sold on domestic markets. Apart from that some of the export or cash crops are used for cooking purposes, they are food crops too like palm oil and groundnut oil.

Map 4-1: Regional Distribution of Cotton, Groundnuts, Cocoa, Oilpalms and Rubber



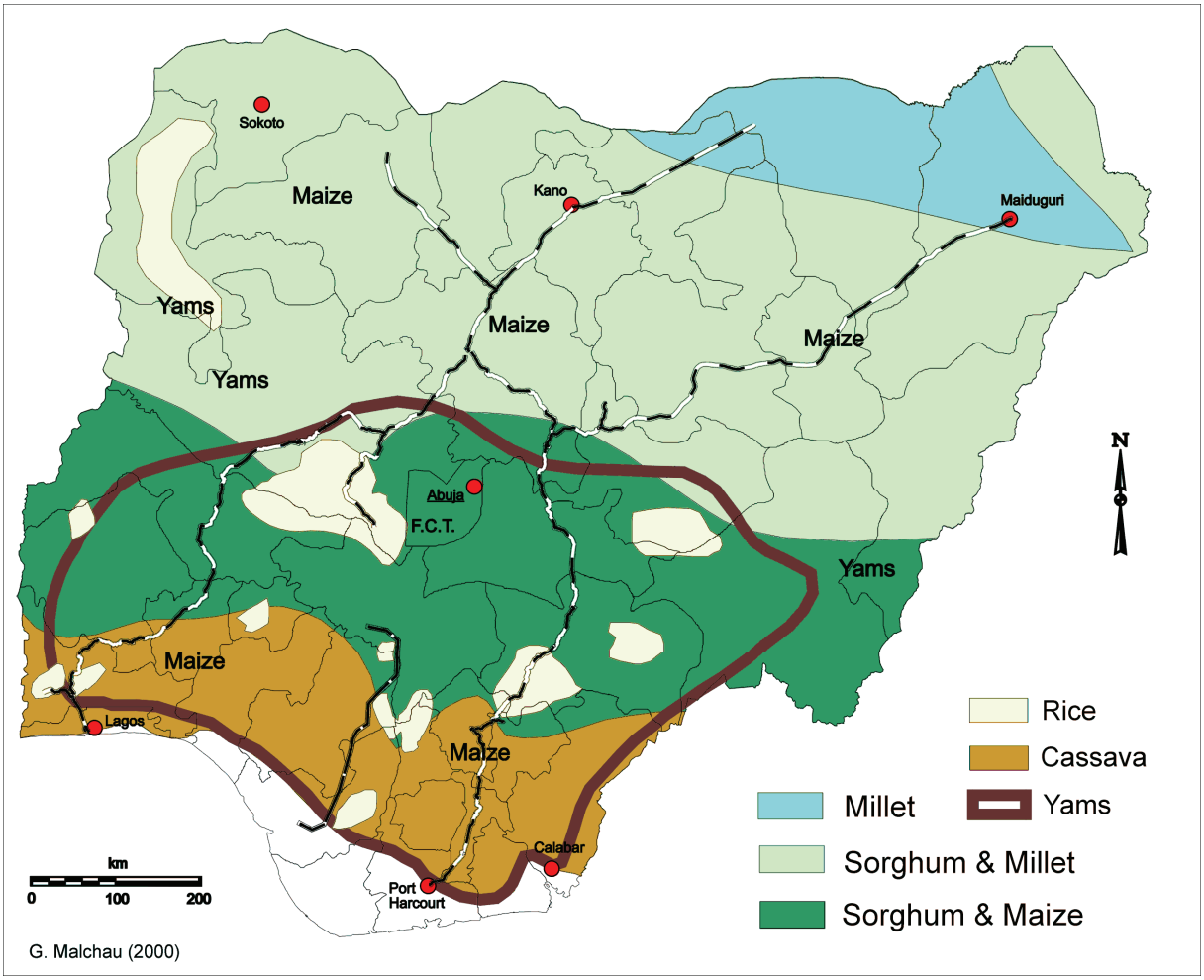
Source: Nigerian Atlas for Social Studies (1982); BALOGUN, O.Y. (2000)

Until 1970 four important export crops could be found: Groundnuts and cotton grown in the north, and cocoa and oilpalms grown in the south (see Map 4-1). Rubber, also grown in the south, was introduced to a greater extent during the 1980s.

Major food crops – also sold on domestic markets as cash crops and not only used for self-sufficiency - are root crops like yams, cassava and cocoyam, cereals like sorghum (guinea corn), millet, maize and rice, pulses like beans, vegetables like onions and tomatoes, oil palm fruits and groundnuts for vegetable oils and at least a large variety of fruits with banana and plantain as the most important ones for daily meals. As well as in the case of export crops nearly 90% of food crops are produced from small scale farmers and around 50% of the working power in Nigeria is engaged in agriculture.

The capability of farming many food and export crops at certain regions in Nigeria (see Maps 4-1 and 4-2) is associated with the climatic conditions and the character of soils which itself is a combination of interactions between rainfall, wind, temperature and basic material during the time. For example soils developed on sandstones are usually less fertile than soils developed on rocks of the basement complex. Another component is population density, which can be a limiting factor for sufficient supply especially of food crops. In general it can be said, that the long double peaked rainy season in the south favoured the growing of root crops and the north with its short rainy season and long sunshine periods favoured the growing of cereals. But there are exceptions, Maize can also be grown in the south as well as rice as swamp type, and cassava can also be grown in the north because this root crop is highly adapted to various environments. Between south and north lies a zone of transition - the middle belt. Till today it is a less developed region inside Nigeria, with low population density but with climatical and ecological conditions that allow the farming of both, root crops and cereals.

Map 4-2: Regional Distribution of Cassava, Yams, Sorghum, Millet, Maize and Rice



Source: Nigerian Atlas for Social Studies (1982); BALOGUN, O.Y. (2000)

Climate, character of soils and population density combined with migrational tendencies of members of different ethnic groups to live in other parts of the country, progressing urbanization and changing feeding habits are forming an enormous potential for transportation. Graphically: The output of major food crops in Nigeria only for feeding was estimated at 62.1 million tonnes in 1999 (FAOSTAT). Half of this output is not consumed in

producer areas but in urban centres and in rural areas not self-sufficient with basic food crops. As a result a volume of more than 30 million tonnes has to enter the transportation system mainly by road. Apart from oil and gas, which are not using the domestic transportation system, there is no other sector in the Nigerian economy which can compete in terms of bulk goods today.

4.1.2 Imports and Exports

In the 1960s Nigeria was still the largest producer and exporter of palm oil in the world. Nigerias export earnings were generated from the agricultural sector with a variety of products cultivated in the south (palm oil and cocoa) and the north (cotton and groundnuts). Stressing south and north is important, because both parts of the country had to offer export commodities to Nigerias economy. The whole railway infrastructure has been built for transportation purposes from the cultivation areas in the north to the ports of Lagos and Port Harcourt.

Table 4-1: Imports and Exports of Agricultural Products (in Mill. US$)

Year	Imports			Exports		Balance (Imports minus Exports)
	Food & Live Animals	Beverages & Tobacco	Animal & Vegetable Oils/Fats	Cocoa & Cocoa Butter	Rubber	
1993	696.6	24.8	66.3	82.0	40.0	-665.7
1994	666.5	32.4	64.7	88.0	32.0	-642.6
1995	1,004.9	34.4	94.5	81.5	58.2	-994.1
1996	1,214.6	36.0	116.9	157.4	36.8	-1,173.3
1997	1,098.0	55.4	129.2	104.0	50.0	-1,128.6
1998	1,105.8	36.3	117.8	93.0	12.0	-1,154.9

Source: IMF (2000), FAO (2001)

After the Civil War at the beginning of the 1970s Nigerias economy changed from a net exporter to a net importer of agricultural products. The reasons were many and diverse. Apart from booming export earnings from the oil sector in the south, there was still the marketing board system for export crops which was not flexible enough in its first role of controlling production and producer prices. The low prices affected the farmers income and they were not longer interested in producing for the world market. One more problem, which is still aware to the present, was the declining yield of cocoa and palm trees. A large number is completely overaged and the majority of small scale farmers has no capital access to invest into new trees. The production of palm oil is not even sufficient for the domestic market, and the import bill for agricultural products includes vegetable oils till today (see Table 4-1).

Urbanization finally is another factor responsible for the increasing amount of agricultural imports. Cities like Lagos and Port Harcourt as well as Ibadan and Kano with annual growth rates up to 8% in the past could not be provided with basic food stuffs by the domestic agricultural sector. In the 1970s prices for basic foodstuffs were also restricted to stop the process of more and more escalating living costs in the towns. The farmers were not encouraged in increasing the output of rootcrops, cereals and other products. As a result many

of them migrated to the towns to earn fast money, and Petrol Dollars were used from the Federal Government to import cheap wheat and rice from the world market for supporting the towns.

This situation continued and worsened to the mids of the 1980s. Although Nigeria was spending 2.1 billion US$ or 16.4% of its total imports for agricultural products in 1981 - the highest amount for agricultural imports in the statistics - the average daily supply with foodstuffs per person reached only an equivalent of 2,067 calories (see Table 4-2). A value smaller than 2,128 calories per day and person is defined as malnutrition (FAO).

From 1983 – the oil price was down and the export earnings low – decrees by the government prohibited the importation of raw sugar and cereals like wheat and rice and some other products. At the same time (Green Revolution Programme) new types of cassava, yams, maize and some other cereals were introduced to stimulate the production for domestic markets. Irrigation schemes (River Basin Development Authorities) for wheat in the north, dryland rice all over Nigeria and other agricultural products were opened to balance the demand of the urban population with own products.

Although the introduction of new kinds of rootcrops and cereals was quite successful the programme was too expensive at all. The real take off in the agricultural sector at the end of the 1980s and the beginning of the 1990s was realized by the liberalization of the markets and by the following extension to new production areas by farmers (see statistics Appendix 4-2). The substitution of wheat and rice imports by own production was not successful. Wheat production reached because of ecological problems not more than 100,000 tonnes a year in 1999 (FAOSTAT), imports were standing at 1,547,000 tonnes a year at the same time. Rice in its various types which is more adapted to the regional climates and soils reached an output of 2,186,000 tonnes (1999), and the import was standing at 690,000 tonnes in 1999. Nevertheless those, especially from the urban population, who can afford it will not buy Abakaliki rice (a synonym for the bad quality of nigerian rice, and a town in Ebonyi State) but imported white rice.

Since 1993 the imports of agricultural products are rising again (see Table 4-1). Changing feeding habits of the urban population are the most important factor for this development and the huge amount spent on wheat, rice, sugar (1,032,000 tonnes in 1999), fish (240,000 tonnes in 1999) and processed food. But against the situation at the beginning of the 1980s presently an average of 2833 calories per day and person is guaranteed (see Table 4-2).

4.2 PRODUCTION OF EXPORT CROPS IN 1999

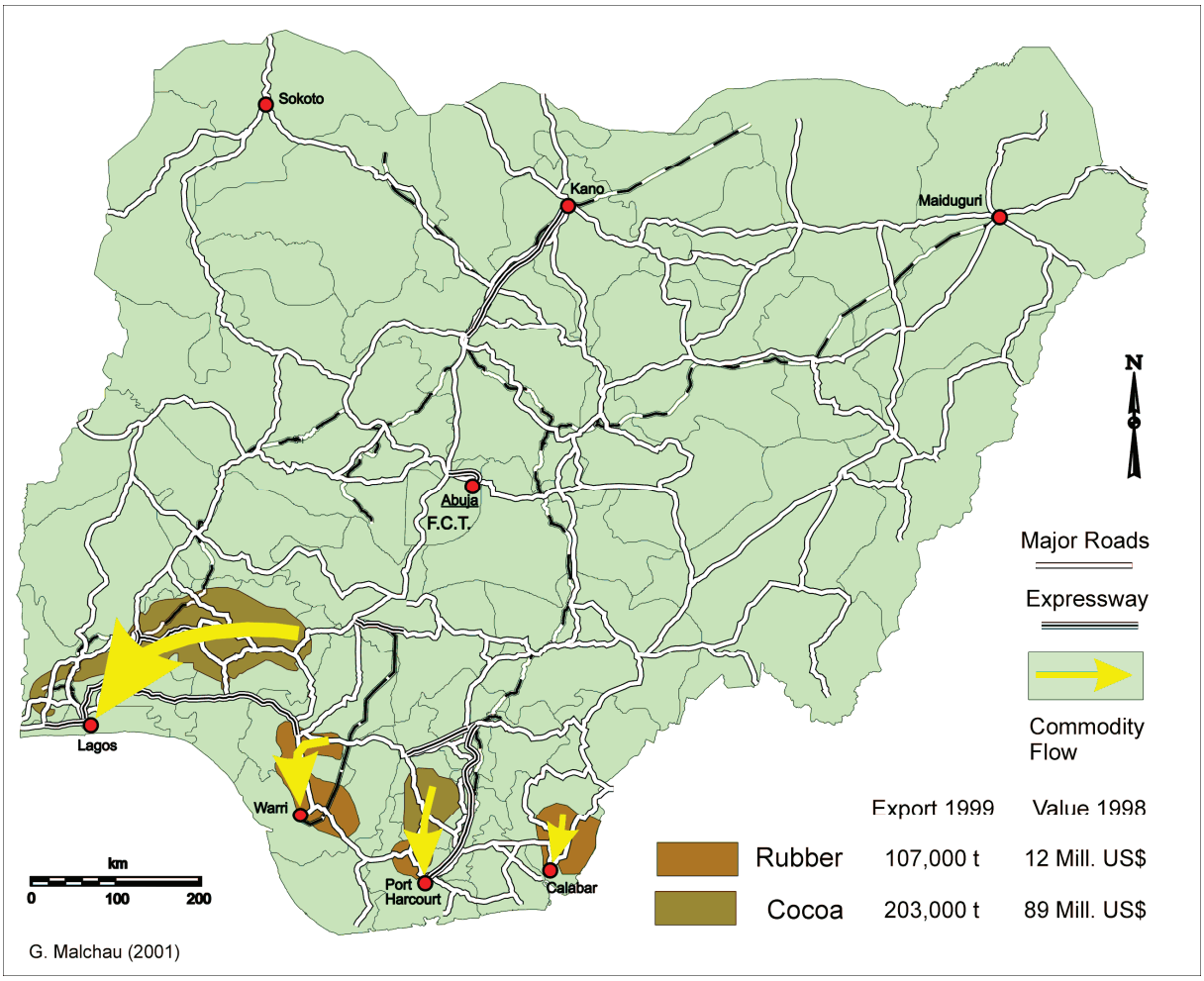
4.2.1 Production Areas and Transport Flows

