PRIORITIES FOR THE DEVELOPMENT OF AKWA IBOM STATE

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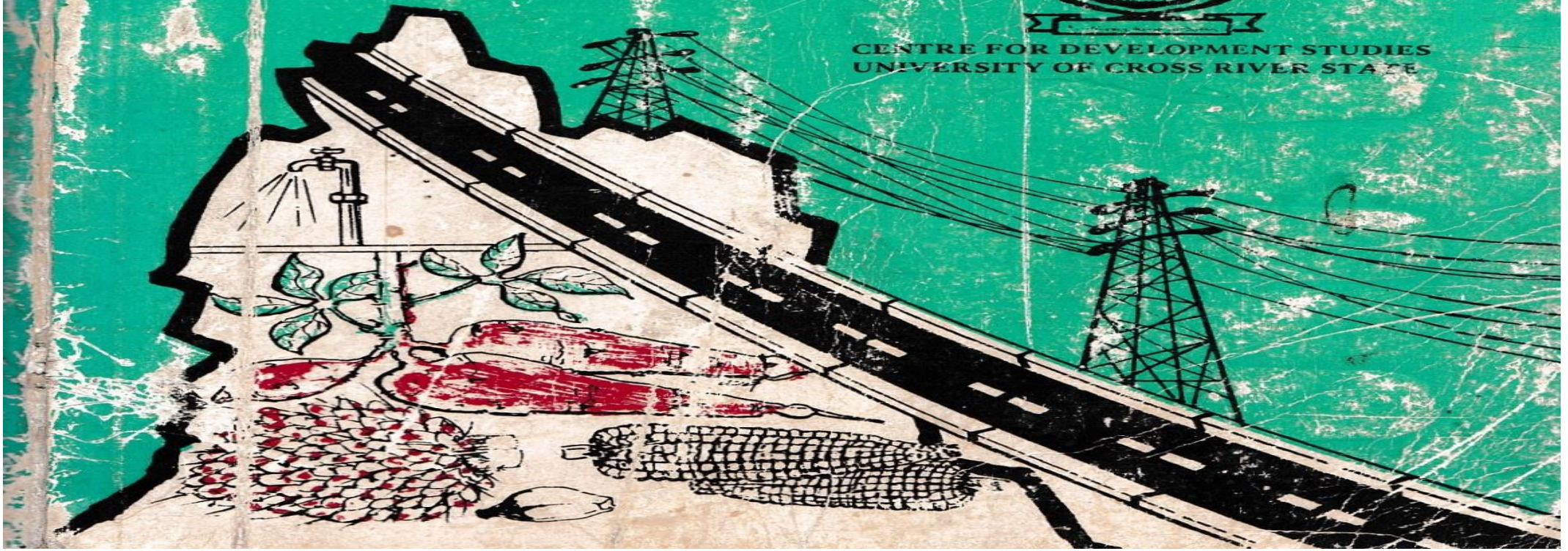

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22

SOURCING OF LOCAL RAW MATERIALS: A PRIORITY FOR DEVELOPING CHEMICAL INDUSTRY IN AKWA IBOM STATE

By
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ABSTRACT

Akwa Ibom State of Nigeria is endowed with many industrial chemical raw materials based on agricultural and mineral resources, but these have not been well exploited. The few existing industries are merely blending houses for import dependent inputs. This paper discuses some of the most abundant local raw materials in the state and possible methods of transforming them to intermediate and finished goods and proposes the establishment of a complex chemical industry based on palm produce.

1.0 INTRODUCTION

From time immemorial man has been using available natural materials at his disposal to improve himself physically and socially in terms of food, medicament and shelter. These materials usually come from agricultural and forestry resources, or are of mineral origin (Tedder and Nechvatal, 1966; Ikoku C., 1986).

Before the oil (petroleum) boom in the mid 1970's Nigeria, as a whole, depended mostly on agricultural products, such as palm oil and palm kernel, coconut, cocoa, groundnuts, hides and skins for its foreign exchange earnings (Arene E. O., 1988). Akwa Ibom State, being a part of the then Eastern Region of Nigeria was no exception, for the area was noted for the production and exportation of large amounts of palm oil and kernel as evidenced from the historic remains of the vessels used for the preparation and transportation of the palm produce, now stored at a museum in Calabar. Akwa Ibom State is still rich in agricultural raw materials which, if well exploited, can form sound bases for the chemical industry. It also has abundant mineral resources in the form of petroleum, limestone, clays and sea water to name but a few.