From the old “traditional” export crops (groundnuts, cotton, palm oil and cocoa) only cocoa left as export commodity for the world market. Nigeria can be found under the 10 largest cocoa producers in the world (2000) and cocoa is behind oil and gas the second in the list of export earners. Rubber, which is the other important export crop in Nigeria, was introduced on a greater scale in the 1980s, although it was cultivated before and it was the only export crop which was not under a marketing board. Both are tree-crops and can be grown only under a humid climate with long rainy seasons and low solar radiation. Especially cocoa also needs, for good yields, soils (cocoa soils) developed from the basement complex rocks and not sandy soils which are usually common in the south. Therefore the main cocoa areas are in the south-

west of Nigeria, the Cocoa Belt in Yoruba Land. That area in the Niger Delta is from minor importance (see Map 4-3).

Compared to other countries in West Africa Nigerias production of cocoa is in the hand of primarily small scale farmers (ca. 90%), and not of (foreign or nigerian) plantation companies. Licensed agents are coming to the villages after the harvest between October and February to classify and buy the fermented and dried beans from the farmers. Some of the collected harvest (22,000 tonnes in 1999) is taken to two Export Processing Factories (EPF) in Ondo State, but the majority of the harvest (203,000 tonnes in 1999) is transported to Lagos for shipping. The EPFs are Stanmark Cocoa Processing at Ondo and Coop Cocoa Industries at Akure, both of them are producing cocoa butter and cocoa powder for export. Apart from exportation an unknown quantity of the harvest is prepared from the farmers to cocoa fat for local consumption (preparing meals).

Map 4-3: Transportation Flows, Roadsystem and Ports for Export Crops (1999)



Source: IMF (2000), FAO (2001)

Rubber is partly in the hand of plantation companies (state owned), for example the Palmol Plantation in Cross River State – a former oil palm plantation. Rubber is not only grown for world market exportation but also to support the nigerian tyre and shoe industry in the south-east and at Lagos. The collecting and marketing process, if small scale farmers are concerned, is similar to that of cocoa. So far rubber is not used for domestic industrial purposes, which is not the case at the moment, transportation goes by road to ports like Warri, Port Harcourt and

Calabar for export (see Map 4-3). The quantity for transportation was 107,000 tonnes in 1999 (total production 107,000 tonnes in 1999) and is together with cocoa from minor importance compared to the quantities of food crops as well as in view of distances.

4.2.2 Projection for further Development

Rubber and cocoa are both commodities with a world wide over-production. In both cases the prices on the world markets are low, in the case of cocoa the lowest price since 27 years was recorded after the harvest in march 2000, and nearly 40% of an annual production world wide is stored in the countries of origin. Particularly in Nigeria the average quality of cocoa is not sufficient compared to the world standard classification scheme. The reasons have to be seen in the old age of the trees, diseases of the trees - chemicals are not available or too expensive - , and the simple fermentation and drying processes. Capital is lacking for small scale farmers to invest into new and better species of trees and it cannot be assumed that the situation will change in the next years.

Although there is a market for processed cocoa products in Nigeria like chocolate drinks, in the long term (2020) the output of cocoa propably will decrease, because the cocoa belt also lies in a region with high population density. Cocoa farms can be used only for cocoa, and not for growing other food crops under the trees as practised in the case of oil palm trees (the old type) in the south east. The cocoa belt is already nowadays a food deficit area, which means that the production of food crops is not sufficient for the local population and food crops from other areas have to be bought on rural markets. In the long term it will be a better business for cocoa farmers to change, and to grow foodcrops like yams, cassava, maize and beans to a greater extent for own demand and for selling to numerous urban markets in Yoruba Land.

The situation for rubber is not much better at the moment, prices on the world market are down and stocks are high in the producer countries. Rubber farms have the same problem, that actually other farmproducts can not be cultivated under the trees because of the low solar radiation. But in contrast to cocoa the industrial development potential is much higher. The nigerian tyre industry with factories in Lagos, Port Harcourt and near Enugu could be a good buyer for rubber in the long term after rehabilitation of the factories and with increasing demand as substitution for foreign new or especially second hand tyres. Unfortunately imported second hand tyres from Europe have a better reputation in Nigeria than brandnew nigerian made tyres, they are cheaper and lasting longer. However this is not a specific problem of rubber cultivation, but of quality and management standards in the tyre industry.

4.3 PRODUCTION OF FOOD CROPS IN 1999

The production of food crops like cassava, yams, sorghum, millet, maize and rice as well as of some former export crops like groundnuts, cotton and palm oil has increased constantly for domestic consumption in the past 10 years from 1989 to 1999 (last available data, see Appendix 4-1 and 4-2). The annual growth rate of production was far beyond the annual population growth rate and a profound improvement was achieved in the average daily supply of calories per person (see Table 4-2). The most important factors for this development have been liberalization of the markets, new types of foodcrops particularly cassava (yield/ha increased moderatly or remained constantly on exhausted soils, or new types like maize and rice were better adapted to different climatical conditions), and a huge extention of producer

areas partly to new created farms in virgin forest regions within Cross River, Ondo and Edo State or other places in the Middle Belt by migrant farmers.

Table 4-2: Calories per Day and Person (1979-1999)

Products	**1979**	**1981**	**1983**	**1985**	**1987**	**1989**	**1991**	**1993**	**1995**	**1997**	**1999**
Vegetables	1853	1934	1788	1934	2057	2211	2471	2684	2716	2700	2751
Animals	109	133	115	96	86	80	84	76	86	79	82
Sum	*1962*	*2067*	*1903*	*2030*	*2143*	*2291*	*2555*	*2760*	*2802*	*2779*	*2833*

Source: FAO (2001): Food Balance Sheets 1979-1999, Nigeria

Table 4-3: Food Consumption in Nigeria

Products	**Estimated Consumption in 1999 (1000 Tonnes)**	**Projected Consumption in 2020 (1000 Tonnes)**	**Per Capita Supply in 1999**			
	Estimated Population 110,845,000	Projected Population 168,223,000	**Kg/ Year**	**Calories/ Day**	**Protein/ Day in Grams**	**Fat/ Day in Grams**
Rootcrops	26,191.98	39,750.04	236.29	570.71	5.90	1,22
Cereals	16,674.89	25,306.50	150.43	1,266.34	33.55	10,02
Fruits	7,969.45	12,094.77	71.90	89.50	1.03	0,47
Vegetables	6,906.08	10,480.95	62.30	45.70	2.30	0,47
Vegetable Oils	1,783.68	2,706.98	16.09	384.22	.	43,61
Sugar (Raw Equivalent)	1,066.50	1,618.56	9.62	94.43	.	.
Meat	901.06	1,367.48	8.13	34.59	3.10	2,37
Fish	608.82	923,97	5.49	10.87	1.67	0,41
Total	*62,102.46*	*94,249.28*	*560.25*	*2,496.36*	*47.55*	*58,57*

Source: FAO (1999): Food Balance Sheet, Nigeria, FAO (2001): FOASTAT Database Results Nigeria, Population and own Calculations for Projection of Consump- in 2020

The total production of cereals, root crops, sugar crops, oil crops, vegetables, fruits, meat and fish was estimated up to more than 109 million tonnes in 1999 by the statistical division of the Food and Agriculture Organization (FAO). Data of the FAO were used for the following estimations and representations considering two reasons: The FAO also calculates on the basis of publications from the Federal Office of Statistics (Abuja) and the Central Bank of Nigeria, but moreover the FAO takes into account results of regional and local studies to adjust statistical trends etc. if necessary.

The total production plus imports (around 3,6 million tonnes of wheat, rice, raw sugar and fish) is divided into all components of domestic utilization as defined from the FAO for their annual food balance sheets. The components of domestic utilization are animal feeding (3,4 million tonnes), seeds (10,7 million tonnes), processing (3,5 million tonnes), waste (32,8 million tonnes), other uses (0,3 million tonnes) and food (62 million tonnes). The waste factor with 32,8 million tonnes or 30% of the annual harvest for all agricultural products is intolerable and caused by several inaccessibilities in the pricing, storage, processing and transportation system. For detailed information of the waste factor of single components see Appendix 4-3., and because these problems are severe they will be discussed later (4.4.2).

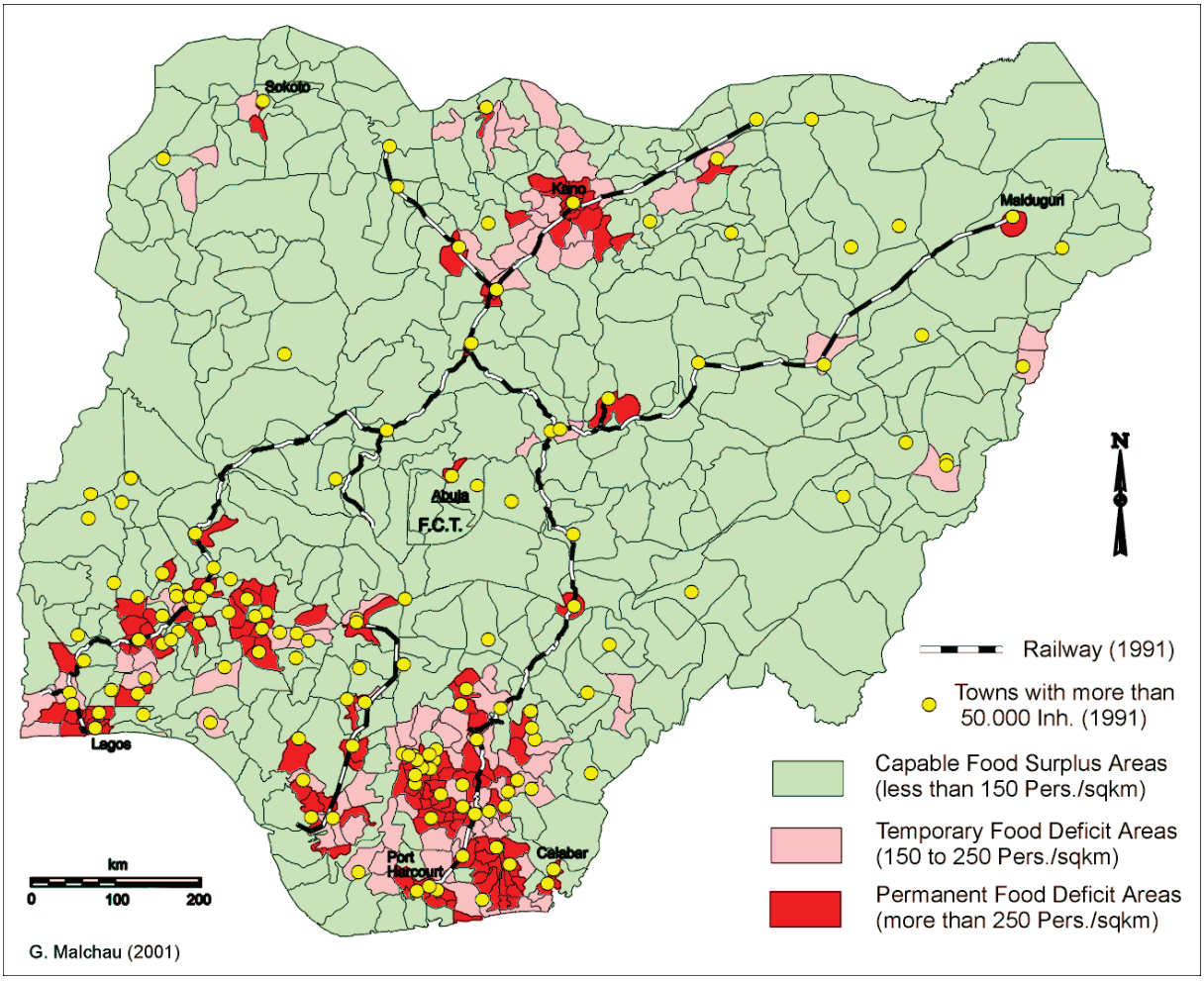
At least 62 million tonnes remain for consumption (see Table 4-3) and as already mentioned a volume of more than 30 million tonnes has to enter all levels (LGA, State, Federal) of the road transportation system. In reality the amount should be above, because only the part for actual consumption is taken into account and not the unknown tonnage of foodcrops, which was loaded in the producer areas but arrived in an inedible condition to the consumer markets.

4.3.1 Food Deficit Areas

Food deficit areas are areas with unsufficient food production for the own population. The reasons for an area to be a food deficit area can be numerous and although this term is coming from the discussion of carrying capacity it does not necessarily mean that the population is starving. For example towns and town agglomerations are food deficit areas like Lagos, Kano, Sokoto or the agglomerations in Yoruba and Ibo Land. Food has to be imported from the hinterland or if this is not possible from other regions with surplus production. But rural areas like the cocoa belt in the south west or the palm belt in the south east are also food deficit areas, not considering their high population density but their economic activities. The main agricultural products are cocoa, palm oil or rubber and not foodcrops like cassava or yams. Nevertheless there are other food deficit areas with inadequate climate and soils, small and scattered farms and high population densities where no economic substitution is obtainable. These areas are increased out-migration areas as long as already migrated family members are not taking care of their relatives. In the reverse case money flows are the compensation to buy foodstuffs from other regions.

The inter-state and inter-regional trade in Nigeria is basing mainly on the existence of food deficit areas, they are poles magnetizing transportation flows from food surplus areas. Map 4-4 shows food deficit areas in Nigeria calculated and classified on LGA-level (1991) for projected 1999 population data. For the demonstration calculations from W.B. MORGAN & J.C. PUGH (1969, 126pp) were used, who collected investigation material from the south to the north in Nigeria for different farming and cropping zones to find out the highest population density in rural areas which can be self-sufficient on their own production of food crops. In average there are two classes, the first up to 150 persons per km², the second more than 150 and up to 250 persons per km². The first class describes farmers who are still practicing rotational bush fallow, the second one are farmers with permanent cultivation. Although these investigations and calculations are more than fourty years old, they are still convenient regarding changes in agriculture. In agricultural production two different trends are obviously, expansion of production to new areas with low population densities

Map 4-4: Food Deficit Areas in 1999



Source: FAO (2001), Federal Office of Statistics (1998, and own Calculations on Population Census Data 1991

and growing new species of crops in densely populated areas, which helps temporarily to avoid reducing yields on exhausted soils. These trends together are not modernization or development of agriculture in the sense of higher output per acre. The real use of fertilizer which would be an input in the middle belt and especially in the north can be neglected because of (black) market and price structures. Respecting these circumstances the classifiction of MORGAN & PUGH was still helpful for the current illustration (Map 4-4), which makes use of three classes. The first class are permanent food deficit areas with more than 250 persons/km². These are LGAs with bigger towns, and rural areas sometimes with very high population densities (up to 800 pers./km²) as it is the case in the palm belt, the cocoa belt, some places in the Niger delta and around Kano. The majority of people living in this areas has to buy foodstuffs on markets throughout the year. The second class are temporaray food deficit areas with population densities between 150 and 250 persons/km². Here it depends on the specific conditions like soils, climate, farm size, farming methods, kind of crops etc. - many combinations are imaginable, if somebody has to buy on markets throughout the year, from time to time or even if a surplus of foodcrops can be produced. Because it was not possible to find out the economic activities of all LGAs concerned, they were put together into one class. The third class regards population densities less than 150 persons/km². This group of LGAs should be able to produce sufficient quantities of foodcrops for themselves and/or a surplus for other areas. However the same is true, it depends on specific conditions as

described for the second class. The agricultural activities of all LGAs concerned were not known, and therefore they were also put together into one class.

4.3.2 Transportation Flows

Although it is not so difficult to identify food deficit areas on the basis of population densities it is much more difficult to do the same with food surplus areas. The best method to know food surplus areas (and food deficit areas) is the measuring of production and consumption (R.K. UDO 1971, 426), apart from that the tendency and direction of transportation flows will be another result.

Last production data are available from the Federal Office of Statistics for 1999, unfortunately not on state level for the most important foodcrops. Nevertheless it was possible to extract production data for cereals and rootcrops on macro-zone level (definition of macro-zones see Appendix 4-4) with the help of FAO statistics from 1998 and a study from the Federal Ministry of Transport basing on 1998 data. Consumption data were calculated with help of census population data (1991) projected to 1998 and the average consumption of calories per person, day and product as shown in Table 4-3. Special diets were considered as far as root crops are more common in the south, cereals except imported wheat and rice are more common in the north and for the middle belt both groups were equal weighted.

As already mentioned a volume of 30 million tonnes was estimated for long distance trade in 1999. Rootcrops and cereals with altogether 19,1 million tonnes (or 64% of total transportation for agricultural products) are handled in the next two chapters. For vegetable oils, vegetables, fruits and fish only some commentary are given, because either the quantities were too small for a method as used for rootcrops and cereals or it was not possible to locate and quantify surplus and/or deficit areas.

Total production of vegetable oils was given with 1,97 million tonnes in 1999. The majority comes from groundnut oil (0,61 million tonnes) and from palm oil (1,15 million tonnes). Groundnut oil is mainly used in the producer areas in the north, but unknown quantities are also transported to the south west (Lagos, Ibadan) and the south east (Port Harcourt, Aba, Onitsha). Palm oil (and palmkernel oil) has their main production area in the south east and with minor importance in the south west. It is the most common cooking oil in the south, but also in parts of the middle belt and within a large minority of Ibo people in Kano. Additionally soap factories in the south east and in Lagos are delivered. Probably more than 500,000 tonnes are leaving the south east on destinations to the south west including Lagos and to the north with Kano.

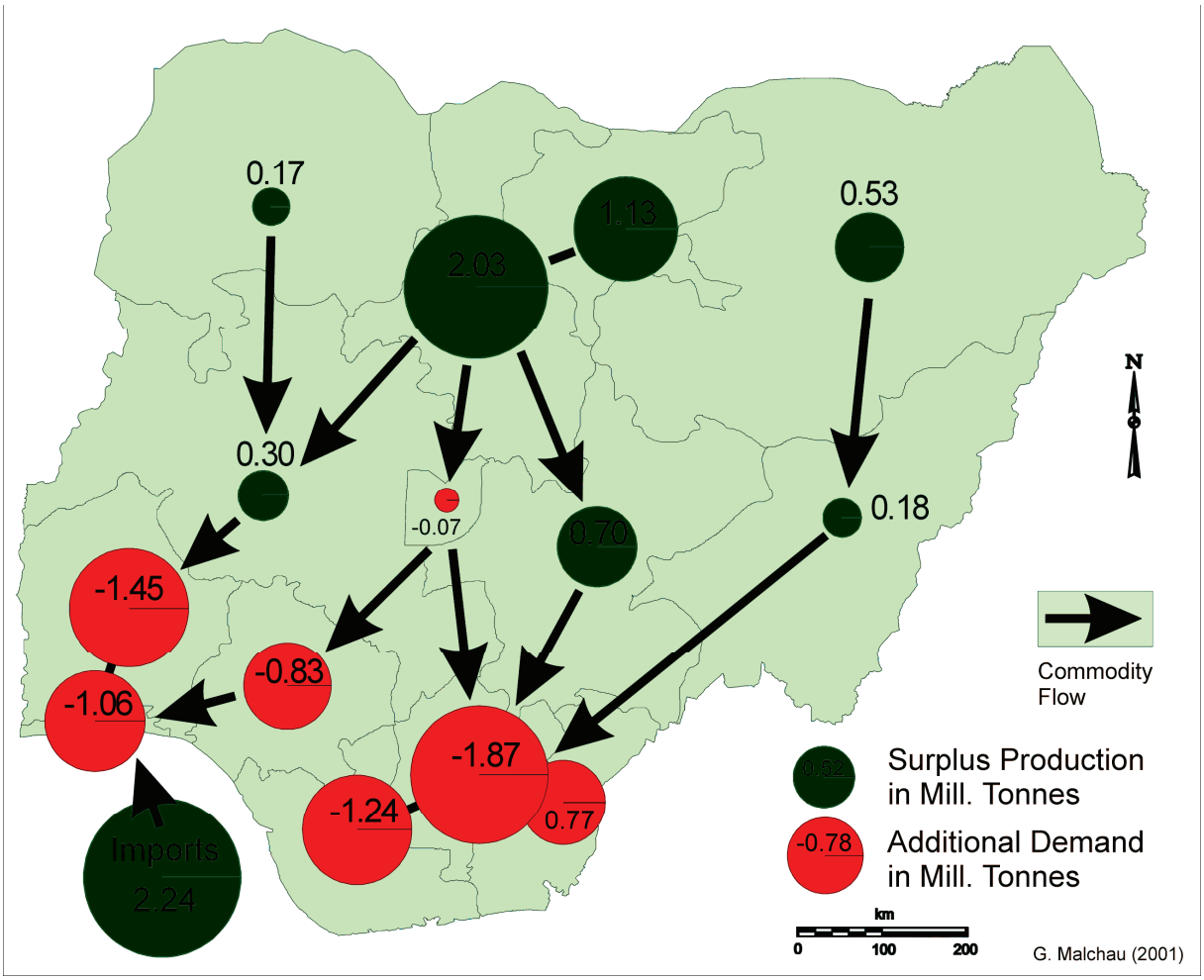
Vegetables (total production 7,8 million tonnes) are agricultural products grown in the house garden or near the compound. If not consumed by the producer the surplus will be sold on the next town market. There are two important exceptions: onions (ca 600,000 tonnes) and tomatoes (880,000 tonnes). The main production areas for onions are Sokoto, Kaduna and Katsina State, to a lesser extent Bauchi, Gombe and Borno State. Possibly more than 50% of the harvest is sent to the large agglomerations in the south west and south east. Tomatoes are grown all over Nigeria but the good qualities and large quantities are coming from Katsina, Kano, Bauchi and Gombe. Another important tomatoe producing area can be found in Ogun and Oyo State. Transportation flows of some 100,000 tonnes of onions and tomatoes are going from the north to the south west and especially to the south east.

Important fruits for inter-state transportation (total production 8,9 million tonnes) are citrus fruits (more than 1,0 million tonnes). Benue and the north of Anambra and Cross River State are the main cultivation areas with transportation flows to all parts of the country. Leading production area for plantains - another important fruit and daily southern dish (1,9 million tonnes) - are Cross River and Enugu State, they are producing together 90% of the total output, which is mainly delivered to all southern States and to a smaller extent to the north.

Fish as salt water and sweet water type is very common along the coast, the big rivers Niger and Benue and in the Lake Tchad region. 383,000 tonnes have been produced in 1999 and another 240,000 tonnes were imported from abroad and also from overseas. Transportation over long distances is not very usual and the trade is more regional, because even smooked fish is not lasting a long time in the humid climate of the south. Transportation of fresh fish in special deep freezer cars is an exception, nearly the complete infrastructure is absent.

4.3.3 Cereals

Map 4-5: Transportation Flows of Cereals in 1999 (Sorghum, Millet, Maize, Rice and Wheat



Source: FAO (2001), Federal Office of Statistics (1998), Federal Ministry of Transport (2000), own Calculations on Population Census Data 1991, and Production Data 1999

Cereals are together with rootcrops and vegetable oils the most important components of the daily calorie intake (see Table 4-3). The volume of transportation for sorghum, millet, maize, rice and wheat produced in Nigeria came to 5,04 million tonnes in 1999, in addition 2,24 million tonnes wheat and rice were imported mainly through Lagos. Map 4-5 shows the demand or supply of each of the 14 macro-zones defined in Appendix 4-4. The data for the macro-zones are already balanced, that means the own production of cereals was taken into account and reduced by the own demand which is a function of the population number and the consumption per year, person and macro-zone.

The main production and surplus areas for cereals, particularly wheat, millet and sorghum are in the north. Smaller production and surplus areas for sorghum and maize can be found in the middle belt. Here should be an additional potential for surplus production in future. Maize and Rice are also produced in the south. But the quantities are too small for the large number of consumers and can not satisfy the demand. Additional supply from the north is inevitable, although especially the urban agglomerations in the south west and south east prefer imported white rice. For baking white bread, which is very common in the south and brewing beer also imported wheat is used. However there are methods developed to manage the brewing process with sorghum instead of wheat. These imports through Lagos are going mainly to the south through Lagos/Ibadan, Benin and Onitsha axis, only a smaller quantity is arriving to the big towns in the north.