When petroleum became the greatest foreign exchange earner for Nigeria, both the agricultural and the mineral sectors of the economy were neglected; however the recent economic recession and the collapse of the international oil market as a source of foreign exchange to sustain Nigeria's industrial activity, have created the need to look inward for the nation's industrial and technological development in terms of locally available raw materials, technology and man-power (Koleoso and Osinowo, 1988).

1.1 INDUSTRIAL DEVELOPMENT IN AKWA IBOM STATE:

Organized industrial activity dates back to the pre-independence years in the 1950s when the palm produce was the chief foreign exchange earner for the Eastern Region of Nigeria. Mills to extract the palm oil and crack the kernel to release the nuts were erected in many parts of the area now known 1970s, the mills were neglected and allowed to rust and rot away; now some of them still remain as monuments. Thus, about two decades ago there was no manufacturing industry in the area; but a few years ago, some industries were set up in the area which was a part of the then Cross River State based mainly on imported technology and semi-finished goods as the raw materials. These industries manufactured alcoholic and non-alcoholic beverages, paints, biscuits, plastics, batteries, ceramics, flour, soaps, etc. with very little industrial inputs from local sources. Later on, these industries ran into serious problems and either folded up or reduced their production capacities to the bearest minimum because of scarcity of imported raw materials. When Akwa Ibom State was created, it inherited some of these industries in 1988 under the same conditions of limited or no production for lack of raw materials. The low level of production resulted in the realization that Akwa Ibom State (and even Nigeria as a whole) has no industrial base because of import-dependence for raw materials (William E. O., 1986). Therefore, restructuring of the manufacturing sector of the economy, especially the chemical industry, should

involve the institution of a series of changes and innocations designed to increase the linkages of the manufacturing sector with local raw materials and reduce excessive import-dependence (Koleoso and Osinowo).

2.0 INDUSTRIAL RAW MATERIALS IN AKWA IBOM STATE:

Akwa Ibom State is potentially rich in agricultural, forestry, aquatic and mineral resources. Table 1 shows some of the locally available raw materials, associated industries and possible products (Allinson, I. I. O. 1986).

RAW MATERIALS	ASSOCIATED INDUSTRY	PRODUCTS
Cassava, yam, plantain banana, maize	food industry, starch	food, flour, confectionaries, biscuits, industrial starches.
Palm produce (oils, nuts, copra)	oil extraction soap, cosmetics	edible oils, soap Creams.
Fruits: Citrus fruits, oranges, palm bunch, plantain/banana peelings	non-alcoholic drink and alkali	Pharmaceutical preparations, orange drink, lemon, wines, etc. Potash, soda, washing soda.
Palm wine	distillery	spirits, ethanol.
Rubber	Rubber based industries.	tyres, balls, balloon, bags, shoe.
Wood Pulps	Pulp and paper	papers: newsprints, tissue wrapping papers, etc.
Clays	ceramics, brick	porcelain wares, cups, pots, electrical insulator, etc.
Sand	glass	bottles, cups, etc.
Limestone	cement, paint	cement, paint, Calcium Carbonate, lime.
Sea water	salt Chloro-alkali	Industrial salts Caustic soda and washing soda, chlorine, acid.
Petroleum	Refinery Petrochemical Plastic	Petrol, kerosine, diesel. engine oil, wax. bitumen, candle, industrial chemicals, etc.

2.1 AGRICULTURAL AND FORESTRY RAW MATERIALS:

(i) Food Crops:

Several tonnes of cassava, yams, plantains and bananas are produced annually in Akwa Ibom State and presently are only used as foods tuffs (starches). If well modified chemically, they can also form very useful industrial starches for use in the paper, textile, confectionary and adhensive industries. To free the starch from these materials, the raw tubers or fruits are grated, washed with water, pressed to remove excess water, and dried in air or otherwise to obtain the powder starch which can then be chemically modified for industrial applications. There are now available locally designed equipment which can be used for industrial starch preparations at the Federal Institute of Industrial Research, Oshodi. Besides, the plants that produce these raw materials are easily cultivated; they are mostly annual crops with high yields. Therefore, there is need to intensify their cultivation to produce them in sufficient quantities for food as well as for industrial purposes.