The most important transportation routes from the north to the south starting in the Kano area continuing to Kaduna and split into two routes to the south either through Jebba to Ibadan and Lagos or through Abuja and Lokoja to the Delta area. Another route from the north takes the road through the Jos Plateau and Markurdi to the south east.

4.3.4 Rootcrops

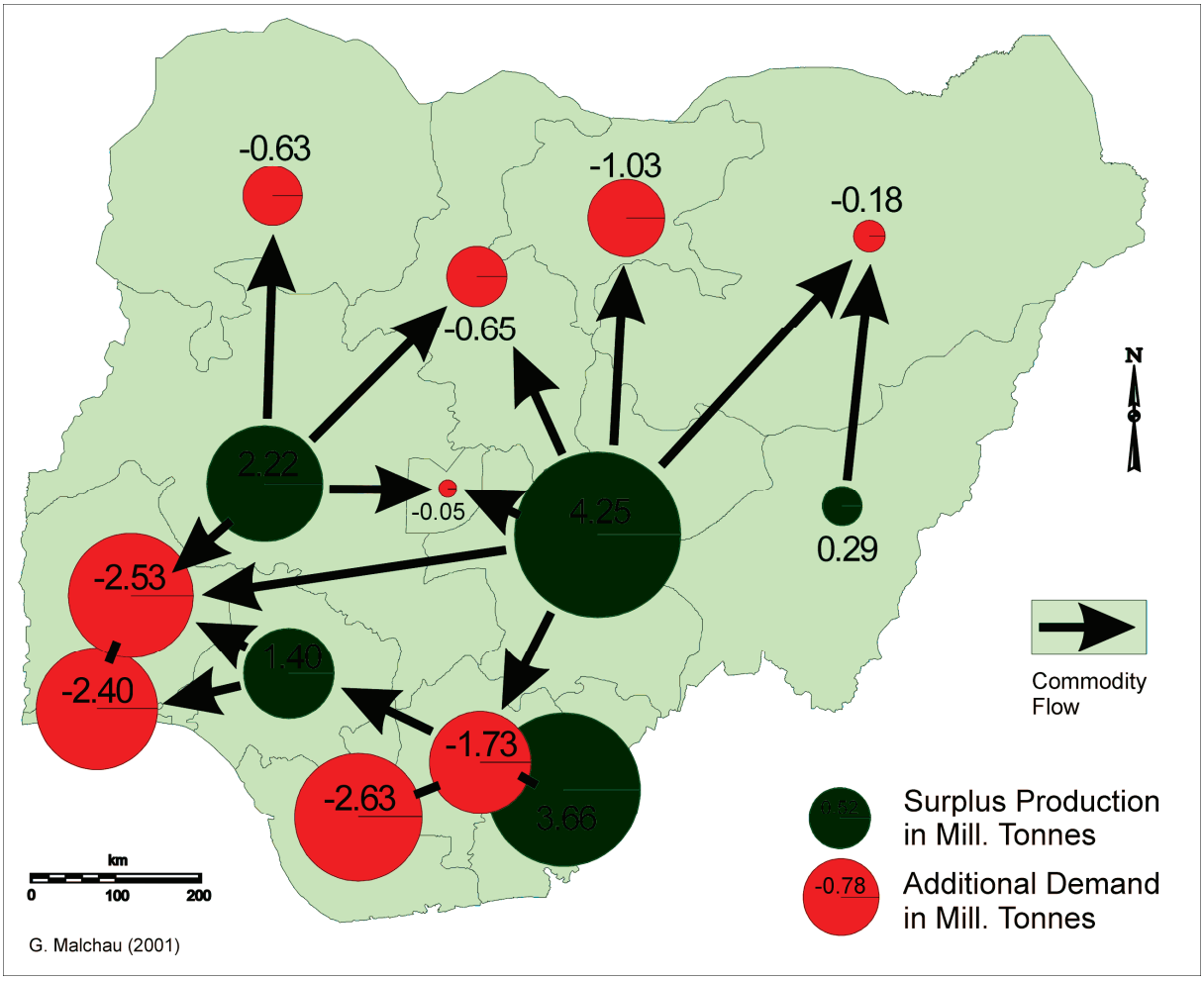
Rootcrops are a more common diet in the south and the consumption here was double weighted. The transportation flows between surplus and deficit areas represent mainly yams (production for food consumption 10 million tonnes in 1999) and cassava (production for food consumption 14 million tonnes in 1999). Cocoyam with around 1 million tonnes is of minor importance. The volume of long distance trade was calculated to around 11,8 million tonnes, although the real load as in the case of cereals too may be higher regarding the waste factor.

Cassava, Yams and other rootcrops are produced throughout the south and the middle belt. In the north cassava is growing only in smaller quantities and the north is a complete deficit area. The demand for Kano area is relatively high because of the large minority of Ibo people and other southerners living in Kano.

The other two deficit areas can be found in the south itself. The delta and parts of the south east belonging to it as well as the western part of the cocoa belt and Lagos. The surplus area between Akure, Ondo and Benin and the second one in northern Cross River State together are not sufficient for the total demand of the south. Additional quantities of rootcrops from the middle belt are necessary and the most important surplus area in Nigeria is located between Jos Plateau and river Benue. From here transportation flows to deficit areas all over Nigeria originate. Another considerable surplus area of the middle belt for root crops is situated in the western part.

Already nowadays the middle belt is an important resource for root crops especially for the densely populated south. The long distance trade with root crops is not a trade in only one direction, it has to be distinguished into three components. At first the middle belt – north trade, secondly the middle belt – south trade and thirdly the south east – south west trade. The main north - south routes are (Kano) – Jebba – Lagos road and (Kano) – Jos –Makurdi – Port Harcourt road, completed by Abakaliki – Enugu – Onitsha – Lagos road.

Map 4-6: Transportation Flows of Rootcrops in 1999 (Cassava, Yams, and Cocoyam)



Source: FAO (2001), Federal Office of Statistics (1998), Federal Ministry of Transport (2000), own Calculations on Population Census Data 1991, and Production Data 1999

4.4 PROJECTED PRODUCTION OF FOOD CROPS IN 2020

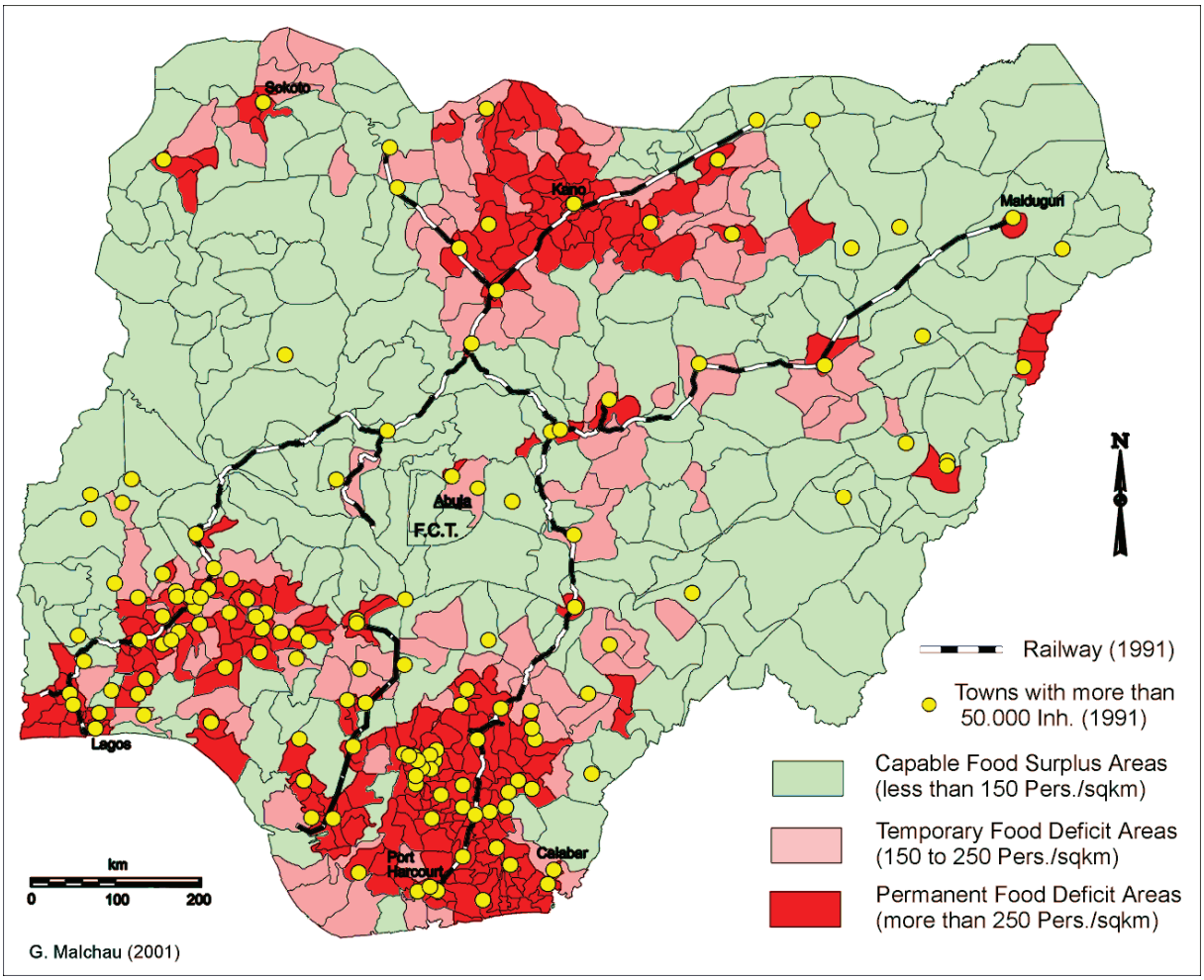
4.4.1 Food Deficit Areas

The projected food deficit areas for 2020 are calculations basing on the population census from 1991 and the population projections of FAO for 2020. These projections giving an average annual population growth rate of 2.22% from 1999 to 2020, and this growth rate was used for all LGAs. Migrational tendencies are not taken into account, that means actually some LGAs classified as temporary food deficit areas with 150 to 250 persons/km² could be wrong recorded and belong to the capable food surplus areas. The average growth rate value of 2.22% can be splitted into 0,72% per annum for the rural population and 3,97% per annum

for the urban population (FAO, see Figure 4-1), but it was not possible to use the splitted growth rate for the calculations of the map. Nevertheless in 2020 probably 98 million persons are living in towns and 70 million persons in rural areas - altogether 168 million inhabitants.

Map 4-7 uses the same classifiction scheme as Map 4-4 for better comparability, although the next 19 years should bring a development for better yields per hectare of foodcrops. If this will be the case the classification scheme probably is too conservative and more capable food surplus areas would be visible.

Map 4-7: Projected Food Deficit Areas in 2020



Source: FAO (2001), Federal Office of Statistics (1999, and own Calculations on Population Census Data 1991

The most substantial result of this map is the huge extention of permanent food deficit areas in the south east, the delta, the south west and also in the north. Some new kernels of high population densities and potential food deficit areas in future are rising up, for example the Jos - Makurdi – Gboko axis, the Kano – Katsina axis and the Sokoto – Birnin Kebbi axis. Some of them are important food surplus areas for basic foodstuffs at present.

The last chapter shall discuss some necessary changes in agriculture regarding production of rootcrops and cereals and consumption matters at present and in future.

4.4.2 Projection for Food Surplus Areas in 2020

The per capita supply in calories per day is sufficient at present in Nigeria, what of course nothing says about the distribution of foodstuffs to the single consumer. Nevertheless the projection for the consumption of basic foodstuffs in 2020 as shown in Table 4-3 assumes that the per capita supply will not change, particularly will not deteriorate. In this case the production of rootcrops for human consumption has to increase from 26.2 million tonnes to 39.7 million tonnes and that of cereals from 16.7 million tonnes (including 2.3 million tonnes imports) to 25.3 million tonnes. The share of imported wheat and rice in 2020 is unknown, but it will not be possible to grow such a quantity of wheat in northern Nigeria to substitute imports. Even to try it is not senseful from an ecological and economical point of view. Rice would be easier to substitute especially if the offered types will have a better quality. The volume for far distance transportation of all groups of basic foodstuffs (see Table 4-3) will also increase from around 30 million tonnes now to more than 54 million tonnes per year in 2020. But the same volume of foodstuffs and even more has to be moved from the producer to rural or urban collecting centres over LGA and State roads, which are usually in a very bad condition. The short distance transport to these collecting centres - as many studies are showing - is in many cases as expensive as the following long distance transport. This is already a serious problem of the whole transportation system not to talk about difficulties in the distribution and availibility of diesel and petrol products. Long transportation time, long and improper storage at collecting centres which itself is a problem for perishible goods and high prices for transportation are the consequences.

The marketing system for many agricultural products in Nigeria is built up in a way that as many traders and lorry owners as possible can participate in the business. Sometimes transportation is more expensive than production of the commodity in the sense that traders and lorry owners have a better outcome with the commodity than farmers.

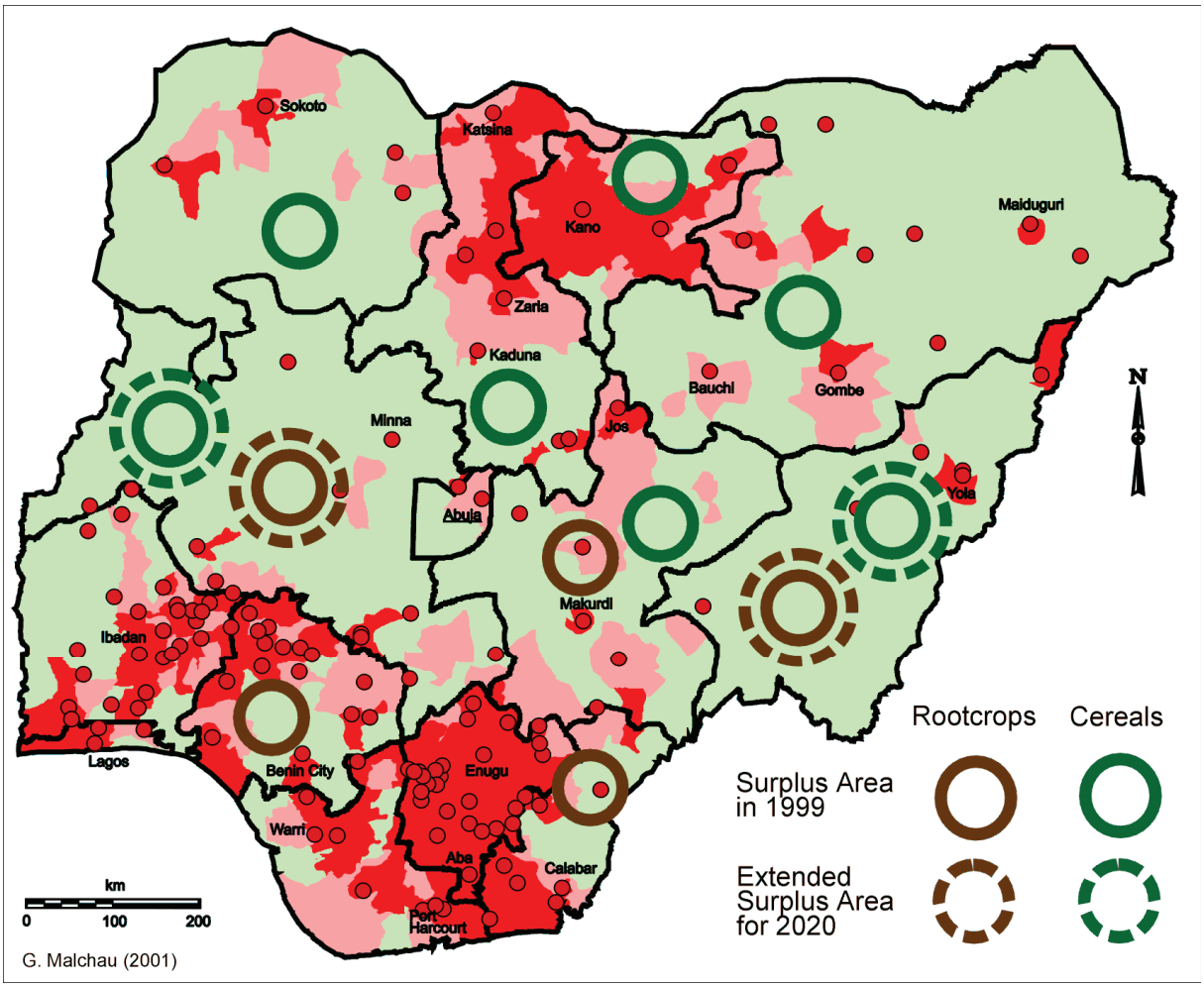
Fluctuations of consumer and producer prices are high, depending on the season (rainy and dry, harvest and planting, or religious celebrations) and farmers and traders try to speculate with their commodities. Long storage time of harvested products are the rule, particularly at the end of dry season and during the following rainy season. This behaviour is causing a high percentage of the waste factor with 30% of the annual harvest, because storage is improper in many cases and especially in the south with humid climate. It is not amazing that rootcrops have the highest waste factor. Probably only a working network of agric-industries for processing the raw materials into durable and storable products can offer a solution. Some companies of this kind have produced in the past, for example VEGFRU near Gombe (tin tomatoes and juice) or a factory in Bauchi was producing corned beef for the nigerian market, also to help avoiding imports of processed agricultural products. Most of them are closed because of infrastructural (e.g. energy) and management problems.

To guarantee the current per capita supply of calories per day for 2020, from own production and not from additional imports, Nigeria has several options.

Modernization of the agricultural sector, which includes security of land for farmers (nationwide land registry) to improve investments into agriculture, planned and regular use of N-P-K fertilizers particularly in the middle belt and north (of minor importance in the south, because of strong rainfalls which are transporting fertilizers to deep soil levels outside the sphere of roots), and slight mechanization, also only in the middle belt and north, especially for preparing the soils for planting, and imaginable in form of farmer cooperations.

Another option is the extention of farm land in the middle belt. Map 4-8 shows all surplus areas on macro-zone level (not necessarily the exact position) at present and the possible extention for 2020 for rootcrops and cereals in the east and west of the middle belt. The present surplus areas for rootcrops in the south probably will not be able to keep the output constant or even to increase it. The reasons are growing population densities with declining space of farmland and dimishing fertility of soils. Soils are impoverished of minerals because of permanent utilization, and as already mentioned it is not senseful to apply fertilizers in general. Only the surplus area between Benin, Akure and Ondo can propably be extented to the west to grow rootcrops instead of cocoa. A similar situation concerning increasing population densities will be met in the northern surplus areas for cereals. Apart from that the supply of water is another important problem – the annual quantity of rain is decreasing since 20 years and the annual fluctuation of rainfalls in time is also high. But in general the fertility of soils is better, and the application of fertilizers, if water is available, can even produce an improved output. Nevertheless the development prospects in the far north, in Sokoto and Borno State for example are limited. The western and eastern middle belt, with low population densities and still available farmland, is also for cereals the alternative of extended production.

Map 4-8: Macro-Zones and Food Surplus Areas in 2020 (Cereals & Rootcrops)



Source: FAO (2001), Federal Office of Statistics (1999), and own Calculations

The last option is regarding the waste factor. To avoid this factor or, what is more realistic, to reduce it to 5% or 10% of the annual harvest, would be sufficient - especially in the case of

cassava and yams – to balance the additional consumption in 2020. A network of adequate storage, and better combined with processing facilities for improved goods for consumers could be an answer to this unnecessary problem.

6 INDUSTRIES, RAW MATERIALS AND TRANSPORTATION

6.1 INDUSTRIAL STRUCTURE – AN OVERVIEW

Industries comprise manufacturing, mining/quarrying and power. However for a better understanding of the industrial structure of Nigeria the mining/quarrying subsector was splitted into "oil & gas", and "mining/quarrying excluding oil & gas" as shown in Table 6-1. Two facts are responsible for this splitting: The production of crude oil ("oil & gas") contributes to the GDP of the total mining/quarrying subsector more than 99%, and furthermore products of the oil & gas subsector are not entering the onshore transportation system of Nigeria.

Per definition the industrial sector includes the secondary sector and "mining/quarrying excluding oil & gas" for this chapter, and is in relation to the entire nigerian economy of minor importance (4.9% of GDP). Moreover, although the distribution of GDP in percent to single subsectors is extremely dependent on the fluctuations of the oil & gas subsector and therefore on world market prices for oil, a decreasing share of the secondary sector is obviously during the last years from 1995 to 2000 (see Table 6-1). The contribution to total GDP of the "mining/quarrying excluding oil & gas" subsector is neglectable throughout the years (0.1 to 0.2%).

Table 6-1: Distribution of GDP in Percent by Sector of Origin (1995-2000)

	1995	1996	1997	1998	1999	2000
Primary Sector	***72.1***	***74.4***	***72.6***	***66.1***	***63.9***	***68.0***
Agriculture (all)	31.6	30.7	33.6	38.9	35.4	28.5
Mining / Quarrying (excl. Oil & Gas)	0.1	0.1	0.1	0.2	0.2	0.1
Oil & Gas	40.4	43.6	38.9	27.0	28.3	39.4
Secondary Sector	***6.2***	***5.5***	***5.8***	***6.2***	***5.7***	***4.8***
Manufacturing	5.4	4.8	5.1	5.2	4.7	3.9
Building and Construction	0.7	0.6	0.6	0.9	0.9	0.8
Utilities	0.1	0.1	0.1	0.1	0.1	0.1
Tertiary Sector	***21.7***	***20.1***	***21.6***	***27.7***	***30.4***	***27.2***

Source: IMF (2001), and own Calculations basing on Current Prices 1995-2000

At current prices the GDP for the secondary sector stood at 1,821 million US$ in 2000, and at 42 million US$ for the mining/quarrying subsector without oil & gas (IMF 2001). In 1990, when a sectoral GDP of 8.5% was realized, up to 10% of the working power were estimated to be engaged in the secondary sector, but at present this share has to be considered even on a lower level.

The manufacturing subsector (3.9% or 1,518 million US$ of total GDP) includes food & beverages, textiles, petrochemicals (also refined petroleum), steel, vehicle assembling and others, for example soap production. The building and construction subsector (0.8% or 269 million US$ of total GDP) which includes cement, roofing sheets and building timber production normally belongs also to the manufacturing subsector, but because of the

progressing urbanization process and the importance for the nigerian economy in future it was separated (see 6.3.4). Unfortunately GDP data for the power subsector (electricity generation) were not available.

6.1.1 Oil & Gas Sector

According to the definition given above, the oil & gas subsector does not belong to the industrial sector for this report. Nevertheless a short overview has to be given, because of the importance of this subsector for the industrial development process in Nigeria, and if necessary additional commentary will be given (see 6.2.2 and 6.3.2).

Since 1973 more than 90% of export earnings are coming from the oil & gas sector. The oil & gas sector which is organized in form of joint ventures between international oil companies and the Federal Government (majority of interest held by Nigerian National Petroleum Corporation, NNPC) is the cornerstone of the nigerian economy and responsible for around 80% of total Government revenues. The quality of crude oil is good (sweet, low sulfur content), and the quantity of proven oil reserves is estimated to 22.5 billion barrels. A present production of 2.1 million barrels/day will allow an utilization for more than 30 years.

Apart from crude oil Nigeria has proven natural gas reserves of 124 trillion cubic feet, the 9th largest in the world. Export of liquefied natural gas (LNG) could become another important source of income in future. First steps have already been done with the completed LNG facility on Bonny Island in 1999 and the Escravos gas project (EGP). The gas-to-liquid (GTL) plant is another project, which is scheduled to be completed in 2005. Partly the gas projects can use flaring gas – a by-product of crude oil production which is/was due to lack of gas utilization infrastructure mainly flared (75%), and therefore wasted.

Without export earnings from the oil sector, the Federal Government would not be able to invest into a non-oil industrial sector at present and, as done, in former times. Here the importance of the oil sector for the industrial sector has to be seen, although the result (4.9% of GDP in 2000) is not agreeing with the plans of the 1970s.

6.1.2 Industrial Sector

At the beginning of the 1970s plans of the Federal Government were implemented to develop a strong industrial sector for the growing demand on the nigerian market. One of the backgrounds was the substitution of imports like steel and manufactured products. At the same time a geological survey had shown, that deposits of raw materials like iron ore at Itakpe and coking coal at Lafia were sufficient in quality and quantity to build up an own integrated steel complex as foundation for an industrial sector. At first Ajaokuta Steel project was commissioned in 1979, followed by Delta Steel plant (1981) and three rolling mills at Oshogbo, Jos and Katsina (1982). In 1989 another project was incorporated. It is the aluminium smelter (ALSCOM) at Ikot Abasi, which is mainly built for exports and which uses natural gas resources for the production process like Delta Steel. These gigantic projects were accompanied by others, for example the Kainji dam with a hydroelectric power station, car assembling factories like Volkswagen of Nigeria and Peugeot of Nigeria, and infrastructural projects for the steel complex like Itakpe – Ajaokuta – Warri railway line.

Billions of US$ were invested from the Federal Government into these projects by using export earnings from the oil & gas sector.

In addition to the steel complex a petrochemical complex was planned and built up in the 1970s and 1980s including three refineries (Warri, Port Harcourt II and Kaduna; Port Harcourt I was already built by Shell-BP in 1965), two petrochemical plants at Port Harcourt and Kaduna for polypropylene, ethylene, butan and other products, and three fertilizer plants at Warri, Onne and another one between Kaduna and Gusau. And at least the above mentioned gas projects were implemented in the 1990s.