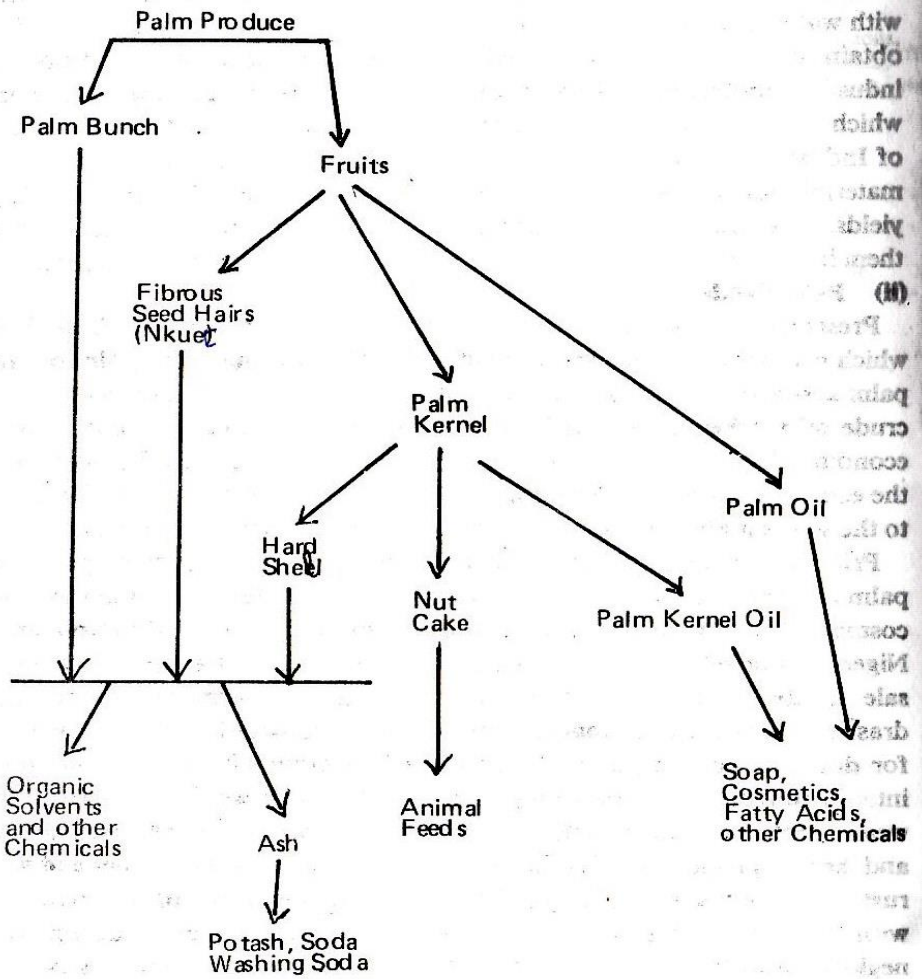
(ii) Palm Produce:

Presently, the most important agricultural product in Akwa Ibom State which can be used as chemical input is the palm produce: the palm oil, the palm kernel oil, the palm nut cake and the coconut oil. With the slum in the crude oil market, Nigerians have realized that the country cannot survive economically if it depends solely on petroleum. Therefore, other sectors of the economy should be developed: palm produce industry should be raised to the status it attained before the discovery of petroleum in Nigeria.

Prior to petroleum production, there used to be shiploads of palm oil, palm kernel and copra bound for Europe for raw material input in the soap, cosmetic and other chemical industries. With the discovery of petroleum in Nigeria, coupled with high foreign exchange earning that acrued from its sale in the 1970s, production of palm oil and palm kernel declined drastically to the extent that the nation started importation of vegetable oils for domestic consumption. Palms started to grow wild and no one took interest to tend them; the young educated class who were trained from the wealth realized from the sale of palm produce completely ignored palm oil and kernel production, leaving it as a "sector for the illiterates and the rustics." The result was a complete neglect of this sector of our economy with the palm trees being left to grow into wild palm groves. Despite this neglect, palm trees constitute the most abundant cash crop in this part of Nigeria, growing in several thousands of hectares of land in each local government area of Akwa Ibom State and yielding fruits several times in a year. The wild groves can be gradually replaced with the high yielding short

species which mature early and can be harvested without the need to climb up the tree.

The two most important chemical components of palm produce are the oil and the nut but the fruit bunch, the fibrous seed coat and the hardened shell (the kernel) have also their usefulness as a source of heat and light energy and as a source of other organic chemicals when extracted with solvents. The accompanying chart shows a breakdown of chemicals and final products which can be derived from palm produce.