Table 6-2: Imports of Selected Goods in Millions of US$ (1993-1998)

	1993	1994	1995	1996	1997	1998
Crude Materials	215.6	121.5	360.8	422.9	415.2	407.9
Mineral Fuels	41.5	41.7	111.7	135.0	119.9	126.9
Chemicals	1,418.1	874.7	2,259.0	2,141.4	2,094.6	2,084.8
Manufactured Goods	1,990.3	774.0	1,992.8	2,528.3	2,694.4	2,692.1
Machinery & Transport Equipment	3,516.2	1,082.9	2,362.1	2,105.4	2,214.6	2,121.1
Miscellaneous Manufactured Goods	315.1	156.2	352.2	323.9	387.6	353.5
Others (incl. Agricultural Products)	796.1	3,420.0	1,150.9	1,340.7	1,301.1	1,278.1
All Imports	*8,292.9*	*6,471.0*	*8,589.5*	*8,997.6*	*9,227.4*	*9,064.4*

Source: IMF (2000)

Despite years of effort the performance of the steel and petrochemical complex as backbone of the industrial sector is unsufficient. Ajaokuta steel project is not completed. Delta steel plant, which was designed to feed the three rolling mills at Oshogbo, Jos and Kaduna with billets, can only produce with imported iron ore from Brazil. The four refineries are not working because of sabotage, fire, poor management and lack of turn-around maintenance (TAM). The refinery problems led to massive fuel shortages throughout Nigeria and the dependent petrochemical plants were also not able to produce chemical basic products and fertilizers.

These difficulties are reflected in the import statistics (see Table 6-2) of the industrial sector throughout the last years. GDP of the manufacturing subsector was given with 166,247 million Naira or around 1,518 million US$ in 2000. Against this amount are standing imports for example of 2,121 million US$ for manufactured goods, 2,084 million US$ for chemicals, 126 million US$ for mineral fuels, and 407 million US$ for crude materials. In summary: The industrial sector is heavily dependent on imports, which was exactly one of the goals, the Federal Government wanted to avoid with her industrialization program.

Another dilemma, which particularly is targeting private owned small scale and middle scale industries, is power generation. Supply of electricity from state owned NEPA (National Electric Power Authority) is irregular, frequent breakdowns and absence of light for days is avoiding regular production of these industrial companies. Irregular power supply is one of the reasons for a low rate of around 30% of production capacity in the industrial sector.

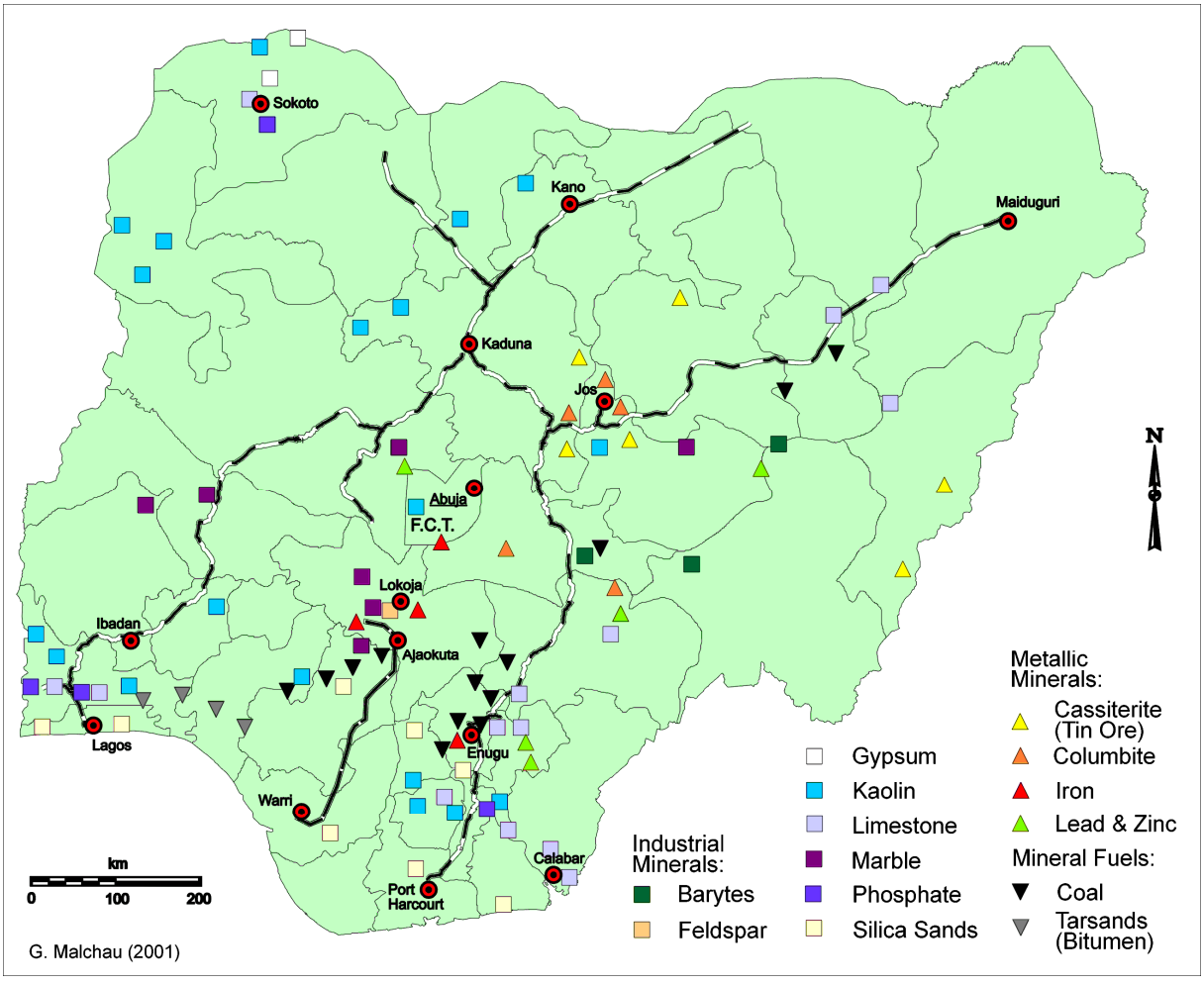
6.2 REGIONAL DISTRIBUTION OF IMPORTANT DEPOSITS

6.2.1 Solid Minerals

In 1996 a new Federal Ministry of Solid Mineral Development was established. An inventory of this ministry showed, that around 33 solid mineral commodities are occuring in about 450 locations nationwide, distributed in almost all the states of Nigeria. A regional distribution of the most important solid mineral deposits with active or explored mines, and classified into industrial minerals, metallic minerals and mineral fuels is given in Map 6-1.

Although Nigeria was an important producer of solid minerals in former times (tin, columbite and coal), at present the solid mineral production is on a very low level. Tin and columbite production at Jos is nearly down because of world market prices – Nigeria was the world largest producer in this field. Coal production at Enugu was left without a market in Nigeria, after the Nigerian Railway Corporation (NRC) changed to diesel engines in the 1970s and electricity generation is basing on diesel, gas and hydro-power. The largest project now is Itakpe iron ore mine, which is waiting for the completion of Ajaokuta Steel complex and the restoration of Delta Steel near Warri.

Map 6-1: Regional Distribution of Important Solid Mineral Deposits (active or explored mines)



Source: BALOGUN, O.Y. (2000), Ministry of Solid Minerals Development (1999), MOBBS, P.M. (1997)

At the moment the most important solid mineral deposits for the nigerian economy as well as for the transportation sector are limestone and gypsum (production data see Table 6-3) used for production of cement. Another important sector is the production of aggregates and stones with 4.69 million tonnes in 1997 (last available data). Aggregates and stones are used for building purposes, roads, railway lines, dam foundations and harbour work. But neither limestone and gypsum nor aggregates and stones are transported over long distances, their mines are delivering projects and factories nearby within a radius of perhaps 50 km.

Nevertheless there are potentials for future mining and industrial processing, for example coal for export or new power plant projects. Nigerian coal is one of the most bituminous in the world due to its low sulpur and ash content and therefore very environment friendly. Another example is brown coal. Large deposits in the tertiary sediments east and west of River Niger can be used to produce coal pellets for industrial use and coal briquettes for domestic use to replace firewood.

Table 6-3: Production of Important Solid Minerals

Minerals	**Production in Tonnes**				**Estimated Reserves of Active or Explored Deposits (Tonnes)**
Industrial Minerals	**1994**	**1995**	**1996**	**1997**	
Barytes	N/A	75,000	131,620	147,645	730,000
Feldspar	N/A	3,722	800	1,225	N/A
Gypsum	N/A	150,000	383,250	432,559	3,000,000
Kaolin	N/A	11,950	102,078	125,219	91,600,000
Limestone	2,908,641	3,127,725	2,095,219	2,430,719	145,000,000
Marble	7,794	66,582	28,602	22,249	64,000,000
Phosphate	N/A	N/A	N/A	N/A	45,200,000
Silica Sands	N/A	N/A	N/A	N/A	2,000,000
Metallic Minerals					
Cassiterite (Tin Ore)	208	357	3,584	3,964	2,400,000
Columbite	17	65	57	496	N/A
Iron	N/A	N/A	31,912	72,484	280,000,000
Lead & Zinc	N/A	N/A	110	13	14,700,000
Mineral Fuels					
Coal/Lignite	N/A	N/A	27,116	9,829	2.74 billion
Tarsands (Bitumen)	-	-	-	-	42.7 billion Barrels

Source: Ministry of Solid Minerals Development (1999)

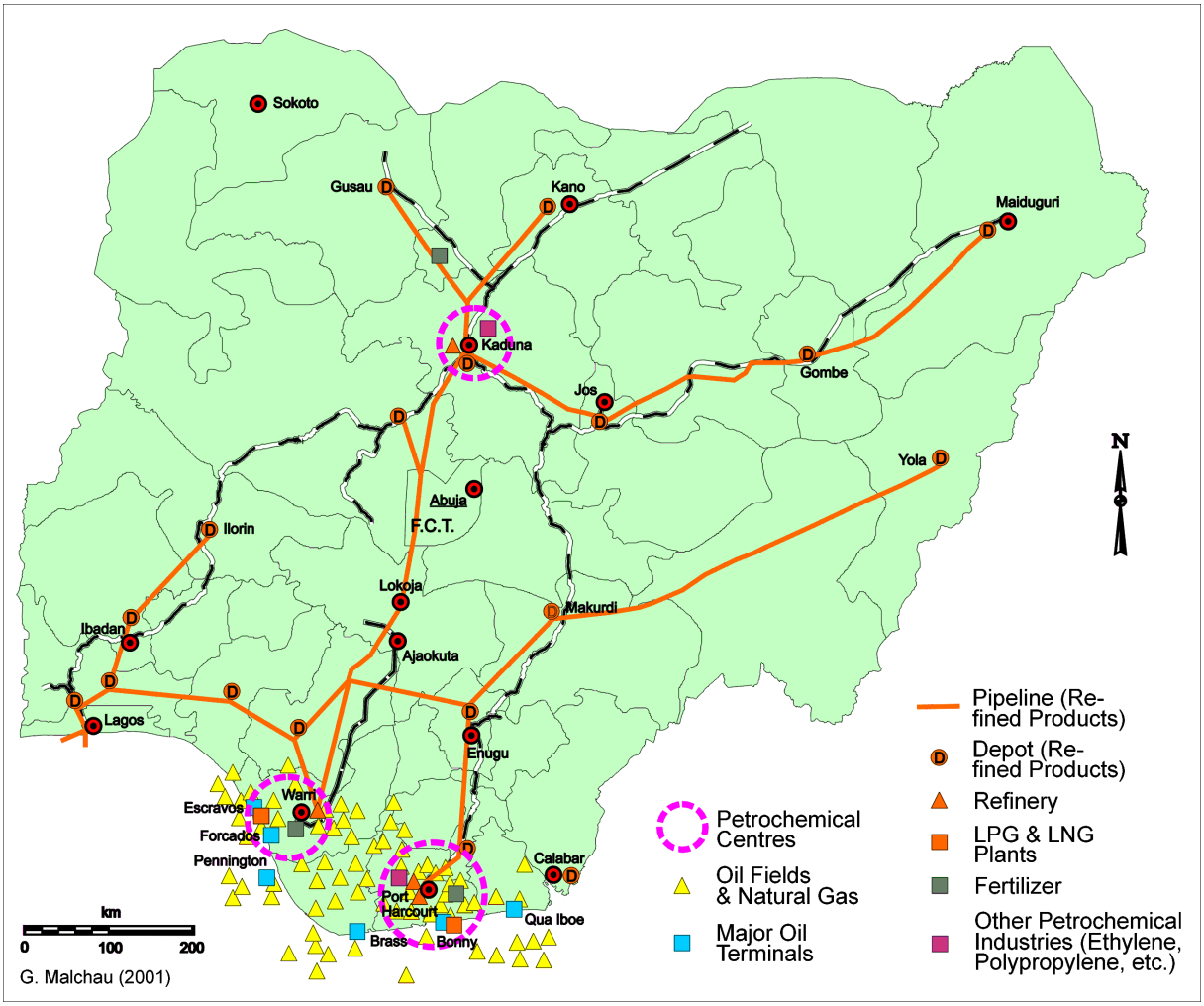
Lignite which is found in Delta State, can be used in industrial production of tar, gas, oil and (nitrate) fertilizer. Tin which is found in Plateau State, can be used in paint, paper and ink industries as far as the world market price will allow such a project. There are salt springs at Awe (Plateau State), Abakaliki (Enugu State) and Uburu (Imo State), while rock salt is available in Benue State. A total reserve of 1.5 billion tonnes has been indicated. The national

demand for table salt, caustic soda, chlorine, sodium bicarbonate, etc. is estimated up to one million tonnes per year and has to be imported up to the presence.

But the most important solid mineral deposits in future will be the Bitumen (tarsand) deposits in Ondo State and Ogun State. About 43 billion barrels (petroleum equivalent) are the current known reserves, which is twice the quantity of known crude oil reserves. An industry basing on this raw material will not only meet local requirements for road construction (in some areas of the deposit belt the tarsand can be extracted directly as asphalt binder without refining), fuels and petrochemicals but will also become a foreign exchange earner for Nigeria.

6.2.2 Oil Fields and Natural Gas Deposits

Map 6-2: Oil Fields, Natural Gas Deposits and Related Industries



Source: BALOGUN, O.Y. Atlas (2000), Federal Office of Statistics (1999), Factfinder Nigeria (1998), MOBBS, P.M. (1997), Länderbericht Nigeria (1992)

The search for oil began with geological studies of the Mineral Survey Company in 1903. A german company – the Nigerian Bitumen Corporation – got the first licence in 1908 to explore for oil, although without any success. In 1956 the first successful drill was made at Afam in the Niger Delta. In 1958 already 5,100 barrels per day were produced, and the

production peaked at 2.44 million barrels per day in 1979. The current OPEC allocation for Nigeria is around 2.1 million barrels per day.

Nigeria has estimated proven oil reserves of around 22.5 billion barrels. Almost all of these reserves are found in relatively simple geological structures along the coast and the delta of River Niger (see Map 6-2). The majority of the oil and gas lies in about 250 smaller fields, but at least 200 other fields are known to exist and contain reserves, which are not estimated till now.

NNPC which owns a 60% share in the major onshore and offshore joint ventures, plans to increase oil production to 5 million barrels per day in 2010.

6.3 INDUSTRIAL PRODUCTION AND LOCATIONS IN 1999

6.3.1 Manufacturing

The most important subsectors of manufacturing in terms of tonnage for transportation (Table 6-4) are food and beverages especially softdrinks and beer, petrochemicals in form of fuel and kerosine for cooking purposes (see 6.3.2), and building and construction which covers mainly cement (see 6.3.4).

Three industrial centres can be identified, two in the south between Lagos and Oshogbo, and Port Harcourt and Enugu, one in the north between Kaduna and Kano (see Map 6-3). In addition to the industrial centres three petrochemical centres can be identified around Port Harcourt, Warri and Kaduna (see Map 6-2).

Analysing the production data of some important goods for the nigerian market (see Table 6-4) it can be realized that almost all groups are showing decreasing figures from 1991 to 1995 (last available data). The manufacturing capacity utilization is given with 42% for 1991 and 32.5% for 1995 (CBN), and around 30% are estimated for 2000. There are several reasons responsible for this development. Almost all subsectors of manufacturing are dependent on imports, although this was not the strategy of the Federal Government when the first industrial development plans were initiated in the 1970s. This dependence on imports results mainly in the fact that required raw materials and other products are not available on domestic markets. Another reason was the fast devaluation of the Naira against US$ in the 1990s. For example the vehicle assembling subsector had to import 90% of the materials from parent companies abroad, which was manageable as long as the Naira was strong. At present companies like Volkswagen of Nigeria and Steyr of Nigeria are not producing again, only Peugeot of Nigeria is still assembling some dozen cars per month. A third reason has to be seen in the irregular power supply, which is a huge pressure of costs, especially for private enterprises.

Even those subsectors, which can buy their raw materials on domestic markets have decreasing production figures. Between 60% and 70% of the raw materials used in the textile industry are sourced locally. The industry is labour intensive, with little mechanization; and it is estimated that it provides employment to around 150,000 workers. The major textile enterprises are located around Lagos, which has the majority of spinning and weaving mills, and other significant textile enterprises are located around Kano and Kaduna. But nevertheless better qualities of textiles made from cotton or synthetics are imported from Europe or Taiwan and China, and the market for nigerian made textiles is dwindling.

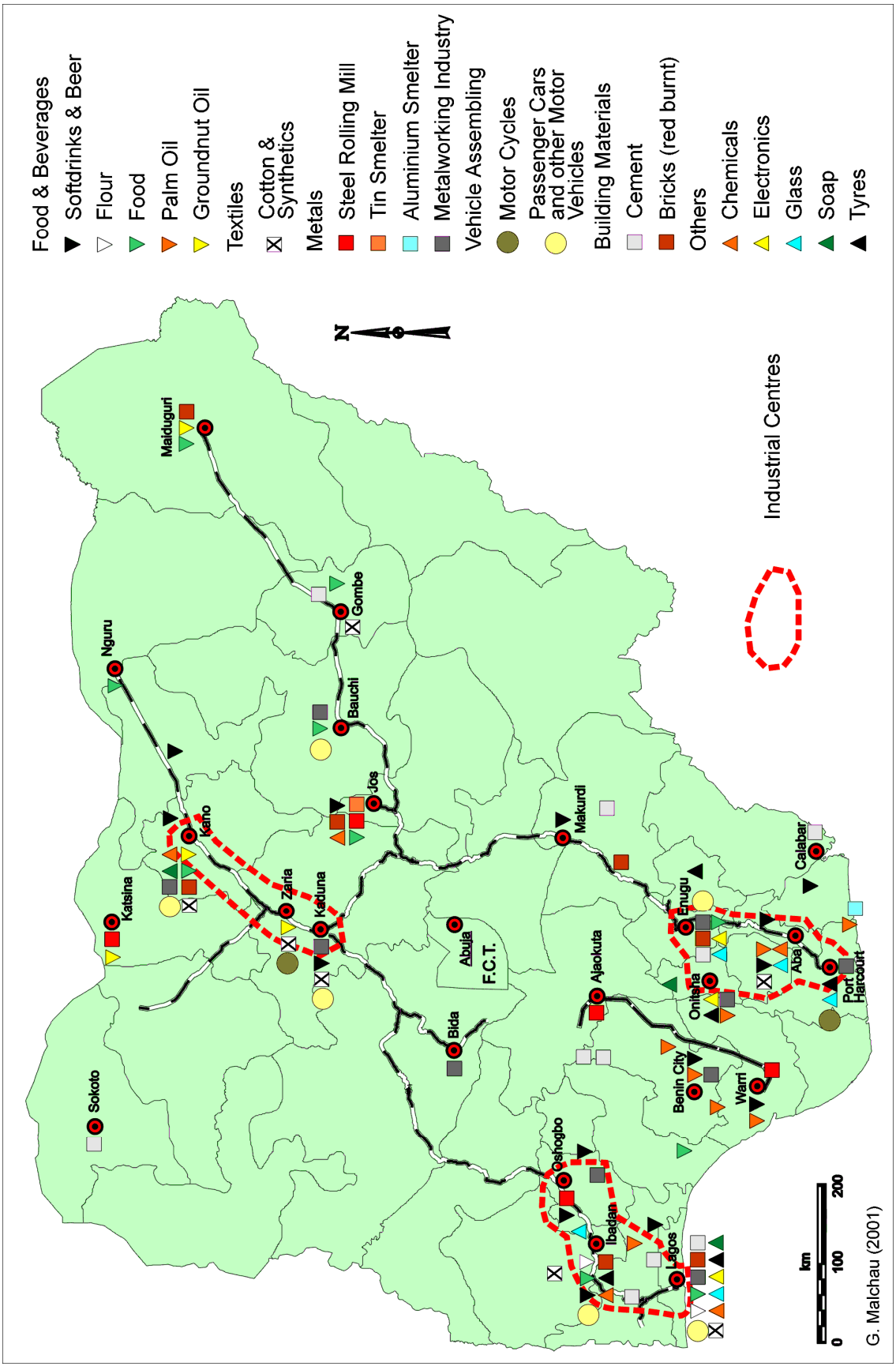
Table 6-4: Production of Selected Goods for Domestic Markets (1991-1995)

Goods	Unit	1991	1992	1993	1994	1995
Food &Beverages						
Softdrinks	Hectolit.	12,003,740	13,433,311	13,458,350	13,219,072	3,756,256
Beer	Hectolit.	8,107,604	7,281,914	16,859,974	23,970,125	1,461,038
Flour	Tonnes	8,416,679	8,397,420	361,783	479,281	251,216
Sugar Confection.	Tonnes	43,501	58,451	61,192	63,284	15,807
Textiles						
Cotton Textiles	1000 m²	394,708	398,424	393,286	379,510	113,296
Synthetic Textiles	1000 m²	327,169	301,430	309,298	308,627	23,650
Petrochemicals						
Premium Motor Spirit	Tonnes	3,625,656	3,821,872	3,316,552	2,149,876	2,700,017
Autom. Gas Oil	Tonnes	2,990,945	2,855,601	2,671,656	1,695,980	2,280,401
Kerosine	Tonnes	1,905,655	1,506,087	1,578,944	968,252	1,437,132
Fertilizers	Tonnes	334,200	N/A	541,373	393,520	610,091
Paints	1000 lit.	21,464	18,386	19,981	20,990	4,387
Building Materials						
Cement	Tonnes	3,418,000	3,344,000	3,247,000	3,086,000	1,573,000
Roofing Sheets	Tonnes	131,930	137,622	117,046	93,946	93,545
Vehicle Assembling						
Motor Cycles	No.	9,742	10,768	9,435	11,166	6,495
Passenger Cars	No.	2,619	2,585	9,796	14,389	640
Other Motor Vehicles	No.	6,347	2,564	4,388	5,485	715
Others						
Soap and Detergent	Tonnes	242,735	242,232	302,865	326,083	110,895
Lubricants	Tonnes	169,791	185,108	195,830	209,456	133,278

Source: Federal Office of Statistics (1999), Länderbericht Nigeria (1992)

Exceptions can be found in the industry for softdrinks and beer. Although the production data for beverages in Table 6-4 are low, if the years 1994 and 1995 are compared, and what was caused by an importation ban of cereals in that years, breweries like Guinness and Nigerian Breweries (Star and Gulder) have excellent profit margins in 2000. Nigerian Breweries belongs to the Heineken Group (majority) and was responsible for 6% of the companies total turnover. In this subsector transportation volumes of probably 2.0 million tonnes or more (weight of glass bottles) can be found. Nevertheless the transportation routes are relatively short. A network of regional breweries is installed in Nigeria with a radius for supply of perhaps 100 km. Only Guinness in Benin City has not a network of regional breweries, but production data and numbers for transportation flows are not available.

Map 6-3: Industries and Industrial Centres (excluding Petrochemicals)



Source: BALOGUN, O.Y. (2000), Federal Office of Statistics (1999), Factfinder Nigeria (1998)

6.3.2 Petrochemical Industry

The centres of the petrochemical industry are already identified (see Map 6-2) as well as the problems. Nigeria has four refineries with a total daily capacity of 440,000 barrels. This capacity is enough for the supply of the petrochemical industry (fertilizers, polypropylene, ethylene, butan, etc.) and the demand of fuels. It will even allow an export of refined products. For 2000 a capacity utilization of 35% was given, which is not enough for the supply of domestic markets. The result are imports of fuels, chemicals and fertilizers worth billions of US$ (see Table 6-2). The fertilizer plant at Onne for example, a cornerstone for the future development of the agricultural sector, is not producing currently. Last available production data are 354,238 tonnes in 1996 and 155,770 tonnes in 1997. All essential petrochemical products for the daily life like kerosine (cooking purposes), fuel and fertilizer are extremely expensive or just not available – although subsidied by the Federal Government.

6.3.3 Iron and Steel

The three inland rolling mills at Katsina, Oshogbo and Jos were established to manufacture steel products such as iron rods, bars and wires by using steel billets from Delta Steel, which has an installed capacity of 1 million tonnes of liquid steel. Each of the mills has a capacity of 210,000 tonnes of rolled products per year. The production of steel was around 4,600 tonnes in 1998 (last available data) after around 100,000 tonnes in 1994. Only Delta Steel in Aladiya near Warri was producing, which is not the case at the moment (2001). Delta Steel can produce only with imported iron from Brazil as long as the railway line to the Itakpe mine is not completed and a pellet plant for direct reduced iron (DRI) at Itakpe is not built.