A CHART SHOWING TRANSFORMATION OF PALM PRODUCE TO INDUSTRIAL PRODUCTS

The preparation of the oils from palm produce is still mainly primitive. Although a few oil extraction plants, earlier set up in the state, have been reactivated, these mills handle just a small fraction of the total oil production while a greater amount is still extracted manually with accompanying losses. Palm Produce industry is an area which should attract many of our industrialists and the government to get involved, reorganize the industry and expand or build up more oil extraction and kernel cracking plants in Akwa Ibom State. Provisions for modifying the oils so extracted, should be made so that bleached and refined oils can be produced for direct use as edible oil or as industrial oils. The industrialists can utilize these as their chemical inputs by setting up standard complex chemical industries based on raw materials derived from the palm produce. These can manufacture the much needed chemical intermediates such as the fatty acids and glycerol for small scale manufactures of soap, cosmetics and pharmaceutics.

(iii) FORESTRY RAW MATERIALS

From the forestry resources, wood pulps, the latex from rubber trees, wine from raffia palm, dyes and spices can be obtained.

(a) The Wood pulps are the main raw material for the paper industry and the few paper mills in the country are producing far less than their normal capacities because of insufficiency of wood pulp especially the long fibres pulps. The trees, *Gmelina Arborea*, the source for the short fibre thrives well in our soil while trials have shown that pines which provide the long fibres can grow in the tropics. It is therefore necessary that a conscious effort be made to regenerate these plants locally by setting up plantations and eventually a pulp mill to provide the intermediate raw material, i.e. the pulps for both the paper and the asbestos industries.

(b) Rubber tree strives well in Akwa Ibom State, but as in the case of palm trees, they have been neglected and the latex, a very useful chemical for the tyre, ball, shoe, adhensive and bag industries, is not produced as much as before. However, with the setting up of a rubber processing mill at Itu, it is hoped that cultivation of rubber trees will be reactivated. More efforts to set up plants to modify the latex for different products should be made.

(c) There are also certain plants in the State from which dyes, spices and flacours can be extracted for use in the textile and food industries res-

pectively. Spices and flavours can be obtained from *Xylopia aethiopia* (ata), Tetrapleura tetraptera (uyayak), Capsicum annum (common pepper), *Piper guineense* (black pepper, udosa) and *Ocimum basilicum* (bush tea, ntong). The plants should be grown in commercial scale and some small scale industries set up to extract the active chemical components from them; these extracts can be modified into chemical intermediates which are used in the food and pharmaceutical preparations.

d) Raphia Palms: The wine locally tapped from the plant, *Raphia hookeri* has been the most celebrated and popular drink in Akwa Ibom State. It is nourishing, containing sugar, yeast and some vitamins; it can also be fermented into alcohol (ethanol) from which other useful spirits can be prepared.. The alcohol is a very useful organic solvent and an important reagent for the synthesis of many chemical intermediates for other industries. Raphia palms also provide the piasava which contains fibres now found suitable for paper making (Odeyemi, 1987) and also as a source of other organic chemicals.

However, just as in the case of the palm oil and the associated industries, the economic importance of palm trees has been neglected eventhough a few entrepreneurs have set up palm wine bottling enterprises in the state; it is necessary to develop this sector of the economy in order to utilize effectively the tapped wine. The palm wine trees should be rehabilitated throughout the state, and distillery and fermentation plants set up to produce ethanol industrially while production of piasava should be encouraged.

2.2 THE MINERAL RAW MATERIALS

The most abundant mineral raw materials in the state are the petroleum, the clays, the white sand and the limestone. Apart from petroleum which is controlled by the Federal Government, other mineral resources are under-utilized in the chemical industry.

2.2.1 THE CLAYS:

The clays are compounds containing aluminium and silica and occur abundantly in many parts of the state, especially in Itu and Eket where they have been, for a long time, used for making pots and plates. Major

products of the industry include Usan Okon, Abang Ikot Ebidang, etc. produced in Eket Local Government Area.

At the moment there is oniy one ceramic industry in the state which cannot utilize all the available raw material. For effective utilization of these clays, there is need to set up more ceramic industries and expand the existing one to produce a wide variety of porcelain wares like electrical insulators, sanitary wares, tiles, tea cups, mugs, flower pots, bricks, etc. A chemical modification of these clays renders them suitable for bleaching our vegetable oils; this is an area worth exploiting for the bleaching of palm oil and palm kernel oil.