Ajaokuta Steel plant was planned to be built in three stages. The first stage has a capacity of 1.3 million tonnes per year to produce long steel products with Itakpe iron ore, but Ajaokuta has to use imported coking coal as long as a facility in Nigeria (Lafia) is not exploited. A transportation system for the raw materials to Ajaokuta or Aladiya (coal or iron) is almost finished that means these transportation flows will not enter the nigerian road system.

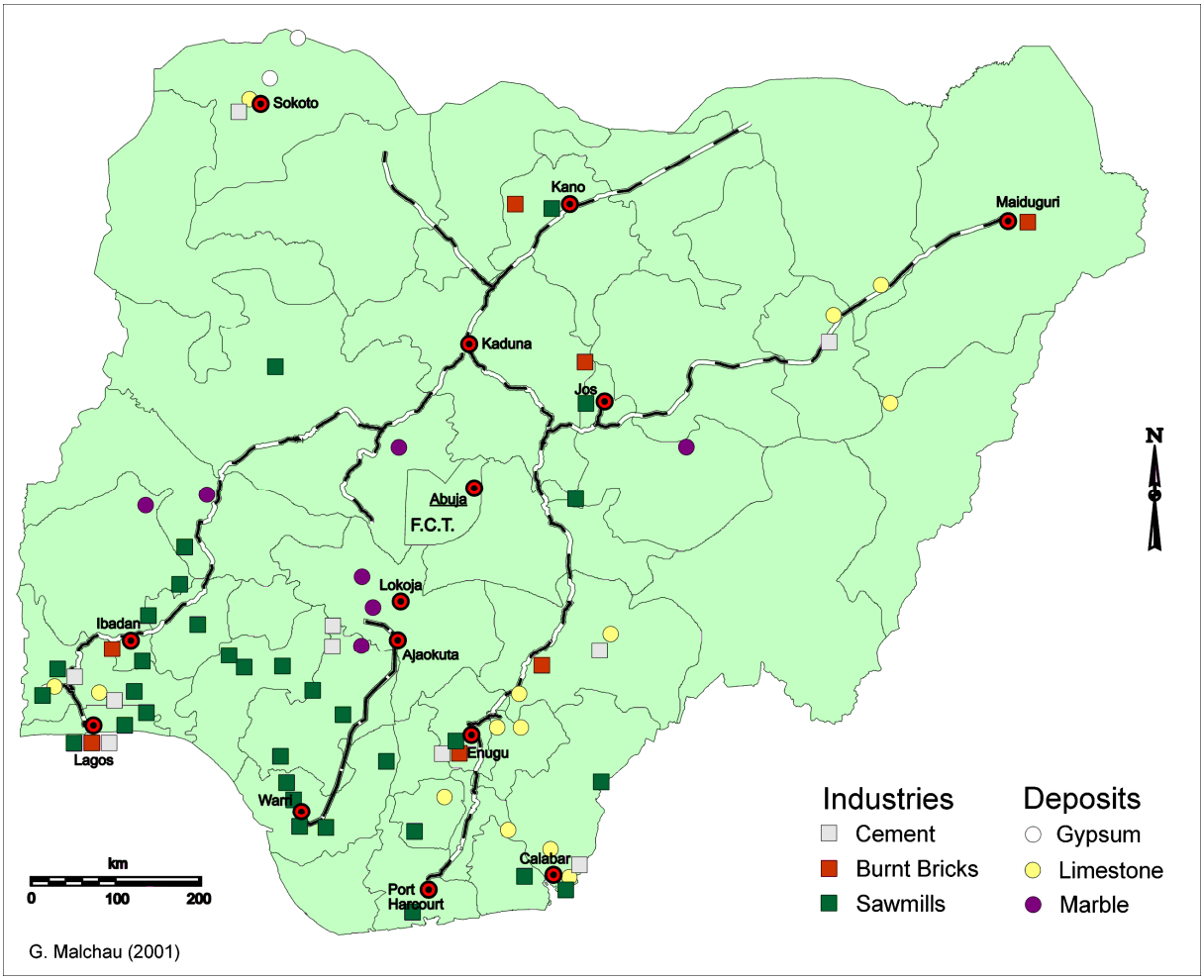
The aluminium smelter at Ikot Abasi needs for the production process imported bauxit, although bauxit is available in Nigeria but not explored. However, all plants belonging to the steel complex including the aluminium smelter are producing for prices above world market prices.

6.3.4 Building and Construction

Building and Construction subsector and particularly the cement industry is also organized in regions like beverages (see Map 6-4) as long as the companies are sourced with raw materials and energy for production. Raw materials (limestone, gypsum) are locally available. The main problem of the cement industry is energy in form of fuels or electricity. The capacity of the cement industry is estimated to 5 million tonnes per year, and the demand between 8 and 9 million tonnes per year. Production data as shown in Table 6-4 are low, only 1.5 million tonnes per year were produced in 1995 (last available data). It is assumed that some million tonnes of cement are imported in 2001 mainly through Lagos (1.2 million tonnes in 1997). This quantity has to be distributed on the road system. Even if the cement factories are producing with full capacity, 3 to 4 million tonnes would remain for import and distribution

nationwide. Because of the progressing urbanization process a demand of 16 to 18 million tonnes in 2020 can be projected.

Map 6-4: Building Materials (Cement, Burnt Bricks and Sawmills)



Source: BALOGUN, O.Y. (2000), Federal Office of Statistics (1999)

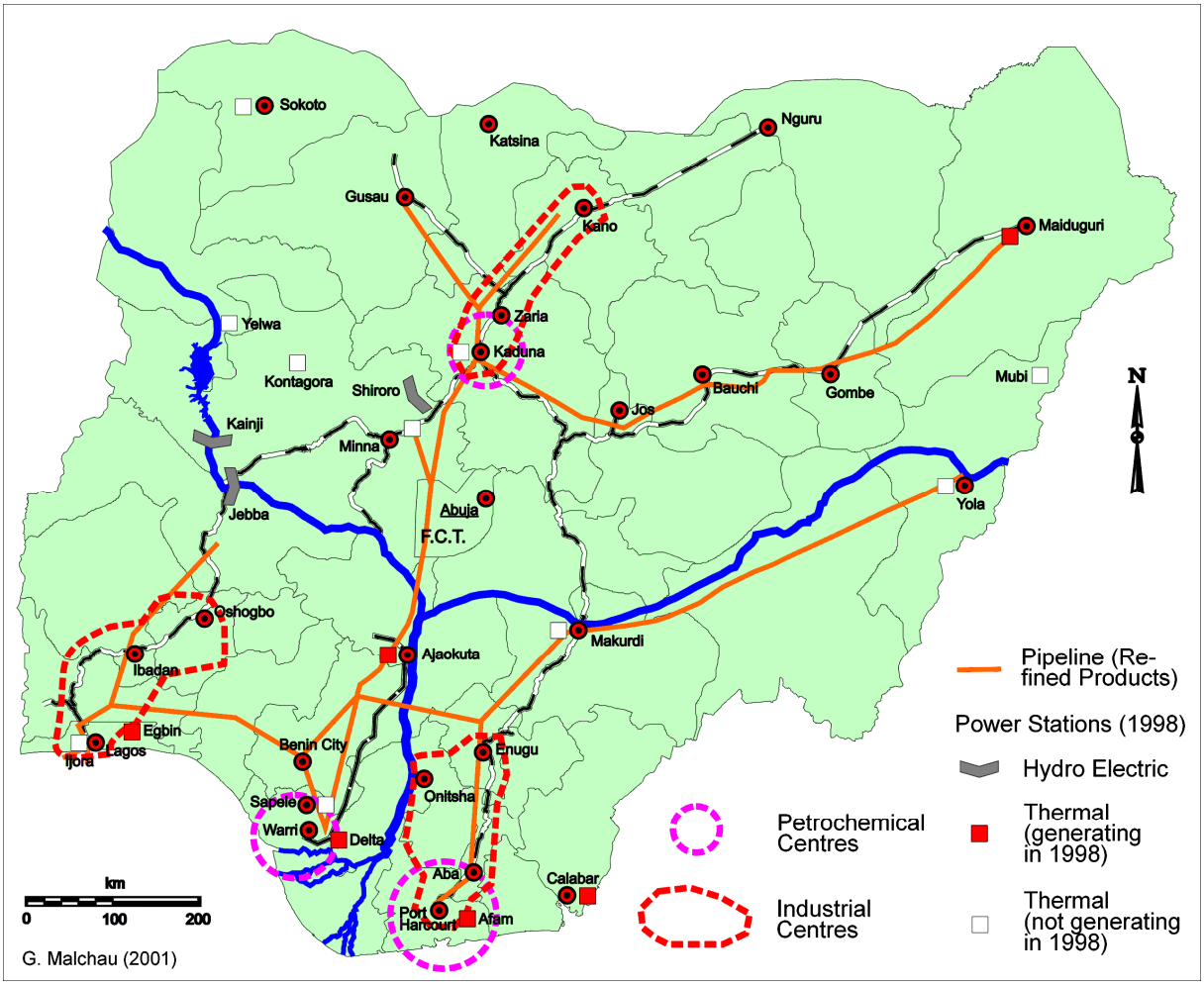
6.3.5 Electricity Generation

State owned NEPA (National Electric Power Authority) has around 5,900 megawatts of installed electric generating capacity. In the average of the last years up to 1998, approximately half of this capacity was able to produce electricity: Two hydro-electric power stations at Kainji and Jebba along the Niger River and Shiroro power station along the Kaduna River together with some thermal generating power stations, which are located mainly in the south at Lagos, near Warri, Port Harcourt and Ajaokuta (see Map 6-5). The generated output of Calabar and Maiduguri was neglectable in 1998. Currently, only 10% of rural households and approximately 40% of Nigerias total population have access to electricity.

Since years Nigeria faces a serious crisis regarding production of electric power and after the breakdown of Egbin power plant (1,320 MW) at Lagos the capacity has fallen to 1,500 megawatts in 2000. But Nigeria plans to expand its electric generation, transmission, and distribution systems, with the long-term goal of reaching 25,000 MW in generating capacity. 16 new power plants are planned – also one at Abuja -, and apart from that the Nigerian

Energy Commission and the Solar Energy Society of Nigeria are working on implementing a solar power system to meet the needs of rural villages and communities, which are not served by the NEPA power grid.

Map 6-5: Power Generation and Industrial Centres (including Petrochemicals)



Source: BALOGUN, O.Y. (2000), Federal Office of Statistics (1999), Factfinder Nigeria (1998)

The Federal Government is hoping to increase foreign participation in the electric power sector and is looking for independent power producers to generate and sell electricity to NEPA. Some agreements are already signed and talks are going on with oil companies like Shell, Texaco, Agip and Exxon Mobil. Another important step is the privatization of NEPA itself, which is scheduled for the end of 2001, but probably will not be reached at that time.

Finally there are plans with the North China Electricity Corporation to construct a spare parts and electrical accessories factory in northern Nigeria to meet the anticipated greater demand for spare parts if Nigeria expands its power sector.

6.4 PROJECTION FOR FURTHER DEVELOPMENT

To give a projection for further development up to 2020 on the basic of the available data material is almost impossible, particularly in respect of transportation volumes for different subsectors of the manufacturing sector and the mining sector without oil & gas.

Of course it will be inevitable to restorate the energy subsector and to expand its capacity to have a fundament for future private small scale and middle scale industrial projects. The same has to be done with the petrochemical subsector. Billions of US$ are wasted for imports of chemicals and refined products which can be produced in Nigeria. The privatization program of government owned large scale projects like NEPA, NITEL and others will probably be the right step, however it is a precondition of the international companies to invest into projects like already planned refineries at Lagos and Akwa Ibom or several power generating plants.

Ideas to push the industrial private sector by small scale and middle scale projects are many and offered from different governmental organizations, non-governmental organizations and international organizations like FAO, IMF and World Bank. Important fields are in the agro and agro-allied subsectors including food processing, for example fruit and chocolate drinks, vegetable processing (like tin tomatoes), cereal milling, feed mills, vegetable oil, and yams and cassava processing, industries which support food production programes through local production of chemicals and equipment (tools), industries with multiplier effect such as flat sheet mills and machine tools industries, including engineering industries for spare parts production, processing of agricultural products (e.g. cassava) and minerals available locally into industrial raw materials. Concrete projects are for example: Leather and leather products, textiles and wearing, building materials like burnt bricks, ceramics and glass, mini-mineral plants for gypsum, mini-sugar production plants, cement production, small/medium scale plants for sheet metal production (roofing), and plants for bottled mineral water (spring water).

A bigger problem will remain with the steel complex. Overproduction of steel products in the world, low world market prices, imports of important raw materials and dispersed locations for production with long transportation routes (apart from Ajaokuta and Delta Steel) are not favourable for the nigerian steel industry.

But if the next 20 years are not used for fundamental changes in the industrial sector a projection basing on population data, imports in US$ and the tonnage of goods arriving to nigerian ports at present will give the following conservative estimation for 2020: Imports excluding agricultural products will be around 12 billion US$ at current prices and the tonnage of imported goods will be around 17 million tonnes excluding RoRo vehicles.