2.2.2 LIMESTONE:

Large Limestone deposits are found in Ikono Local Government Area and in smaller quantities in other areas. This raw material can be transformed into cement for building purposes, precipitated chalk (calcium carbonate) and lime (slaked and quick lime) as chemicals used in the paint, paper and textile industries. The possibility of combining locally available crustacean shells from perewinkle (mfi) and (nkop) with limestone to produce cement substitute should be investigated.

2.2.3 THE SEA WATER:

During the civil war (1966—1969), many families, especially those along the coast in the south of Nigeria, depended on edible salts extracted from the sea water, eventhough it was not pure. However, after the war, this source of salt has been completely neglected because edible salt is now imported into the country. Besides edible salt, other industrial salts, soda, chlorine and acid can be manufactured from sea water. At the moment in Nigeria, there is no chloro-alkali industry which is one of the basic chemical industries in the industrialized countries to feed other industries with intermediate products. Hence, establishing a salt industry from sea water can be an economically viable venture. Processing sea water involves filtration, evaporation of the water, crystallization and fractionation to obtain the salt which can then be electrolyzed to produce sodium hydroxide (soda) and chlorine. The soda can be converted into sodium carbonate by passing in carbon dioxide obtained by burning limestone while chlorine dissolves in water to form the hydrochloric acid, a very useful industrial chemical, and hypochlorous acid which in turn can be converted into sodium hypochlorite, a very useful bleaching agent.

2.2.4: THE PETROLEUM:

In Akwa Ibom State, petroleum is drilled from both the land and the sea. Petroleum product is controlled by the Federal Government and appears to have made very little impact on the industrial development of the state. On the other hand, petroleum products are greatly used as bases for some industrial establishment in some states of the Federation; thus, we have refineries at Port Harcourt, Warri and Kaduna to provide the country with petroleum fractions e.g. cooking gas, petrol, kerosine and bitumen which are themselves very useful industrial chemicals; and the petrochemical industry at Kaduna and Port Harcourt to introduce petroleum based basic industrial chemicals e.g. ethene, benzene, propyne and their polymer homologues for the plastic industry. There are also plans to liquify the Natural Petroleum Gas for industrial applications. However, all these activities have been slated for other states, eventhough Akwa Ibom State is one of the biggest producers of petroleum in Nigeria. Because of this abundant raw material, it is economically worthwhile establishing some petroleum or petrochemical based industries in Akwa Ibom State.

3.0 SUGGESTION FOR DEVELOPING CHEMICAL INDUSTRY IN AKWA IBOM STATE:

i) From above discussion, Akwa Ibom State is rich in chemical raw materials, and if a conducive environment for industrialization of the state is to be created, there must be an effective planning strategy.

ii) The government should set up progressive, flexible and dynamic policies and increase incentives to attract the industrialists as well as the unemployed to embark on meaningful industrial ventures based on locally available raw materials.

iii) Access to industrial information and credit facilities should be made available to any citizen who wants to establish a chemical industry at little cost;

iv) There should be increased agricultural and forestry products from which most of the industrial inputs are derived (Koleoso and Osinowo).

v) Two Raw Material Centres should be established in the State, one to take care of research and development in agricultural and forestry based raw materials while the other investigates and processes mineral raw materials into useful products.

vi) The University of Cross River State should consider, as a matter of priority, establishing a Faculty of Technology and expediting its action in

starting the proposed Industrial Centre. The University should be charged with the responsibility of researching and developing industrial raw materials, designing and fabricating equipment to set up a pilot plant for trial manufacture of goods from the raw materials. It should also be its duty to establish data bank for industrial information for the state.

vii) A complex chemical industry based on palm produce should be established to extract, refine and transform the palm oil, palm kernel oil and the coconut oil into edible oils, chemical intermediates and finished products.

viii) Lastly, there should be a general enlightenment and public orientation on industrialization of our state. Agencies like the Mamser, the Directorate of Food, Roads and Rural Infrastructure (DFFRI), the Better Life For Rural Women and the Schools should be involved in educating the masses on the needs for a rapid industrial growth in our state.

CONCLUSION

Akwa Ibom State is endowed with abundant industrial raw materials which, when well exploited and modified, become useful starting materials for the chemical industry. Presently, only a very small fraction of these locally available materials are used as chemical inputs. At the same time, the existing industrial establishments are performing far below their normal capacities because of scarcity of foreign exchange to purchase semifinished goods which, hitherto, have formed the bulk of their raw materials. Therefore, if these industries are to be sustained for effective production and if more chemical industries are to be established, the development of the local industrial raw materials should be one of the priorities for industrialization of Akwa Ibom State.

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